

NEW

FULL COLOUR GUIDE TO ELECTRONIC PRODUCTS

Sept 1994–Aug 1995

Maplin



BS 5750
Part 2 1987

Level B
Quality Assurance
RS12750

**SAVE
UP TO**

£50

**SEE PAGE 3
FOR DETAILS**

OUT OF THE ORDINARY!

**Britain's Best Selling Electronics
Products Catalogue for 1995**

Over 800 colour packed pages with hundreds
of New Products at Special Low Prices!

55

9 770957 546050

CATALOGUE PRICE: £3.45



NO WIRES†, NO FUSS, NO WORRY
 –with the latest, technically advanced,

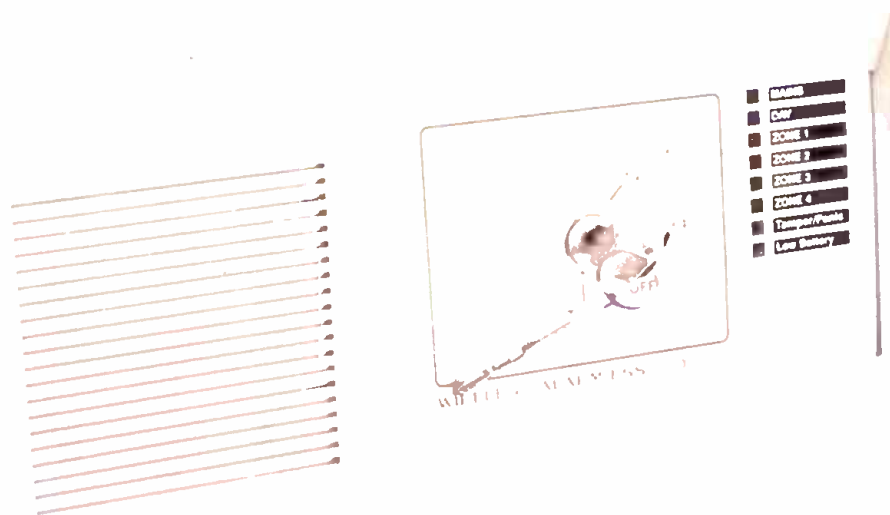
WIRELESS HOME INTRUDER ALARM

IT'S SO EASY TO INSTALL!

– simply fix the units onto the wall, follow a few basic instructions and that's it – your home is alarmed!

†The Fox Wireless Home Alarm System has been specially designed to help protect your home and your family, without spoiling your decor with yards of unsightly wiring. As there is no wiring between the intrusion detectors and the control panel, the system can be easily fitted by anyone with average DIY skills.

This ergonomically designed system is so easy to use – just one remote button controls arming, disarming and panic functions! It is also fully expandable by adding more sensors and accessories from the extensive Fox Security range featured in the Security Section of this catalogue



CONTENTS: Control Panel (with keys)
 *†Wireless PIR Detector *†Wireless Contact Transmitter, 2-button Key-fob Transmitter, Instruction Manual and wall fixings.
Order Code XS57M £99.99

†Requires PP3 battery.
Order Code JY49D £2.99

The Alarm system can use up to four remote control key-fob transmitters which are also compatible with all Vixen car alarms.

Additional Remote Control Key-fob
Order Code CR43W £9.99

Available from Maplin Stores nationwide

- 4 detection zones, part or full arming capability
- DTI approved
- Can use up to four key-fob transmitters for maximum convenience
- Built-in extra loud 120dB siren
- Automatic low battery warning
- Output for external siren, for extra attention
- Optional battery back-up for protection during mains failures
- Intrusion history display shows where the alarm was triggered
- Tamper-proof
- Unique code-learning feature eliminates manual programming



REMEMBER: This Alarm system is fully expandable by adding more sensors and accessories from the extensive FOX Security range.

HELP PROTECT YOUR HOME at this breakthrough price

only £99.99*

Order Code XS57M Add Carriage £3.90 E6

Watch, Listen and Discover more about the Alarm System with the FOX WIRELESS HOME ALARM SYSTEM **VIDEO GUIDE** – An entertaining, informative way of showing how easy the Alarm is to fit, use and expand. PLUS The video will include a special £5 VOUCHER that you can redeem when you buy a Fox Wireless Alarm or, should you decide against purchasing an alarm, we will refund the full PURCHASE PRICE OF THE VIDEO if returned to us within 28 days.

Video Guide £5
 Order Code DE76H

WORLD RADIO HISTORY

ELECTRONIC PRODUCTS

- | | |
|----------------------------------|------------------------------|
| 1 Security | 5 Audio & Video |
| 2 Entertainment & Leisure | 6 Speakers & Sounders |
| 3 Telephones | 7 Sound Equipment |
| 4 Radio Communications | 8 Aerials |

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Dear Customer,

Welcome to your copy of the new 1995 Maplin Catalogue. As you look through the 800 full-colour pages, you will DISCOVER THE WHOLE WORLD OF ELECTRONICS AT YOUR FINGERTIPS: everything from everyday items like plugs, batteries and torches, right up to the latest high-tech computers and test equipment.



Whether you're looking for alarms for your home or car, components for your hobby or servicing, accessories for your car or cycle, DIY or specialist tools, electrical fittings for your home, test equipment, or simply a blank video tape, YOU'LL FIND THEM ALL IN THE PAGES OF THIS CATALOGUE.

Just look at some of this year's new products:

There's a new WIRELESS BURGLAR ALARM that is easy to fit yourself and COSTS LESS THAN £100!; a Garage Alarm to help protect the possessions in your garage, shed, summer-house, etc.; more new additions to our range of in-car booster amplifiers; more sophisticated computer accessories; new automatic battery chargers; and much, much more – all tested and approved by our own Design and Evaluation engineers, so that you can buy with confidence, knowing you are dealing with a company which is a BRITISH STANDARDS INSTITUTE BS5750 REGISTERED STOCKIST.

I'm also delighted to be able to tell you about our entirely new range from GP Batteries. Maplin is now able to offer you high-quality batteries at extremely competitive prices by dealing directly with a major battery manufacturer, BUT WITHOUT PAYING FOR A BIG-BRAND NAME. You've probably bought GP batteries before, without realising it – they'll have had the name of a well-known large company or supermarket on them! Many have superior specifications and all are available at superb prices.

Once again, I'm delighted to present you with more of our very popular MONEY-SAVING VOUCHERS WORTH £50, that you can use, either in our shops, or when you order by mail, saving you the price of your catalogue over and over again.

If you need more information on any of the products in the catalogue, or simply like to browse around, POP INTO YOUR LOCAL MAPLIN STORE – our friendly, technical staff are always on hand to guide you through the technical specifications or just to give you that extra, vital piece of information. See the maps at the back of the catalogue for details of your nearest store.

THERE ARE NOW 33 MAPLIN STORES across the country and there are plans for 5 more by the end of 1995, allowing us to continue to grow and improve our service. We never forget that our success depends on providing you, the customer, with high-quality, state-of-the-art electronic products at the keenest prices. That's the commitment that makes Maplin 'out of the ordinary'.

Maplin Electronics continues to go from strength to strength despite Britain's gloomy economic outlook – in fact we were recently listed by leading chartered accountants, Price Waterhouse, as ONE OF THE ONE-HUNDRED FASTEST GROWING COMPANIES IN THE COUNTRY! Join the winning team today and enter the world of Maplin Electronics!

Yours sincerely,

A handwritten signature in black ink that reads "Doug Simmons". The signature is written in a cursive style with a long, sweeping underline.

Doug Simmons,
Marketing Director.



BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750

Maplin

MONEY- SAVING VOUCHERS

We're giving money away!

These vouchers entitle you to the discount shown on your purchases from the 1995 Maplin Catalogue. To claim your discount simply return the relevant voucher vouchers with your first order, or present them at any one of our shops nationwide.

SAVE UP TO

£50

OFFER VALID UNTIL 30TH SEPTEMBER 1995

£1 off voucher

On purchases of £20 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£1 off voucher

On purchases of £20 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£3 off voucher

On purchases of £60 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£5 off voucher

On purchases of £100 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£10 off voucher

On purchases of £200 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£10 off voucher

On purchases of £200 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

£15 off voucher

On purchases of £300 or over from

Maplin

Valid until 30th September 1995

One Voucher per transaction.

Maplin

MONEY-SAVING VOUCHERS

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£50

OFFER VALID UNTIL 30TH SEPTEMBER 1995

£1 OFF

(One voucher per transaction.)

TO THE CUSTOMER: This coupon may be used to gain a saving of £1 off your next transaction of £20 or more. Only one coupon may be used per transaction. Redemption of this coupon against any other items would constitute fraud. Maplin Electronics reserve the right to refuse redemption of coupons if they have reason to believe that they have been used other than in accordance with their terms. Valid in U.K. only. Please submit vouchers with your orders from the Maplin Catalogue to:
Maplin Electronics plc, P.O. Box 3, Rayleigh, Essex SS6 8LR or at any Maplin Shop nationwide
This money off voucher can only be used when purchasing goods from the Maplin Electronics 1995 catalogue. Voucher cannot be used where the price may vary from the 1995 Maplin Catalogue, i.e. to purchase Sale items, special offer promotions, manager's specials, subscription discounts or any Bulk Purchases (where the number of single items purchased reaches the quantity eligible for bulk discount). This voucher is also excluded from calibration or repair services, handling and mailing charges.
Cash value 0.01p. Offer ends 30th September 1995.

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Cash value 0.01p. Offer ends 30th September 1995.

£5 OFF

(One voucher per transaction.)

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Cash value 0.01p. Offer ends 30th September 1995.

£15 OFF

(One voucher per transaction.)

TO THE CUSTOMER: This coupon may be used to gain a saving of £15 off your next transaction of £300 or more. Only one coupon may be used per transaction. Redemption of this coupon against any other items would constitute fraud. Maplin Electronics reserve the right to refuse redemption of coupons if they have reason to believe that they have been used other than in accordance with their terms. Valid in U.K. only. Please submit vouchers with your orders from the Maplin Catalogue to:
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Cash value 0.01p. Offer ends 30th September 1995.

Call us NOW – for direct action!

You can place an order with us 24 hours a day, 365 days a year. What's more you can telephone, fax, telex, write or use your computer to talk to our Cashtel service (see Cashtel section at rear of catalogue) – and you're in complete control. All orders placed outside normal office hours (9.00am – 5.15pm) are dealt with immediately the next working day.



PLACING YOUR ORDER

When using the 24-hour ordering service, please have the following information to hand:

Your customer number

Your name, address and postcode.

Your Credit Card type, number and expiry date.

For each item you require give:

A Stock code.

B Description.

C Quantity.

D Price (each).

E Name of publication and page number where item appears.

Further details on 'How to Order' can be found on page 7 and at the back of this catalogue.

Telesales (24-hour service): 01702 554161 Fax: 01702 553935 Telex: 995695 (MAPLIN G)
Cashtel: 01702 552941 Maplin Key Call: 01702 556751

We'll get you up and running!

HOW? When you buy a Maplin Kit and if you run into difficulties constructing it, we are here to help you.

Sometimes you may have the disappointment of putting time, effort and money into a project, only to find that on completion it doesn't work. When you buy a Maplin Kit you will have the reassurance that, in the unlikely event your completed project doesn't work, you know that we will 'Get-You-Working'.

Help is at hand! For Technical Queries*: Write to: 'Customer Technical Services', Maplin Electronics, P.O. Box 3, Rayleigh, Essex SS6 8LR.

We will do our utmost to speedily answer your technical enquiry; or Fax: (01702) 553935; or Phone: (01702) 556001, 2 pm to 4 pm, Monday to Friday, except public holidays. And if you get completely stuck with your project, get our back-up and we'll get you back up and running! The 'Get-You-Working' Service:

We will undertake to get working any of the Maplin Kits** published in *Electronics – The Maplin Magazine*. Please return the completed kit to us at the following address: 'Returns Department', Maplin Electronics, P.O. Box 3, Rayleigh, Essex SS6 8LR. Enclose a cheque or Postal Order based on the retail price of the kit as shown in the table on the right (subject to a minimum of £17). If the fault is due to faulty components, incorrect instructions or any error on our part which could have led to the fault, we will repair the project free of charge and return it to you carriage paid with a refund of your postage to us.

If the fault is due to an error or errors, that you have made, we will charge you according to the table:



Kit Retail Price	Standard Servicing Cost
Up to £24.99	£17
£25–£39.99	£24
£40–£59.99	£30
£60–£79.99	£40
£80–£99.99	£50
£100–£149.99	£60
Over £150	£60 min.

If no fault can be found with the project, a charge of £17 will be raised to cover the cost of setting up any equipment needed and the subsequent testing.

We will 'Get-You-Working' as fast as possible, but please allow up to four weeks. We will acknowledge receipt of your returned kit by return of post.

**What magazine offers you this kind of service?
Electronics – The Maplin Magazine of course!**

* We can only answer technical queries related to Maplin projects and products.

** The 'Get-You-Working' Service is available for all Maplin Kits and Maplin Projects with the exception of: 'Data Files'; projects not built on our ready etched PCBs; projects built with the majority of components not supplied by Maplin; Circuit Maker ideas; Mini Circuits or other similar 'building block' and 'application' type circuits.



The heart of our operations. THE CENTRE OF EXCELLENCE

Maplin has always strived for quality and excellence in all aspects of company policy. In 1990 our massive distribution centre opened in Barnsley. 9,000 products lines, over 500 suppliers, 10,000 orders per week and 500,000 customers worldwide are dealt with from the heart of our operations. As soon as orders are entered in our Rayleigh, Essex base, they are instantly transferred via computer line to our distribution centre and all goods are despatched from there. (All orders received by 5pm are despatched the same day.)

Remember, we can offer a fast, reliable service together with low, low prices making us your first choice for components and quality, value for money goods every time.

Assessed Capability and what it means to you

To compete in today's markets, companies must produce quality products and services as efficiently and economically as possible.

Increased quality awareness has led to a growing demand for quality assured products throughout industry, and many major purchasers are now demanding independent certification when they buy manufactured goods. To market efficiently it is essential that the distribution and stocking of materials and components gets in a reliable and efficient manner. The supply of quality assured products is therefore a vital link in the industrial chain – and one which has benefits for every aspect of the process and ultimately the customer.

The BSI system for the registration of STOCKISTS OF ASSESSED CAPABILITY is designed to be a nationally accepted system for the distribution of quality assured products. In fact, since its introduction, the MoD have withdrawn their own 05-31 procedures in favour of the BSI system.

By supplying our customers with products, materials and components from a quality assured source, increased customer confidence and quality promotion throughout the company will be assured.

The registered stockists symbol is a sure indicator of goods that have been processed to the highest standards.

Customer Confidence

Confidence that ALL GOODS purchased from Maplin are checked by our quality control department.

Confidence that products are acquired from quality assured sources (or meet the requirements of in-house quality control), and that the quality is maintained during storage, packaging and re-consignment.

Confidence in a system that places emphasis on both quality of products and satisfactory levels of service.

The system is intended to comply with the system requirements for BSI REGISTERED STOCKISTS SCHEME (BS5750 Part 2 1987) Level B.

REMEMBER, ALL THIS IS BACKED BY THE MAPLIN 5-STAR GUARANTEE.

- ★ BEST POSSIBLE VALUE!
- ★ QUALITY TESTED!
- ★ GUARANTEED THAT ALL GOODS ARE BRAND NEW AND MEET MANUFACTURERS' PUBLISHED SPECIFICATIONS!
- ★ FULL BACK-UP SERVICE!
- ★ SAME DAY DESPATCH ON ALL STOCK ITEMS!



BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750

Guaranteed Deliveries

All orders for Guaranteed Deliveries must be received by 2.00 p.m. if a next day delivery is required. These services are available to any address in the UK including the Isle of Man and the Channel Islands.

Next Day Delivery Excluding Saturday

The following charges are in addition to any other charges normally due. If we receive your order before 2.00 p.m. we can guarantee that you will receive all items in stock on the next working day (i.e. excluding Saturdays, Sundays and Public Holidays). Please note this is an additional service to our usual methods of despatch, where delivery is usually next day, but is not guaranteed. These charges will also apply

if you telephone on Friday before 2.00 p.m. and require delivery the following Monday.

UK Mainland up to 5.30 p.m.....	£6.25
UK Mainland before noon.....	£8.30
Addresses as above	
delivery before 10.30 am.....	£13.00
Northern Ireland before noon.....	£15.00
Northern Ireland before 10.30 am.....	£20.00
Scottish Offshore Islands	
& Scilly Isles.....	£20.00
Isle of Man.....	£20.00
Channel Islands.....	£20.00

Saturday Deliveries

The following charges are in addition to any other charges normally due. If we receive your order before 2.00 p.m. Friday we can guarantee that you will receive all items in stock on the next day (except Public Holidays). All deliveries

are normally before noon.

UK Mainland.....	£15.00
Northern Ireland.....	£22.00
Scottish Offshore Islands	
& Scilly Isles.....	£28.00
Isle of Man.....	£28.00

(Saturday deliveries are not available on Channel Islands)

The Scottish Islands and the Scilly Isles are the following postcode areas :

IV40-49, IV51, IV55, IV56, KA27, KA28, KW15-17, PA41-49, PA60-78, PA80-88, PH42-44, TR21-25, ZE1-3.

Deliveries to some postcode areas within the Highlands and Offshore Islands may take 2 days or longer if there are adverse weather conditions.

You know the name, Look up our number.

Maplin telephone services

The new streamlined Maplin telephone system allows direct connection to the department you require, with greatly reduced waiting times.

Please ensure you dial the correct department as calls cannot normally be transferred.

After normal hours* orders can be left on our answering machines.

Please ensure you place your order using the format shown below.

SALES (24-hour service) 01702 554161

CUSTOMER SERVICES (non-technical enquiries) 01702 552911

TECHNICAL ENQUIRIES (2pm to 4pm only) 01702 556001

MAPLIN KEY CALL (24-hour DTMF Phone order line) 01702 556751

CASHTEL (24-hour Modem service) 01702 552941

HEAD OFFICE 01702 554155

FAX 01702 553935 **TELEX** 995695 (MAPLIN G)

Bona fide trade and business customers should call MPS on 01702 554171.

**Normal hours: 9am to 5.15pm Monday to Friday.*

Order Any Time, Day or Night

Phone 01702 554161 – Any Time!

Ordering from us outside normal hours* is now possible, enabling you to call when cheap rate is available. Suddenly find you need something at a weekend or in the evening – now you can call us straight away!

When you call, you will hear a short message then please speak when you hear the tone. Please give the following information in sequence and speak slowly and clearly and spell any unusual word in your name and address.

1. Your telephone number including STD code or exchange name where we can contact you on the morning of the next working

day, if there is anything unclear in your message.

2. Your customer number if you know it.

3. Your name.

4. Your address.

5. Your postcode.

6. Your credit card type and number (please note we only accept Access, Visa, or American Express).

7. Your credit card expiry date.

8. Now for each item you

require give:

i Stock code.

ii Description.

iii Quantity.

iv Price each.

v Name of publication and page number where item appears (e.g. 1995 Catalogue, Page 27).

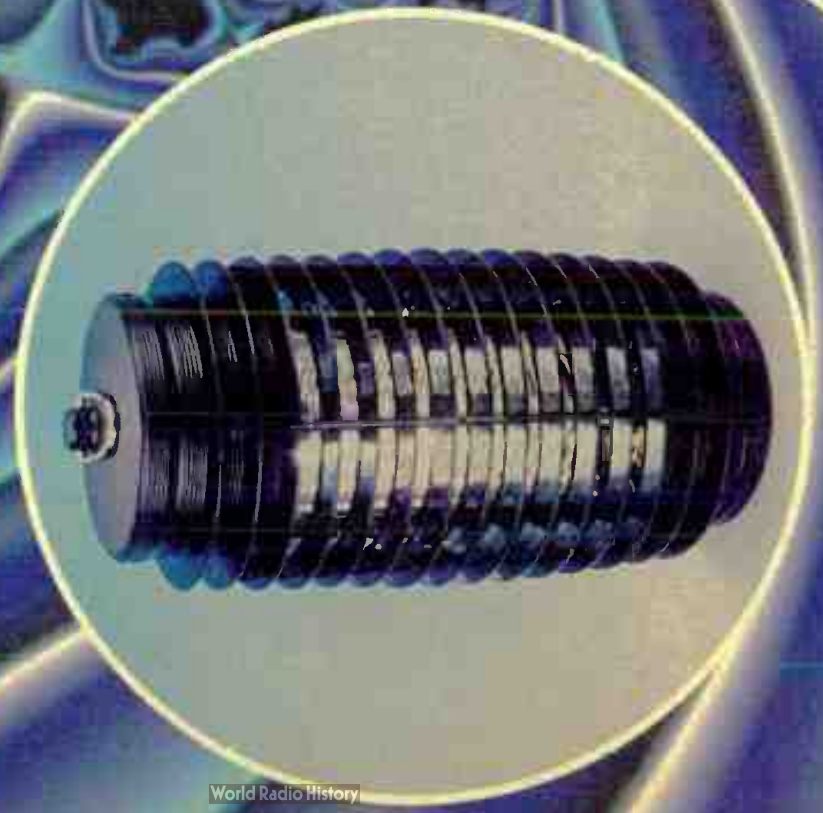
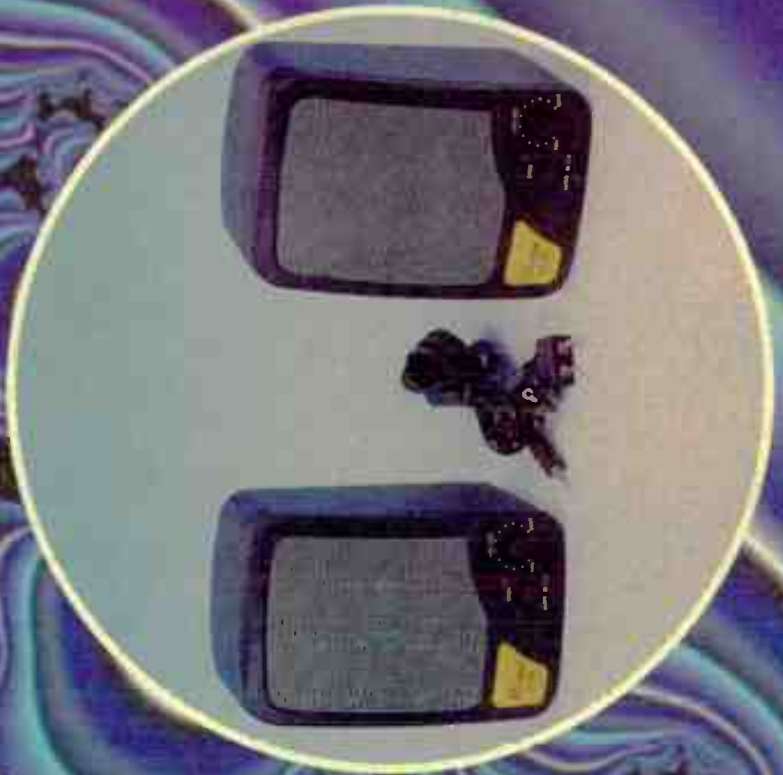
Please do not send us a written confirmation of your order.

POSTAL STRIKES

Please remember that during national postal strikes we can still get the goods to you as quickly as usual. So please place your order by telephone. You can phone any time, day or night. If you do not have a credit card, during national postal strikes only, special arrangements will be made to accept your payment by bank giro. Details of these arrangements will be explained on our Answerphone Information Service line 01702 558617 during national postal strikes.



NEW PRODUCTS



1 SECURITY**2 ENTERTAINMENT & LEISURE****3 TELEPHONES****4 RADIO COMMUNICATIONS****5 AUDIO & VIDEO****6 SPEAKERS & SOUNDERS****7 SOUND EQUIPMENT****8 AERIALS**

Just a selection of the vast range of exciting electronic products that are featured in the following pages: look out for the latest high-tech intruder alarms and accessories, superb high-powered in-car amplifiers, and a new range of joysticks and games pads for computer entertainment systems.

SECURITY

Alarm Sticker	20	Glass Break Detector	19	PIR Sensors	21
Bell Boxes	16	Halogen Lamps	23	Pressure Mats	18
Bicycle Alarm	27	Halogen Tubes	24	Security Light Switches	25
Burglar Alarm Accessories	17	Heat Detector	19	Smoke Alarms	20
Burglar Alarms	11	Home Alarm	15	Tilt Sensors	29
Car Alarms	28	Junction Boxes	18	Ultrasonic Detectors	29
Car Door Switch	32	Keyswitch	15	UV Bank Note Checker	28
Courtesy Lights	23	Magnetic Switches	17	Vibration Sensor	20
Door Lock Electric	20	Panic Buttons	19	Window Foil	18
Door Viewers	20	Personal Alarms	26	Wireless Alarms	12
Garage Alarm	13	Photo-electric Sensors	25	Xenon Beacons	17

KEYPAD ENTRY DOOR SECURITY ALARM



A versatile and easy-to-fit alarm which is installed on the inside of a door. It comprises an attractive and robust main unit, fitted on the door itself, and a magnet assembly which is mounted on the frame. When the door is closed, the magnet is detected by the proximity sensor within the alarm. When the door is opened and the magnet moved away from the unit, the sensor detects the change and activates a loud piercing alarm. The alarm can only be turned off by entering a 3-digit code on the keypad found on the main unit. There are four main modes of operation, selected by a slide switch on the main unit:

1. Visitor chime. When set to this position, the alarm will give a pleasant tone to announce the entry of visitors. This function makes this system useful for shops and offices.
2. Instant alarm. When the occupier is in the building, and the alarm is switched to this function, then opening the door will trigger the alarm. The alarm can only be disabled by entering your personal code, although it will shut off automatically after the auto-stop time interval has elapsed.
3. Delay alarm. The occupier leaves the switch in this position when leaving the building. Upon opening the door and re-entering, your personal code must be keyed in within 8 seconds or the alarm will be activated.
4. Off. When the unit is not required, the batteries are being replaced or the code is being changed, the switch is set to this position. However, the alarm

cannot be turned off simply by selecting this position. In addition to the above features, there is a red 'panic' button on the main unit which immediately sets off the alarm. In addition, the system is designed to expand, as up to 10 additional daisy-chained magnetic sensors (for other doors and windows) and an external siren can be connected. The siren output could be used to drive an external horn speaker. The alarm and its magnet assembly can be mounted using double-sided adhesive strips supplied with the unit, or with screws for a more permanent installation.

Dimensions: 222mm x 70mm x 33mm (main unit with fixing bracket); 15mm x 15mm x 55mm (magnet). The alarm unit is supplied with magnet assembly, double-sided self-adhesive strips and full instructions. It is powered by two 9V PP3 batteries (not included).

Order			3023
Code	Type	Price each	
ZC38R	Keypad Door Alarm	£16.99	

DIY 'NEIGHBOURHOOD WATCH' SECURITY ALARM



A complete single zone home burglar alarm kit. Simple to install – simple to use, and exceptional value for money.

The control panel is an ON/OFF key operated unit. The unit, which is microprocessor based, provides: A fault indicator light which will tell you if any of the detectors fitted are activated. Entry/exit time delay. 20 seconds to exit and 15 seconds to enter before going into alarm. The monitoring, 24 hours per day, of the tamper circuit and personal attack circuit.

An automatic bell cut off after 20 minutes and system reset.

The kit contains:

- ★ 1 microchip control unit.
- ★ Bell box and siren.
- ★ 4 pairs of magnetic contacts.
- ★ 1 personal attack button.
- ★ 1 large pressure mat.
- ★ 1 stair pressure mat.
- ★ Anti-tamper microswitch.
- ★ 50 metres of four core security cable.
- ★ Cable clips and fixings.
- ★ Easy to follow instruction booklet.
- ★ Siren housing label.

All the detection devices available in this catalogue can be fitted to extend the system, and up to 2 passive infra-red detectors can be fitted if a 12 volt transformer is used.

The power for the system is by 12 volt battery (not supplied), which is housed in the bell box. We recommend two HP992 batteries (YJ23A) connected in series. The battery will provide years of service unless the siren is sounded for long periods.

Order			3031
Code	Type	Price each	
XM97F H7	DIY Alarm Kit	£54.99	

IT'S A FACT!

BURGLAR ALARMS

Do not be put off from installing an alarm because of the thought of installing hundreds of cables all over your house, and spoiling your decor. The cable used is a neat, white, plastic covered type and is only about 4mm thick – much the same as the wire used for telephones. Much can be hidden with a little thought during the installation.

MAPLIN
KEY CALL
Phone 01702 556751

WIRELESS ALARM

Fox Security

NEW

A technically advanced, sophisticated Wireless Alarm that is so easy to install - all you need to do is screw the units onto the wall, follow a few simple instructions and that's it - your house is alarmed.



- ★ 4 detection zones, part or full arming capability
- ★ Remote control panic alarm
- ★ Easy to fit, simple installation
- ★ No ugly wiring between detectors and the control panel
- ★ DTI approved transmitters
- ★ Full remote control operation, via key-fob transmitter
- ★ Can use up to four key-fob transmitters for maximum convenience
- ★ Built-in extra loud 120dB siren
- ★ Fully expandable - just add more detectors
- ★ Automatic low battery warning
- ★ Output for external siren, for extra attention
- ★ Optional battery-back up for protection during mains failures
- ★ Intrusion history display shows where the alarm was triggered
- ★ Unique code-learning feature eliminates tedious manual programming of the control panel and key-fob transmitters

The system is ergonomically designed and is so easy to use - just one remote button controls arming, disarming and panic functions. It is also fully expandable by adding further sensors and accessories from the wide range of accessories available. Eight switches are used to form your chosen system code. All Wireless PIR Detectors and Contact Transmitters, for use with your alarm, are then set to the same code.

The Wireless Home Alarm System includes a Control Panel, Wireless PIR Intruder Detector, Wireless Contact Transmitter, 2-button Key-fob Transmitter, Instruction Manual and wall fixing. The key-fob transmitters supplied with the Fox Wireless Home Alarm will also operate all Vixen car alarms.



A video which will answer your questions about the Wireless Alarm is available. This video guide is an entertaining and informative way of showing how easy it is to fit, use and expand the alarm. Included is a £5 voucher that you can redeem when you buy the Wireless Alarm.

Order Code	Type	Price each
XS57M	E6 FSS7500 Wireless Alarm	£99.99
DE76H	Wireless Alarm Video	£5.00

WIRELESS ALARM ACCESSORIES

Contact Transmitter

Fox Security

NEW

By using additional Wireless Contact Transmitters then windows, patio windows and exterior doors may all be protected. Each Contact Transmitter is capable of being connected to several contact switch sensors, i.e. you don't need to have a separate Contact Transmitter for each contact switch. Thus a large window can have a Magnetic Reed Switch attached to each opening frame, all connected to a single Contact Transmitter mounted beside the window. If two or more contact switches are to be used, they must be wired in series. Supplied with mounting hardware and instructions. Requires an alkaline PP3 battery (JY49D).



Order Code	Type	Price each
XS59P	FWT101 Contact TX	£14.99

Doorbell Transmitter

Fox Security

NEW



By adding a Wireless Doorbell Transmitter to the Wireless Alarm System, then you can save the inconvenience and mess of wiring up a doorbell. The Wireless Doorbell Transmitter is simply fixed near the entry door and when pressed, sends a doorbell signal to the Control Panel, which produces a pleasant ding-dong sound from the internal siren.

Alternatively, the transmitter may be positioned indoors, for example: in the room of a sick or elderly relative, allowing them to summon another person in the house. Requires an alkaline PP3 battery (JY49D).

Order Code	Type	Price each
XS60Q	Doorbell Transmitter	£14.99

PIR Detector

Fox Security

NEW



Additional PIR Detectors can be installed in every major room in the house providing additional security and peace of mind. The Wireless PIR Detector has a coverage angle of 90° and a range of 40ft and is therefore ideal for mounting in a corner to protect a whole room. The ideal mounting height is approximately 7ft from the floor. The Wireless PIR Detector is supplied with an adjustable mounting bracket, and mounting hardware. Requires an alkaline PP3 battery (JY49D).

A pack containing three different types of lens is also available (DK21X). Each lens provides a different range and detection area to allow for individual circumstances. The 'pet' lens detection area takes into account household pets, and will not trigger the PIR when pets are present. The 'curtain' lens has a coverage that allows the PIR to be installed, hidden in a slight gap between two curtains. The 'corridor' lens offers protection down long corridors and halls.

Order Code	Type	Price each
XS58N	FWP100 Wireless PIR	£29.99
DK21X	FPL100 3 PIR Lenses	£2.99

Outdoor Siren With Strobe Light

Fox Security

NEW



Designed to enhance the capabilities of the Wireless Alarm by providing an additional siren with the added advantage of a bright red strobe. The siren is housed in an attractively styled weather-proof box that is very easy to install, and is directly connected to the main Wireless Control panel. The powerful 120dB siren and eye catching dual strobe light can be operated separately if necessary. The Siren and Strobe Light can be used with other suitably equipped alarm



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systems. Supplied with instructions, mounting bracket and 15m of cable.

Specification

Sound output:	120dB
Power requirements:	11V to 14V DC
Operating current	
siren:	200mA
strobe:	250mA

Order Code	Type	Price each
KU93B	B2 FSA106 Siren+Strobe	£39.99

Wireless Alarm Kit Back-up Battery



A 12V 1.2Ah rechargeable sealed battery may be fitted within the Control Panel giving protection during mains power failures, or if the mains supply is deliberately cut in an attempt to disable the alarm. When installed, the back-up battery is automatically charged while the Control Panel is receiving mains power.

Order Code	Type	Price each
YJ69A	A1 1.2Ah L/Acid 3at 12V	£14.99

Technical assistance and advice concerning products in the 'Security' section can be obtained by calling one of our helpline staff on (01702) 552911

A1 CORDLESS ALARM SYSTEM RF8000 NEW

- ★ Cordless system, very easy to install, requires minimum wiring
- ★ Sophisticated anti-jamming protection
- ★ 5 detection zones with a maximum of 15 cordless detectors/sensors
- ★ Complies with requirements of BS6707 - intruder alarm systems for consumer installations
- ★ Conforms to wireless standard BS6799 Pt 4A and to MPT 1340 wireless exemption standard
- ★ Up to 6 remote control units can be used, each providing a personal attack alarm facility
- ★ 115dB external siren and flashing strobe unit



The RF8000 is a sophisticated cordless alarm system that will provide years of protection for your home and your family. A unique feature of this system is the anti-jamming protection. The system can be programmed to recognise that the control panel is being jammed, and if the jamming is continuous for 30 seconds, the alarm will activate. For even greater security in high-risk areas, it is possible to select an anti-jamming protection level which records any jamming within a preset time. If the total amount of jamming reaches 30

seconds the alarm is activated. To enhance the system further, the movement detectors send out several signals if they detect an intruder. This combined with the anti-jamming protection make the system virtually impossible to beat. The system is very easy to install, requiring minimal wiring - simply connect the control panel to the external alarm and to a suitable mains supply. The kit includes the control panel, two PIR movement detectors, a door/window sensor, remote control unit, external siren with flashing strobe, clips, fixings and instructions. The remote control unit, movement detector and door/window sensor are already programmed and ready to use. It is only necessary to fit the batteries and site the units in suitable positions. The movement detector, door/window sensor and the remote control unit signal to the control panel using radio signals so no complicated wiring is required.

The advanced control panel incorporates five detection zones. Each zone can accept three types of cordless detector such as a PIR movement detector, smoke detector, or door or window sensor. Each detector programmed to a zone is represented by its own colour coded LED. This makes it easy to identify a detector that needs a battery replacing, or has activated the alarm. 16 push-buttons on the control panel allow the system to be armed, disarmed or part armed. However, before any instruction is accepted, the personally selected 4-digit passcode must be entered. Zones can be programmed as entry/exit and allow the user a preselected time delay to enter or exit the premises. This delay is adjustable. The remote control unit offers ease of use and portable protection. Up to six remote control units can be programmed into the system and can be used either inside or outside the premises to arm, disarm or part arm the system. Pressing the panic button will cause an alarm condition 24 hours a day even if the system is disarmed - especially useful for the elderly and infirm. The attractive rustproof siren unit houses a powerful 115dB siren and flashing strobe light. Both the housing and the cable connecting the unit to the control panel are protected from tampering. The PIR movement detector, door/window sensor and remote control are available separately to enhance the system and provide comprehensive protection. A smoke detector is also available separately that will provide 24-hour protection from smoke and fire even if the alarm is disarmed. The smoke alarm should not be positioned where it may give false alarms due to smoke or fumes from a kitchen or solid fuel heating. The control panel has provision for a sealed lead-acid battery (YJ69A, not supplied) to provide battery back-up in the event of a mains power failure. Reed switches (YW46A, YW47B), window foil and termination (YW50E, YW51F), and contact switch (JU65V) can be used in conjunction with the door/window sensor to form a continuous loop to provide protection for additional windows, etc. within a room.

Contents of Kit

Control panel:	1
PIR detector:	2
Door/window sensor:	1
Remote control:	1
External bell box:	1
Connecting cable:	20m
All detector batteries	
Assorted clips, fixings and instructions	

Order Code	Type	Price each
AQ39N	E8 MSS8000 Cordless Alm	£199.99

Order Code	Type	Price each
AQ40T	MSS8002 PIR Detector	£39.99
AQ41U	MSS8003 Smoke Detect	£39.99
AQ42V	MSS8004 Door/Win TX	£29.99
AQ43W	MSS8005 Rem/PA TX	£19.99

Versatile Multipurpose Intruder Alarm

Fox Security

NEW



Features

- ★ Easy key-switch operation.
- ★ No complex setting up or programming.
- ★ Built in 2-tone 120dB siren sounds alert to any intrusion.
- ★ Easily-fitted magnetic switch.
- ★ Easily expanded by adding further magnetic switches etc. from the extensive Fox Security range
- ★ Input for optional mains adaptor (not supplied)
- ★ Entry/Exit time of 20 seconds

Now, at last, you really can protect the unguarded property in your outbuildings at an affordable price. This new, electronic alarm can protect the car in your garage; the bicycles, tools, garden furniture, lawnmower and sports equipment in your shed; the fridge, cooker and TV in your caravan, utility room or conservatory. Don't suffer the distress and inconvenience an intruder could cause. Don't allow thieves to ruin, or make off with, your hard-earned property - when at such a low cost you can give yourself real peace of mind.

Typical intruder alarm units do not extend their use further than the family home. The Fox Multi-Purpose Intruder Alarm has been specially created to fill this important gap in security using the same principle as alarms costing hundreds of pounds.

Easy to fit just screw the control panel to a suitable surface, attach one cable from the panel to the switch supplied and the alarm is ready for use. The alarm is battery operated for flexibility of use so the alarm can be installed in many otherwise inaccessible outbuildings, etc.

The Fox Alarm System comes complete with Control Panel with built-in siren and keyswitch, 2 keys, 5m of alarm cable, a magnetic door or window switch, cable clips, fixings and an easy to understand instruction manual. Requires an alkaline PP3 battery (JY49D, not included), but can be used with a suitable AC adaptor. If an AC adaptor is used, then the alarm MUST be fitted with a rechargeable battery. An external output rated at 7V to 14V at 200mA (depending on whether the alarm is powered by a battery or AC adaptor) is provided which can be connected to an external siren.

Order Code	Type	Price each
AP97F	B1 Versatile Alarm	£19.99

MAPLIN
KEY CALL
Phone 01702 556751

VERSATILE MULTIPURPOSE INTRUDER ALARM ACCESSORIES

Outdoor Siren

Fox Security

NEW!



This compact, attractive External Siren Output can be easily connected to the alarm to provide a visible and extremely audible alarm. The siren could be mounted on the outside of the building, or positioned closer to, or even inside, the main building. The siren is easy to install and is supplied with the necessary hardware and cable.

Order Code	Type	Price each
CW50E	FSA105 Outdoor Siren	£14.99

Garage Door Sensor

Fox Security

NEW!

This garage door sensor is specifically designed for up-and-over type doors, and will quickly react to anyone trying to open the door when the alarm is armed. Easy to install and supplied with fitting instructions.



Order Code	Type	Price each
CW51F	FGS104 Garage Sensor	£9.99

Recommended Reading

Home Security by Vivian Capel



Order using code
AA86T £14.95NV

INTRUDER ALARM MSS2500



The MSS2500 is ideal for small to medium sized domestic installations. The Control Panel is mains operated with rechargeable battery back-up. The rechargeable battery (not supplied) either 1.2 amp/hour (YJ69A), 1.9 amp/hour (XG74R), or 2.6 amp/hour (XG75S) 12V is automatically recharged whilst mains is present, and will provide standby supply to the unit if the mains supply is interrupted.

The MSS2500 has 4 zones:-

- ★ 1 x delay zone for entry/exit.
- 1 x 24 hour zone for personal attack and tamper monitoring.
- ★ 2 x detection zones.

The MSS2500 is as simple to use as it is to install. It is operated by a 4 position keyswitch:-

1. Off position.
2. Test position, which inhibits the external sounder whilst testing sensors.
3. Circuit 1 isolates Zone 2 to give partguard for night setting.
4. Circuit 1 + 2 for full guard.

Facilities

First up latch on LED will indicate the first zone to have been activated.

Regulated 1 amp power supply.

Latching strobe output. The external strobe will continue to flash after sounders have ended.

Internal buzzer output.

Interface for any common negative self-actuating bell module.

The attractive, clean-cut look of the polycarbonate case provides the option to site the control in a visible location. The front of the Control is protected by a tamper switch and will activate the sounder/strobes if unauthorised removal occurs.

Any of the detection devices available in this catalogue, i.e. passive infra-red detectors (up to 5), pressure mats, magnetic contacts, personal attack buttons (key operated), vibration devices, and window foil, can be fitted to the system. The MSS2500 complies with BS 4737. Additional blank keys are also available separately.

Specification

Construction:	Polycarbonate
Dimensions:	Height 214, Width 298, Depth 80 (mm)
Inputs:	Detection loops 400 milliseconds Tamper loops 400 milliseconds Maximum loop resistance 10kΩ AC input 220/240V
Outputs:	Bell output total continuous current 1A Latching strobe Auxiliary 12V supply DC fuse 1.5A Buzzer output
Bell Supply:	1A continuous Int. quiescent current 10mA Changing voltage 13.8V nominal Total DC power supply current 1A

Order Code	Type	Price each
XP00A	B3 Alarm Panel MSS2500	£42.99
KW62S	Blank Keys for XP00A	99p

INTRUDER ALARM MSS3000

The MSS3000 is a 6 zone microprocessor control panel. It was designed primarily for domestic and small commercial applications and has a host of modern features.

The microprocessor present in the MSS3000 acts like a miniature computer, which enables you to select, change or inhibit with ease the many facilities available in the unit.

In common with most microprocessor controlled equipment, this unit does require a clean mains supply free from spikes or other switching interference. We recommend that a mains line filter is fitted to the spur supplying the alarm panel.

The MSS3000 is housed in a sturdy polycarbonate case. It has been specifically designed to allow the unit to be located for easy access by the user, without disfiguring the decor.

The operation of the control panel can be either by the on-board digital keypad, or by use of a remote keyswitch located outside the protected zones (available separately in this Catalogue). Programming the control panel is by use of the keypad only.



The MSS3000 provides:

- ★ 1 x delay zone for entry/exit which can be selected from the 4 detection zones.
- ★ 1 x 24 hour personal attack monitoring zone.
- ★ 1 x 24 hour tamper monitoring zone.
- ★ 3 x detection zones.

The unit can be programmed in minutes. The display of 8 LEDs will indicate the status whilst programming the unit or whilst in use.

Facilities

Personally selectable 4-digit user/engineer code.

No keys to mislay, and easily changed if required.

Keypad with audible indication.

LED display provides visual indicator of all zones.

Variable entry/exit time with audible tone giving last 10 second speed up warning of activation.

Quick set feature enables user to override the programmed exit time and sounder.

Last four event replay. (A valuable fault finding aid that allows the user or engineer to investigate the "history of intrusion" or failure of sensors for the last 4 alarm indications.

Tamper switch protection for unauthorised front cover removal.

Isolated zones indicated by flashing LED.

Omit zone. Any of the 4 detection zones except the one selected as entry/exit can be omitted before arming the system. The omitted zone information is stored until changed. Useful for regular night setting. Unit will accept up to 2.8Ah 12V rechargeable battery (not supplied), which is automatically recharged while mains is present.

Prevent omit. The unit can be programmed to prevent users from omitting zones.

Intermediate zone. Any zone can be designated as intermediate.

Chime facility. Any or all zones can be programmed to give a quiet audible indication of activation while control unit is in OFF position. Useful for shops, reception areas, etc.

Variable internal and external sounder durations.

Variable entry/exit durations.

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01702 553935**

Conforms to BS 4737. Meets NACOSS requirements if fitted by a NACOSS approved installer. Simple programming and user instructions are provided, and any of the detection devices shown in this Catalogue can be used with the MSS3000.

Specification

Construction: Polycarbonate
 Dimensions: Height 214, Width 298, Depth 80 (mm)
 Outputs: Internal speaker
 External sounder
 Latching strobe
 Positive set for latching PIRs
 Auxiliary 12V supply
 1A power supply

Order Code	Type	Price each
XP01B B3	Alarm Panel MSS3000	£49.99

Remote Master Keyswitch

A compact master remote keyswitch for use with the MSS3000 control panel, and to be used when a detector could be activated before the keyswitch is used to disarm the system, i.e. at final exit/entry door. If more than one keyswitch is to be fitted only one master is required, the slave keyswitch can be used for any additional requirements, i.e. to turn system on/off at the bedside. Housed in a polycarbonate case measuring 100 x 70 x 42mm.



Order Code	Type	Price each
CP97F	Master Keyswitch	£22.99

Remote Slave Keyswitch for MSS3000

This neat remote keyswitch, in a polycarbonate case, enables the MSS3000 Control Panel to be armed or disarmed from a separate location inside the protected area. Incorporation into the MSS3000 system enables the keypad panel to be activated, whilst retaining all the desirable programmable features of a keypad panel. Dimensions: (H) 100, (W) 70, (D) 27 mm



Order Code	Type	Price each
YZ65V	Slave Keyswitch	£12.99

MAPLIN SECURITY SYSTEM



An extremely comprehensive security system kit for the home and small businesses, consisting of existing stock items but available here as a single package offering a substantial saving over the total price of the individual components. The system includes a microprocessor-based control panel, two sensitive PIR detectors, two magnetic reed switches for windows etc. and a 112dB siren/strobe light.

- ★ 1 MSS3000 Alarm Panel
 - ★ 1 External Bell Box
 - ★ 1 12V 1.2Ah Lead-Acid Rechargeable Battery
 - ★ 2 Compact Indoor PIR Detectors
 - ★ 2 Surface Reed Switches
 - ★ 50m. 6 core Burglar Alarm Cable
 - ★ Pack of Plastic 4mm Cable Clips
- Supplied with full fitting instructions.

Order Code	Type	Price each
ZC36P H14	Security System Kit	£124.99

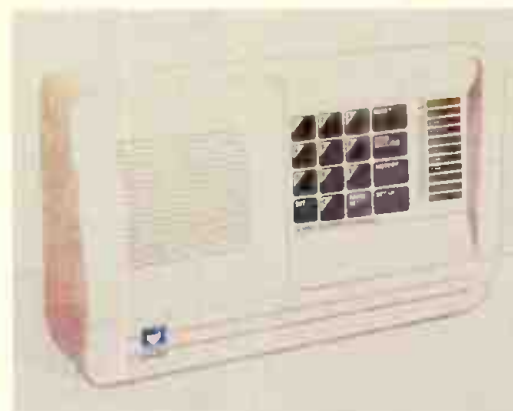
HOT TIP

If you have a doorbell plate with a window for your name, only put your initials and/or your surname in it, or leave it empty. If you put Miss, Ms or a woman's first name, you will be advertising that a woman lives there, maybe alone. This applies for an entry in a telephone directory as well.

HOME ALARM FSS8500

Fox Security

NEW!



This state-of-the-art alarm panel features six zones that can be programmed as 'final entry/exit', 'walk-through' and 'entry/exit in night-set'. In addition, there are a further three zones for personal attack, a 24h tamper loop and a 24h fire/flood/gas alarm. The panel is provided with several 4-digit user codes, which are defined as 'Master 1', 'Master 2', 'Duress', 'Night-Set', 'Engineer' and 'Holiday'. Master 1 and 2 codes allows for the setting and un-

setting of the alarm, and can include zone omit if required.

The Duress code allows setting and unsetting of the alarm and triggers a relay that can activate an optional telephone dialler etc.

The Night-Set code is an optional programmable code that allows the user to set and un-set pre-programmed areas of the premises, but if the Night-Set code is programmed, then the zone omit function cannot be used.

Holiday code is issued by the holder of Master 1 code and will only set and un-set the alarm. When the Master 1 user returns from a holiday or short break, and enters his code, the Holiday code is cancelled. Engineer code provides a range of programmable functions.

The 24h tamper alarm can be silenced by any user, but can only be reset by Master 1 user, but only if Engineer only reset is turned-off.

Other useful facilities include a 'strobe' output which provides 12V when the alarm has been triggered and remains until the alarm is reset. There is a separate fire-bell output which switches 12V when the 24h Fire/Flood/Gas zone is triggered. A reed relay output provides a connection to an external dialler, if required. A 'quick-set' function reduces the exit time so that the alarm can be quickly armed if the premises is still occupied. A 20-event memory logs all violations since the alarm was last set.

The panel is mains powered and there is provision for a sealed lead-acid battery backup that will be charged while mains is applied to the panel.

Order Code	Type	Price each
RZ55K B3	Home Alarm FSS8500	£39.99

INTRUDER AND FIRE ALARM MSS3500



The MSS3500 is a 9 zone microprocessor control panel, ideally suited for use in large domestic and small, or medium, commercial installations.

The MSS3500 is housed in an attractive polycarbonate case, which enables it to be installed in a visible location. However, up to 2 remote keypads can be fitted to the system, and the control panel sited in a hidden location.

The MSS3500 provides:

- ★ 1 x delay zone for entry/exit.
- ★ 1 x 24 hour zone for personal attack monitoring.
- ★ 1 x 24 hour tamper monitoring (with the added benefit of a tamper indication being shown by an LED on each separate zone).
- ★ 5 x detection zones.
- ★ 1 x fire zone.

The MSS3500 is simple to programme and operate. The microprocessor present means the control panel is likely to have the facility suited to your individual installation requirements. The keypad acts like a computer keyboard, enabling you to select, change, or inhibit the many features available.

Facilities

Up to 4 different personally selectable user codes. Engineer code.

Keypad operation with audible indication.

Continued on next page



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BS 5750 Part 2 1987
 Level B: Quality Assurance
 RS12750

Continued from previous page

A display of 12 LEDs will indicate the status of the control panel during use and programming.
 Up to 2 remote keypads can be fitted.
 Variable entry/exit time with audible tone giving last 10 second speed up warning of activation.
 Quick set feature enables user to override programmed exit time and sounders.
 Visual/audible walk test (both outputs).
 Outputs for digital communicator indicating PA/FIRE/INTRUDER.
 Last 4 event replay for fault finding and to investigate the "history of intrusion" or failure of sensors for last 4 alarm indicators.
 Tamper switch giving extra protection for unauthorised front cover removal.
 All zones can be isolated except FIRE, PA and ENTRY/EXIT.
 Isolated zones indicated by flashing LED.
 Pulsed sounder output on fire zone.
 Unit will accept up to 2.8Ah 12V rechargeable battery (not supplied) which is automatically recharged while mains is present.

Programmable Facilities

Omit zone, any zone except FIRE, PA and ENTRY/EXIT zone can be omitted as required.
 Partguard code for night time arming when repeated preselected-selected zones are required to be armed, both the partguard code and selected zones can be changed by the user with ease.
 Prevent omit. The unit can be programmed to prevent users from omitting zones.
 Intermediate zone. Any zone can be designated as intermediate.
 Internal speaker delay.
 External sounder display.
 Installer reset only facility.
 Silent personal attack facility.
 Chime facility any or all zones can be programmed to give a quiet, audible indication of activation whilst control unit is in OFF position. Useful for shops, reception areas, etc.
 Variable ENTRY/EXIT durations.
 Indication of last user to arm and disarm unit.
 Cleaner code. A separate selectable code which, when entered, will limit the user to entering the zones allocated to that code.
 Zone pairing. Control will monitor system until both zones are activated to create alarm condition.
 Conforms to BS 4737. Meets NACOSS requirements if fitted by a NACOSS approved installer. All of the detection devices available in this catalogue can be used with the MSS3500. Easy to follow user and engineer instructions are included.

Specification

Construction: Polycarbonate
 Dimensions: Height 214, width 298, depth 80 (mm)
 Outputs: Internal speakers
 External speakers Positive set for latching PIRs
 Latching strobe Auxiliary 12V supply
 Dedicated fire output 1A power supply.

Order

Code	Type	Price each
XP02C	B3 Alarm Panel MSS3500	£69.99

Remote Keypad for MSS3500

All the features of the keypad, display and audible warnings which are present in the main control panel are also present on the remote keypad. Up to 2 remote keypads can be fitted to the system thus providing more flexibility, i.e. giving the facility to arm, disarm, and programme the system from wherever a remote keypad is fitted.
 Flush or surface mounted.



Specification

Construction: White enamelled metal case
 Dimensions: Height 115, Width 190, Depth 30 (mm)

Order

Code	Type	Price each
YZ66W	MSS3500 Remote Keypd	£44.99

The Communicator



A very advanced and useful addition to any security system, the 'Communicator' connects to any alarm panel and will relay a message to up to 4 different personally programmed telephone numbers when the alarm system has been triggered. These can be any standard BT or Mercury numbers, such as for your home, office, or a mobile phone number so that you may be contacted if on the move. The system plugs into a standard BT 'phone socket and is fully BABT approved. A simple programming sequence means that the contact numbers can be changed as often as required.

The system is extremely reliable as it uses no tape mechanism, the voice recording being stored in battery-backed RAM. The personalised message is recorded by the user and can easily be changed. Fully compatible with a 12V trigger input level, the system can be easily interfaced to all existing alarm systems. The unit is powered from the 240V AC mains, and can be backed up by an optional 2 x PP3 nicad batteries (see 'Batteries and Power Supplies' section of this catalogue). This is highly desirable since the device will otherwise be disabled in the event of the mains supply being tampered with, or during a power cut. The case is made from an attractive and robust, cream-coloured polycarbonate. The control and programming buttons are combined in a dirt and moisture proof membrane keypad. Full instructions for the use and installation of the unit are supplied. Overall dimensions: 214mm x 298mm x 80mm.

Order

Code	Type	Price each
GL03D	D5 Communicator	£99.99

Large External Alarm Box



A large well-made external alarm box in polypropylene. The box has a strong rear panel with various fixing holes and a shelf for a battery etc. The front part of the box is coloured and has three vents moulded in each side. The two parts clip together after fixing the back plate to an outside wall and then one screw locks the box together. A plate is provided for fixing a microswitch e.g. FP45Y or FP42V etc. which would be held operated by the long thread on the screw. Anyone attempting to unscrew the screw to get into the box will operate the microswitch long before the screw is removed. Overall size 405 x 273 x 140mm deep. Box is available in red, white, blue or yellow. Also available in horizontal mounting version. Colours are red or white.

Order

Code	Type	Price each
YP50E	B3 Bell Box Red	£7.25
YP51F	B3 Bell Box White	£7.25
YP52G	B3 Bell Box Blue	£7.25
YP53H	B3 Bell Box Yellow	£7.25
XM98G	B3 Red Hrzntl Bell Box	£7.25
XM99H	B3 White Hrzntl Bell Bx	£7.25

Assembled External Bell Box

This bell box is designed for use with our range of MSS2500/3000/3500 alarm systems. The unit contains everything required for a professional external installation. The bell box is manufactured in polycarbonate, a material similar to that used in the construction of motorcycle crash helmets. The added strength of polycarbonate means the unit conforms to both BS 4737 and NACOSS standards. The unit is assembled to include: Polycarbonate bell box front and back. Fitted to the backplate is a tamper switch, which monitors removal of the box from the wall, or any attempted removal of the front cover. A powerful 112dB siren. A low profile strobe light. Rechargeable, self-contained bell module. The module monitors the power supply between the control panel and the siren. If that supply is interrupted, the alarm is activated and the power cell will supply power to the siren for up to 1 hour.

Specification

Dimensions: Height 405, Width 273, Depth 140 (mm)

Order

Code	Type	Price each
XP03D	C5 Assm P/Carb BBox	£42.99

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BURGLAR ALARM ACCESSORIES

Low Profile Xenon Flasher Unit

Weatherproofed xenon tube-based flasher designed primarily as an alarm beacon. Gives off two bright, attention-grabbing pulses of light every second. The translucent acrylic cover lens of the unit is marked with Fresnel rings and the sides are striated to maximise light dispersal. The unit also features reverse polarity protection. Flashers with lenses in four different colours are available; red, clear, amber and blue. The body itself is manufactured from durable black ABS plastic. This unit is not suitable for continuous flashing use. Tube life approx. 1 million flashes.



Working voltage: 12V DC
 Supply current: 150mA
 Power output: 1W
 Flash rate: 2Hz (approx)
 Overall size: 70mm dia. x 44mm high
 Fixing: Two 6mm dia. holes for bolts and one 18mm dia. hole for lead

Supplied with approx 0.5m red and black cable and mounting gasket.

Order Code	Type	Price each
ZC14Q	Xenon Flasher Amber	£8.49
ZC15R	Xenon Flasher Blue	£8.49
ZC16S	Xenon Flasher Clear	£8.49
ZC17T	Xenon Flasher Red	£8.49

Standard Alarm Beacon

A standard alarm beacon designed for use with burglar alarms etc. The xenon tube gives an intense flash about once every one third of a second. The cover has a flat top marked with Fresnel rings and the sides are striated for maximum light dispersion. The unit is weatherproof once fixed.



Working voltage: 12V DC
 Supply current: 200mA
 Flash rate: 3 flashes per second (approx.)
 Overall size: 100mm diameter x 80mm high
 Fixing: Two 4mm holes on 103mm centres

Supplied with approx 0.5m red and black cable.

Order Code	Type	Price each
YM96E	Strobe Flasher	£14.49

Alarm Beacon

A very high efficiency, low power consumption beacon, designed for use with intruder alarms. The xenon tube gives an intense flash of light once every second. The cover has a flat top marked with Fresnel rings and striated lines for maximum light dispersion. The whole unit is completely sealed and fully weatherproof.



Working voltage: 12V DC
 Supply current: 40mA
 Flash rate: 1 flash per second
 Overall size: 74mm diameter x 48mm high
 Fixing: Two 5mm holes on 45mm centres.
 Maximum panel thickness: 10mm

Supplied with 70mm diameter foam mounting washer and approx. 0.5m red and black cable.

Order Code	Type	Price each
YK39N	Alarm Beacon	£12.99

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Reed Switch Recessed



A reed switch and magnet encapsulated in identical white plastic mouldings designed to be recessed into door or window frames. Reed moulding has four wires, two form a security loop, the other two are connected to the reed. Reed contact makes when subjected to a magnetic field.

Operate distance: 9.5mm
 Release distance: 11mm
 Flange dimensions: 19mm dia x 1mm thick
 Main body dimensions: 27.5 x 8mm dia.

Order Code	Type	Price each
YW46A	Door Contact Reed	£1.75

Five Terminal Flush Contact Reed Switch

Fox Security

A magnet and reed switching sensor for burglar alarms, normally to be recessed into doors or windows and their frames. One part contains the magnet, while the other part contains the reed switch which is normally closed in the presence of the magnet.



Opening the door/window will cause the reed to open. The reed switch terminates in a pair of screw terminals, and there are a further three terminals for the security loop. Operating distance, reed to magnet: Reed closes at 13mm, and opens at 15mm. Dimensions, magnet or reed: Length 35mm, width 22mm. Requires a recess at rear in door or frame 19mm diameter (3/4 in), by 15mm deep. Fixing centres 27mm. Screws supplied.

Order Code	Type	Price each
FK77J	Flush Contact Reed	£1.45

Panel Pin Fixing Five Terminal Contact Switch



Magnet and reed contact switch identical to the above, except parts are retained in the door or window frame by a pair of 15mm long panel pins. Ideal where dimensions of the wooden frame are limited. Each surrounding lip is 26mm diameter.

Order Code	Type	Price each
JU65V	Pinned Flush Reed	£1.45

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24-HOUR SLIMLINE DIGITAL TIMER NEW

This timer is a slimline digital controller that can be plugged straight into your existing 13A socket outlet and can be programmed to switch loads of up to 13A resistive or 2A inductive. The timer can switch up to 4 ON/OFF programmes per day, with a minimum of 1 minute between switch settings, each of which can be manually overridden. The override function is cancelled at the next automatic ON or OFF switching time. The unit has a back up battery in order that timing is kept accurately, even during a power cut.



GREAT VALUE!
£18.99
RZ84F

Reed Switch Surface



A surface mounting reed switch and magnet in similar white plastic mouldings. Reed unit has five screws, three for making security loops and two are connected to the reed. Reed contact makes when subjected to a magnetic field. Screws supplied.

Operate distance: 14mm
Release distance: 15.5mm
Dimensions:
(both parts) 67 x 14 x 12mm
Fixing centres: 52mm

Order Code	Type	Price each
YW47B	Surface BA Reed	£1.70

Door Loop



Two junction boxes connected together with 300mm of four-core cable. Each box contains five screw terminals and two others, connected to a contact which breaks when the lid is removed. Junction boxes and cable are white. Suitable fixings (not supplied), four 1/2 in. countersunk No. 6 woodscrews. Dimensions of each box: 80 x 24 x 18mm. Fixing centres: 56.5mm.

Order Code	Type	Price each
YW48C	Door Loop	£2.75

Window Foil



A self-adhesive aluminium foil with a strong adhesive on one side and a shiny finish on the other. Stick about 1in. from the frame all round the glass. If the glass cracks the foil will break. Supplied on reel 33m x 9mm.

Order Code	Type	Price each
YW50E	Window Foil	£1.99

Window Foil Terminations

Two self-adhesive terminating blocks which clamp onto the ends of the window foil and provide a screw terminal connection to the foil. Moulded in clear acrylic plastic.



Order Code	Type	Price each
YW51F	Foil Terms	52p

Pressure Mat



Designed for use with intruder alarms etc., the mat is placed under a carpet, rug etc. and gives an abrupt change from open to short circuit when stepped on. Size: 555 x 395 x 3mm.

Order Code	Type	Price each
YB91Y	Std Pressure Mat	£3.99

Stair Pressure Mat



A four contact pressure mat as YB91Y, but having dimensions 555mm x 215mm x 3mm in order to lay along the top of a step or stair.

Order Code	Type	Price each
FK79L	Stair Press Mat	£2.99

Junction Box 5-Way



A white PVC junction box with five screw terminals and two others connected to a contact which makes when the lid is on and breaks when the lid is removed. Suitable fixings (not supplied), two 1/2 in. countersunk No.6 woodscrews. Dimensions: 80 x 24 x 18mm. Fixing centres: 56.5mm.

Order Code	Type	Price each
YW49D	BA Junction Box	60p



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Junction Box 8-Way



A junction box for interconnecting cables of a security system. The box has a pair of contacts at centre which are normally closed with the lid in position, but which are released if any attempt is made to remove the lid. There are eight additional screw terminals, and a number of holes are provided in the back for cable entry and screw fixing. Dimensions: 72 x 56 x 19mm.

Order Code	Type	Price each
FK76H	Junc Box JB8S	90p

Junction Box 12-Way

A junction box for interconnecting cables of a security system. It has a pair of break contacts which will normally be closed while the lid is securely in position, but which will be released if any attempt is made to remove the lid. The box has twelve screw terminals organised as two 6-way, nylon terminal blocks, one on each side of the back panel. Four break-outs are provided in the back for cable entry, and four countersunk screw holes for fixing. Dimensions: 80mm square x 20mm deep. Colour is white.



Order Code	Type	Price each
RC59P	12-Way Junction Box	£1.75

Help Button

Fox Security



A rectangular button in an off-white plastic moulding with the word "help!!" printed in red on a push-to-make with screw terminals. Dimensions 76 x 23 x 15mm deep. Fixing centres 66.5mm.

Order Code	Type	Price each
FP12N	Help Button	£1.30

Panic Button

A red button in a round, off-white mounting for fixing to a wall, underside of a table or counter or any flat surface, which may be used to trigger an alarm system manually. Contacts are single pole push to make, with screw terminals. The red button is surrounded by a shallow, concave recess to prevent it being depressed accidentally.



Dimensions:— 44mm diameter x 18mm deep. Fixing centres 28mm, two screws supplied.

Order Code	Type	Price each
FK46A	Panic Button	£2.99

Top Operated Panic Button

A large red rectangular plastic button housed in a quality white plastic box. The button is normally flush with the top of the box and requires minimum effort to activate, this makes it virtually impossible to accidentally push the button. Once pushed and the loop is broken (by reed switch), a supplied key is used to reset the button. A red 'flag' in a recessed window indicates the button has been pushed, and a green 'flag' when the button has been reset. The lid has a single screw fixing and a tamper contact is provided, that is made when the lid is screwed into place.



Dimensions: 83 x 65 x 29mm.

Order Code	Type	Price each
KR00A	T/O Panic Button	£2.99

Metal Panic Button

A red button housed in a metal case. The button requires a positive push to activate alarm. It is push to break and should be used in normally closed loop circuits. Once depressed, the alarm can only be disarmed by resetting with the key provided and resetting the control panel.



Specification
Dimensions: Height 65, Width 50, Depth 25 (mm)

Order Code	Type	Price each
YZ67X	Metal Panic Button	£5.99

Heat Detector



A heat sensor comprising an encapsulated bi-metal strip acting as a normally open single pole make switch. The round metal sensor is mounted on a white,

bevelled pattress. The bi-metal strip operates at 60°C ±5°C. Contacts are rated at 0.3A at 24VDC. Dimensions: 100mm diameter x 35mm deep. Sensor unit is 47mm diameter. Has two pairs of screw terminals. Fixing slots are 4 x 9mm on 71mm centres.

Order Code	Type	Price each
FK47B	Heat Detector	£4.99

Glass Break Detector

A sensitive glass-break detector which uses a strong adhesive pad to fix to the glass. The sensor may be positioned to give a make or break action. The sensor must be mounted at least 75mm from a corner or edge of the pane. The sensor is first fixed to the glass,



then adjustments can be made which allows the sensor to be rotated to the desired position in accordance with the enclosed instructions for use. The two-core cable which is approx. 250mm long can then be terminated on a junction box mounted on the window-frame for example. Dimensions 34mm diameter x 21mm high.

Order Code	Type	Price each
FP11M	Glass Break Sensor	£2.65

Twin Beam Break Detector



A synchro twin beam infra-red detector with a range of 30 metres, suitable for indoor protection. It detects intruders when both the upper and lower beams are simultaneously broken. The detectors each require a 12V to 20V DC supply and the transmitter has a green LED in transmitting mode and the receiver has a red LED in alarm mode. A reed relay output is provided with normally closed contacts.

Specification
Recommended range: 30 metres (indoor use)
Beam characteristics: 950nm modulated 700Hz (wavelength)
Beam response time: 50 to 100 msec.
Alarm period: 1sec.
Relay output: Reed relay NC 20W 0.5A 250V DC
Power requirement: 12 to 20V DC
Current consumption at 12.5V DC: 20mA Tx 15mA Rx
Rx alignment adjustment: 180° (±90°) horiz.
Environment: -25°C to +50°C
Case material: Infra-red transmissive polycarbonate
Weight: 260g

Order Code	Type	Price each
BZ64U A1	Beam Break Detector	£26.99

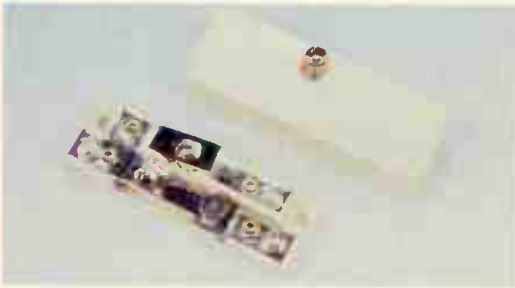
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Vibration Sensor

Fox Security



A simple mechanical vibration sensor comprising a weighted moving contact which can be adjusted by a set-screw for varying degrees of sensitivity. Usually the screw setting is chosen for the contacts to be normally closed; physical displacement of the unit causing the contacts to open since the weighted movable portion remains inert relative to the body of the unit. The detector reacts best to a displacement in the same direction as the moving contact's natural direction of movement (it will operate with a displacement applied at right-angles, but to a lesser degree). Greatest sensitivity can be achieved by mounting the unit vertically with the bob-weight of the movable contact uppermost (cable entry hole at top). To ensure equal sensitivity in both directions two such units may be used mounted vertically with one turned 90° to the other. The two units are then wired together in series. In addition, a second contact is provided in series with the movable contact which is normally held closed by the cover so that the cover cannot be removed without triggering the alarm. Readily applicable to automotive security systems, for example.

Dimensions: 60mm long x 15mm wide x 22mm deep.

Order Code	Type	Price each
FK78K	Vibration Detector	£3.49

Electric Door Catch Release

A strong and secure electrically operated door catch release mechanism, which operates from 12V AC or DC, current 1.5A. Ideal for use in security, doorphone and restricted access systems. The mechanism can be used with mortice locks (but not deadlocks). Please note the lock mechanism itself is not supplied and this should be purchased from a good hardware store or locksmith. Connection to solenoid coil is via two screw terminals. Mechanism requires a cavity of 102 x 21 x 29mm for mortice locks.



Order Code	Type	Price each
YU89W B1	Electric Door Lock	£16.99



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DOMESTIC SMOKE ALARM

A battery powered domestic smoke alarm that gives early warning of fire in the home. The alarm is easily installed as there is no wiring involved. The alarm has a sound output of 85dB (minimum) at 10 feet, and a battery life of at least one year. There is a low battery warning that beeps every minute for 30 days. A test button is provided that simulates the effect of smoke and checks the sensor, electronics and horn. 9V battery included. Dimensions: 140 x 125 x 46mm; weight 175g.



GREAT VALUE!
£4.99
KC38R

Door Viewer

Viewtech



A door viewer of high quality and excellent optics, having a machined alloy body chemically finished in black, and a chrome bezel of 31mm diameter surrounding the lens. Adjustable to suit most doors up to 50mm thick. Requires a 15mm diameter fixing hole.

Order Code	Type	Price each
RC45Y	Door Viewer	£12.99

Safety Eye

NEW!



A large door viewer that displays an image on a 45mm screen of the area outside your door. It is possible to stand up to 2m from the door and still see a clear image of the outside, so making it easy to see visitors and reduce eyestrain. Finished in a rugged black plastic and suitable for doors up to 30mm thick. Requires a fixing hole 46mm in diameter. Overall length 78mm.

Order Code	Type	Price each
RZ48C	Safety Eye Viewer	£12.99

Car Alarm Sticker

A highly visible triangular self-adhesive car alarm sticker, ideal to ward-off thieves whether an alarm is fitted or not. The sticker measures 75 x 75mm (approx.), has a bright red border and black lettering on a white background.



Order Code	Type	Price each
JR91Y	Alarm Sticker	60p

SMOKE ALARMS

IT'S A FACT!

SMOKE ALARMS

A must for the home, office, shop etc. to give an early warning of smoke and, in case of fire, allowing valuable extra time to escape. Recent changes to Building Regulations make the fitting of mains smoke alarms compulsory. Locating smoke alarms is important, since sufficient smoke must enter the alarm before it will respond. The alarm needs to be within 10 paces (23 feet) of the fire to respond quickly, at least 15cm away from walls and corners, and at least 30cm away from any light fitting or decorative object which might obstruct smoke entering the alarm. When a ceiling position is not practical, the alarm should be fixed with the top edge between 15 to 30cm below the ceiling. In areas with sloping or peaked ceilings, the alarm should be installed 90cm from the highest point measured horizontally. For maximum protection and peace of mind, it is recommended that a smoke alarm is fitted in every room of the house, except bathrooms, shower rooms, garages or other rooms where the smoke alarm may be triggered by steam, condensation, normal smoke or fumes.

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Smoke Alarm with Relay



A smoke alarm that is designed to operate with the 12V supply from the control panel of a security system, and provides an alarm signal via a set of relay contacts. The contacts are normally closed in the 'no smoke' condition. The alarm has a sound output of 85dB (minimum) at 10 feet, and an LED flashes every two seconds when smoke is detected. The LED normally flashes every 40 seconds, to provide indication that the unit is on. The test facility, which can be operated locally or remotely, checks the sensor, electronics and the alarm.

Specification

Supply voltage:	10-2V to 13-2V DC
Standby current:	150µA maximum
Alarm current:	30 to 60mA
Cable:	5 core (4 core if remote test not needed)
	Maximum resistance 20Ω
Relay contacts:	24V/1A resistive
Dimensions:	140 x 125 x 46mm
Weight:	170g

Order Code	Type	Price each
KC39N	Smoke Alarm + Relay	£19.99

Combined PIR and Smoke Detector



A space saving combined PIR and smoke detector in a compact white ABS case that is suitable for any intruder alarm system with 12V detector system. The PIR has an operational angle of 90° and a range of approximately 15 metres, with 10 long range zones, 10 intermediate zones and 5 short range zones. The recommended mounting height is 2.5m to 4m. The dual element sensor has a selectable one or three pulse count and is housed in a tamper protected case. The ionisation type smoke detector conforms to BS5446 Part 1. There are separate connections for use with control panels with fire and intruder outputs. To utilise all the functions, either one 8-way cable or two 4-way cables will be needed to connect to the control panel; two for the power connections, two each for the smoke detector and PIR and two for the anti-tamper function. Size 110 x 66 x 41mm.

Order Code	Type	Price each
CP98G	PIR Smoke Detector	£29.99

Indoor Pulse-Count Type 180°

A very high quality passive infra-red detector using the very latest technology to provide extremely high immunity to false alarms. The alarm will only be triggered if two consecutive signals are detected within about half a minute. Thus very slowly moving changes like heat from a radiator, the sun



rising or setting etc. are not detected, whereas a person would have to move into one segment then wait over half a minute before moving into the next, but since no-one can know where the segments are, this is in practice an impossibility and therefore a person entering the protected area will always set the alarm off. This very small and unobtrusive unit can mount on a flat wall, in the corner between two walls or between the ceiling and a wall. An anti-tamper switch is incorporated which can be connected to the alarm system's 24-hour circuit along with smoke detectors, heat sensors etc. to set off the alarm even while the system is not set. The unit has a dual sensing element and will cover an area 12m x 12m over 110° in a fan shape pattern and an area of 3m over 180° to the left and right, depending on position and surroundings. It should be positioned so that it has a clear and unobstructed view of the area to be protected. Avoid pointing the unit at fast changing heat sources, such as cookers, kettles etc. For best detection, site the unit so that intruders pass through the beam rather than directly towards or away from the unit. A walk-test LED is provided which lights dimly if one pulse is counted and brightly after two counts to assist in setting up and positioning the unit. The LED can be switched off in normal use if desired. The pulse count facility can be disabled if required so that the unit triggers at the first pulse. The detection range and height can be adjusted without repositioning the unit, for added convenience during installation.

Specification

Detection method:	Dual pyroelectric passive infra-red
Detection angle:	110° (fan shape)
Coverage:	12m x 12m
Detection angle:	180° (left - right)
Coverage:	3m
Detection beams:	38
Detection rows:	2
Mounting height:	1.8 to 2m
Adjustable angle:	30° Vertical
Operating voltage:	12V DC
Operating current:	20mA
Relay output:	30V at 0.5A N.C. max. (AC/DC)
Pulse count:	Switchable 1 or 2. In 2 count mode second pulse must occur within 40 secs for alarm to trigger
Alarm display:	Red LED monitor
Alarm period:	2 (±1) seconds
Sensitivity:	Adjustable
Tamper switch:	Internal microswitch
Weight:	60g (Net)
Dimensions:	65mm dia x 43mm deep

Order Code	Type	Price each
AJ96E	Pulse Count PIR	£21.99

Mains Powered Smoke Alarm



A 220/240V AC mains powered smoke alarm that can be interconnected (up to 12 alarms) so that when one alarm senses smoke all the alarms sound. The alarm must be continuously powered 24 hours a day so it is important that it is not in a circuit that can be turned off by a switch. The alarm should be wired permanently to a separately fused circuit at the distribution board, and a junction box has to be installed where the alarm is to be placed. The smoke alarm has a 'hush' button to help control nuisance false alarms. When pushed, the alarm switches to a reduced sensitivity mode. This condition allows unwanted alarms to be silenced for a period of approximately 10 minutes. The unit will give a short beep every 40 seconds during this time as a reminder. After this 10 minute period, the alarm reverts to normal mode. Pressing the 'test' button will also revert to normal mode. Fitted with mains indicator, the alarm sound output is 85dB (minimum) at 10 feet. Size 140 x 115 x 50mm. Weight 181g.

Order Code	Type	Price each
KC40T	Mains Smoke Alarm	£15.99

PASSIVE INFRA-RED DETECTORS

Portable PIR Alarm/Chime Unit



A compact passive infra-red detector and alarm unit that is completely self contained. The unit, finished in smart white plastic, measures 35.5 x 108.5 x 68mm. The unit may be used free-standing on a desk, shelf, etc. or using the integral swivel bracket, mounted on a wall either horizontally or vertically. A slide switch on the side of the unit selects chime/off/alarm modes. In the chime mode, when the detector is triggered, a 'ding-dong' chime sounds, ideal for use as an automatic door or shop bell. In the alarm mode, triggering the detector will sound an ear piercing 90dB ft siren, the alarm will reset and re-arm after 30 seconds. Exit delay after arming is 10 seconds. Power requirements 9V PP3 alkaline battery (FK67X) not supplied, standby current is 90µA, expected battery life 6 months. Detector coverage angle 60°. Operating temperature range -10 to +40°C.

Order Code	Type	Price each
YU17T	Portable PIR Alarm	£20.99

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01702 553935

HIGH IMMUNITY INDOOR PULSE-COUNT DETECTOR

A compact indoor PIR sensor for use with intruder alarm systems. This detector has superior immunity from white light, EMI and RFI, and exceeds the industry standards by 200%. For ease of installation, the detector features a unique patented tamper-proof bracket. The neat design has curves on two planes and can easily be installed in the most challenging locations. Once installed, the unit gives highly effective intruder detection to BS4737. The detector is supplied with a volumetric lens, which has an adjustable range up to 12m (40ft) over a 104° arc of coverage, producing a maximum width of 18.9m (62ft). Selectable pulse count is included to avoid false triggering. The unit requires 12V DC and has normally closed relay contacts for the alarm output and normally closed switch contacts for the tamper output. To aid setting up of the positioning and range of the sensor, a walk-test LED is fitted to the unit which indicates when the trip threshold has been passed. For optimum results, the unit should be sited in such a way that intruders would pass through the beam, rather than directly towards or away from it. Three alternative lenses are available offering different ranges and coverage for specific applications.

The pet lens (AG82D) has a 12m (40ft) range with an arc of 104° and a maximum coverage of 18.9m (62ft). Viewed from the side, the beam is very narrow, so if positioned above the height or reach of any pets or animals the alarm will not be set off.

The curtain lens (AG83E) offers a very narrow 12m (40ft) range with an arc of 6° and a maximum width of 1.3m (4ft). Viewed from the side the coverage is over an arc of 104°, that is, from floor to ceiling. The detector can be hidden in a small gap between two curtains.

The long-range lens (AG84F) has a 40m (130ft) range with an arc of 8° and a maximum width of 1.6m (5ft) and is ideal for long corridors and passageways.



GREAT VALUE!
£21.99 AG81C

Specification

Pyro-electric detector:	dual-element, low-noise
Voltage:	9 to 16V DC
Current:	17mA typically at 12V DC
Alarm output:	normally closed relay contacts rated at 24V DC 50mA
Tamper output:	normally closed switch contacts rated at 24V DC 50mA
Alarm period:	2s to 3s
False Alarm Protection	
Electrostatic discharge:	no false alarm up to 8kV, complies with IEC 801-2 and BS6667 Pt 2
RF immunity:	no false alarm from 150kHz to 1GHz at 30V/m modulated, complies with IEC 801-3 and BS 6667 Pt 3
Transient immunity:	no false alarm up to 4kV, complies with IEC 801-4 and BS 6667 Pt 4
Operating temperature:	-10°C to 55°C
Temperature tolerance:	no false alarms up to 1.7°C/m
Maximum humidity:	95% non-condensing
Mounting:	up to 4.1m (13.6ft) with adjustment range ±30°
Casing:	flame retardant ABS
Dimensions:	90 x 63 x 40mm

Additional Lenses

AG82D Pet Lens 80p, AG83E Curtain Lens 80p, AG84F Long Range Lens 80p

Outdoor PIR Light Control Device



A light control device with a 180° motion sensor and the ability to switch up to 1100 watts, attractively styled for indoor use but is also suitable for outdoor use. The unit uses a built-in passive infra-red (PIR) detector that reacts instantly to body heat and switches on a lamp(s). After an adjustable period of time, the lamp is automatically switched off. A built-in, variable light level, photocell deactivates the motion sensor during the day. If the supply to the unit is switched off and then on within two seconds, the unit changes to manual mode and the lamp will be on all the time. To revert to auto mode, the mains supply is switched off for over five seconds and switched back on again. Ideal for porch lights, gate lights etc., this PIR light control device makes the perfect addition to your security system.

Specification

Detection method:	Passive infra-red
Power requirements:	220/240V AC 50Hz
Standby current:	30mA (max.)
Operating current:	35mA (max.)
Lighting load:	1100W (max.) incandescent 500W (max.) fluorescent
Detection range:	12m min. at 20°C
Detection angle:	180°
Adjustable angle:	Vertical 180°
Lux level:	0 to 1000 lux
Housing design:	Water resistant
Lamp-on time:	5 secs ±3 to 12 mins ±3

Order

Code	Type	Price each
BZ18U	Indoor/Outdoor PIR	£21.99

PIR Light Control Device



A PIR light control device for switching up to 10 amps. The head can swivel through 180° and has a range of 14 metres at 20°C. The device has adjustment for light level and time delay and can be used outside if it is protected from the weather by mounting it under the eaves of roofs. The light level control is initially set to 'TEST' and will allow the light to come on during daylight. The control is turned fully clockwise and at the desired ambient light level, the control is adjusted until the light comes on, the light control will now only be active from dusk to dawn. Once activated, the light control will stay on for up to 12 minutes approx., but can be adjusted to be as short as 5 seconds. The device is suitable for switching on up to four 500W halogen lamps or porch lights, gate lights or a combination of lights up to the rated 10A.

Specification
 Detection range: 14m @ 20°C
 Detection angle: 180°
 Mounting height: 1.8 to 2m wall mount
 Rated load: 10A, incandescent lamp
 Switch off delay: Adjustable from 5 seconds to 12 minutes approx.
 Weight: 300g

Order Code	Type	Price each
CR06G	Outdoor 10A PIR	£29.99

Miniature Infra-red Detector



A compact, 90° indoor passive infra-red detector for use with our existing range of intruder alarm systems. The unit can be fitted for normal range (up to 12m) or tilted down by 8° for a reduced range. This is accomplished by either using the top pair of fixing holes, for normal range, or the bottom pair of holes (the mounting is angled) for short range. The pulse count can be set for either 1, 2 or 3 counts, and it is suggested that at the recommended height, a count of 2 is selected. This will require an intruder to move a few paces before triggering the alarm. False triggering due to insects etc., will be greatly reduced. In addition to the normal alarm contacts, the device has tamper contacts as well. Requires 12V DC.

General Specification

Detection system:	Passive infra-red dual element sensor.
Range:	12m approx. over 90°.
Recommended mounting height:	2.2m.
Alarm signal:	Normally closed contacts 30V DC 75mA maximum.
Tamper output:	Normally closed 24V 50mA.
Supply voltage:	9 to 14V DC 50mA.
Ambient temperature:	-10°C to +50°C
Weight:	50g.
Case dimensions:	68 x 58 x 43mm, white ABS.

Order Code	Type	Price each
DM12N	Miniature PIR	£21.99



01702 554161

PIR LAMPS

Floodlight Security System with PIR

Fox Security



A high-powered floodlight, controlled by a built-in passive infra-red intruder sensor. This practical outdoor security system offers outstanding value for money and at the flick of a switch it can also double as illumination for outdoor events, such as parties and barbecues. When installed, the infra-red sensor provides detection over a wide 110° degrees of arc with a range of 15m. The range of the detector is such that this system is suitable for both commercial and domestic applications, the actual degree of sensitivity being adjustable. When any form of infra-red radiation (e.g. body heat) is detected moving within this region, the halogen tube (supplied separately) of the floodlight is switched on for up to 12 minutes (period adjustable). Not only does the brilliant light provide a deterrent to any would-be criminal, but it also provides a handy automatic light for use when parking the car, bringing in the shopping, avoiding obstacles or finding front door keys. A built-in circuit ensures that the unit does not operate wastefully during the day.

Specification

Power requirements:	240V AC 50Hz at 2.1A
Maximum lamp rating:	500W
Detection range:	50ft (15m) at 20°C
Horizontal detection angle:	110°
Mounting Height:	7ft to 9ft (2.13m to 2.74m)
Floodlight angle:	Adjustable through 180° vertically
PIR sensor unit angle:	Adjustable through 60° horizontally and vertically
Operational modes:	Automatic and manual
Lighting time period:	Adjustable from 5 seconds to (when sensor tripped) 12 minutes (approx.)
Daylight override:	Adjustable threshold
Floodlight housing:	Cast zinc alloy
PIR sensor unit housing:	Fire, water and UV resistant
Environmental protection:	IP44
Recommended cable:	3-core; 6 amp or greater capacity Max dia.: 8mm (see Cables section for suitable types) Entry to unit by cable gland.

Supplied with full fitting instructions. Please note that the halogen tube is not supplied, and must be ordered separately, see next page.

Order Code	Type	Price each
GK05F	F5 I/R Halogen Lamp	£16.99

Wide Detection Angle PIR Detector

Designed to be mounted on the corner of a house or out building, this ingenious device has a 270° detection angle, and is ideal for switching on a halogen lamp and a load rating of 1100W. The detector features adjustable 'time-on' and 'light level' settings. A distance adjustment and manual override are also incorporated.



Specification
 Detection method: Passive infra-red
 Power requirements: 220/240V AC 50Hz
 Power consumption: 1.1W max. (PIR sensor)
 Lighting load: 1100W (max.) incandescent
 Detection range: 12m min. by 200° wide at 20°C
 5m min. by 270° wide at 20°C
 Detection angle: 180°
 Adjustable angle: 22° vertical
 Mounting height: 1.8m to 2m above ground
 Lamp-on time: 5 ±3sec to 12 ±3min
 Housing design: Water-resistant

Order Code	Type	Price each
CR47B	270 PIR	£34.99

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Halogen Floodlight



A product very similar to GK05F above, but without the passive infra-red detector fitted. Please note that the halogen tube is not supplied and must be ordered separately, see below.



Order Code	Type	Price each
ZC33L ³¹⁴⁵	D3 Halogen Lamp	£9.99

240V 300W and 500W Halogen Lamps

High-powered halogen tubes with a brilliant white light (colour temp. 2900°K) which can provide 9000 lumens of illumination for 500W tube and 5000 lumens for 300W tube. To fit standard R7S base, these tubes are suitable for any application where a very bright light is required (for example, video work). Also suitable as replacement bulbs for our Security Light (GK05F). Important note: please avoid touching the glass itself with bare fingers as the grease will reduce the life of the tube. Average life 2000 hours. Overall dimensions: 119.6mm long x 10mm dia.



Order Code	Type	Price each
KP50E ⁴⁸³⁹	300W Halogen Tube	£3.99
JX53H	500W Halogen Tube	£3.99

GLOBE LIGHT

An attractive globe light that automatically comes on, at night, when someone enters the detection range. The built-in PIR detector reacts instantly to body heat and switches on the lamp, after an adjustable period of time, the lamp is switched off automatically. An adjustable, built-in, photocell deactivates the PIR during the day. The light is easy to install and requires an incandescent lamp (maximum 100W), and should be mounted 2m, approximately, above the ground. The detector has an 180° detection angle, a range up to 10m, and can be adjusted vertically through 22°. When motion is detected, the lamp is switched on providing a welcoming light for your family and friends as they approach your home. Intruders do not like unexpected light and will, hopefully, be put-off.



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£24.99 CR46A
(D2)

Specification

Detection method:	Passive infra-red	Detection range:	10m min. at 20°C
Power requirements:	220/240V AC 50Hz	Detection angle:	180°
Standby current:	30mA (max.)	Adjustable angle:	22° vertical
Operating current:	35mA (max.)	Mounting height:	1.8m to 2m above ground
Lighting load:	100W (max.) incandescent	Lamp-on time:	5sec ±3 to 12mins ±3

Mini Floodlight with PIR

Fox Security



A compact high-powered floodlight, controlled by a built-in passive infra-red intruder sensor, similar to our popular standard security floodlighting system (GK05F). Like its bigger brother, this outdoor security system offers outstanding value for money, and at the flick of a switch can also double as a source of general illumination for outdoor events. When the floodlight is installed, the infra-red sensor provides detection over 110° of arc up a distance of 12m. This detection range means the unit is sensitive enough for use in commercial as well as domestic applications; the level of sensitivity being adjustable. In use, when any form of infra-red radiation (e.g. body heat) passes through this detection region, the 150W halogen tube (supplied separately) is switched on, for up to 12 minutes, catching any intruders unexpectedly in a brilliant flood of light. The 'on' time is adjustable from 3 seconds to 12 minutes. The lamp is not only a useful deterrent against intruders at night, it is also a handy automatic welcoming light for you, your family and friends. The lamp is prevented from operating wastefully during daylight hours.

Tube not supplied, requires tube: DM51F

Specification

Operating voltage:	240V AC 50Hz
Maximum lamp rating:	150W
Detection range:	12m (39ft) at 20°C
Horizontal detection angle:	110°
Mounting height:	1.8m to 2m (6ft to 6ft 7in)
Floodlight angle:	Adjustable through 100° vertically
PIR sensor angle:	Adjustable through 60° vertically and 330° horizontally
Operating modes:	Automatic and manual
Automatic lighting period:	Adjustable from 3 seconds to 12 minutes
Daylight override:	Adjustable threshold
Floodlamp housing:	Cast zinc alloy

Order Code	Type	Price each
DM50E ⁴⁸³⁶	F2 Mini Halogen Lamp	£19.99

150W Halogen Tube

Fox Security



A halogen tube rated at 250V AC, 150W, for use with the mini halogen lamp DM50E.

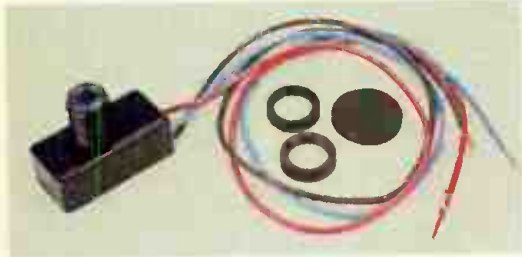
Order Code	Type	Price each
DM51F ⁴⁸³⁷	150W Halogen Tube	£3.99

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PHOTO-ELECTRIC CONTROL



A photo-electric control especially designed for use in both industrial and domestic installations. The photocontrol is manufactured from high quality materials to give a long and reliable performance. The housing is moulded from polycarbonate, for excellent mechanical strength and high impact resistance. The opaque housing eliminates false operation due to light feedback from within the fixture. A clear ultra-violet stabilised window prevents cracking or clouding due to sunlight. A bimetallic switch provides time delay to prevent turn off due to temporary ambient light conditions i.e. car headlights. The 'eye' is weatherproofed, but the body must be mounted in a suitable weatherproof enclosure. The control should be located such that the 'eye' faces away from artificial light sources, and is not illuminated from the light it controls. Requires a panel cut-out 18mm dia., two nuts and gasket included. Overall size 52 x 26 x 41mm (includes 'eye', excludes cables).

Specification

Photocell: 0.75in² cadmium sulphide (surface passivated)
 Switch: Single pole, single throw normally closed
 Lead wires: 1.0mm² to BS6231
 Line = brown
 Load = red
 Neutral (common) = blue
 Lead length: 500mm
 Voltage range: 200V to 300V AC mains
 Standard turn-on: 55 to 70 lux
 Rated load: 1200W incandescent load
 1000VA mercury vapour, high pressure sodium or other H.I.D. load
 Rated life: 5000 operations minimum at rated load
 Temperature range: -40°C to +60°C

Order Code	Type	Price each
KR47B	PhotoElectric Contrl	£10.99

SS4 Photo Electric Switch



This photo electric control unit is designed to switch on at dusk and off at dawn and incorporates a standard photo electric switch and a translucent plastic dome. The switch-on function operates when the light level falls to 70 Lux and the switch-off function operates when the light level rises to 210 Lux. A time delay is incorporated so that car headlights do not cause false operation. The unit will switch all types of domestic and industrial lighting up to 5A max. An entry hole in the connector base is large enough to accommodate a 20mm bush for connection to conduit or MiCC wired system. A continuous live and neutral supply of 240V AC at 50Hz is required. The photocell being factory calibrated, is not variable and is contained in a sealed unit that plugs into a NEMA socket mounted in the wall bracket. The photo cell plug is polarised to prevent incorrect insertion into the socket. Screws and wall plugs for mounting the unit are supplied.

Specification

Light switching levels: 70Lux On, 210Lux Off
 Voltage range: 240V AC, 50Hz
 Max Current switchable: 5A
 Max Power Rating: 1200W
 Standby Current: 30mA

Order Code	Type	Price each
GX12N	SS4 Thermal Ph/Cell	£14.99

SS4E Photo Electric Switch



This photo electric control unit is designed to switch on at dusk and off at dawn and incorporates an electronic control circuit for greater sensitivity, and a clear plastic dome. The switch-on function operates when the light level falls to 70 Lux and the switch-off function operates when the light level rises to 105 Lux. A time delay is incorporated so that car headlights do not cause false operation. The unit incorporates electronic switching which will switch all types of domestic and industrial lighting up to 5A max. An entry hole in the connector base is large enough to accommodate a 20mm bush for connection to a conduit or MiCC wired system. A continuous live and neutral supply of 240V AC at 50Hz is required. Screws and wall plugs for mounting the unit are supplied.

Specification

Light switching levels: 70 Lux On, 105 Lux Off
 Voltage range: 240V AC, 50Hz
 Max Power Rating: 5A
 Power Consumption: 1200W
 Standby Current: 30mA

Order Code	Type	Price each
GX13P	SS4E Elect P/Cell	£19.99

SECURITY LIGHT SWITCHES

Automatic Light Switch

An easy to install PIR (Passive Infra-Red) sensor using the latest techniques, and which reacts instantly to body heat within its detection zone. It can be conveniently used anywhere in the home, will automatically switch lights on whenever someone



enters a room, and turn them off again when the presence of a person is no longer detected. It can also switch on at dusk and is adjustable for darkness level. Saves money on your electricity bills by always ensuring lights are turned off, can also be used as a normal light switch and is suitable for 2-way switching circuits for hallways and stairs.

An adjustable photo-electric cell allows you to set the darkness level at which you want the automatic mode to come into operation. While in automatic mode, the lights will come on as soon as someone enters the room, and remain on while the person is present. When no further presence is detected, the lights are switched off again after a short wait. During daylight hours the unit is inactive, but there is a manual override for normal switching. A 150° wide-angle, multi-zone lens is used for the PIR sensor providing a detection range of 9 metres (30ft), and the unit is protected by a replaceable fuse and will switch up to four 60 watt tungsten lamps, but is not suitable for fluorescent lighting.

The unit is simple to install as it replaces existing light switches, and will fit a standard 16mm deep metal wall box. Comprehensive step-by-step instructions are included.

Warning: not suitable for use outdoors.

Specification

Detecting range: 9 metres with angle of 150°
 Sensor type: Dual element PIR
 Input power: 240V AC @ 50Hz
 Load rating: 250W max., 40W min. incandescent lamps only

Ambient light to darkness sensor type: Photo-electric

Radio frequency interference limits are to BS800, and electrical safety to BS415.

Order Code	Type	Price each
ZB32K	Auto PIR	£24.99

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Automatic Security and Dimmer Switch



An easy to install PIR (Passive Infra-Red) sensor using the latest techniques for ease of use and to give you added security around your home, and which reacts instantly to body heat within its detection zone. It includes a 'touch dimmer' control which lets you set your own light level, and has a manual override for normal on/off control. During automatic mode, the sensor will switch lights on automatically whenever someone enters the room. Continued movement in the room will keep the lights on, and when no further movement is detected the lights will be slowly dimmed until off.

The security mode has two functions, one of which will sense if an intruder enters the room, day or night, and will immediately flash the lights on and off to frighten them, and also attract attention from outside. The other function is a deterrent which switches the lights on and off at random intervals giving the impression that the home is occupied during the hours of darkness, for a duration of up to 8 hours. The flashing alarm function is still active in this mode.

A single touch-button dimmer is used to set the light level required, when released the unit 'remembers' the current level, but there is also a manual override for normal light switch operation. An extensive detection range of 150° is due to the use of a multi-zone lens which detects movement up to 9 metres (30ft) away. The unit is protected by a replaceable fuse and will activate up to four 60 watt tungsten lamps. It is not suitable for switching fluorescent lighting. The 2-way switching facility allows it to be used in lighting circuits for hallways and stairs.

An automatic self check facility flashes the LED indicators and dims the lights when the unit is initially powered-up. The unit is simple to install and connect in place of existing light switches, and fits a standard 16mm deep metal wall box. Comprehensive step-by-step instructions are included.

Warning: not suitable for use outdoors.

Specification

Detecting range: 9 metres with angle of 150°
 Sensor type: Dual element PIR
 Input power: 240V AC @ 50Hz
 Load rating: 250W max., 40W min.
 incandescent lamps only

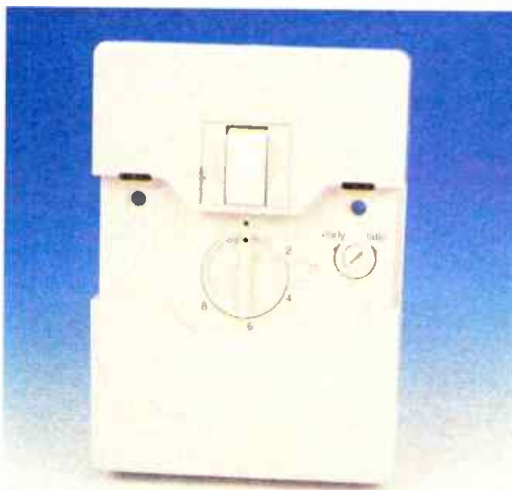
Ambient light to darkness sensor type: Photo-electric

Radio frequency interference limits are to BS800, and electrical safety to BS415.

Order Code	Type	Price each
ZB33L	Auto Dimmer PIR	£34.99

Programmable Security Wall Switch

A single wall switch incorporating a light sensitive controller designed to operate during darkness or whenever required. The controller turns on the light automatically as darkness falls, and will then switch off after any period of time of up to eight hours, as determined by the preset control concealed beneath the sliding front cover. The unit fits standard conduit and surface boxes (screws are supplied), and doubles as a normal light switch. A front panel lamp indicates when the unit is active, and the sensitivity of the light sensor is adjustable to vary the moment of switch on time. Once triggered, the unit waits two minutes before switching on the lights. The unit can also be wired into two-way lighting circuits. Supplied with installation and operating instructions. Front panel is 85mm square. Depth (from rear of main body) 11mm.



Order Code	Type	Price each
MK44X	Security Wall Switch	£19.99

Signal/Burglar Alarm Cable



General purpose 4-core, 6-core and 8-core signal cables ideal for use with security alarms and other applications where low voltages and low currents are being used. The cable contains flexible wires each having seven strands of 0.2mm tinned annealed copper insulated wire.

Specification

Max. working voltage: 60V RMS
 Max. current per core: 1A
 Max. conductor resistance: 92.4Ω/km @ 20°C
 Max. operating temperature: 70°C
 Conductors: 7/0.2mm strands of annealed copper wire conforming to BS6360
 Insulation: PVC to radial thickness of 0.2mm nominal conforming to BS6746
 Sheath: PVC nominal wall thickness 0.5mm

Nominal overall diameter

4-core: 3.5mm
 6-core: 4.1mm
 8-core: 4.5mm

Wire insulation colours

4-core: Red, blue, yellow, black
 6-core: Red, blue, yellow, black, white, green
 8-core: Red, blue, yellow, black, white, green, orange, brown

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR89W	4-Wire Burglar Cable	20p
PA77J B4	100m 4-Wire Burglar	£12.99
XS54J	6-Wire Burglar Cable	28p
PB71N C5	100m 6-Wire Burglar	£17.99
CW70M	8-Wire Burglar Cable	35p
PB80B D7	100m 8-Wire Burglar	£23.99

PERSONAL SECURITY ALARMS

Personal Protector

A very compact personal alarm, in a tough black plastic case. Due to its slim size, it can be easily slipped into a pocket or handbag, carried by hand, or attached to a belt loop or key ring by using the supplied clip. The loud, piercing, 110dB alarm is activated by pulling the rip cord, which removes a plastic plug from its socket. The alarm will sound continuously for up to 1 hour, or until the plug is replaced in its socket. The unit is powered by two 1.5V 'N' size batteries (supplied). Overall dimensions: 80 x 60 x 18mm. Weight: 66g including batteries.



Order Code	Type	Price each
DM37S	Personal Protector	£7.99

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IT'S A FACT!

PERSONAL SECURITY ALARMS

A personal attack alarm is the only deterrent allowed by law. Street crime is on the increase, and those at risk include people who work early or late shifts, walkers, joggers, women, children, the elderly and anybody who travels alone by foot during unsociable hours. The police and consumer organisations recommend the carrying of pocket alarms by these 'at risk' groups as they draw immediate attention to both the victim and the attacker, providing a deterrent to the criminal whilst summoning help. It must be stressed that batteries, where used, should be checked periodically to ensure that the alarm will operate when needed. Since these units can produce extremely loud and piercing alarm signals they should only be used in an emergency and for the shortest time possible. This is because permanent ear damage could result from prolonged exposure. For the same reason it must be ensured that the hearing of children and pets is not endangered.

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PERSONAL ATTACK ALARM

A personal attack alarm is the only deterrent allowed by law, and police officers advise all women to carry a sonic alarm for their own protection. This alarm is recommended for use to anyone alone outdoors, the old and infirm, teenagers, shift workers, tax-drivers, for attracting attention after an accident or as a deterrent against vicious dogs. This alarm uses a gas cartridge to produce an ear-piercing 115dB shriek, just a firm push of the top will set off the alarm, which can be either a short burst or continuous. The continuous deafening sound will last for about two minutes – enough to frighten off the most determined attacker. Once locked on the noise will continue even if dropped. The Alarm is small enough to fit easily into a pocket or handbag, or clipped into a blouse or jacket pocket. The replaceable gas cartridges are available in packs of two and contain no CFC gases and are therefore ozone friendly.



GREAT VALUE!
£5.99
KR18U

KR19V Cartridge x 2 £5.25

Multi-Purpose Pocket Alarm with Light

Fox Security



A handy but reliable device for personal protection. It combines a flashlight with a high-powered alarm. With a durable plastic case finished in two-tone grey, this personal alarm offers two methods of being triggered. The first is simply to move the slide switch towards the wrist strap (Moving it the other way turns on the flashlight). This method is used if the unit is hand-held. The other is to pull out the wrist strap itself, which enables it to be operated quickly if the unit is concealed. There are several uses for this method. For instance the unit could be zipped into a handbag, except for the strap which is wrapped around the owner's wrist. Should theft be attempted, the strap will be separated from its socket activating the alarm and immediately drawing attention to the handbag. The alarm is muted simply by replacing the strap. Other applications include a door or window alarm. The unit is powered by a single PP3 9V alkaline battery (not included) and is supplied with a plastic holder which is used for storage or mounting of the unit when it is used as a door or window alarm. Overall dimensions: 120mm x 47mm x 25mm. Weight with battery: 120g.

Order Code	Type	Price each
ZC39N	Pocket Torch Alarm	£6.99

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Mugger Buster



A handy but reliable device for personal protection, combining a flashlight with a high-powered alarm built into a rugged case. The alarm is provided with a belt clip and a slide switch on one edge. It is finished in mat black with an orange lamp-cover. Sliding the switch toward the lamp provides a steady beam of light. Sliding the switch away from the lamp will sound the alarm and provide a flashing beam of light to attract attention. To de-activate the alarm simply insert the de-activate pin, attached to the wrist-strap, into the de-activate gap. The alarm is powered by three 'AA' size batteries, supplied.

Order Code	Type	Price each
GW54J	Mugger Buster	£9.99

BICYCLE ALARM



This practical and dependable bicycle alarm is designed to secure your bicycle and, hopefully, is an aid against theft. It provides an ear-piercing 110dB alarm when the lock is tampered with or if the steel cable is cut. Four 'Allen key' type screws (a special screwdriver is included) hold the battery cover in place, and the battery compartment is fitted with a tamper switch that is activated when the battery is in position and the lid is replaced. If the alarm switch is 'on' and someone tries to remove the battery compartment cover, the alarm will sound to warn you that the lock is being tampered with, and to help deter a thief. A vibration sensor switch is also located in the battery compartment, and when switched on activates the vibration sensor. When the alarm is switched on and the lock is moved in any way, the alarm will delay for 5 seconds, and then the alarm will automatically sound for 15 seconds. This cycle of 5 seconds 'off' and 15 seconds 'on' will continue only if the lock is continually tampered with. To use the alarm, the cable is firmly locked into the cable locking socket and the 'alarm' button is pushed. A short 'beep' will sound which tells you that the battery has power and the lock is in the armed mode. If a 'beep' is not heard then the battery must be replaced. Once set to 'alarm', there is a 15 second delay time before the alarm will activate, if tampered with. The alarm can be deactivated by turning the cable lock switch and key in a clockwise direction. A mounting bracket is included which is designed to be fixed to a bicycle frame to hold the lock in place. Housed in a black ultrasonically welded case, this lock requires a PP3 9V battery (not included). The steel cable is 6 feet long, allowing the bicycle to be secured to railings, lamp posts, etc. This alarm lock can also be used to protect a wide range of valuable items such as trailers, large lawnmowers, motorbikes, etc.

Order Code	Type	Price each
BZ69A	A1 Bicycle Alarm	£28.49

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UV Bank Note Checker



A mains powered ultra violet bank note checker in a rugged black plastic housing, that is designed for desk or counter use. The note is placed under the UV light and, if it is genuine, it will not reflect the 'blue' light. Fitted with a top mounted on/off switch and approximately 1m of mains lead. Dimensions: 180 x 120 x 75mm.

Order Code	Type	Price each
RZ46A	U.V Money Checker	£9.99

CAR ALARMS
Keyless Delay Alarm



A novel car alarm which should take just a few minutes to install. It requires just the connection of three wires under the bonnet and fixing the alarm horn. One wire bolts to the chassis and the other two are connected in the fusebox. With the ignition off, simply touch the green wire to any fuse. If the LED on the back of the horn lights then the red wire must be connected to that point, if it does not light connect the green wire to that point (though first find a fuse where the LED does light so that you know where to connect the red wire). After about 10 seconds, the alarm will go off. To reset it, switch the ignition on. When the ignition is turned off you have about 1 minute to leave the car and close the door before the alarm is armed. If an interior light then comes on, e.g. through opening a door, boot, bonnet, glove compartment etc. then after about 10 seconds if the ignition key is not turned on, the alarm will go off. The alarm will sound for about 45 seconds then re-arm itself. The horn gives a very loud 110dB tone to warn off intruders. It is very simple to install and you cannot forget to arm it as it works automatically from the ignition key. Note that this product may not function correctly with very low wattage courtesy lights or if a high efficiency maintenance-free battery is in use.

Horn dimensions: 132mm diameter throat, 147mm long. Horn swivels up and down on base.

Order Code	Type	Price each
YN58N A1	Keyless Car Alarm	£16.99

Technical assistance and advice concerning products in the 'Security' section can be obtained by calling one of our helpline staff on (01702) 552911

Vixen Vehicle Alarm Systems

A range of low-cost, high quality, vehicle alarm systems, that includes a compact, easy to install, basic model; a compact expandable model, and a top-of-the-range, battery backed-up, fully expandable system. All the alarms include a small remote control that has an in-built dedicated code. This code can be one of 59,000, programmed into the alarm system during installation. This makes it virtually impossible for another remote control to arm/disarm your alarm. An additional feature of the alarm is a 'self learning' ability, where, on set-up, the alarm memorises the code from the remote transmitter. The alarm can be armed/disarmed from a maximum of two different codes, from two transmitters. Should one of the transmitters be lost or stolen, the alarm can be reprogrammed to accept a replacement transmitter's code, and in the process rendering the lost unit incapable of operating the alarm. Additionally, the remote control also provides a 'panic' facility, this allows the alarm to be activated if you are personally attacked within 100ft of your vehicle. All the alarms feature a very loud 115dB siren, which should deter the most determined thief, and a fully adjustable shock sensor - any attempt to break into the vehicle by breaking a window, will trigger the alarm. Additionally, opening any door, the boot or bonnet resulting in a courtesy light coming on, will also trigger the alarm. Also, all the alarms feature a 'warn away' facility, where a slight disturbance to the vehicle will result in a subdued response, making any potential thief aware an alarm is fitted. This feature also greatly helps reduce false alarms. Should the tampering or disturbance continue after the warn away has sounded, then the full alarm response will be triggered. The alarms can be set to operate with vehicles that have an electric cooling fan that can operate when the ignition is switched off. By cutting one wire, this facility will not cause the alarm to trigger. A range of accessories is also available and includes a remote receiver that can be used to operate house lights or possibly an automatic garage door, if this facility is fitted.

Remote Vehicle Alarm



This low cost alarm is an easy to install one piece design, connected to your vehicle by two wires. When programmed with the remote control code, the alarm is installed and is ready for use. A third wire should be connected to the ignition switch, so that the alarm cannot be armed when the engine is running. When armed, any forced entry into the vehicle which will turn on an interior light, or any sudden 'shock' to the vehicle, will cause the alarm to be triggered. Additionally, the alarm features a 'warn-away' function which is set by pressing the remote control button twice. When the shock sensor is triggered, a warning tone will tell the thief to back-off. If the shock sensor is triggered more than twice within 15 seconds, the alarm will be triggered. This effective alarm comes with comprehensive fitting instructions, fixing kit, remote transmitter and warning stickers. A spare remote transmitter (ZF48C) is also available.

Order Code	Type	Price each
ZF47B A1	Remote Vehicle Alarm	£29.99
ZF48C	Vehicle Alarm Xmitter	£9.99

Expandable Remote Vehicle Alarm with Battery Back-up



A top-of-the-range vehicle alarm system that incorporates all the features of CR36P including LED status indicator, built-in parking light flasher, plus an in-built engine ignition disable facility. The lead from the ignition switch to the ignition coil is cut and the two leads are connected to two wires on the alarm. When the alarm is armed, the ignition coil is disabled, the engine will turn, but will not start. An alkaline 9V PP3 back-up battery (not included) provides additional security. When armed, if the main power, or earth, connection to the alarm, is broken then the alarm will be triggered. A key operated switch is provided on the back of the alarm that will bypass all the alarm functions when operated, this is convenient when the vehicle is being serviced or valeted. The alarm requires only five leads to be connected to be operational. To provide comprehensive protection to your vehicle, an output is also provided for connection to the remote switch module AM26D. The range of optional extras that can be used with this alarm provides a very comprehensive and sophisticated vehicle alarm system. Complete with comprehensive fitting instructions, fixing kit, remote transmitter and warning stickers. A spare transmitter (CR43W) is also available.

Order Code	Type	Price each
CR37S C2	Car Alarm With Batt	£64.99
AM26D	Relay Module	£5.99
CR43W	Spare Transmitter	£9.99

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Vixen 152 Portable Car Alarm with Remote Control



A simple but effective car alarm which does not require permanent installation. Suitable for any car, van, truck, etc. and can be swapped between two or more vehicles. The main unit takes its power mainly from a standard cigarette lighter socket via a coiled lead, but also contains its own back-up battery which will power the built-in alarm siren if it is disconnected. A green LED indicates the state of the back-up battery, while a red LED shows that the main supply is present, and doubles as an armed state indicator. It is armed and disarmed by a remote keyring transmitter, using a UHF radio link instead of the infra-red method. The transmitted code is unique, and a processor in the main unit interprets the code upon arming, and then expects to receive the same code for disarming. In this way another keyring transmitter, even of the same type, cannot disarm the alarm. It is mounted internally somewhere near the dashboard either on velcro or clipped onto a dedicated mounting bracket (supplied). The alarm is triggered by physical shock to the vehicle, or by detecting a voltage drop in the vehicle's electrical supply. The latter can be configured to delay current sensing for 3 minutes after arming, necessary if the vehicle has an electric cooling fan which does not switch off immediately when the ignition is switched off and the key removed.

The keyring transmitter has two buttons, the first of which is the arm/disarm button, and two alarm modes are possible. If the button is pressed once, the alarm will be armed in 'normal' mode, that is, after a 3 second 'settling' period the alarm will sound for 30 seconds and reset if disturbed by a physical shock or voltage change. If the button is pressed twice (within 3 seconds) during arming, the alarm adopts 'warning' mode where, if triggered, a warbling sound is generated as a pre-warning to intruders. If disturbance continues or is repeated more than 3 times over the next 20 seconds then the proper siren will be activated. In addition a 'panic' function is included where the siren is sounded regardless simply by holding down button #1 on the keyring for more than 3 seconds. The siren will beep once when armed. When disarmed the alarm will indicate whether it was triggered in your absence by beeping 4 times, if not, it only beeps twice. The unit also has a 5W white light built into the body which will be illuminated when disarmed. This can be useful as a secondary courtesy light prior to opening the car door. Button #2 on the keyring transmitter is used to control this light independently and can therefore provide a light for use at any time for map reading, etc. The sensitivity of the shock sensor is adjustable using the supplied trimmer tool. Also supplied are wire and snap-lock automotive cable connectors for re-wiring the cigarette lighter socket to a permanent 12V source if it is not already so connected. The lighter plug of the main alarm unit also incorporates a fuse. Two keys are also provided for the on/off keyswitch on the main unit,

EXPANDABLE REMOTE VEHICLE ALARM

An expandable version of the basic model that features two pin switches to provide protection for the boot and bonnet. An LED status indicator is included that, when mounted on the dash provides a very visible indication that the alarm is active. Additionally, the alarm has a high-current pulsed output that is used to 'flash' sidelights, indicator lights or dipped beam headlamps, in fact any lighting load up to 10A. The alarm has a grounded trigger input that can be used with an ultrasonic detector or the very sensitive motion detector. Additionally, an output is provided to operate the remote door lock interface. When used in conjunction with central door locking this facility allows all the doors to be locked and unlocked when the alarm is armed and disarmed. Power door lock motors are available to incorporate this feature into vehicles without central locking. Finally, to provide comprehensive protection to your vehicle, an output is provided for connection to the Maplin remote power switch module (AM26D). This unit is used to disable the starter when the system is armed, thus making it virtually impossible to start the vehicle. The contacts are rated at 10A, and connection to the remote power switch is via on-board screw terminals.



GREAT VALUE!
£54.99 CR36P
[B1]

The alarm remote control features two buttons – the upper button is used to arm/disarm the system, activate the 'warn away' facility and for personal attack. The second button is used to deactivate the built-in shock sensor circuit. This high quality vehicle alarm system comes with a comprehensive instruction manual, fixing kit, remote transmitter and warning labels.

CR43W Spare Transmitter £9.99, AM26D Relay Module £5.99

and a 12V battery in the keyring transmitter. Main unit requires alkaline PP3 battery (not supplied) and is available separately (Order Code JY49D). Please note: The car alarm will only work with cars that have functional cigarette lighters when the ignition is switched off. To check if the alarm is suitable, push the cigarette lighter in with the ignition switched off, if it does not get hot then the alarm is not suitable for your car.

Order Code	Type	Price each
CJ77J B	Portable Car Alarm	£39.99

Vixen Vehicle Alarm Accessories

This range of accessories (except the remote receiver) are designed to operate with the expandable vehicle alarms and cannot be used with ZF47B.

Compact Ultrasonic Detector



A compact one-piece unit that will detect the breaking or removal of glass, and will sense intrusion or movement within the vehicle. The unit incorporates adjustable sensitivity and an LED that is used for

testing the unit. The small size makes it ideal for siting the unit on a parcel shelf or dash providing a very visible deterrent. The detector is easy to install requiring just three leads to be connected, one to a positive (+) 12V DC, one to earth and one to the alarm system. Supplied with 1m of 3-core cable. Size 85 x 60 x 30mm.

Order Code	Type	Price each
CR38R	Comb U/sonic Detect	£21.99

Very Sensitive Motion Detector



A very sensitive, adjustable, motion detector that will detect anyone trying to force a door, a bonnet or boot, or attempt to raise the vehicle, in order to illegally remove the wheels or tow the vehicle away. Complete with 1ft of three core lead. Size 154 x 26 x 25mm.

Order Code	Type	Price each
CR4CT	Motion Detector	£4.99

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Ultrasonic Detector with Separate Sensors



An ultrasonic detector with detached sensors attached to the control box by leads 2.5m long. The small control box can be fixed in any convenient position such as under the dash or in the boot. The two sensors can be mounted at suitable positions inside the vehicle. The control box is fitted with a test LED and adjustable sensitivity, and requires three leads (5m long) to be connected; two to the battery supply and one to the alarm system.

Order Code	Type	Price each
CR39N	U/Sonic Det and Sens	£26.99

Remote Door Lock Interface



This device is intended to interface the alarm system with a vehicle's central door locking system. When the alarm is armed the doors will automatically be locked and unlocked when the alarm is disarmed. The door lock pulse time can be increased from 0.6 to 3.6 seconds, for cars that require a longer pulse time. It is important to ascertain the type of door locking mechanism fitted to your vehicle e.g., plungers, vacuum, relay etc., so that the module can be installed correctly. Some vehicles may require extra external relays to suit the vehicle's requirements.

Order Code	Type	Price each
CR41U	Remote Door Lock Int	£15.99

Door Lock Motor Kit



A kit to convert a car that does not have central locking, into power locking, so that the doors can be locked automatically when the alarm is armed. A kit will be required for each door, and each kit includes a motor, mounting bracket, screws, connector rod, 2.5m of connecting cable and a rubber tube to protect the cable as it passes from the door into the body of the car. Requires the remote door lock interface CR41U. Supplied with full fitting instructions.

Order Code	Type	Price each
CR42V	Door Lock Motor	£11.99

Push Switch with Cover

A push-to-open switch with weatherproof cover for use in motor vehicles. Suitable for use with alarm systems as a door, boot, bonnet sensing switch, or simply as a courtesy light switch operated by a door or the boot lid. The switch is provided with a standard 1/4 in. blade terminal for accepting push-on receptacles, such as HF10L, and notches in the push rod as a guide for cutting to fit any installation. Maximum throw is 6mm

Order Code	Type	Price each
AY07H	Pin Sw With Cover	£1.20

Passive Starter Interrupt System



A simple to install passive starter interrupt that provides additional protection for your car. When the unit is activated, the LED status indicator flashes when the ignition is turned off. To start the car the driver must briefly activate a designated switch to disarm the unit - the driver will have 15 seconds to start the car. The process can be repeated if the car does not start within 15 seconds. A valet switch is included to override the unit for servicing.

Order Code	Type	Price each
AG89W	Interrupt Starter	£14.99

Remote Receiver



This receiver can be used to control an electric garage door opening system, exterior house lights etc., by pressing the button on your remote transmitter, as

supplied with the CR36P and CR37S alarm systems only. Alternatively, a second transmitter can be purchased if preferred (CR43W). The receiver can switch up to 10A, and can be programmed to provide a momentary pulsed output, a latching output, a 60 second timed output or a 3 minute timed output. The receiver has a range up to 150ft and requires a 12V DC power supply. Fitted with 1.5m of connecting cable. Size 100 x 72 x 33mm. Please note that the remote receiver is NOT supplied with a transmitter. Maximum switching voltage is 50V. A suitable rated slave relay will have to be used if mains operated

Order Code	Type	Price each
CR44X	Remote Receiver	£22.99
CR43W	Spare Transmitter	£9.99

MODULAR CAR ALARM SYSTEM

A very comprehensive range of sophisticated car alarm systems and accessories which offer a great deal of protection to any vehicle. The need to fit a good alarm system is becoming ever-increasingly apparent as every hour, day and night, 300 cars are affected in some way by the attention of criminals, and the problem is worsening. There are four alarms in the range, which may be connected to a range of sensors. N.B. when the vehicle is sent in for servicing or repair, the agent must be informed of the existence and correct operation of the alarm system.

IMPORTANT NOTE: THESE ALARM SYSTEMS CAN BE FITTED TO NEGATIVE EARTHED VEHICLES ONLY. If in doubt, please consult your vehicle handbook or local dealer.

There are four models of alarm in this range. All feature the following:

1. Uniquely coded remote control for instant arming/disarming of the system from the vicinity of the protected vehicle. This remote control is of very compact size (overall dimensions: 50mm x 34mm x 14mm) and doubles as a keyfob. It is powered by a 12V VR22Y type battery. When installed, headlamps or indicator lamps (depending on alarm model) will flash and the alarm will sound momentarily to confirm arming/disarming.
2. The alarms have minimal current consumption and can be left fully armed for extended periods.
3. Current sensing. If, for example, a door is opened and the courtesy lamps (which need to be rated at 10W minimum) come on, then the resultant voltage drop is detected and this triggers the alarm. The system has provision to ensure that the engine cooling fan (where fitted) does not trigger the alarm.
4. Powerful 120dB siren (not MS605) to attract attention to the vehicle and the criminal. The alarm system can also be connected up to the headlights or indicators (not MS605) to provide visual indication that the alarm has been triggered, and to indicate which car in the street has been violated.
5. Each alarm is controlled by a powerful dedicated microprocessor, to ensure consistent and reliable operation.
6. Automatic switch-off after operating for a pre-determined period (the length of this period is dependent on the alarm model) in order to conserve battery power and avoid causing excessive disturbance to the community. They also re-arm themselves ready to detect further interference.
7. In an emergency, the alarm can be triggered from outside your car to attract attention or help.
8. Supplied with cable harness (approx. 2.5m in length), all fuses and a rubber cover which clips over the rear of the alarm to provide weather resistance to the connections.
9. Stickers supplied with the unit, which can be fixed in prominent positions to indicate the fact that a sophisticated alarm has been fitted to the vehicle.

HOT TIP

Do not forget to have your car windows security etched, and if you have not got one already, fit a locking petrol cap as well.

Specification

	MS605	MS706	MS725	MS707
Supply voltage:	12V DC	12V DC	12V DC	12V DC
Supply fuse rating:	15A	15A	15A	15A
Headlamp fuse rating:	10A	10A	10A	10A
Ignition relay capacity:	-	-	10A	-
Arming Delay:	10 sec.	10 sec.	30 sec.	30 sec.
Siren SPL (at 1m):	-	120dB	120dB	120dB
Reset Time:	5 sec.	5 sec.	5 sec.	5 sec.
Alarm Time:	60 sec.	30 sec.	60 sec.	30 sec.
Height:	76mm.	87mm.	100mm.	87mm.
Width:	76mm.	112mm.	100mm.	112mm.
Length:	146mm.	105mm.	157mm.	105mm.
Sensors:				
Ultrasonic:	MS702, MS703 or MS704 unit	Supplied with MS711	MS702, MS703 or MS704 unit	Supplied with extra MS711
Pin switch:	-	-	2 extra MS711	2 extra MS711
Output interfaces:				
Central locking door:	-	MS718	MS718	MS718
Electric window lift:	-	-	MS717	MS717

MS605 'Quick-Fit' 2-Wire Remote Control Car Alarm

Moss



A 'quick-fit' vehicle alarm system that only needs two holes drilled and two wires connected to install in your car. The alarm is fitted with a distinctive multiple sound pattern siren, to allow you to easily identify your own alarm, if activated. Added protection is provided by adjustable shock sensing that detects shock or vibrations to the vehicle and triggers the alarm. An ultrasonic sensor may be added to the system to provide extra protection if a door is opened or a window is broken. Supplied with comprehensive instruction/installation manual.

Order Code	Type	Price each
BA65V B1	Car Alarm MS605	£59.99

MS706 Remote Control Car Alarm with Ultrasonic Interior Detection

Moss



A comprehensive alarm system which, in addition to features 1 to 9 above, includes an ultrasonic interior sensor module which detects the presence of anybody in the car and also whether windows have been

broken. This ultrasonic detector unit also features a bright red LED to tell the outside world that the alarm is armed. There is also an orange LED on this unit which glows when an intrusion is sensed. There are also inputs for switch sensors, they enable the boot, bonnet and doors to be linked into the alarm system. These switches are available in packs of 2 (Order Code KU17T). In addition an interface is available (MS718) which connects this unit to the vehicle's central locking system (where fitted) so that it may be locked or unlocked when the system is armed or disarmed by remote control. The alarm takes the form of a 120dB piezoelectric siren accompanied by the indicator lights flashing. Supplied with instruction and installation manuals, wiring harness and sleeve, ultrasonic sensor unit, all mounting hardware, two window warning stickers and two remote controls.

Order Code	Type	Price each
GL04E B2	Car Alarm MS706	£99.99

MS725 Remote Control Car Alarm with Engine Immobilisation

Moss

A versatile microprocessor-controlled vehicle alarm that has in addition to 1 to 9 above, many other features including engine immobilisation (when the alarm has been triggered) and accessory protection. If any attempt is made to remove mobile phones, radio/audio equipment and fog/spot lights then the alarm will be triggered. There are inputs for ultrasonic interior sensors (MS702, 3 and 4) and switch sensors, two provided (additional pairs are available, MS711). If you should forget to arm the alarm, then automatic last door arming arms the alarm after everyone has left the car. There is provision for a MS718 central locking interface to be connected, which will enable cars with central locking to be remotely locked and unlocked when the system is armed or disarmed. MS717



interface allows control of electric windows if fitted. To help with installation, a free video is included as well as self-diagnostic checking. During installation, the alarm will automatically locate and identify any faulty sensors. Supplied with comprehensive instruction and installation manuals.

Order Code	Type	Price each
BA64U B3	Car Alarm MS725	£109.99



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MS707 Programmable Remote Control Alarm

Moss

A very sophisticated top-of-the-range user-programmable car alarm system controlled by a built-in microprocessor with a battery-backed memory. It incorporates all the features listed as 1 to 9 on previous page, but includes many refinements and conveniences. An ultrasonic intruder alarm is supplied for fitting into the passenger compartment, and this item features a bright red flashing LED to indicate to passers by that an armed alarm is fitted. A green LED is also fitted, which glows when the system is detecting an intrusion. Additional sensors can be fitted including pin switches (MS711 type), of which two are supplied (There is no limit to the number of these that can be fitted). Actuators which can be connected are vehicle central locking systems via the MS718 interface, and electric window motors which are connected up using the MS717 window lift interface. Thus the vehicle can be unlocked or locked, and the windows closed, by remote control whenever the system is armed or disarmed. A useful feature is the personal security alarm which may be triggered from the remote control in an emergency. The built-in microprocessor provides several important features and user-programmable attributes. These include:



1. Self-diagnostic system, operated whenever the system is powered up. This will check each sensor in turn to see if any are damaged or triggered, and will indicate the offending item by means of a red LED mounted on the ultrasonic sensor.
2. Manual sensor bypass. This allows the user to turn on or off any sensor as required.
3. Automatic sensor bypass. This allows faulty or triggered sensors to be bypassed. Before this can be done, the user is alerted to the problem by the automatic diagnostic system. Another feature is that the user can program the alarm to ignore a particular sensor after a set number of triggers, this number being user-definable between 1 and 15.
4. Triggered sensor indication. When the alarm has sounded, the red and green LEDs on the ultrasonic sensor flash in unison to inform the user as to which sensor(s) triggered the alarm.

Other features provided by this alarm system include a circuit to protect any accessories installed in the vehicle (radio and stereo equipment, mobile phone and additional lights where fitted), and an engine immobilisation facility which disengages the starter solenoid when the alarm has been triggered. There is also a 'last-door arming' innovation which automatically arms the alarm as soon as the ignition has been turned off and the driver's door has been opened/closed. This sophisticated alarm system is provided with a VHS videocassette (which shows step-by-step installation, programming and use of the alarm), instruction and installation manuals, wiring harness and rubber sleeve, ultrasonic sensor unit, programming button, full mounting hardware, two switch sensors and two remote control units.

Order Code	Type	Price each
GL05F B3	Car Alarm MS707	£149.99

MS711 Switch Sensors

Moss



These are spring-loaded 'pin' switches normally fitted so that when the boot, bonnet or doors are opened, there is no weight acting against the spring which forces the switch contacts together, triggering the alarm. In such applications, they have a 'normally open' action. They require a 12mm and a 2.5mm hole to be drilled in the chassis metalwork, and please note, with these alarm systems the metalwork (ground) is connected to one pole of any pin switch fitted. Therefore, if the switch is mounted on plastic or fibre-glass a wire will be required from this pole to ground (the 'negative' side of the battery). Supplied with full mounting instructions, hardware and two spade connectors. Available only in packs of two.

Order Code	Type	Price each
KU17T	Switch MS711	£4.25

Ultrasonic Sensors

Moss



A range of ultrasonic sensor units for the MS605 and MS725 alarms. Each unit features two ultrasonic transducers. One transmits a constant stream of harmless ultrasonic sound waves that are reflected off every interior surface of the vehicle in which it is installed, forming a unique 'pattern'. The other transducer receives the reflected ultrasound and if the pattern is disturbed by, for example, windows being broken or doors being opened, then the alarm will be triggered. Each unit has a sensitivity control to compensate for various car sizes and fitting locations. There are three ultrasonic sensors in the range: MS702. This model has both transmitting and receiving transducers in the same compact unit, which are set at angles to each other. As a result, there is only one component to fit and this simplifies installation, which would normally be on the dashboard or parcel shelf. A scanning red LED array is fitted which indicates that the alarm is set, and thus provides a highly visible deterrent to thieves. This can be turned off when not required in order to conserve power. Full fitting/set-up instructions, all leads and mounting hardware are supplied.



MS703. An ultrasonic sensor unit very similar to MS702 above, except that the alarm status is indicated by a single red LED only. Supplied with mounting

hardware, all connecting leads and full instructions. MS704. A very compact ultrasonic sensor system which can be installed almost anywhere in the vehicle. It consists of separate 'micro' transmitter and receiver units which are designed to be as unobtrusive as possible. Each unit can be mounted in the dashboard, or anywhere with sufficient depth. Alternatively, the outer casing and flange can be removed from each unit which allows them to be fitted into almost any small space. These are connected by screened cable to a control module which contains all the electronics and interfaces to the main alarm system, and this unit can be hidden out of the way. A small LED is fitted to the ultrasound transmitter to indicate when the system is armed. The system is supplied with a comprehensive manual, mounting hardware and all connecting leads.



Order Code	Type	Price each
ZC26D	Ultra Sensor MS702	£29.99
ZC27E	Ultra Sensor MS703	£24.99
ZC28F	Ultra Sensor MS704	£29.99

Actuator Interfaces for MS Series Car Alarms

It must be stressed that the following units allow electric window and central locking systems where fitted to be integrated into the alarm system. They will not provide such features to cars not already equipped with them!

MS718 Central Door Locking Interface

Moss



This unit will enable a MS706, MS707 or MS725 alarm system to lock or unlock the doors of the vehicle when the system is armed or disarmed by remote control. It connects directly to the existing central door locking motor or compressor. A manual and video are supplied which gives full instructions for installation and use. All connecting leads are included.

Order Code	Type	Price each
ZC30H	Door Lock Interface	£21.99

MS717 Electric Window Lift Interface

Moss



This unit has been designed for use with the MS707 and MS725 alarm systems. When fitted to a vehicle with electric windows, the alarm system can close them when the system is armed by remote control. It connects directly to the window motor, the operation time is adjustable. The unit is supplied with a comprehensive owner's manual, and all the required cables. Each unit will operate two windows, and is very straightforward to install.

Order Code	Type	Price each
ZC29G	Window Lift Intface	£24.99



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RADIOS

Miniature FM Radio

This miniature, auto-tuning, FM radio receiver is a product of state of the art miniaturisation and produces a quality of reception that is normally only expected from radios many times its size. This little radio is provided with an 'on/off' switch, a 'seek' button and a 'reset' button and a pair of earphones, attached to 800mm of cord, that also doubles as the aerial. The 'seek' and 'reset' buttons are used for tuning. To



operate, the 'reset' button is pressed once. This sets the frequency at the low-end of the tuning range (i.e. 88MHz). Then the 'seek' button is pressed once for each station that is automatically tuned in to, until the desired station is found. If you have a favourite station, then tuning in is not required every time the radio is switched on, as the last station selected is always remembered when the power is switched off.

Frequency range: 88MHz to 108MHz (FM)
Power source: 1 x 3V lithium button cell
Type CR2032 or equivalent (supplied)

Dimensions: 36 x 26 x 10mm
Weight: 23g

Order Code	Type	Price each
CJ05F	Mini FM Radio	£14.99

Multiband Stereo Radio with Frequency Synthesis Tuning



A stylish, compact, feature-laden and very sensitive radio receiver that offers superb value for money. In addition to long, medium and VHF bands, this unit offers coverage of 12 short wave bands which cover 2.3MHz to 26.1MHz as well as continuous operation from 150kHz to 29.999MHz. The frequency in use is displayed on a large, clear LCD display which also functions as a 24 hour clock. This display has a back-light facility so that the display can be read clearly under poor lighting conditions. There is a built-in beat frequency oscillator (BFO) which enables AM single-sideband (SSB) and continuous-wave (CW) transmissions to be recovered, and an AM bandwidth selector which achieves a compromise between audio bandwidth and selectivity when this type of demodulation is being used. There is also a 5-LED signal strength meter, an RF gain control and although a telescopic aerial is fitted there is a socket for an external aerial.

Specification	
Receiver type:	Dual conversion superheterodyne
Frequency	VHF/FM: 87.5MHz to 108MHz
Coverage:	LW/AM: 150kHz to 281kHz
	MW/AM: 520kHz to 1620kHz, Continuous coverage(AM): 150kHz to 29999kHz
SW/AM:	Subdivided into 12 bands.
120m Band:	2300kHz to 2500kHz
90m Band:	3200kHz to 3400kHz
75m Band:	3900kHz to 4000kHz
60m Band:	4750kHz to 5060kHz
49m Band:	5800kHz to 6200kHz
41m Band:	7100kHz to 7500kHz
31m Band:	9500kHz to 9900kHz

25m Band:	11650kHz to 12050kHz
19m Band:	15100kHz to 15600kHz
16m Band:	17550kHz to 17900kHz
13m Band:	21450kHz to 21850kHz
11m Band:	5600kHz to 26100kHz

Power supply: Six 1.5V 'D' cells (alkaline recommended) for radio (or 9V at 400mA min. connected to DC IN jack via 2.5mm power plug, the positive pole being connected to the barrel of the plug).

Two 1.5V 'AA' cells (alkaline recommended) for clock.
IF frequencies: 1st AM IF: 55845kHz
2nd AM IF: 450kHz FM: 10.7MHz
AM: 50dB FM: 60dB

IF suppression:
AM suppression (on FM): 30dB

Stereo channel separation: 25dB
Tone control: Bass: ±8dB at 100Hz
Treble: ±8dB at 10kHz

Output power: 1.2W (DIN) at 10% distortion
Antenna: Ferrite rod for LW/MW (150kHz to 1620kHz) Telescopic rod for SW (1620kHz to 29999kHz) and VHF (87.5MHz to 108MHz).

Connectors for: 9V DC 2.5mm barrel plug (centre at 0V)
Stereo earphones(3.5mm jack)
5-pin DIN (for amplifier/tape recorder) Output 1mV at 1kΩ
Antenna socket (Phono connector) for SW/VHF

Overall Dimensions: 160mm (H) x 315mm (W) x 70mm (D)

Supplied with instruction book, directory of broadcast stations, shoulder strap and 75Ω coax. to phono plug adaptor. Batteries are not supplied.

Order Code	Type	Price each
GK85G	F3 Multiband Radio	£114.99

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HEADPHONES

Replacement Foam Earpads

A selection of various shaped foam earpads. Can be used as replacements for the original pads on lightweight personal stereo headphones, which invariably perish with old age. All sold in pairs.

Miniature Range

Five different sizes of foam pads, all in black.

In the table below, 'round' and 'square' refer to the shape of the outer edge, either half-round or flat sided. All are circular

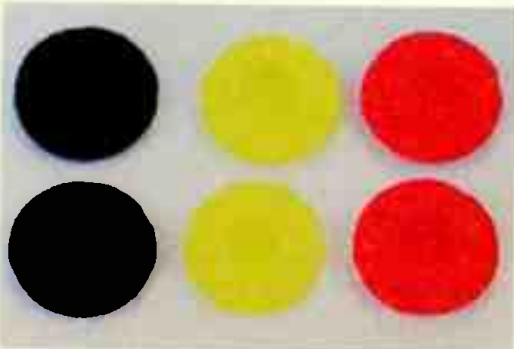
except 'oval' type, which is genuinely oval in shape with half-round edge. Dimensions stated are internal diameter x internal depth x width of overlapping edge at rear, approximately.



Type	Inner dimensions dia. x depth x edge	
Large round:	50 x 5 x 7	JZ34M
Medium round:	43 x 6 x 10	JZ35Q
Medium oval:	46/40 x 5 x 15	ZB97F
Small round:	30 x 7 x 9	ZB98G
Small square:	30 x 7 x 9	JZ36P

Order Code	Type	Price each
JZ34M	Lrg R Earpad	80p
JZ35Q	Med R Earpad	75p
ZB97F	Med O Earpad	75p
ZB98G	Sml R Earpad	65p
JZ36P	Sml S Earpad	65p

Inner-ear Range



Very small foam earpads for inner-ear type headphones. Size is 15 x 4mm (internal) with 5mm wide rear overlap. Three different colours available: black, red and yellow. Sold in pairs.

Order Code	Type	Price each
JZ30H	Earpad Black	49p
JZ32K	Earpad Red	49p
JZ33L	Earpad Yellow	49p

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Stereo Headphone with Boom Microphone

A stereo dynamic headphone with adjustable headband and a dynamic microphone on an adjustable boom. The membrane type driver diaphragms are mounted in back vented plastic shells with foam padded ear pieces. The phones have 2.5 metres of cable terminated in a standard 1/4 in. stereo jack plug with strain relief sleeve. The microphone can be detached if required, and is fitted with 2.5 metres of cable terminated in a mono 1/4 in. jack plug with strain relief.



Headphones
Impedance: 32Ω
Sensitivity: 95dB/mW
Frequency response: 20Hz to 20kHz
Nominal input: 1mW
Max input: 100mW

Microphone
Impedance: 500Ω
Sensitivity: -82dB (56mV)
Frequency response: 200Hz to 5kHz

Order Code	Type	Price each
YJ85G A	Stereo Mic Hdphone	£28.99

Stereo Headphone with Microphone

A stereo headphone with an adjustable leather effect headband, and a 19mm diameter dynamic microphone on a bendable PVC sleeved boom. The boom is mounted on a swivel base on the left-hand ear pad shell. The 40mm diameter mylar speakers are mounted in black plastic shells with leather effect foam filled ear pads. The phones have 2.2m of flat cable terminated in a 3.5mm stereo jack plug for the ear phones, and a 3.5mm mono plug for the microphone. The microphone is a low impedance dynamic type as opposed to an electret type, so no energising battery is required. However, a suitable low impedance microphone preamplifier will be required.

Headphones
Impedance: 32Ω ±15%
Rated power input: 30mW
Maximum power input: 100mW
Frequency response: 40Hz to 12kHz
Right/left balance: <3dB
Total harmonic distortion: <3%



Sound pressure level: 92dB ±4dB (@ 1mW CNS)

Microphone
Impedance: 200Ω
General
Weight: 100g (without cable)

Order Code	Type	Price each
CJ10L A	Stereo Headset + Mic	£18.49

Stereo Earphones

NEW!



A low cost stereo earphone that is suitable for all portable personal stereos, and attractively finished in black. There is no headband and the small transducers sit comfortably in the ear. The compact design offers very good sound quality, particularly in the bass region, and the earphone is supplied in a tough plastic case, making them ideal for travelling. The 1.1m lead is terminated in a gold-plated 3.5mm jack plug.

Specification
Impedance: 22Ω to 32Ω
Frequency range: 20Hz to 20kHz
Maximum power input: 60mW
Sensitivity: 96dB spl at 1kHz

Order Code	Type	Price each
DK95D	Stereo Headphones	£4.99

Earphones



A light-weight pair of personal stereo earphones that sit comfortably in the ear and have an adjustable headband. The 1.2m long lead is terminated in a 3.5mm right-angle stereo jack plug. Suitable for use with all types of personal radios, cassette players, etc.

Specification
Type: Dynamic
Impedance: 32Ω ±5%
Sensitivity: 98dB S.P.L. at 1kHz
Frequency response: 20Hz to 20kHz

Order Code	Type	Price each
CJ09K	Earphones	£3.99

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Lightweight Stereo Earphones

NEW

An extremely lightweight stereo dynamic earphones with adjustable headband and suitable for use with digital audio sources. The earphones are very comfortable and offer good quality at a reasonable price. The 1.2m lead is terminated in a 3.5mm jack plug. Supplied with black earpads.



Specification

Impedance: 32Ω
 Frequency range: 20Hz to 20kHz
 Sensitivity: 98dB spl at 1kHz

Order Code	Type	Price each
RJ97F	L/Weight Earphones	£5.99

CD Compatible Bass Earphones

A set of high-quality stereo inner earphones with bass emphasis ideally suited for listening to CD players. These lightweight sensitive units come with 1m of lead terminated in a right-angle 3.5mm jack plug.



Specification

Type: Dynamic
 Driver units: 15mm dia. dome
 Impedance: 32Ω
 Sensitivity: 100dB at 1kHz
 Power handling capacity: 10mW
 Maximum input power: 40mW
 Frequency response: 20Hz to 20kHz

Order Code	Type	Price each
CJ12N	Bass Earphones	£4.99

Universal Mini Headphones

A light-weight pair of personal stereo type miniature headphones with washable round black foam earpieces and adjustable headband. The 1 metre long lead is terminated in a 3.5mm stereo jack plug. Suitable for use with all types of personal cassette players and radios etc.



Impedance: 32Ω ±15%
 Drive units: 27mm mylar diaphragm
 Input power: 50mW max

Order Code	Type	Price each
ZB91Y	Mini Phones	£4.49

EARPHONES WITH COBALT SPEAKERS

A high quality stereo earphone with samarium cobalt speakers for superb sound quality and suitable for all portable personal stereos, CD players and digital sound. The compact design offers a wide frequency response and high sensitivity. Finished in black and supplied in a tough plastic case for protection when not in use. The 1.3m lead is terminated in a gold-plated 3.5mm jack plug.



Specification

Impedance: 22Ω to 32Ω
 Frequency range: 15Hz to 20kHz
 Maximum power input: 60mW
 Sensitivity: 103dB spl at 1kHz

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 RZ93B

NEW

Educational Headphones

A low cost durable mono headphone suitable for general purpose use, especially suited to an educational environment. The padded ear pieces are adjustable and the headband is in black plastic. Supplied with 1m approx. of coiled cable terminated in a 1/4 in. mono jack plug.

Impedance: 600Ω
 Frequency range: 30Hz to 18kHz
 Sensitivity: 105dB/mW



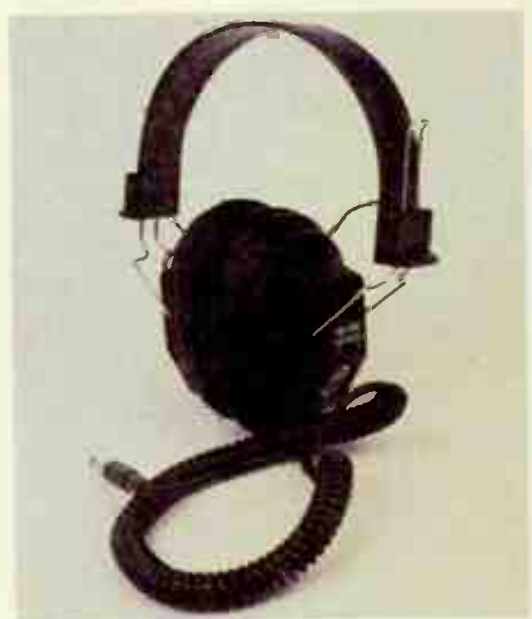
Order Code	Type	Price each
CP51F	Educate Phones	£4.99

Low Cost Stereo Headphones

A stereo dynamic headphone with adjustable headband suitable for general purpose use. The headphones can be switched to mono, and the long coiled lead is terminated with a 3.5mm stereo jack plug. An adaptor to connect to a 1/4 in socket is included. These low cost headphones are very sensitive and have a wide frequency response.

Specification

Sensitivity: 105dB S.P.L. @ 1kHz
 Frequency response: 20Hz to 18kHz
 Impedance: 32Ω ±5%



Order Code	Type	Price each
BZ58N	Low Cost Headphones	£5.49

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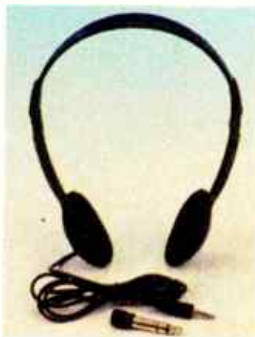
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Lightweight Stereo Headphones

NEW!

A lightweight stereo headphone with adjustable headband and suitable for use with digital audio sources. The headphones are very comfortable and offer good quality at a reasonable price. The 1.2m lead is terminated in a 3.5mm jack plug and a converter plug is included for 1/4 in jack sockets.



Specification

Impedance: 22Ω to 32Ω
 Frequency range: 20Hz to 18kHz
 Maximum input power: 100mW
 Sensitivity: 101dB spl at 1kHz

Order Code	Type	Price each
RJ96E	L/Weight Headphones	£4.99

CD Compatible Headphones



A pair of high quality headphones intended for listening to compact disc and digital music material. The drivers feature high energy magnets and diaphragms designed to bring out the best in the dynamic range and superior signal to noise ratio of compact disc. Maintains sensitivity and stability at low volume levels. It has adjustable padded steel headband and leather earpads, and a 2.7m long extra flexible lead terminated in a 3.5mm stereo jack plug. 1/4 in. jack adaptor included. Colour black.

Specification

Driver type: Dynamic
 Impedance: 32Ω ±1.6Ω
 Max. input power: 200mW
 Frequency response: 16Hz to 22kHz
 Weight: 190g

Order Code	Type	Price each
ZB92A	B1 CD Phones	£13.99

Leather-Effect CD Compatible Headphones

A high quality pair of headphones featuring gimbal mounted leather-effect, detachable, earpads. The drivers are equipped with rare-earth magnets for high sensitivity and wide frequency range, making them ideally suited for use with CDs and other digital equipment. The 3m of connecting lead is terminated in a 3.5mm jack plug.

Specification

Magnet: Neodymium (NdFeB)
 Impedance: 32Ω
 Frequency range: 20Hz to 20kHz
 Maximum power input: 100mW
 Sensitivity: 108dB/mW



Order Code	Type	Price each
CJ04E	B Headphones	£21.99

Digital Headphones

Designed for listening to digital source material, these quality stereo headphones feature super thin diaphragm drive units for the very best in sound quality. Lightweight and comfortable to wear, the gimbal mounted earpads fit snugly against the ear and provide excellent external sound isolation. The adjustable black padded headband ensures that the headphones are still comfortable after long continuous use. The 3m lead is terminated in a 3.5mm gold-plated plug and a 1/4 in. to 3.5mm adaptor is included.



Specification

Sensitivity: 102dB/mW @ 1kHz
 Frequency response: 20Hz to 20kHz
 Impedance: 32Ω
 Cord length: 3m approx.

Order Code	Type	Price each
BZ25C	B1 Digital Headphones	£15.99

Slimline Headphones



A modern looking slimline headphone with an adjustable headband. Construction is of the semi-enclosed type and has high quality samarium cobalt magnets. The 2.1m long cable is terminated in a 3.5mm gold plated stereo jack plug. A 1/4 inch to 3.5mm adaptor is supplied.

Matching impedance: 4 to 40Ω
 Drive unit: 40mm
 Input power: 100mW
 Frequency response: 15Hz to 25kHz

Order Code	Type	Price each
YU16S	B1 Slimline Headphones	£15.99

TD60 Headphones

Koss



The Koss TD60 is a lightweight (7.3oz) portable headphone, for listening on the move, is fitted with 'Pneumalite' earcushions for comfort and better bass. The headphone is finished in black with an adjustable padded headband, and comes with a 3.5mm jack and a standard jack adaptor.

Specification

Frequency response: 18Hz to 20kHz
 Sensitivity: 97dB/1mW
 Distortion: <0.2% @ 100dB SPL
 Impedance: 27Ω

Order Code	Type	Price each
KR72P	B1 Headphone TD60	£27.99

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TD75 Headphones

Koss

A high quality headphone featuring gimbal mounted 'closed cushion' earpads, designed for maximum isolation and deep bass response – perfect when used with home or portable CD players. The adjustable headband has a padded black vinyl covering for extra comfort. The connecting lead has an in-built, individual L and R, sliding volume control and is fitted with a 3.5mm gold-plated jack. A matching standard jack adaptor is also included.

Specification

Frequency response: 20Hz to 20kHz
Sensitivity: 94dB SPL/1mW
Distortion: <0.5% @ 100dB SPL
Impedance: 150Ω



Order Code	Type	Price each
KR74R C1	Headphone TD75	£47.99

MAC 5 Headphones

Koss



A lightweight, studio quality, headphone suitable for digital listening, finished in light grey, with adjustable headband. The lead is terminated in a 3.5mm gold-plated jack and a matching standard jack adaptor is included.

Specification

Frequency response: 20Hz to 20kHz
Sensitivity: 95dB SPL/1mW
Distortion: <0.3%
Impedance: 60Ω

Order Code	Type	Price each
KR73Q B1	Headphone MAC5	£42.99

MAC 7 Headphones

Koss



A high quality studio grade headphone featuring 'closed cushion' earpads, designed for maximum isolation and deep bass response. The adjustable headband has a padded matching light grey vinyl covering for extra comfort – a very attractive and distinctive quality headphone. Complete with a gold-plated 3.5mm jack and a matching standard jack adaptor.

Order Code	Type	Price each
KR75S C1	Headphone MAC7	£59.99

Professional Monitor Headphones

A high quality professional stereo headphone with an adjustable black padded headband. The fully enclosed double earpad construction provides good isolation from external sound sources and the gimbal support ensures that the headphones sit comfortably but firmly upon the listener's head. The double drive system uses a 30mm tweeter and 50mm woofer in each earpiece, with titanium plated diaphragms and samarium cobalt magnet for powerful low bass and superb high frequency response. The flat oxygen-free copper (OFC) cable enters separately on left and right sides and is terminated in a 3.5mm gold plated stereo jack plug. A 1/4 inch to 3.5mm adaptor is supplied. Cable length approximately 3m. A stand is provided for storing your headphones.



Impedance: 20Ω (1kHz)
Drive units: 30mm and 50mm
Input power: 300mW
Frequency response: 3Hz to 30kHz
Efficiency: 101dB/mW
Weight: (excl. cable): 270g

Order Code	Type	Price each
YU42V C1	Double Drvr headphones	£39.99

IN-CAR CROSSOVERS

In-Car 7-Band Parametric Equaliser Unit

A compact, audiophile grade, stereo line-level sound processor and 7-band graphic equaliser for in-car entertainment systems, for use between a conventional car stereo and/or CD player and following power amplifiers, or further signal processing units. All connections are made by phono sockets, separate stereo inputs for 'Line' (car stereo, etc.) and 'CD'. The input is selected by a push-push button to the right of the front panel.

Outputs are also at line level and must be amplified by following power amplifiers before driving loudspeakers. Although two sets of outputs are provided, one for 'Front' and the other for 'Rear'. It is not essential that you must use both, for 'ordinary' stereo the equaliser can still be used to full effect by using either one output pair. In this event the left-hand fader control on the front panel must be turned fully in the direction of the output chosen, either 'R' or 'F'.

Each input has its own level adjustment preset, are accessible on top of the unit's case and are not readily available in normal use. There are also seven slide switches in the top panel which can be used to select the centre frequency of each of the seven equaliser bands. Seven rotary front panel controls provide up to ±18dB of boost or cut to each of the seven bands. All rotary controls have a centre-click-stop action in the 'flat' position.



The unit is designed to be dashboard mounted as part of a conventionally fitting car stereo system, and as such the case follows a half-height variation of the standard DIN size, being 7in. wide and 1in. high. A metal 'U' bracket is also provided for under-dashboard mounting. Fixing is by two threaded holes in each side of the case; hardware is included. 'Open-ended' power, earth, and 'remote' on/off control wires are provided with the unit and the power lead has an integral in-line fuse.

Specification

Frequency band selection range,
F1: 35, 50, 65 or 80Hz
F2: 90, 125, 160 or 200Hz
F3: 230, 320, 400 or 500Hz
F4: 600, 800Hz, 1.0 or 1.2kHz
F5: 1.5, 2.0, 2.5 or 3.0kHz
F6: 3.7, 5.0, 6.2 or 7.5kHz
F7: 9.0, 12.0, 15.0 or 18.0kHz
Bandpass gain control range: ±18dB
Input impedance: 10kΩ, 'Line' or 'CD'
Frequency response: 20Hz to 20kHz
Signal to noise ratio: 70dB
Total harmonic distortion: 0.1%
Maximum output level: 5V r.m.s.
Dimensions of case: 177 x 130 x 25mm
Dimensions of front panel: 185 x 31mm

Order Code	Type	Price each
CJ11M	Parametric Equaliser	£62.99

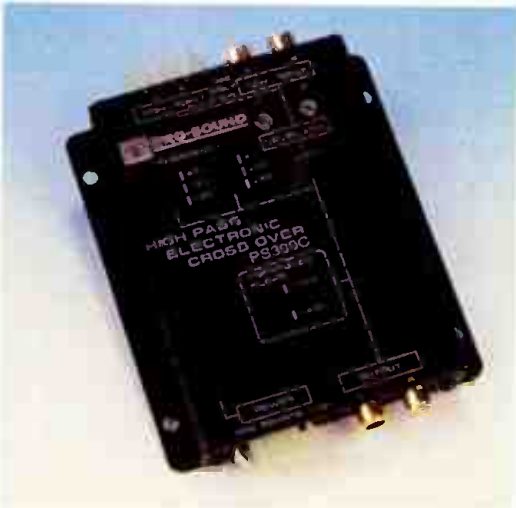
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Car Stereo High and Subwoofer Crossover Units



A pair of crossover units which will both accept either high or low level stereo inputs from a car stereo, where the high level originates from loudspeaker outputs, and low level originates from a line level signal for feeding power amplifiers, equalisers, etc. The low level inputs are via phono sockets, whereas the high level inputs are via a 300mm long, 4-way wiring loom terminated with a special plug which is keyed to prevent accidental reversal. Similarly, the power supply, earth and the 'remote' on/off switching control line are connected via a 300mm long, 3-way loom with connector. The main supply wire includes an in-line fuse. All loom wires are colour-coded and identified with labels.

The high-pass electronic crossover unit is intended to drive midrange and treble speakers via dedicated power amplifiers. Screwdriver operated input level adjustment presets are provided and a crossover point which can be switched to 60, 120 or 180Hz to feed drivers from the midrange upwards. In addition a 'frequency multiplier' function can be used to increase the selected basic crossover frequency by a factor of 30 or 50 times. Crossover slope can be chosen at 8 or 12dB/octave.



The subwoofer electronic crossover is very similar, also having left and right input level presets, a phase switch, and a crossover frequency point selectable at 50, 90 or 180Hz. In addition ± 12 dB of bass boost or cut can be added, operating at 45, 80 or 120Hz, with left and right presets.

In both cases stereo output to a following stereo power amplifier is via phono sockets. Each unit is contained in a steel case with 8mm wide mounting flanges at the sides for fixing to a panel or bulkhead or under the dashboard.

Specification

High pass unit

Crossover frequency,	
x1 multiplier:	60, 120 or 180Hz switchable
x30 multiplier:	1.8, 3.0 or 5.4kHz
x50 multiplier:	3.0, 6.0, 9kHz

MULTICHANNEL ELECTRONIC CROSSOVER

A superb car stereo active crossover that offers a wide range of functions. The compact unit offers two outputs for feeding two sets of subwoofers (normal and boost), a rear 3-way crossover, and a front 3-way crossover, with each section having an output level control (7 in total). All the connectors are gold plated, and are marked inputs for subwoofer, rear and front; outputs for front - low, mid, high; rear - low, mid, high; subwoofer - normal and boost. The subwoofer section has a normal low-pass, frequency selectable output with a 12dB or 18dB/octave slope, and the added facility of a switchable 0 or 180° phase change. With the boost output, all the controls are common to normal output with the addition of 45Hz or 80Hz boost switch and boost level control. A rear input on/off switch is provided.

The front and rear sections feature a comprehensive selection of crossover points to tailor the sound output for individual tastes and vehicles. The high frequency crossover features a 0 or 180° phase change switch. Additionally, the rear section has an input on/off switch. Screw terminals are provided for connection to the vehicle's 12V supply and include a remote on/off facility. There are no fuses in the unit, therefore it is essential that the unit is powered from a fused supply.

The unit is finished in a pleasing graphite grey colour with light grey legend.



Specification

Crossover range	
Subwoofer normal output:	60Hz, 80Hz, 120Hz, 180Hz
boost output:	as normal with 45Hz or 80Hz boost
Front and rear outputs low bandpass:	50Hz, 80Hz, 120Hz, flat - high pass 1.5kHz, 2.4kHz, 3.5kHz, flat - low pass
mid bandpass:	50Hz, 80Hz, 120Hz, flat - high pass 5kHz, 6.8kHz, 8kHz, flat - low pass
high:	2.4kHz, 3.5kHz, 5kHz, 7kHz with 0 or 180° phase change
Crossover slope rate subwoofer:	12dB or 18dB/octave (± 3 dB), selectable
rear/front:	12dB/octave (± 3 dB)
Input impedance:	10k Ω
Output impedance:	1k Ω
Output gain:	0dB
S/N ratio:	>98dB
THD:	0.01%
Power requirements:	12V DC, 0.5A max. negative ground
Size:	264 x 50 x 180mm
Weight:	1.23kg

Crossover slope:	8 or 12dB/octave switchable
Gain:	0dB
Signal to noise ratio:	100dB
Channel separation:	70dB
Overall dimensions:	98 x 130 x 23mm high including sockets

Subwoofer unit

Crossover frequency:	50, 90 or 180Hz switchable
Crossover slope:	12dB/octave
Maximum signal level:	2.5V r.m.s.
Total harmonic distortion:	0.05% maximum
Gain:	0dB
Bass boost:	± 12 dB adjustable
Bass boost operating point:	45, 80 or 120Hz switchable
Signal to noise ratio:	100dB
Channel separation:	70dB
Power supply range:	9 to 16V DC
Overall dimensions:	98 x 130 x 23mm high including sockets

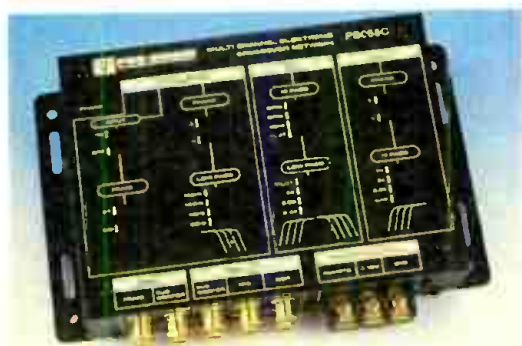
Order Code	Type	Price each
CJ08J	B High-Pass Crossover	£29.99
CJ07H	B Low-Pass Crossover	£29.99

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Car Stereo 3-Way Active Electronic Crossovers



Two examples of a high quality active crossover which are as near as possible universal, and so can be set up to suit many differing, multi-way speaker systems. Both units are common in having essentially three bands forming a 3-way crossover deriving separate bass, midrange and treble channels. In addition the advanced version has preset controls for adding bass boost or cut by up to ± 12 dB to improve the response of the driver used, depending on where its resonant frequency lies. Level controls for conventional bass, midrange and treble outputs are also included on the advanced unit. Each complete unit is housed in a matt black steel case having 15mm wide fixing flanges at both ends, and hardware is supplied for screwing to a panel or bulkhead or under the dashboard. The basic unit measures 150 x 120 x 40mm, while the advanced unit is 170 x 130 x 40mm.

Please take note that both these units are not able to drive any speakers directly, but will need following power amplifier stages. To complete the full 3-way stereo system, three stereo pairs of power or booster amplifiers will be needed, or one quad or 4-way amplifier and one stereo amplifier. Two stereo pairs of phono sockets are provided for inputs ('front' and 'sub-woofer'), and three pairs of output phono sockets for the three bands. All sockets have gold-plated contacts for reliability.



Specification

	Basic unit (CJ06G)	Advanced unit (GK10L)
Power supply:	+12V DC @ 250mA max.	+12V DC @ 90 to 150mA
Gain, all channels:	0dB	0dB ± 2 dB
Maximum bass boost/cut:	N/A	12dB ± 2 dB @ 40Hz
Crossover roll-off, all:	12dB/octave	12dB/octave
Signal to noise ratio:	70dB	100dB
Total harmonic distortion:	0.03%	0.01%
Maximum input level:	>6V r.m.s.	6V r.m.s.
Crossover points:		
Bass:	50	80
Lower midrange:	80	120
Upper midrange:	2.4	3.5
Treble:	2.4	3.5

Order Code	Type	Price each
CJ06G	Basic 3W Crossover	£34.99
GK10L	Adv 3W Crossover	£42.99

RECOMMENDED READING

Killer Car Stereo on a Budget

by Daniel L. Ferguson

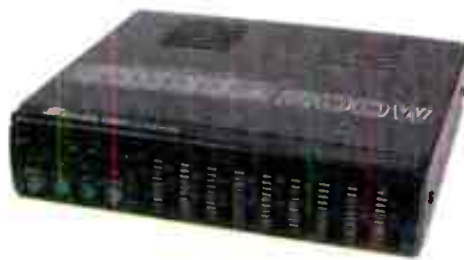


Order Code	Type	Price each
AA77J	Budget Car Stereo	£7.99 NV

IN-CAR HIGH-POWER BOOSTER AMPLIFIERS

200W Car Booster Amp and 10-Band Graphic Equaliser

Pro-Sound



A combined 10-band graphic equaliser and 4-way booster amplifier for car stereo systems in one compact unit measuring only $7 \frac{1}{2} \times 6 \frac{1}{2} \times 1 \frac{1}{2}$ inches. The equaliser has ten boost/cut sliders, each operating for both left and right channels simultaneously covering nine octaves in steps of 30Hz, 60Hz, 120Hz, 250Hz, 500Hz, 1k, 2k, 4k, 8k and 16kHz, over a range of emphasis or attenuation of + and -12dB. Each slider has click-stop centre and ± 4 dB positions. The equaliser includes interference suppression circuitry, and can be switched in or out of service as required. In addition there is a simple signal level bargraph display with a total of five divisions, to indicate signal magnitude leaving the volume control, and which has two green, one yellow and two red divisions. A 'scan' function is available which shows the signal level on the bargraph display. There is also a stereo enhancer facility which can be switched in or out. The complete unit is finished in satin black, controls and buttons are back illuminated with a green light, and the sliders have integral green LEDs. The equaliser will accept line level inputs and signals from the loudspeaker outputs of radios, radio cassettes, CD players etc.

Specification

Power requirements:	11 to 16V DC
Polarity:	Negative earth only
Max. current:	10A peak
Recommended replacement fuse:	5A quickblow
Frequency response:	30Hz to 30kHz
Total output power:	200W music power (70W r.m.s.)
Speaker impedance:	2 to 16 Ω
Equaliser tone control range:	± 12 dB
Centre frequencies:	30, 60, 125, 250, 500Hz, 1, 2, 4, 8, 16kHz
Signal to noise ratio:	>68dB
Amplifier supply voltage rejection ratio:	-57dB approx.
Dimensions:	178 x 160 x 42mm
Weight:	850g

Supplied with fitting hardware for location under a dashboard etc., and fitting and operating instructions.

Order Code	Type	Price each
GK83E	200W Amp + Eql	£89.99

IT'S A FACT!

AUDIO SPECTRUM FACTS

Octave	Frequency - Typical sounds and effects if range emphasised
1st	16Hz to 32Hz Large pipe organ and lower bass frequencies. But be careful, for if emphasised can result in excessive loud speaker cone movement.
2nd	32Hz to 64Hz Bass fundamentals, that is main bass frequencies of organ, double bass, tuba etc. If excessive will result in boominess and will highlight mains hum problems.
3rd	64Hz to 128Hz Gives 'warmth and body' to sound, although can produce 'muddiness'. This is also the 1st harmonic.
4th	128Hz to 256Hz Fundamentals of male voices, cello, viola, clarinet, horn and trumpet. Adds richness to sound but can produce a 'boxiness' cardboard quality.
5th	256Hz to 512Hz Fundamentals of female voices, oboe and flute. Emphasis can improve intelligibility but can produce 'roof of mouth' quality.
6th	512Hz to 1kHz The 'telephone region' giving most intelligibility to music and speech these are the most easiest frequencies to hear and produce. Emphasis of the 6th can produce a 'hollow, megaphone' quality.
7th	1kHz to 2kHz The easiest frequencies to hear and reproduce, but if excessive, can produce a 'tinny' quality. Excessive 6th and 7th causes listener fatigue.
8th	2kHz to 4kHz Adds 'brilliance and articulation' and 'presence' to instruments (3-6kHz) and voices (2.8kHz) and a moderate boost (+3dB) at 2.8kHz to 3.2kHz adds 'clarity' to choirs. Also, this is the main area of 'needle scratch' and emphasis here adds 'peaks' and gives a 'nasal' quality to the sound quality.
9th	4kHz to 8kHz Important overtones that give quality to musical instruments. Accurate 'sibilance' (harsh tones) if response here is correct. 'Peaks' here give rise to 'stridencies'.
10th	8kHz to 16kHz Overtones of reeds, brass, cymbals etc. that adds a lively, sparkling character and transients to sound. Peaks here will give a 'comb and paper' effect to some strings, but over emphasis gives a 'chromium plated' effect.
11th	16kHz to 32kHz Adds further overtones, but much of this area is out of the conventional human audio spectrum. Certain animals, such as dogs, can hear these frequencies and can be affected by them.

50W Car Booster Amplifier

Pro-Sound

NEW



A compact booster amplifier for in-car audio systems offering 25W maximum output per channel (50W total). This high definition amplifier will accept line level inputs, via gold plated phono sockets, or from the loudspeaker outputs from radio cassettes. A gain control is provided to match the amplifier to the source equipment. The amplifier features fully complimentary audio stages, an excellent signal-to-noise ratio thermal shut down and short circuit protection. Generally, the amplifier is mounted in the boot, but it can be mounted in other locations such as under a seat. It is advisable to keep all wiring to a minimum, where possible. Supplied with a detailed instruction book and fixing screws.

Specification

Maximum power output:	10W rms per channel into 4Ω
THD with 4Ω load:	0.06% at 10W
S/N ratio:	95%
Damping factor:	100
Channel separation:	60dB
Input sensitivity:	200mV to 1.2V
Input impedance:	20kΩ
Supply Voltage:	11.5V to 14.4V DC negative earth
Dimensions:	140 x 49 x 120mm

Please note: Colour of case may vary.

Order Code	Type	Price each
RZ99H A1	50W Car Booster Amp	£29.99

100W In-Car Booster Amplifier

Pro-Sound

NEW



A 4-channel high definition amplifier rated at 10W rms per channel. The unit is intended for use as the output power amplifier for in-car stereo systems, offering four stereo sound sources. Two pairs of stereo phono line level inputs are provided for connection to a main radio/cassette unit having compatible low-level outputs, and input sensitivity controls and a power on LED are included. The input sensitivity can be adjusted to accommodate input levels from 200mV to 1.2V. This unit must be mounted securely to the vehicle before it is used.

Specification, each channel

Mean power output:	10W rms into 4Ω
Total harmonic distortion:	0.05% nominal
Power bandwidth:	±0.7dB 20Hz to 20kHz (-3dB @ 60kHz)
Signal to noise ratio:	80dB nominal
Channel separation:	65dB nominal

Input sensitivity:	200mV to 1.2V, adjustable
Input impedance:	17kΩ
Quiescent current drain:	740mA
Full power current drain:	8.2A rms into 4Ω load, 11.5A peak

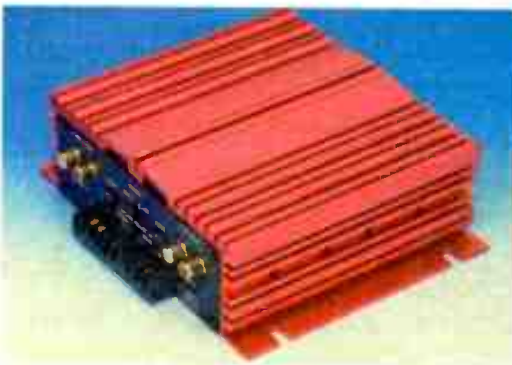
Please note: colour of case may vary

Order Code	Type	Price each
AQ24B A2	100W Car Booster Amp	£39.99

120W In-Car Booster Amplifier

Pro-Sound

NEW



A 4-channel stereo high-power amplifier with outputs of up to 15W rms per channel. The unit is intended for use as the output power amplifier for in-car stereo systems, offering four stereo sound sources. Two pairs of stereo phono line level inputs are provided for connection to a main radio/cassette unit having compatible low-level outputs, and input sensitivity controls are included. Screw terminals are mounted at both ends for supply and speaker wire connections, including a remote power on/off control line which can be connected to the automatic antenna drive output of the main stereo unit. Protection includes thermal shutdown and integral 20A fuse and a mode switch can select 2-channel stereo operation if required. Fixing screws supplied.

Specification, each channel

Mean power output:	15W rms into 4Ω, 25W rms into 4Ω
Total harmonic distortion:	0.05% nominal
Power bandwidth:	±0.7dB 20Hz to 20kHz (-3dB @ 60kHz)
Signal to noise ratio:	80dB nominal
Channel separation:	65dB nominal
Input sensitivity:	200mV to 2V, adjustable
Input impedance:	17kΩ
Quiescent current drain:	740mA
Full power current drain:	8.2A rms into 4Ω load, 11.5A peak

Please note: colour of case may vary.

Order Code	Type	Price each
AQ25C B3	120W Car Booster Amp	£49.99

IN-CAR MOSFET OUTPUT HIGH POWER BOOSTER AMPLIFIERS

Pro-Sound

A range of high efficiency booster power amplifier modules, any of which can be added to an existing car stereo sound system to drive high power loudspeakers. Each complete unit is housed in a very solid alloy case which doubles as the heatsink. Output powers are in the range of 45 to 140W, depending on the chosen module, and the higher supply voltage levels required for such outputs are derived from the conventional 12V system by an integral switched mode supply converter in each module. The converter includes shut-down protection against output short circuits or overheating, which switches the amplifiers off until the fault is removed.

Each amplifier module is intended to be remote from the main stereo system, and has a remote power on/off control line connection in addition to permanent +12V and earth supply connections. It is only necessary to connect the remote line to the automatic antenna drive output of the main radio/cassette player unit to ensure that the power amplifier is switched on and off.

For all modules, input/output connections consist of left/right phono socket inputs, and 4-way screw terminal connections for two pairs of speaker wires. Each amplifier also includes a 'boost sub woofer' switch, adding approximately 10dB to the output level at 40Hz; a power on indicator LED and a 'shutdown' state indicator LED. Input sensitivity is adjustable from 100mV to 1V for full output by a rotary control.

180W Bridgeable Booster Amplifier

NEW



A 45W rms per channel booster module which includes an integral fuse in series with the +12V supply line. The module can be used as a single channel bridged amplifier if both inputs are provided with a common signal and the speaker is connected between the '+L' and '+R' outputs.

Specification

Supply voltage range:	11.5V to 14.4V
Fuse rating:	20A
Maximum power output:	45W rms into 4Ω
Output power, bridged:	90W into 8Ω
Peak current output:	10A
Speaker/amplifier protection schemes:	Internal failure (DC), short circuit, overheating
Total harmonic distortion:	0.05% into 4Ω
Frequency response:	20Hz to 30kHz ±0dB
Signal to noise ratio:	100dB
Channel separation:	60dB
Sub woofer boost:	10dB @ 40Hz
Damping factor:	200
Input sensitivity:	100mV to 1V, variable
Input impedance:	20kΩ
Dimensions, inches:	8.2W x 2.1H x 8.5D

Please note: Colour of case may vary.

Order Code	Type	Price each
AF24B D6	180W Bridge Car Amp	£79.99

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552941**

Stereo 300W per Channel Booster Amplifier



A 90W rms per channel booster module which includes an integral fuse in series with the +12V supply line. The module can be used as a single channel bridged amplifier if both inputs are provided with a common signal and the speaker is connected between the '+L' and '+R' outputs.

Specification

Supply voltage range: 11.5V to 14.4V
 Fuse rating: 40A
 Maximum power output: 90W rms per channel max., into 4Ω
 Output power, bridged: 180W rms into 8Ω
 Peak current output: 20A
 Speaker/amplifier protection schemes: Internal failure (DC), short circuit, overheating
 Total harmonic distortion: 0.05% into 4Ω
 Frequency response: 20Hz to 30kHz ±0dB
 Signal to noise ratio: 100dB
 Channel separation: 60dB
 Sub woofer boost: 10dB @ 40Hz
 Damping factor: 400
 Input sensitivity: 100mV to 1V, variable
 Input impedance: 20kΩ
 Dimensions, inches: 8.2W x 2.1H x 12D
 Please note: Colour of case may vary.

Order Code	Type	Price each
AF25C F8	300W Car Booster Amp	£129.99

560W Car Power Booster Amplifier



A 140W rms per channel booster module providing a total power output of 800W. This module cannot be operated in bridged mode.

Specification

Supply voltage range: 11.5V to 14.4V
 Maximum power output: 140W rms per channel max., into 4Ω
 Peak current output: 40A
 Speaker/amplifier protection schemes: Internal failure (DC), short circuit, overheating
 Total harmonic distortion: 0.02% into 4Ω
 Frequency response: 20Hz to 30kHz ±0dB
 Signal to noise ratio: 100dB
 Channel separation: 60dB
 Sub woofer boost: 10dB @ 40Hz
 Damping factor: 400
 Input sensitivity: 100mV to 1V, variable
 Input impedance: 20kΩ
 Dimensions, inches: 8.2W x 2.1H x 24.3D
 Please note: colour of case may vary.

Order Code	Type	Price each
AF26D H13	560W Car Booster Amp	£249.99

Quad 100W per Channel Booster Amplifier

Pro-Sound



A high-power amplifier with 100W maximum output per channel (400W total), designed to be the output power amplifier for car stereo systems with line-level outputs. A contoured extruded alloy casing, which doubles as a heatsink, houses the amplifier. The unit has two stereo amplifiers, and can be operated in one of four modes: As a two channel input, two channel bridged output amplifier; As a two channel input, four channel output amplifier; As a three channel input, two channel output amplifier with bridged mono 'sub-woofer' output. Short-circuit protection is provided. On one end panel four phono inputs are provided for front and rear stereo systems, along with input sensitivity controls, a channel selector switch and power LED. The inputs are fed from the low-level outputs of a radio/cassette unit, or similar, having four corresponding front/rear stereo 'preamp' or 'low-level' outputs. The other end panel features all the outputs arranged on an eight-way terminal block, a 25A fuse, and a three-way terminal block carrying power and remote 'on' connections. The remote 'on' is used to turn the amplifier on when the signal source, e.g., radio, is turned on.

The amplifier is supplied with an instruction manual giving connection and installation details. Suitable power cables such as BZ91Y/ BZ92A and CK17T/EZ93B can be found in the cables section along with suitable speaker cables such as XS37S/XS36P.

Specification

Maximum output power: 100W peak per channel
 70Wrms per channel, 4 channels driven (bridged)
 35Wrms per channel, 4 channels driven into 4Ω
 THD at nominal output: 0.1%
 Frequency response: 20Hz to 20kHz ±1dB
 Signal to noise ratio: 80dB
 Input impedance: 12kΩ
 Maximum sensitivity: 500mV nominal for full output
 Power requirements: 11V to 16V at 25A maximum (negative earth)
 Dimensions: 300 x 220 x 56mm

Order Code	Type	Price each
CJ03D H	400W Car Amp	£139.99

IN-CAR ACCESSORIES

Noise Suppressor Isolation Transformer

NEW

This noise suppressor has been designed to eliminate the noise in a car audio signal line without affecting the audio quality of the system. The suppressor is housed in a metal tubular case with gold-plated phono connections fitted on flying leads. Dimensions of case: 70 x 35mm dia. Total length is 550mm approximately (with flying leads). Weight 147g.



Order Code	Type	Price each
RZ95D	Noise Suppressor	£8.99

IT'S A FACT!

TABLE OF EVERY DAY SOUND LEVELS

Decibels	Pressure	Typical Noise
120	20Pa	Low level jet aircraft (threshold of pain)
110		Rock band
100	2Pa	Inside tube train
90		High street
80	0.2Pa	Factory floor
70		Noisy office
60	0.02Pa	Normal conversation
50		Quiet office
40	0.2μPa	Rural house
30		Quiet conversation
20	2μPa	Whisper
10		Still night in the country
0	20μPa	Silence (threshold of hearing)

High Quality Isolation/Noise Suppressor

NEW

A very high quality in-line car stereo line level isolation/noise suppression transformer. All the inputs to inputs, inputs to outputs, outputs to outputs and ground to any ground are fully isolated. The connections are via flying leads with the inputs connected to gold-plated phono plugs and the outputs to gold-plated phono sockets. The phono connections have a total length of approximately 650mm. The enclosure is rectangular, with a mounting base 125 x 55mm, and a height of 40mm. Weight 300g. Colour



Order Code	Type	Price each
RZ96E	H/Quality Noise Supp	£9.99

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High/Low Impedance Matching Transformer

NEW

A high/low impedance matching transformer designed to convert high level car stereo speaker outputs to line level inputs of a power amplifier.



Housed in a plastic tubular enclosure with flying leads and an overall length (including leads) of 350mm approx. The enclosure is 65mm long with a diameter of 25mm. The device has an extremely flat frequency response from 20Hz to over 100kHz. The input connections are by a male bullet connector (positive) and a female bullet connector (negative). The output is via two female phono sockets.

Order Code	Type	Price each
RZ94C	Hi/Lo Match T/mer	£5.99

20A DC Noise Suppressor

NEW

A 20A in-line suppressor specifically designed for DC supplies to in-car audio equipment. The unit is very easy to install having just three flying cable connections, and is housed in a rugged rectangular enclosure with a mounting base 125 x 125mm and an overall height of 40mm. The overall length including cables is 400mm approx. Weight 440g approx.



Order Code	Type	Price each
RZ97F	20A Noise Suppressor	£9.99

Gold-Plated Car Battery Clamp and Terminal Lugs

A gold-plated battery clamp for use in cars with high quality in-car entertainment systems, in particular compact disc players. Two gold-plated terminal lugs are available for connecting to 4AWG or 8AWG power cables. Suitable cables may be found in the 'Cables'



Order Code	Type	Price each
BZ99H	Gold Terminal	£5.99
CK33L	8AWG Lug	£1.48
CK34M	4AWG Lug	£1.48

**Fax your orders to:
01702 553935**

Multway Car Battery Clamp

NEW

A multiway gold-plated battery clamp that will accept the starter lead, high power amplifier and two other auxiliary feeds. The clamp will form an important part of a high quality, high power, in-car entertainment system. Requires 4mm, 3mm and 2.5mm Allen keys.



Order Code	Type	Price each
AG92A	M/Way Battery Clamp	£14.99

4 into 1 Cable Connector for Car Audio Systems



A gold-plated 4 into 1 cable connector, encapsulated in protective, insulating clear plastic. Allows one 4AWG cable to be connected to four 8AWG cables (see Cables Section). Supplied with five plastic caps to cover the screws after the cables have been clamped. The clear plastic base has a 5mm diameter hole at each corner for fixing to a suitable surface. Size 63 x 51 x 25mm.

Order Code	Type	Price each
CK00A	4/1 Car Audio Connct	£7.99

Heavy Duty Distribution Block

NEW

A gold-plated 3-way heavy duty distribution block encapsulated in clear acrylic. The ends will accept 4AWG cable which allows the block to be inserted in a main power cable and provide continuity. Three 4AWG cables can be connected to the block to provide power to very high power audio amplifiers etc. The base has four 5mm diameter holes for securing to a suitable surface. Requires 5mm and 4mm Allen keys. Size 90 x 53 x 30mm.



Order Code	Type	Price each
AG93B	H/Duty Dis Block	£11.99

Distribution Block for Car Audio Systems

NEW



A gold-plated 8-way distribution block encapsulated in clear acrylic. The ends will accept 4AWG cable which allows the block to be inserted in a main power cable and provide continuity. Eight 8AWG cables can be connected to the block to provide power to audio equipment, such as power amplifiers, audio cassette and CD players etc. The base has four 5mm diameter holes for securing to a suitable surface. Requires 4mm and 3mm Allen keys. Size 90 x 53 x 30mm.

Order Code	Type	Price each
AG91Y	8W Car Dis Block	£11.99

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70A Circuit Breaker



A fast acting 70A circuit breaker with gold-plated terminals, that are marked 'BATT' and 'AUX' for correct insertion in a power feed for high powered in-car entertainment systems. Two diagonally opposite 6mm holes may be used for fixing the breaker to a suitable surface. Size 74 x 48 x 37mm.

Order Code	Type	Price each
BZ96E	70A Circuit Breaker	£13.99

Car Audio Gold-Plated Fuseholders



Two types of gold-plated fuseholders for use with high quality in-car entertainment systems. The heavy duty version will accept one 4AWG cable (high power battery cable) and provide two fused output connectors that will accept 8AWG cable – to supply in-car entertainment equipment. The standard version is two separate fuseholders, suitable for 8AWG cable. Both types have a black plastic base and a clear plastic clip-on protective cover, and require a 3mm Allen key to secure the cables, the heavy duty version also requires a 4mm Allen key. The base has two 5mm diameter holes 20mm apart for fixing the fuseholder to a suitable surface in the car. Fuse size 37 x 10mm. Overall size 101 x 52 x 32mm.

Order Code	Type	Price each
BZ97F	Fusebox Heavy Duty	£11.99
BZ95D	Fusebox Standard	£11.99

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Plug-In Style Car Audio Fuseholders



Two gold-plated fuseholders in the same style as the audio-grade fuseholders using cartridge fuses, but designed for use with the modern blade-terminated pattern plug-in fuses. The fuseholders are used for wiring high quality, car entertainment systems into a vehicle. The 2-way version has two electrically separate fuseholders which will accept 8AWG high power battery cable (see Cables Section) to supply individual items of in-car entertainment equipment. The 4-way distribution block has a common connection at one end with terminal holes to take 4AWG battery cable either end-on or at right-angles. From this four fused outlets are provided at the other end for 8AWG cables. Cables are secured with either 3 or 4mm Allen grub screws. Both types have transparent plastic bases and a transparent clip-on cover, which has rectangular cutouts to accept the plug-in fuses, so there is no need to remove cover to access fuse. Each base has 4mm countersunk fixing holes spaced 95 x 31mm for the 2-way version, and 95 x 64mm for the 4-way distribution block. Overall size, 108 x 44 x 28mm for 2-way version, 108 x 76 x 28mm for 4-way version.

Order Code	Type	Price each
GW75S	FBox 2-Way Plug-In	£14.99
GW76H	FBox 4-Way Plug-In	£21.99

Plug-In Fuse

A plug-in style fuse to fit the two above fuseholders, rated at 60A.



Order Code	Type	Price each
GW77J	60A Plug-In Fuse	£1.49



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Car Ioniser

NEW!



This compact ioniser is designed to improve the quality of the air in your car. The ioniser generates a copious stream of negative ions into the air that combine with the positively charged pollution particles. Airborne particles and odours are removed from the atmosphere by a process of electrostatic precipitation

which results in a 'after a rainstorm freshness'. The device may help to relieve colds and similar respiratory problems, as well as benefiting headache and hayfever sufferers. Easy to install, just connects to a cigarette lighter socket. Supplied with plug and 1m of connecting lead.

Order Code	Type	Price each
RZ54J	Car Ionizer	£9.99

12V Mini Car Fan

NEW!



A mini car fan that will help to keep you cool during the summer. Plugs in to a standard cigarette lighter socket and is fitted with a convenient on/off switch and large suction pad. Supplied with 1.5m of lead.

Order Code	Type	Price each
AQ26D	12V Mini Car Fan	£4.99

SWITCH BOXES Audio Switch Box



An extremely compact audio selector unit that allows switching between one of four stereo audio inputs. All connections to inputs and outputs are via standard phono sockets mounted on the rear of the unit, except input 1 where connection is via a front-mounted 3.5mm stereo jack socket, thus allowing 'personal stereo' type units to be connected to normal Hi-Fi equipment. Selection is by means of four top-mounted switches. Recesses above the switches allow identification labels to be neatly positioned. The unit is supplied with one stereo phono to phono cable, one stereo 3.5mm to 3.5mm jack cable, a self-adhesive double-sided fixing pad and five identification labels. Dimensions: 138 x 28 x 37mm. Colour: Silver.

Order Code	Type	Price each
YZ24B	A1 Audio Switch Box	£15.99

FAX YOUR ORDER NOW!
01702 553935

2-Way Speaker Control



A neat, black metal, loudspeaker switch box that allows two pairs of loudspeakers to be used with one pair of amplifier loudspeaker terminals. The switch can select either pair of loudspeakers, or all four together. The internal wiring of this unit is such that the load presented to the amplifier will not fall below that of the lowest impedance speakers. Thus if 4Ω speakers are used, the minimum load will be 4Ω. The unit is for four speakers maximum and is NOT recommended for valve amplifiers.

Order Code	Type	Price each
KR94C	2W Speaker Switch	£9.99

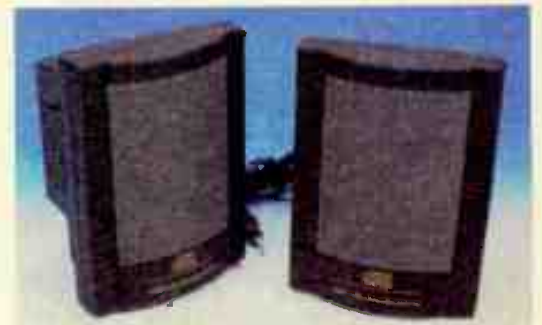
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EXTENSION SPEAKERS

Micro Speakers

NEW!



A pair of passive 3 1/2 in loudspeakers enclosed in an attractive black plastic case with a matching metal grill. The loudspeakers are suitable for use with personal computers (with suitable output) portable hi-fi equipment, such as radios, personal cassette and CD players. The speakers offer excellent sound quality and frequency response for such a small enclosure. The speakers are connected to a miniature stereo jack plug by approximately 1.8m of cable.

Specification
Nominal impedance: 8Ω
Frequency response: 100Hz to 15kHz
Power rating: 5W (PMPO)
Dimensions: 137 x 98 x 92mm

Order Code	Type	Price each
ZC97F	Micro Speakers	£8.99

Active Micro Speakers



A compact high-quality speaker system with a 7W music power capacity that can be operated in active or passive modes and is ideally suited for use with portable stereo radios, cassette players and CD players. In the active mode each speaker has its own amplifier operated by the insertion of the connecting lead. Output level is set by the 'volume min-max' control and tone can be modified with the 'treble boost on/ off' switch located at the rear. Bass boost circuitry is also provided, controlled by an 'on/off' switch. The speaker system is powered by four size C batteries, not supplied. A 6V DC 2.1mm power socket is provided for external supplies. Supplied with instruction leaflet.

Order Code	Type	Price each
MK51F	Active Micro Speakers	£14.99

Bass-Reflex Mini-Speaker System



A compact high-quality speaker system with a 30W peak handling capacity. Two different versions of the speaker system are available:

1. Standard 'passive' type. This requires an external amplifier to drive it. This particular model will make an ideal extension speaker for a (stereo) TV set. It features a ported cabinet for enhanced bass response, a 4" bass driver and 2" tweeter. The good sound quality and power handling in a compact size also make this system a good choice for "in-car" use. The sound quality is superior to most car speaker systems, and they can easily be removed to prevent theft. They can also be used as rear speakers in a surround sound system. Connection to each speaker is by means of colour-coded spring clip terminals (red +, black -).

2. Active type. This is a speaker of the above type but one of the pair has a mains-powered stereo 20W per channel amplifier built in to its casing. The rear of this speaker features bass, treble, volume and on-off controls. There are also phono sockets for the left and right audio inputs. One channel of the amplifier powers the speaker in which it is mounted, and a colour-coded lead (approx. 2m long) connects the other channel to the other, passive speaker which is fitted with a red and black spring lever terminal. This type of speaker system is ideal for use with personal stereo equipment (a twin phono to stereo 3.5mm lead is supplied for this purpose) and for use in an A.V. system. In particular, the unit could be connected to a video recorder or TV

set via the Peritel (SCART) socket or phono socket normally fitted to such equipment. Appropriate leads can be found in the 'Connectors' section. This will greatly improve TV and video sound quality whilst retaining independence from the hi-fi system.

Specification

Cabinet type:	Bass reflex
Drive units:	4" cone type for bass 2" cone type for treble
Maximum output:	Passive type: 30W (from external amplifier) Active type: 20W (from built-in amplifier)
Frequency response:	32Hz to 20kHz
Speaker System impedance:	4Ω
Dimensions:	137mm (W) x 210mm (H) x 126mm (D)
Maximum weight:	2.1kg approx.

ACTIVE SYSTEM ONLY:

Input sensitivity:	200mV to 1V
Input impedance:	2kΩ
Power requirements:	240V AC 50Hz

The active system is supplied with a double-phono to 3.5mm stereo jack lead so that portable equipment can be connected to it. Suitable mounting brackets can be found below as item GL18U.

Order Code	Type	Price each
GL20W E6	Passive MiniSpeakers	£39.99
GL19V F8	Active Mini Speakers	£59.99

MAPLIN KEY CALL

Phone 01702 556751

Mounting Bracket Kit for Small Speakers

A pair of innovative mounting brackets suitable for relatively small speakers with a weight of up to 6kg. They are suitable for use with types GL19V and GL20W. When used with these speakers, special attachments fit into recesses present in the speaker cabinet and when tightened will firmly clamp the speakers. Other brackets supplied allow different



speakers to be used, but fixing holes would need to be drilled into the cabinets. These brackets feature a lockable universal joint so that positioning of the speakers is simplified and a great range of adjustment is possible. Normally, these brackets would be used for wall or ceiling mounting, but they can also be mounted on photographic tripods or clamped to a table using additional attachments.

Order Code	Type	Price each
GL18U A2	Mini Spkr Mount Kit	£19.99

LOW VOLTAGE LAMPS

Electronic Light & Keychain

The Maplin Powerbeam has a moulded, ergonomically designed case, housing a high intensity light emitting diode (LED) that produces a powerful, intense beam of red light. The batteries are replaceable and are a standard, easily obtainable type (JG88V). The Powerbeam is extremely useful, and is always to hand when you need it for locating things in the dark such as house and car keyholes, or an item dropped - the intense red beam is much stronger than a conventional torch.



Order Code	Type	Price each
GW51F	Light/Keychain	£1.99

Cycle Safety Lamp

A compact, lightweight lamp that is ideal for mounting on a cycle or as a red warning lamp when walking, running, or roller skating, clipped onto a belt. The high-brightness, triple-LED lamp can be switched to steady or flashing mode. Requires two AA size batteries (JY48C). Dimensions: 66 x 47 x 26mm.



Metal mounting bracket and armstrap included.

Order Code	Type	Price each
GW52G	Cycle Safety Lamp	£7.49

Cycle Lamp Set

NEW



A matching pair of cycle lamps in tough white and black plastic that are supplied with detachable universal brackets and batteries. Each lamp has a heavy duty on/off slide switch, conveniently positioned on the back of the housing. The multipurpose bracket allows the lights to be mounted on most parts of the cycle, in the correct manner, at 90° to the road. Bulb and battery replacement is very easy, a coin is used to lever apart the two halves of the lamp. The front lamp uses a high brightness Krypton bulb, and the back lamp uses a standard pre-focus bulb. Each lamp requires two 'D' type cells (four supplied). The front light conforms to BS6102/3 and the back light conforms to BS3648.

Order Code	Type	Price each
ZC31J A2	Cycle Lamp Set	£12.99

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Auto Light



A smart, twin tube fluorescent lamp in a white plastic rectangular escutcheon with a ribbed perspex diffuser. The base can be fixed to the wall of a boat, caravan, motor caravan etc. with two screws at 245mm fixing centres; screws should be 20mm long wood screws or self tap type no larger than 3mm diameter (not supplied). The fluorescent tubes will have to be temporarily removed for this operation. Each tube is 12 inches long and rated at 8W and combine to give a bright yet soft white light output for all purposes including reading and writing, but with a low power consumption, certainly much lower than a filament lamp with the same light output. Designed to run from a 12V DC vehicle battery, the lamp uses an integral DC/DC inverter/tube driver, which may present some interference to a portable AM radio but has no effect on VHF FM or UHF TV receivers. Includes on/off switch in the form of a 250mm long pull-on/pull-off cord and toggle at one end. Power connection is via a pair of 100mm long red and black wires (+12V and common) at rear for connection to a 12V system, and there is a 98 x 40 x 10mm deep recess provided for enclosing connection terminals.

Order Code	Type	Price each
YZ35Q	Auto Light	£8.95

Fluorescent Tube

A 12V 8W fluorescent tube for use as replacement in caravan and boat lamps.

Order Code	Type	Price each
LQ11M	12V Tube	£3.49

Cupboard Light



A white plastic, battery operated wall light ideal for cupboards, under stairs, lofts, cellars, garages or boats. The lamp is operated by a pull-switch and is powered by two 'D' size (UM-1) batteries, which are not included. Three screws are provided for mounting to a suitable surface. Dimensions: 123mm dia. x 68mm. Suitable batteries include: zinc chloride JY62S, alkaline FK66W.

Order Code	Type	Price each
KR34M	Cupboard Light	£3.49

Solar Flashlight

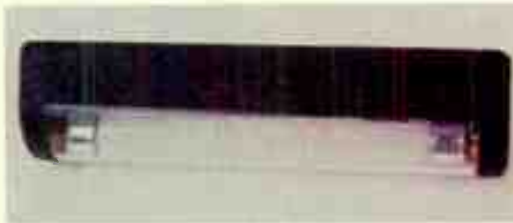
NEW!



This handy flashlight contains two rechargeable NiCd 'AA' size cells which can be recharged from the solar cells which are incorporated in the handle of the case. Simply place the flashlight with the solar cells facing the sun and it will recharge. The batteries can also be charged from a suitable 3V mains adaptor for which there is a power socket in the end of the case. Alternatively, the batteries can be removed and charged in an external AA Ni/Cad charger. It is essential that only NiCd rechargeable batteries are used in this flashlight. Finished in black plastic.

Order Code	Type	Price each
UK89W	Solar Flashlight	£14.99

Mini Fluorescent Lantern



A handy miniature lantern with a bright 6in. 4W fluorescent tube. It is powered by 4 AA cells (alkaline recommended) which are not included. Two self-adhesive sets of Velcro-type pads are supplied, which allow the lantern to be securely fixed to a surface and yet be easily removed. The high brightness offered in such a small size makes this lantern ideal as a pocket torch, or for camping.

Order Code	Type	Price each
ZC11M	Mini Fluor Lantern	£3.99

Mini Lantern Optum

A very useful, compact torch and fluorescent tube combined. A switch on the side of the uni-switches from off to torch or tube. The torch uses a 6V MES tubular pre-focused bulb and the fluorescent light uses a 6in. 4W tube. It is ideal for use in power cuts, garages, sheds, in the car or for camping, fishing etc. The lamp has a remarkably bright light for such a compact unit and a carry strap so that it can be hung up. The lamp requires four AA cells (alkaline recommended) not supplied. Overall size 152 x 53 x 21mm.



Order Code	Type	Price each
YT10L	Mini Lantern	£4.49
JX46A	Bulb For YT10	40p
JX45Y	Tube For YT10	£1.69

Multi-Purpose Lantern

A slim multi-purpose lantern with three different light sources. A very bright spotlight that uses a krypton bulb, is mounted on a 180° swivel head, while on one side, a fluorescent lamp is fitted, and on the opposite side an amber flashing light is fitted. The lantern can be used as a table lamp by using the swivel head as a stand, or stood on end, to allow use of the spotlight. A belt clip is also provided. The lantern requires four 'AA' (UM3) type batteries, which are not included. Rechargeable batteries can be used, and a socket is provided for charging the batteries from an AC/DC adaptor (6V DC) (not supplied). A red LED indicates that the batteries are charging. Dimensions: 225 x 68 x 32mm.



Order Code	Type	Price each
BZ63T	Multi Purpose Lantern	£4.99

Rubber Torch



A very high quality durable rubber-bodied torch which represents very good value for money. The lens is made of toughened clear plastic instead of glass for longevity and safety. The water resistant body features two flush-mounted 'snap' action switches for 'on' and 'off' which are unlikely to be operated inadvertently. The base of the torch is unscrewable for simplicity of battery replacement, and features a recessed ring so that the torch may be easily hung up. To renew the bulb, peel back the rubber around the lens, remove the lens, unscrew the reflector, remove the old bulb from its socket in the torch, fit the replacement and reassemble. Batteries supplied (replacement 2 x 'D' type cells). Overall dimensions: 205mm length, 75mm dia.

Order Code	Type	Price each
ZC09K	Rubber Torch	£3.99

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Small Rubber Krypton Torch

A black rubber-bodied hand-held torch that is fitted with a high brightness krypton bulb. The lens is made from transparent plastic and the torch is powered by two 'AA' cells. Three interchangeable lens in red, green and yellow are also supplied with the torch. The lens unscrews giving access to the two 'AA' type batteries and the bulb holder. The rubberised body features two flush-mounted 'snap' action switches for 'on' and 'off' which are unlikely to be operated inadvertently. The torch has a wrist strap attached to its body. Supplied with two 'AA' type batteries. Overall dimensions: 165 x 38mm diameter.



Order Code	Type	Price each
UK90X	Small Rubber Torch	£3.99

Large Rubber Krypton Torch



A large black rubber-bodied hand-held torch that is fitted with a high brightness krypton bulb. The lens is made from transparent plastic and the torch is powered by three 'D' cells. The lens unscrews giving access to the three 'D' type batteries and the bulb holder. The rubberised body features two flush-mounted 'snap' action switches for 'on' and 'off' which are unlikely to be operated inadvertently. The torch has a wrist strap attached to its body. Supplied with three 'D' type batteries. Overall dimensions: 260 x 65mm diameter.

Order Code	Type	Price each
UK91Y	A1 Large Rubber Torch	£4.99

Auto Hand Lamp



An extremely useful hand lamp with a 12V, 6W bulb and 4.55m cord terminated in a standard car cigarette lighter plug. The main body is constructed from sturdy black plastic and features an on/off switch. The top grille is orange in colour and features a hook from which the lamp can be suspended. It incorporates a safe plastic lens to protect the bulb and is detachable from the main body to facilitate bulb replacement. Replacement bulbs are available from most auto part suppliers. Overall dimensions: 166mm x 50mm dia.

Order Code	Type	Price each
ZC18U	6W Auto Hand Lamp	£2.75

Multi-purpose Rechargeable Lantern

A very practical combination lamp which combines a bright torch, a flashing yellow hazard warning light, and an effrescent lamp. These icient twin tube fluofeatures make the lamp ideal for camping, around the home or emergencies. The tubes are 8in. 6W and either one or both can be switched on. The



fluorescent lamp can be operated alone or in combination with either the torch or the hazard warning light. The torch end is twisted off for bulb replacement. The lantern is powered by an integral, rechargeable, 6V DC 3Ah sealed lead-acid battery which is recharged from the battery charger supplied, via a standard 2.1mm power socket. A red LED indicates when charging is taking place. Overall dimensions: 282 x 105 x 94mm.

Order Code	Type	Price each
CJ33L	A3 Rechargeable Lantern	£24.99

Water Resistant Torch

A bright, hand-held torch especially designed for outdoor use. It uses a 'krypton' bulb for high efficiency and a light output superior to conventional filament bulbs, with a generous 98mm round reflector. A resilient, plain plastic lens is used instead of glass for safety, and the whole lampholder is removable to gain access to the bulb itself and the battery compartment. This is held in place by a screw-on ring which retains the reflector. The reflector and lens are sealed to the ring with a thick rubber circular bead, and the joint

between the screw-on ring and the body is protected by a red synthetic gasket or 'O' ring of square-section. As they stand these render the torch adequately splash-proof, but improvement may be possible by the sensible application of a non-hardening compound to improve the sealing of these joints – such as the Multi-Purpose Grease (FM80B), to be found in the tools section of this catalogue – in the right places. The torch uses four 'D' type cells which preferably should be alkaline (not included). The body is a one piece black plastic moulding, with handle and wrist-strap, a security ring for a lanyard and a free-standing base. The on/off switch is a push button on top with a rubber cover. Overall dimensions are 170 x 140 x 120mm.



Order Code	Type	Price each
JU21X	Water Resist Torch	£5.49
JX50E	Krypton Bulb For JU21	50p

High Power Halogen Spotlight



A robust, powerful, hand-held halogen spotlight that plugs into the 12V DC cigarette lighter socket fitted to most motor vehicles. The 250,000 candlepower illumination produced makes this a very useful spotlight for mobile and emergency lighting. A metal hanger is provided in the top of the spotlight which also houses an on/off switch. The spotlight is provided with three meters of coiled cord and a protective cover. Please note that, in use, the lamp will get very hot and will draw a very high current from the vehicle's battery. Care should be taken to avoid discharging the battery. Overall dimensions: 160 x 117 x 90mm. Replacement bulb available: KP62S

Order Code	Type	Price each
CJ50E	A1 Halogen Spotlight	£9.49
KP62S	Bulb for AG90/CJ50	£1.99

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12V HAND-HELD HALOGEN SPOTLIGHT

A 12V high-powered halogen spotlight that is designed to plug directly into a cigarette lighter socket found on most modern cars. This 300,000 candle power lamp is ideal for camping, nighttime emergency roadside repairs, power cuts etc. The contoured handle features a retractable metal hook and an on/off switch. A tough, detachable plastic hook is included that can be screw to a wall, or suitable flat surface. The back of the spotlight has a recess for clipping over the hook. The lamp is fitted with approximately 3.5m of coiled lead terminated with a suitable plug to fit a cigarette lighter socket. Housed in a rugged black impact resistant plastic casing. A replacement bulb is available. Diameter 170mm, overall length 275mm, depth 95mm.



Replacement bulb KP62S £1.99

Map Light

A combination map clip and map light for use in the car at night. To use, simply fold your map leaving the panel(s) to view on top. Clip the map light onto one edge, and insert the provided cigar lighter plug into the car's socket. The device comprises a 204 x 120mm perspex screen which is edge lit by four tiny filament bulbs. The light diffuses through the screen, which has a shallow wedge section, ensuring light is reflected from the top surface down onto the map across its width. A circular magnifying section is included at the bottom righthand corner. The clip has a maximum opening of 6mm. The coiled lead is 450mm long retracted, 160cm long extended. Provided with a plastic storage wallet to protect the screen while not in use.



Order Code	Type	Price each
YZ36P	Map Light	£4.99
JX47B	Bulb For YZ36	40p

Fluorescent Reader's Light



A compact, black, portable battery powered lamp fitted with a 14mm fluorescent tube mounted on a flexible neck. It features a sturdy clip which enables it to be secured to a shelf, panel edge, headboard etc. It can be used as a 'hands free' source of illumination for situations where you need a torch but require the use of both hands. The lamp itself requires 4 'AA' type cells (not included) which should preferably be of the alkaline type, particularly if the unit is to be left on continuously for prolonged periods. The integral clamp will open to a maximum of 40mm and is capable of gripping shelves, table edges etc. up to 30mm thick. The lamp body features an on/off slider switch and a reflector mounted behind the tube.

Order Code	Type	Price each
ZC12N	Fluor Reading Lamp	£7.49

Reader's Light

A small, portable battery powered lamp that may be either free standing or alternatively clipped to a shelf or the edge of a panel etc. Can be used to help illuminate the interior of an instrument case or similar confined space to provide close-up, on the spot lighting for fiddly soldering jobs, or in any situation where you need a small torch, but at the same time need both hands free. The lamp uses four AA size batteries (not supplied) contained in the base and providing stability

in the free-standing mode. The integral clamp will open to 40mm maximum and is capable of gripping shelves, edges of tables etc. up to 30mm thick. A flush on-off slide switch is provided plus a 2.5mm jack socket for an external 6V supply. The lamp proper is mounted at the end of a jointed arm which has a rotatable hood, and uses an easily replaceable MES bulb. Overall dimensions, folded - 120 x 45 x 60mm. Maximum reach of arm - 208mm



Order Code	Type	Price each
FM99H	Reader's Light	£3.99

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MAINS INSPECTION LAMP

Optum



A handy inspection lamp which is ideal for use in the garage, home or anywhere mains power is available. Supplied with a 4.5 metre long power cable which allows good access to the work area. An on/off switch is fitted to the plastic handle, and the bulb (60 watt max., not supplied) is protected from breakage by a bright orange plastic cage surround which also features a reflective strip. A hook at the top of the lamp allows it to be hung, leaving both hands free. The lamp is not water- or weather-proof. The mains lead is terminated with tinned wires, which should be connected to a standard 13A mains plug fitted with a 2 or 3 amp fuse.

Order Code	Type	Price each
ZC19V	Inspection Lamp	£6.49

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COMPACT LIGHTWEIGHT CYCLE COMPUTER

A super compact, lightweight bicycle computer with LCD readout that features three user levels. Basic offers three sport functions: current speed, trip time and trip distance. Advance level offers, in addition to the basic sport functions: 24h clock, alarm clock, countdown timer, distance alarm, odometer, maximum speed, average speed and average speed alarm. Professional level features five functions in one display; the three basic functions plus distance alarm and training speed alert. The bicycle computer can be programmed to operate in either the metric or British system and can be used with cycles having wheel diameters from 20 to 28in. Other unique features include a countdown timer, an automatic start state (counting starts as soon as the wheel turns), and the ability to be used for team time trial or individual road race. The cycle computer is easy to install, and set up, and includes a standard CR2032 lithium battery.



Specification	
Controller:	4-bit, 1-chip microcomputer
Sensor:	No contact magnetic sensor
Speed measurements (all settings):	0 to 199.9km/h
Trip distance:	0 to 999.9km
Odometer:	0 to 9999.9km
Set trip distance:	0 to 999.99km
Trip time:	0 to 9h 59m 59s
Dimensions:	47 x 45 x 16mm
Weight:	25g

Specification	
Recording system:	DC bias
Erasing system:	Magnetic
Tape speed:	4.75m/sec
FF/Rewind time:	120 sec (C-60 tape)
Wow and flutter:	0.4% WRMS
Frequency response:	250Hz to 6.3kHz
S/N ratio:	30dB
Audio output power:	300mW
Power source:	3V DC from 2 x AA cells or adaptor
Loudspeaker:	40mm dia. 8Ω
Sockets	
Input:	External microphone (3.3kΩ) External DC power adaptor Remote Control
Output:	Earphone (8Ω)
Dimensions:	87 x 114 x 32mm
Weight:	215g
Accessories:	Carrying case, C-60 cassette

Order Code	Type	Price each
YZ50E A1	Recorder TRC1130	£64.99

THE BEST OF SERVICE

Micro Cassette Dictating Recorders Olympus S926



Designed specifically to keep up with the high-paced businessman, career woman and college student of today. Its shapely design, engineered specifically to the shape of your hand, puts effortless fingertip control at your command. Now you can simplify all your recording and transcribing jobs. Full functions such as VCVA (variable control voice actuator), fast play and microphone sensitivity give you ease of operation when you need it most. Thanks to VCVA and adjustable microphone sensitivity, the Olympus S926 begins recording only when the microphone senses a preset audible level. A red LED indicates when a recording is being made. The Olympus S926 is packed with other sleek features to match its slim figure. Fast play lets you play back recorded material at faster than normal speed for quick reference. With the pause button, stop/start operations are easily performed in both the recording and playback modes. These are just a few of the time saving features you get from this unit. With the S926 you'll spend less time searching for information and more time listening to it. All the features in the S926 combine to give you top-rate micro-cassette performance. VCVA, automatic power shut-off and fast play make your micro-cassette recording operations more efficient. And, of course, you'll find the standard features of high and low sensitivity, pause switch, cue/review/quick review, two tape speeds (2.4cm/sec and 1.2cm/sec).

ULTRAVIOLET MINI LANTERN



A very useful miniature torch combined with an ultraviolet (UV) fluorescent tube, offering exceptional value for money. A switch on the side of the lantern selects torch beam on, UV tube on, or power off. The torch uses a readily available 6V MES, tubular pre-focused bulb, and a 6in. 4W UV tube. The UV light facility is especially useful to stamp collectors for reading the phosphor dots on postage stamps. It can also be used to detect UV security ink and to check the authenticity of bank notes. The lamp body features a carry strap so that it may be hung up, and the lamp itself requires four AA cells (alkaline recommended) not supplied. Overall size 152 x 53 x 21mm. Spare UV tube available: CR48C

Order Code	Type	Price each
ZC10L	UV Mini Lantern	£8.49
CR48C	UV Tube for ZC10	£2.95

CASSETTE DICTATING RECORDERS

Standard Cassette Dictating Recorder



A dictating machine that uses standard audio cassettes, designed for use in the office, conference room or other business environment. The unit features convenient push buttons for hand held or free-standing use. The Voice Operated Recording System automatically eliminates pauses in speech, thus increasing the recording time available on the cassette and cutting out unwanted gaps. A 3-digit tape counter is provided for easy location of specific sections of tape. Automatic level control 'conference facility' adjusts the unit's sensitivity to compensate for varying levels of speech, ensuring clear recordings.

Specification

Tape: Micro-cassette
 Tracks: 2 tracks, 1 channel monophonic
 Drive system: Capstan drive
 Tape speed: 2.4cm/sec and 1.2cm/sec switchable
 Recording system: Continuous adjustment using volume control in VCVA recording mode
 Earphone jack: 2.5mm, impedance 8Ω
 Audio power output: 150mW (EIAJ) at 2.4cm/sec
 Power source: 3V DC from 2 x AA cells or adaptor
 Dimensions: 122 x 24 x 58mm
 Weight: 160g (including batteries)

The recorder comes with one XB15 and one XB60 microcassette, carrying case and batteries.

Order Code	Type	Price each
YZ51F A1	Recorder S926	£59.99

Did You Know?

James Watt (1736 to 1819) was a British engineer who made fundamental improvements to the Newcomen steam engine, resulting in the modern high pressure steam engine. However, today his name is used to indicate units of power. For instance, a loudspeaker could be said to have 50W (watts) of handling power; or a light bulb, 100W of brightness etc. A 'Watt' is an SI unit of power equal to one joule per second. Also, volts x amperes equals watts ($V \times I = W$).

Olympus S928



The portable recorder S928 is similar to the S926 with additional features, including a Mic input and a tape counter with reset button. The mic input allows an external microphone to be connected for a better recording. A tape counter allows the tape to be cued at vital parts of the tape for reference. A green LED indicates when the recorder is in playback mode. The recorder is fitted with 'Audible Indexing'. An audible tone can be recorded at the start of each recording to help find a particular section during playback. The whole package comes with a carrying case, one XB15 and one XB60 microcassette and batteries.

Order Code	Type	Price each
ZF24B A1	Recorder S928	£79.99

MULTIFUNCTION LCD WATCHES

World Time Watch and Thermometer Casio

A versatile, high quality world time watch with the added facility of a built in Thermometer. The attractive square LCD displays all the usual timekeeping functions as well as a world map. In 'world time' mode the time in one of 23 different time zones can be displayed at the press of a button. The temperature range is from -10°C to 60°C (14°F to 140°F) with a changeover between °C and °F. There is a local temperature memory that stores 24 temperature records at hourly intervals. The dual time facility allows an alternative time to be preset and recalled. This world time facility will appeal to those who travel a great deal or make frequent international phone calls, as it makes it easy to keep global time in the proper perspective. Five multi-function alarms can be preset independently, as a daily alarm, monthly alarm (only date set), 1 month alarm (only month set) or date alarm (month and date set). A count down alarm is included from a maximum of 24 hours and 'beeps' for 10secs. when zero is reached. The stopwatch facility can time events, up to 24 hours, within 1/100 second with 'signals' to confirm the start/stop operation. The regular timekeeping functions include hours, minutes, seconds with year, date and day. The time display can be set to show either the 12 or the 24-hour format, and the watch automatically determines and sets the number of odd or even days in the month. This superb watch is housed in a black resin case with matching strap and is powered by one CR1620 battery with a battery life of approximately three years. Water resistant to a depth of 100m (static water pressure).



Order Code	Type	Price each
DM94C	World Time Watch	£34.99

Data Bank Casio



An extremely well-specified digital watch which couples renowned Casio quality with many useful features. The normal timekeeping display shows the day of the week, date, year and the time in hours, minutes and seconds. This 'chronometer' function automatically compensates for leap-years and months of differing lengths. The display can be switched between 12 and 24-hour operation, and will show the time in any of 24 different time zones. A 24-hour stopwatch is also available which works to a resolution of 1/100 second. The alarm functions are very comprehensive. In addition to a switchable daily alarm and an hourly bleeper, there is a countdown alarm. This works to a resolution of a second and the countdown period can be user-defined between 1

minute and 24 hours. An extremely useful 8-digit 4-function calculator with memory is included, the keypad being incorporated on the watch face. The same keypad is used to enter data into the 50-page telephone and scheduling memories. Each telephone memo 'page' can comprise 8 letters and 12 numbers, while the scheduling facility will allow 5 letters per page. The 50-page memory is shared between these two functions. The top part of the LCD panel has a 'grid' which shows at a glance the memorised scheduled events over two weeks. To prevent unauthorised people from gaining access to any information stored in the watch, a 'private password' function has been provided. An essential 'power fade' indicator is present on the display panel which will warn the owner when the batteries need replacing. Thus, information stored in the watch may be copied from the display and written down, being re-entered into the memory once fresh batteries have been installed. A 'micro-light' permits reading of the display under poor lighting conditions, although it must be stressed that prolonged usage will reduce the life of the battery considerably. Normally, the lithium CR1616 battery will power the watch for approximately 2 years. Supplied in an attractive presentation case with owner's manual. A battery is included.

Order Code	Type	Price each
ZF15R	Data Bank Watch	£39.99

Exercise Pulse Monitor Casio

A superb watch designed for those who are serious about fitness, housed in a black resin case with matching strap. By simply programming the watch with the relevant data i.e. age, the watch measures your pulse, and displays your optimal aerobic range. An 'intensity' gauge even indicates the intensity of the activity you are performing. Additionally, there are three sets of 7 measurement data memories. The watch has the usual timekeeping functions i.e. hours, minutes, seconds, month, date and day, and automatically determines and sets the number of odd or even days in the month. A daily alarm can be set to provide a gentle reminder at the same time every day, and time signals can be set to 'beep' on the hour. The time display can be set to show the time in either the 12 or 24-hour format. Power is supplied by a CR2016 type battery with an approximate battery life of two years. Water resistant to a depth of 50m (static water pressure).



Order Code	Type	Price each
DM95D	Exercise Pulse Mon	£46.99

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Weather Station

Casio



An unusual watch incorporating barometer, altimeter and depth-meter functions in addition to regular timekeeping, several alarm modes and a stop-watch. It will appeal particularly to divers, hikers, rock/ mountain climbers and to those who participate in weather-dependent activities (such as golf and other sports). Other uses include measuring the height of buildings and the altitude of specific areas above sea level. The watch is rugged in appearance, and there is a characteristic protrusion on the left side of the case which contains the sensor used for the special functions. The case is guaranteed to be water-resistant at depths of up to 100m. A large LCD is used as the main display, showing mode and time/stop-watch information. This display will also show height, depth (both measured in metres) and atmospheric pressure (measured in millibars) when the watch has been set to the relevant mode. In addition, there is a 'weather tendency' display which shows the trend in atmospheric pressure (over three hour intervals) during the preceding 18 hours. Such information is helpful when predicting weather changes. The same display also shows which pressure-related function has been selected, any data stored in the memory or the date/day of the week. Above this display, a semi-circular bargraph shows graphically the present value of atmospheric pressure (when selected) or alternatively the difference (in isobars) between a current pressure measurement and one previously stored in memory. Other memories store maximum altitude and depth values which, when reached, will trigger a warning alarm. For accurate measurement, the reference altitude will need to be entered (such information can be obtained from an Ordnance Survey map of your area or a precision altimeter (the best option). The watch could also be calibrated by setting the reference to 0m at sea level). The reference atmospheric pressure has been set at the factory, but can be recalibrated if required with the aid of a precision barometer. In addition to pressure measurement functions, this watch offers a range of timekeeping facilities. The time can be shown in either 12- or 24-hour format and a calendar facility (day of the week, date and month) is offered. In the normal timekeeping mode, either the date/day or the weather tendency display can be shown. 3 independent alarms are present, in addition to a switchable hourly beeper and a user-definable countdown alarm. A stop-watch fitted with split/reset functions and a resolution of $\frac{1}{100}$ second has also been included. The two SR927 silver batteries supplied will provide power for up to 2 years of operation, a presentation box and comprehensive owner's manual are also included.

Accuracy

Parameter	Accuracy at constant temp.	Effect caused by change in temp.
Timekeeping:	±15s/month	-
Barometer:	±(Difference in atmospheric pressure x 4.5% + 3mb) max.	±16mb max. per 10°C
Altimeter:	±(Difference in altitude x 4.5% + 30m) max.	±120m max. per 10°C
Depthmeter:	±(Displayed value x 12.5% + 0.4m) max.	±0.2m max. per 10°C

The sensor is very sensitive to shock and has been designed to work at temperatures between 10°C and 40°C.

Order Code	Type	Price each
ZF14Q	Weather Watch	£69.99

CLOCKS

Analogue Clock with MSF Decoder

NEW!



An ingenious, very accurate, analogue alarm clock that incorporates a radio receiver tuned to the MSF time-code transmitter at Rugby. An internal quartz oscillator keeps the clock running should the MSF reception be lost, or goes out of range. The clock has an alarm with 'snooze', and a backlight which is operated by a switch on the side. Setting the clock is very simple. A thumb-wheel on the rear of the clock is used to set the hour and minute hand to the top of the current hour (e.g. if the current time is 7:45, then the hour hand is set to 7 and the minute hand to 12). Two AA batteries (not supplied) are inserted and the 'SNOOZE' button is pressed until the seconds hand reaches the top of the minute. After approximately 2m the clock hands will automatically adjust to the correct time. House in an attractive black case measuring 88 x 98 x 56mm, the clock requires two AA batteries (JY88C) to operate.

Order Code	Type	Price each
RJ88V	Analogue Clock+MSF Dec	£24.99

Traveller's Alarm Clock



A compact, high quality, analogue quartz alarm clock with luminous hands. Setting the clock and alarm times is straightforward, the knobs for these functions being located on the back of the clock. The alarm time is indicated by a red pointer, the function itself being activated by means of a large press switch on the front of the clock. To turn on, this switch is pushed up to reveal a red bar verifying its status. When the alarm, which has a pleasant bell sound, has gone off the press switch only needs to be pushed down to stop it. The alarm will run for 40min. unless turned off, although this will constitute a large and unnecessary drain on the battery. This accurate and handy little clock is powered by a single alkaline AA cell, one of which is supplied with the unit, along with

operating instructions. Under normal usage, the battery will last for approximately a year. Overall size: 62 (H) x 93 (W) x 30.5mm (D). Weight: 134g. Accuracy: ±20 seconds per month (at normal temperature).

Order Code	Type	Price each
ZF16S	Travel Alarm Clock	£13.99

Electronic Timer



A superb, low-cost, count-down timer for those many process timing applications in the kitchen, around the home, and in workshops and laboratories. This digital timer is programmable to count-down from a maximum of 19 hours and 59 minutes. At the end of the count period a loud, piercing, bleeping, alarm sound is emitted until switched off. The timer contains an LCD, and three push buttons: 'hour/clear', 'min/alarm stop' and 'start/stop'. The count period is set up with 'hour' and 'min' and started with 'start'. The count can be stopped at any time, before it is complete, with 'stop' and restarted with 'start'. When the count-down is complete the alarm will sound. This is switched off with 'alarm stop'. The counter can be reset at any time using 'clear'. Colour white. Overall dimensions: 75 x 58 x 25mm. Uses a 1.5V type 'AA' battery, supplied. Includes instructions.

Order Code	Type	Price each
GW55K	Desk Timer	£4.99

FOR CASHTEL
Phone 01702 552941

Count-Down Timer

NEW!



A simple count-down liquid crystal display (LCD) timer that counts in minutes and seconds. Three buttons below the LCD provide control of the 'Minutes', 'Seconds', 'Clear', 'Start/Stop' and 'Memory'. During count-down, the two legends 'M' and 'S' flash 'on' and 'off'. Completion of the count-down is indicated by an alarm that starts when the count-down has finished and the display reads zero. The alarm, which can last as long as 30 seconds, is stopped by pressing the 'Start/Stop' button. This will also cause the display to show the original time setting. The count-down can be repeated again using the original setting or either be

cleared or a new time set in.

Simultaneously pressing the 'Min' and 'Sec' buttons clears the display and the memory. A short bleep is emitted when any button is pressed and when the digits are scrolled up in fast mode. A spring loaded belt clip, which incorporates a magnet, is fixed to the back of the timer. The instructions for standing the product upright appear on the back of the packaging.

Specification

Digits - minutes: 19mm
 seconds: 14mm
 Unit dimensions: 62 x 62 x 26mm
 Operational current: 4µA while counting (no alarm sounding)
 Set time (max): 99 mins 59 secs
 Power supply: One AAA battery

Order Code	Type	Price each
RJ82D	Count Down Time	£6.99

Calendar/Clock



An attractive 100-year calendar clock that is ideal for home, office or travel. A large LCD shows the time, day and date. Features include 12/24 hour clock format, weekday and weekend alarm settings plus a six minute snooze function. Other features include a US/Europe calendar format. The cover below the display slides down to reveal the set up controls. A five position slide switch selects the function and four buttons are used to set a particular function. The other controls are a snooze/alarm switch and an alarm stop switch. The display dimensions are 58 x 34mm. Overall dimensions of the white case are 79 x 77 x 53mm. Powered by a type 'AAA' battery, supplied. Instructions included.

Order Code	Type	Price each
GW56L	Calendar/Clock	£10.99

Snooze Alarm Clock



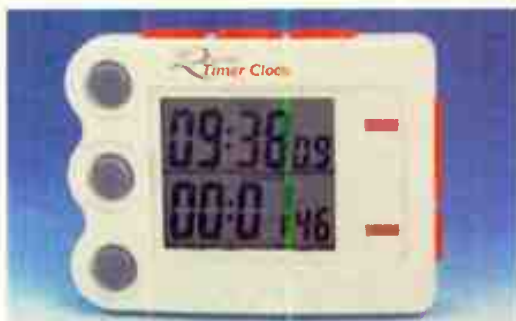
An attractively finished battery operated alarm clock incorporating a snooze facility. The snooze alarm will repeatedly sound every eight minutes, until the alarm is switched off.



The clock can be set to display either a 12- or 24-hour format and in the 12-hour mode the unit will display am or pm accordingly. The clock is fitted with a 'light' button, which when pressed illuminates the LCD. The 'light' button also stops the alarm from sounding when pressed. The unit has an in-built folding stand and is supplied with a wall mounting bracket.

Order Code	Type	Price each
RJ77J	Snooze Alarm	£8.99

Dual Timer Clock



A compact Dual Timer featuring two liquid crystal display (LCD) screens which show the time for the clock and stopwatch and two timers T1 and T2. The clock can be set to either 12-hour or 24-hour system. The three timers are arranged so as to act as one count-up (stopwatch) and two count-down timers. The two count-down timers can be operated individually or consecutively.

Specification

Digits - hours/minutes: 14mm(H)
 seconds: 8mm(H)
 Unit dimensions: 89 x 68 x 19mm
 Operational current: 9µA. This increases when the alarm sounds
 Set time count (max): 23 hours 59 minutes 59 seconds
 Power supply: One AAA battery

Order Code	Type	Price each
RJ81C	Dual Timer Clock	£9.99

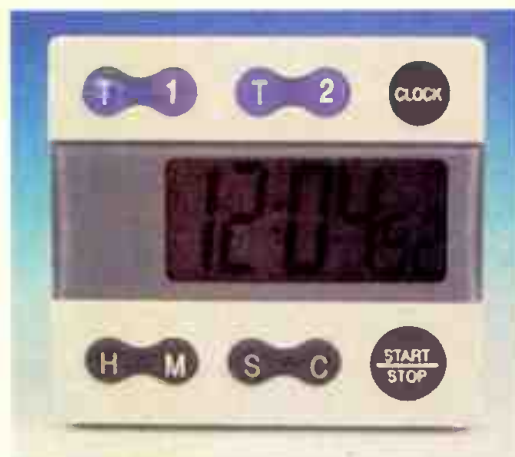
Large LCD Display Count Down Timer



An eye-catching, precision, digital timer that is programmable to count down from 99 minutes 59 seconds, with an alarm that sounds for 30 seconds when zero is reached. This large LCD timer has two buttons to set the minutes and seconds, and a large round button to start/stop the countdown, although any button can be pressed to stop the alarm once it sounds. The timer can be clipped to a thin board or shirt pocket, using the plastic clip at the rear of the timer. Alternatively, it can be attached to iron or steel surfaces using the magnet at the rear, or stood on any flat surface using the flip out metal stand bar. Housed in a white/light grey plastic case and powered by one G-13 1.5V button cell (included). Size: 72 x 66 x 22mm. Weight: 58g with battery.

Order Code	Type	Price each
BU79L	Count Down Timer	£9.99

Large LCD Display Up/Down Timer and Clock



An attractive large LCD timer and clock with two independent count down timer channels, programmable to count down from 99 hours 59 minutes, 59 seconds to zero. When the timer reaches zero the timer starts to count up and the alarm sounds for 60 seconds. Pressing any button will stop the alarm. The two timer channels can be run concurrently so that the start of a timed period and the end of the period can be set. Above the LCD are three buttons to select either 'timer 1', 'timer 2' or 'clock' mode. The lower buttons are used to set the timers and time of day, and to start/stop the timers. The timer can be clipped to a thin board or shirt pocket, or can be freestanding using the integral stand. The clip incorporates a magnet for attachment to iron or steel surfaces. Housed in a white/light grey plastic case and powered by one G-13 1.5V button cell (included). Size 72 x 66 x 22mm. Weight 58g with battery.

Order Code	Type	Price each
BU80B	Up/Down Timer	£10.99

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Quartz-Light LCD Alarm Clock



A black LCD analogue clock with alarm and hourly chime. Three buttons situated below the display set the clock and alarm and illuminate the display.



The 'Mode' button displays the set alarm time when it is pressed. Pressing it a second time returns the display to the clock time. It is also used when setting the clock and the alarm time. The 'Set' button permits selection of the minute and hour hands and together with the 'Mode' button moves the hands to the desired time. The 'Light' button illuminates the display when pressed. Four individual symbols appear on the display in

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Continued on next page

Continued from previous page

conjunction with the set time and alarm. The 'AM/PM' symbol is visible all the time whereas the 'AL' and 'Bell' symbols appear when the alarm is set. The final symbol is the hourly 'Chime' which is available only when the alarm is set.

Two 'AAA' cells are supplied in the packaging with the clock. Adhesive velcro is supplied for retaining the clock to a suitable surface. Full instructions are supplied with the unit.

Specification

Display dimensions: 35 x 35mm
 Unit dimensions: 69 x 60 x 35mm
 Operational current: 3µA. This can increase up to 30mA with the other functions in operation.
 Power supply: Two 'AAA' batteries

Order Code	Type	Price each
RJ78K	LCD Alarm Clock	£7.99

Extra Large LCD Calendar and Clock



A handsome calendar clock that is ideal for home, office and the traveller. An extra large LCD display shows hours, minutes, date, month, year and a full calendar month. Additional features include four minute snooze function, selectable 12/24 hour clock format, daily alarm with indicator and automatic leap year adjustment. Complete with folding stand, and housed in a dark charcoal finished plastic case, this calendar clock is powered by one G-13 1.5V button cell (included). Size: 116 x 90 x 20mm. Weight: 130g with battery.

Order Code	Type	Price each
BU82D	Calendar Clock	£17.99



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Precision Digital Stop-Watch



A digital stop-watch with LCD display accurate to 1/100th of a second. The shock and moisture resistant case is of polycarbonate and Kraton and the display lens is acrylic, and a neck cord is attached. This multipurpose stop-watch is easy to use and accurate for all sports activities, and can display 'LAP' time and reset and restart counting from zero for the next lap while holding last lap display, or continue with current time and hold display only, as well as be able to pause counting during a 'time out' period and resume counting from current held time. The timing range is from zero to 9 hours, 49 minutes and 59.99 seconds. Recommended operating temperature is -10°C to +59°C. Dimensions: 80 x 57 x 17mm.

Order Code	Type	Price each
YU03D	Stopwatch	£12.99

Small Clock Module FM-882

A compact digital clock module that uses a quartz crystal to provide an accuracy of ±15 seconds per month. Four digits show hours and minutes for a 12 hour period with AM and PM indicators. Operates from one GE-13 silver oxide button cell and draws a maximum of 5.5µA, which results in a battery life of approximately one year. The clock has an integral flanged bezel and can be snapped into a panel cut-out of 50 x 25mm. Makes an ideal small, low-cost and accurate digital clock suitable for a wide range of applications.



Specification
 Digit height: 10mm
 Oscillator frequency: 32.768kHz
 Accuracy: 15s/month
 Operating voltage range: 1.2V to 1.8V
 Battery life: 1 year approx.
 Dimensions
 panel cut-out (body): 45 x 25mm
 depth: 15mm

Order Code	Type	Price each
YU05F	Small Clock Module	£8.49

ANALOGUE QUARTZ CLOCK MOVEMENTS

Make your own clock using these analogue movements which are simple to use, offer quartz crystal accuracy and require just one AA size battery to operate. The CMOS circuit drives a self starting, two pole stepper motor from a crystal oscillator, and reduction drive from the second hand to the minute and hours hands is through nylon gears.

Quartz Clock Movement



A standard basic quartz clock movement as described above. The movement is supplied without hands but uses the separate hands shown on the next page. Time is set with a knob on the back. Movement is attached to face with a threaded brass boss having a shouldered brass collar nut.

Specification

Crystal freq: 32.768kHz
 Accuracy @ 22°C: ±0.45 ±0.55s/day
 Operating voltage: 1.3 - 1.65V DC
 Operating temperature: -10°C to +60°C
 Average current: <150µA @ 1.5V
 Battery life: ~1 year
 Dimensions: 55 x 55 x 17mm not including mounting boss and hand pivots.
 Mounting boss: 8mm dia. clear
 Hole dia. for collar: 10mm dia. clear

Order Code	Type	Price each
YU49D	Clock Module	£3.49

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Chiming Clock Movement

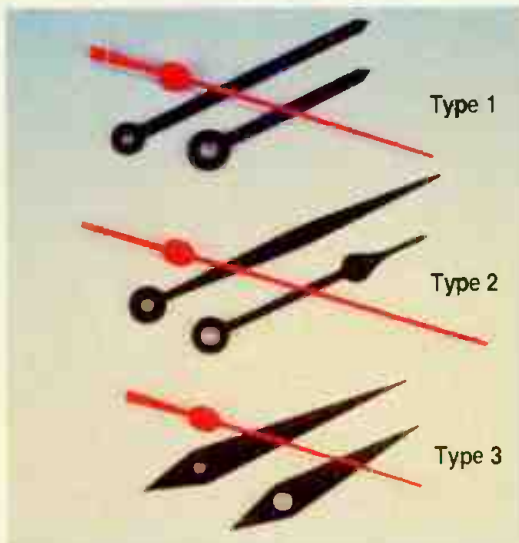


A quartz crystal clock movement exactly as standard movement above, but having in addition a combined microchip chimes generator and output amplifier pcb, driving a 57mm diameter moving coil loudspeaker. The chimes generator and amplifier module is powered separately by an additional two AA cells, and two control wires from the clock module cause tunes to be produced hourly. The whole assembly can be mounted in a custom clock case. Specifications as for standard movement.

Order Code	Type	Price each
YU66W	Melody Clock	£5.49

Analogue Clock Hand Sets

Three sets of plastic hands of different designs which can be used with both the standard quartz movement and the chimes movement overleaf. The hours and minutes hands are black, the second hand is red for each set.



Length from centre pivot:

	Hour	Minute	Second
Type 1	53.75	80.0	80.0
Type 2	70.0	94.0	94.0
Type 3	45.0	66.0	66.0

Order Code	Type	Price each
YU74R	Clock Hands: Type 1	25p
YU75S	Clock Hands: Type 2	25p
YU76H	Clock Hands: Type 3	25p

Table Alarm Clock Movement

As standard quartz movement above but including an alarm function, and a special set of four hands, one of which is a set alarm time indicator. The alarm sounds where the hour hand aligns with the alarm set hand. Separate set time and set alarm knobs are provided on the back with an alarm on/off switch. The separate hands below will not fit this movement as the mounting pivots are of different diameter. Also unlike standard movement, alarm version has no central mounting boss and instead is provided with two mounting holes through the case; fixing centres 49mm x 8BA/M2 clear.

Specification

As those for standard movement except –	
Operating voltage:	1.3 to 1.7V DC
Operating current:	<85µA @ 1.5V
Alarm current:	<8mA @ 1.5V
Alarm volume:	>80dB @ 10cm
Alarm duration:	35 min. ±20 min.
Alarm time accuracy:	±5 min.
Operating temperature:	-10°C to +50°C
Dimensions:	52 x 55 x 23mm not including hand pivots.



Lengths and colours of hands, measured from centre pivot:

Hour (black with a luminous stripe):	19mm
Minute (black with a luminous stripe):	26mm
Second (red):	26mm
Alarm set (yellow):	20mm

Order Code	Type	Price each
YU67X	Alarm Clock Module	£4.49

Wireless Clock Module



A compact analogue clock movement that incorporates a miniature radio receiver to decode the Rugby MSF time-code transmissions. Once locked to the transmission, the module is extremely accurate. Supplied with hour, minute and second hands. Finished in black. Requires one 'AA' battery (not supplied). Dimensions of module (not including hands) 55 x 55 x 12mm.

Overall length of hands

hour:	77mm
minutes:	120mm
seconds:	120mm

Order Code	Type	Price each
RJ89W	W/Less Clock Module	£19.99

DIGITAL THERMOMETERS

Ice Warner



Essentially a minimum/maximum digital temperature module, it includes an alarm bleeper which sounds if either programmed temperature threshold is exceeded. Especially useful in the car since the external probe can be positioned somewhere on the underside of the vehicle, but preferably not adjacent to or to the rear of the engine (heating effect) nor in direct air flow (wind chill effect) to gauge the nominal temperature at or near the ground and thus give warning if it is cold enough for conditions to be icy. For this purpose the self contained module comes complete with a mounting bracket for fitting it to the dashboard or similar, and a supply umbilical which plugs into the cigar lighter socket. The bracket can be attached with a single screw and can tilt and rotate through two planes to ensure a good viewing angle. 'U' clips and self adhesive pads are provided to secure the external probe cable and the probe itself if installed for this purpose. The module can also read the internal temperature and either can be selected with the 'in/out' switch. The module includes a 12 hour clock with AM and PM indicators, and time is shown while the 'clock' button is held down. A miniature lamp illuminates the LCD display in the dark. Beneath a lower flip-down cover there is a display centigrade/fahrenheit option switch, and four buttons for setting both the upper and lower temperature threshold points and the clock time. The module also uses a 1.5V AAA size battery either as a backup or main supply. Also provided with self adhesive pad on back for fixing to a flat smooth surface. Cable for external probe is over 3 metres long, and the power supply lead 1.4 metres long.

Order Code	Type	Price each
YT98G	Ice Warner	£14.99

Large Display Thermometer



This superb, attractive, large format display, digital thermometer will impress anyone who needs to observe and monitor inside and outside temperatures. Useful in the home, office, workshop, car, or in the greenhouse, or where there are extreme climatic conditions, etc., to guard against. The meter has an internal, built in sensor and an external sensor in the form of a flat plastic probe attached to the end of a 3m wire. This external sensor is attached to the inside of a non-moving window. The temperature range is -50° to +70°C. The display is approximately 47mm wide by 19.5mm high. A flip-out stand is fitted on the back of the unit for mounting. Powered by a type 'LR44' 1.5V battery, supplied. Colour black.

Order Code	Type	Price each
GW58N	I/O Digital Thermo	£7.99

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Pocket Thermometer



A handy low-cost digital thermometer with a wide range of applications. The face of the thermometer features a four digit LCD, a push-button, and a battery compartment. Two sampling rates are available, the default rate is 10 seconds, which helps to conserve battery power, but a 1 second rate can be obtained by holding down the button. Ideal applications are food processing and storage, agriculture, pharmaceutical, brewing, and the heating and ventilation industries, are just a few examples. Dimensions: probe 120 x 3.5mm, face diameter 38mm, overall length 140mm.

Specification

Temperature range: -55°C to +148.8°C
 Resolution: -49°C to 105°C 0-1°C
 -55°C to -49°C 0-2°C
 105°C to 129°C 0-2°C
 129°C to 140°C 0-3°C
 140°C to 148.8°C 0-4°C
 Accuracy: ±1-5°C (Full Range)
 ±1°C (0°C to 60°C)
 Battery: 1.5V G-5 size (supplied)

Order Code	Type	Price each
RT21X	Pocket Thermometer	£15.99

Large Display Thermometer



This superb, attractive, large format display, digital thermometer will impress anyone who needs to observe and monitor inside and outside temperatures, particularly from a distance. Useful in the home, office, workshop, or in the greenhouse or cold frame, or where there are extreme climatic conditions, etc. The unit will also provide maximum and minimum readings, of inside and outside temperatures, at the press of a button. These readings are stored in a memory that can be cleared at any time. The meter has an internal, built-in sensor and an external sensor in the form of a flat plastic probe on the end of a length of wire. This external sensor is attached to the inside of a non-moving window. The temperature range is -50°C to +70°C. The display is 74.5mm wide by 63mm high in total and each reading is 29mm high. A flip-out stand is fitted on the back of the unit for table standing. Powered by a type 'AAA' battery, supplied.

Order Code	Type	Price each
GW59P	Large Dual Thermo	£15.49

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Thermometer Clock NEW



An attractive white LCD dual-purpose clock that displays the time as well as the ambient temperature in either °C or °F. On the front of the unit is a single push-button labelled 'Clock' which, when the display is reading temperature, will show the time when pressed. The time can be altered even when displaying temperature. The front 'Clock' button is held 'on' and the 'HR' and 'MIN' buttons pressed. The temperature sensor is positioned at the top left-hand side of the unit's face.

Specification

Display dimensions: 48 x 20mm
 Digit height: 18mm
 Unit dimensions: 63 x 45 x 15mm
 Weight: 32g
 Power supply: One 'AAA' battery

Order Code	Type	Price each
RZ53H	Thermometer Clock	£6.99

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Digital Thermometer and Clock



An attractive, compact thermometer and clock, with an outdoor temperature probe, that can display either °C or °F. The LCD display alternates between time and temperature readings at three second intervals. A small slide switch on the front selects either the indoor or outdoor temperature probe, which is attached to the module by 2m of black twin flex. Time settings and the °C/°F slide switch are mounted on the back of the module. The module has a flip-out stand on the back for desk or table top use, or it can be wall-mounted using the matching wall bracket (supplied). Finished in dark grey and silver.

Specification

Temperature range: indoor: -5°C to +50°C (-23°F to +122°F)
 outdoor: -50°C to +70°C (-58°F to +158°F)
 Resolution: 0.1°C (0.1°F)
 Battery type: Single G-13 type 1.5V (LR44)
 Probe length: 22mm
 Probe diameter: 5mm at base, 4mm at tip
 Size: 68 x 52 x 16mm (incl. bracket)
 Weight: 51g (incl. battery)

Order Code	Type	Price each
BU77J	Small Thermometer	£9.99

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Aquarium Thermometer



This LCD thermometer is primarily intended for use with an aquarium, but it also doubles up as a room thermometer. A sliding switch, at the bottom right-hand side, selects either the water temperature or the room temperature. The water temperature sensor is housed in a sealed metal cylinder connected to the thermometer by approximately 1m of lead. A suction cap attached to the sensor holds it in position within the tank. The room temperature sensor is housed inside the actual thermometer body on the left-hand side of the thermometer. The thermometer has an operational range of between -20°C to +70°C.

Specification

Dimension: 60 x 40 x 14mm
 Temperature range: -20°C to 70°C
 Power supply: One LR44 (SR44) battery

Order Code	Type	Price each
RJ79L	Aquarium Thermometer	£6.99

Thermometer/Clock



A very compact, low-cost inside/outside LCD thermometer and clock that is ideally suited for use in the car, the office or home. Also suitable for greenhouse or workshop. This thermometer has a wide temperature range, measuring from -50°C to $+70^{\circ}\text{C}$. The unit has a built-in internal sensor and an external sensor that takes the form of a flat plastic probe attached to a 3m length of wire. This external sensor is attached to the inside of a non-moving window or, in a car, somewhere unaffected by engine heat, e.g. behind the front bumper, not directly in the wind stream. Controls to set up the clock and select $^{\circ}\text{C}$ or $^{\circ}\text{F}$ are on the rear, with a temperature selector slide switch at one end. On the face is a clock button and a light button. The unit is provided with 'velcro' mounting pads for attaching to any smooth surface. Colour black. Dimensions: 114 x 24 x 17mm. Supplied with type 'AAA' battery and instructions.

Order Code	Type	Price each
GW57M	Thermo/Clock	£7.99

Pocket Meter with Alarm

A well-made, attractive pocket temperature meter and clock. The meter has an internal sensor and an external one in the form of a plastic encapsulated probe at the end of a thin wire which coils up inside the meter. When not in use the external probe stows in two clips on the side of the meter. A switch beneath the display selects the internal or external sensor.



A second non-latching switch beneath the display, when pressed, permits the 12-hour clock to be displayed. The lower half of the front cover slides down to reveal the other controls. A set/lock switch prevents accidental resetting when in the lock position. The clock can be set with the separate hours and minutes push-buttons and high and low temperatures may be set, such that when either temperature is reached, an alarm sounds for 6 seconds approx. A further switch switches the alarm off or on. Annunciators on the LCD display show whether high and/or low temperatures have been set. The back of the meter houses a sprung plastic pocket or belt clip and on the lower half a stand can be hinged out to make the meter free-standing. A further cover on the back can be opened to reveal the battery and the compartment where the external sensor's wire may be coiled up.

Specification	
Display:	3 1/2 digit 10mm high LCD display
Clock:	12-hour clock
Temperature range:	-5°C to $+50^{\circ}\text{C}$ (internal sensor) -20°C to $+70^{\circ}\text{C}$ (external sensor)
Resolution:	0.1 $^{\circ}\text{C}$
Accuracy:	$\pm 1^{\circ}\text{C}$ (0°C to 40°C at 1.5V)
High and low temperature set range:	-19°C to $+69^{\circ}\text{C}$
Overall size:	105mm high x 66mm wide including probe x 20mm thick
Probe length:	82mm
Probe diameter:	7mm at base, 3.6mm at tip
Probe wire length:	900mm approx. x 2mm dia.

FREEZE ALERT

NEW

A handy and convenient device that gives a visual and audible warning if the temperature inside your freezer rises above $-10^{\circ}\text{C}/14^{\circ}\text{F}$. The module is attached to the outside of the freezer door (sticky pad supplied) and the probe is passed through, when the door is opened, and positioned at the rear of the freezer cabinet. An LED will flash and an alarm sounds when the temperature rises above -10°C . There is a small on/off slide switch on the front of the module. Ideal for domestic and commercial freezers, as well as industrial and laboratory freezers. Requires 1 'AA' size battery (supplied). Length of cable 2.7m. Dimensions: 77 x 46 x 19mm



GREAT VALUE!
£4.99
RZ43W

The meter can be used to display indoor and outdoor temperature if the external probe is placed outside a window, or it could be used in the greenhouse or in aquaria (the external probe is waterproof and can be immersed in water) or in photographic applications or in the car etc. The meter operates from a single 1.5V AAA cell and is supplied with full instructions

Order Code	Type	Price each
FD26D	Pocket Temp Meter	£17.99

Specification	
Temperature range:	-10°C to $+110^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ to $+230^{\circ}\text{F}$)
Resolution:	0.1 $^{\circ}\text{C}$ (0.1 $^{\circ}\text{F}$)
Temperature sensing speed:	1sec. or 10sec.
Battery type:	Single 'AAA' 1.5V type
Size:	107 x 59 x 20mm
Weight:	100g (incl. battery)

Order Code	Type	Price each
BU78K	Probe Thermometer	£22.99

Digital Alarm Thermometer with Warning Alarm



A slimline, portable digital LCD thermometer and clock with a stainless steel probe that is suitable for industrial or domestic use. The unit features a programmable maximum and minimum alarm, making it ideal for measuring and monitoring refrigeration, food processing, heating and ventilation, particularly in the food industry. The 100mm long stainless steel probe is attached to the unit by 1m of sensing wire, and for convenience, the probe can be clipped to the side of the unit. The sensing wire is stored inside the battery compartment. The unit has two exposed slide switches which are the alarm on/off and temperature sensing speed, either 1sec or 10secs. The slow sensing speed saves battery energy, prolonging battery life. The front cover slides down to reveal the buttons to adjust and set the time, high and low temperature alarms, and slide switches to select either $^{\circ}\text{C}$ or $^{\circ}\text{F}$ display or clock function. The light cream case has a flip out stand and a spring loaded clip, for fixing to a belt etc.



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Digital Alarm Thermometer with Steel Probe



A slimline, portable LCD thermometer with a stainless steel probe that is suitable for industrial or domestic use. The unit features a wide temperature range, and a programmable maximum and minimum alarm, making it ideal for measuring and monitoring temperatures in the electronics, heating and ventilation, refrigeration, laboratory, and food processing industries. The 100mm long stainless steel probe is attached to the unit by one meter of sensing wire, and for convenience, the probe can be clipped to the side of the unit. The sensing wire is stored in the battery compartment. Beneath the display the unit has two exposed slide switches that are the alarm on/off and temperature sensing speed of either 1sec. or 10secs., the slow sensing speed reduces battery use, to prolong battery life. The front cover slides down to reveal buttons for adjusting high and low temperature alarms and slide switches for setting and locking the alarm and selecting either °C or °F display functions. The light cream case has a flip-out stand for placing on a table and a spring-loaded clip for fixing to a belt, etc. Supplied with battery and instructions.

Specification
 Temperature range: -55°C to +148.8°C (-67°F to +299.8°F)
 Accuracy at 0°C to 60°C: ±1°C
 Accuracy over full range: ±1.5°C
 Resolution from -49°C to 105°C: 0.1°C
 Resolution from -55°C to -49°C: 0.2°C
 Resolution from 105°C to 129°C: 0.2°C
 Resolution from 129°C to 140°C: 0.3°C
 Resolution from 140°C to 148.8°C: 0.4°C
 Battery type: 'AAA' 1.5V
 Size: 106 x 58 x 20mm
 Weight: 100g (incl. battery)

Order Code	Type	Price each
RT20W	WideRng Probe Thermo	£26.99

Dual Display Indoor/Outdoor Thermometer

A compact, attractive, dual LCD digital thermometer that displays indoor and outdoor temperatures in °C at the same time. The meter has an internal and an external probe that is attached to a thin 3 metre cable. Each display has a memory that stores the maximum and minimum temperature reached since last reset, and the reading can be recalled by pressing the relevant buttons. The thermometer is housed in a distinctive white and grey plastic case with a built-in plastic stand for table standing. The thermometer can be wall-mounted if preferred, and a wire holder is supplied for fixing the sensing probe to a wall. Powered by one 'AA' battery.



Specification
 Temperature range indoor: -5°C to +50°C
 outdoor: -40°C to +50°C
 Resolution: 0.1°C
 Probe length: 20mm
 Probe diameter: 7mm at base, 4mm at tip
 Probe wire length: 3m approx.
 Size: 110 x 70 x 20mm
 Weight: 85g (excl. battery)

Order Code	Type	Price each
BU81C	Dual Display Thermo	£15.49

Thermo-Hygrometer with Memory



This meter has a large clear LCD panel which shows relative humidity (RH – as a percentage), and temperature (which is user-selectable to read in either celsius or fahrenheit). A memory is incorporated which will store the lowest and highest RH and temperature readings. These figures can be shown, or the memory reset, at any time. Indicators on the display show if it is 'wet' (RH over 65%), 'dry' (RH below 45%) or 'comfortable' (RH between 45% and 65%). The unit is attractively finished in white and two-tone grey, and can be table or wall mounted.

Size: 99 x 70.5 x 20.5mm
Weight: 70g (less batteries)
Temp. range: 0°C to 50°C (+32°F to 122°F)
Temp. resolution: 1°C/1°F
RH range: 25% to 95% (at 23°C/77°F)
RH resolution: 1%
 Supplied with instructions and wall mounting bracket. Batteries (2 x AAA size – alkaline recommended) not included

Order Code	Type	Price each
ZA41U	Pocket Thermo/Hygro	£23.99

Hygrometer with Memory



A hygrometer that displays the relative humidity (RH) as a percentage on an LCD panel. In addition, the module will store the highest and lowest readings taken, and these can be shown on the display. These readings can be reset at any time. Indicators on the display show if it is 'wet' (RH over 65%) or 'dry' (RH below 45%). The unit is finished in white and two-tone grey, and can be wall or table mounted. Measuring range: 25% to 95% (at 25°C); resolution 1%. Dimensions: 99 x 70.5 x 20.5mm; Weight 70g (less batteries). Supplied with instructions and a wall bracket. Batteries (2 x AAA size, alkaline recommended) are not included.

Order Code	Type	Price each
ZA42V	Pocket Hygrometer	£19.95

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Outdoor Temperature/ Humidity Meter with Memory



A thermo-hygrometer similar to ZA40T but with several refinements. An external temperature probe allows the unit to monitor the temperature at a distance of 3m or less from the unit, for example that outdoors or in a refrigerator. A memory is incorporated which will store the lowest and highest external temperature readings. These figures can be shown, or the memory reset, at any time. An additional independent display shows the temperature as measured by a sensor integral to the unit. Indoor RH expressed as a percentage is also shown. Size/range/resolution/Specifications: As for ZA40T except that the RH measuring range is between 32% and 90%. Supplied with instructions. Batteries (2 'AA' size alkaline recommended) not included

Order Code	Type	Price each
ZA43W	Dial Thermo/Hygro	£27.99

Electronic Rain Gauge

An ideal way of measuring amount of rain fall from the comfort of your own home. An external rain collector measures how much rain has been collected over a period of time and displays the total on an indoor display unit, which can be wall mounted or free standing. The liquid crystal display shows the amount of rain fall in millimetres, this reading can be reset at any time. The display unit is powered by a single AAA cell and is supplied with 10m of cable, to which the external collector unit is attached. Rain collector unit size, 100 x 50 x 100mm. Display unit size, 93 x 62mm x 22mm



Order Code	Type	Price each
YZ48C	A1 Rain Gauge	£42.99

Hygrometer



An attractive, circular mechanical hygrometer with a brass finish that measures from 0% to 100% REL humidity. The hygrometer is inserted in a 60mm diameter hole that ideally should be 18mm in depth. A rubber sleeving ensures the hygrometer is held firmly. Overall dimensions: 70 x 40mm.

Order Code	Type	Price each
ZF22Y	Hygrometer	£9.99

Barometer



A circular mechanical barometer which is designed to be inserted into a hole that has a diameter of 60mm and a depth of 18mm. A rubber sleeving ensures the clock is held firmly. The Barometer will measure from 960hpa to 1065hpa and is also marked 720mm to 800mm. A secondary pointer needle set in the clear plastic cover, is used for comparing the previous days pressure against the present days pressure. Overall dimensions: 70 x 40mm.

Order Code	Type	Price each
ZF37S	Barometer	£16.99

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Thermometer



An attractive, circular mechanical thermometer with a brass finish that measures Celsius (-20°C to +50°C), and Fahrenheit (0°F to 120°F). A pointer needle is used to show the present ambient temperature. The thermometer is designed to be inserted into a hole that has a diameter of 60mm and a depth of 18mm. A rubber sleeving ensures the thermometer is held firmly. Overall dimensions: 70 x 40mm.

Order Code	Type	Price each
ZF23A	Circular Thermometer	£9.99



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RS1275J

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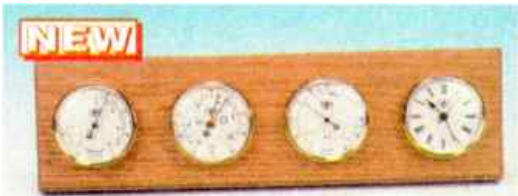
Circular Analogue Clock



A circular battery operated analogue clock with an attractive Roman numeral style face and three black hands. The clock is powered by a 1.5V "N" size battery. The clock is designed to be inserted into a hole that has a diameter of 60mm and a depth of 18mm. A rubber sleeving ensures the clock is held firmly. Overall dimensions: 70 x 40mm.

Order Code	Type	Price each
ZF30H	Circular Analog Clk	£10.99

Instrument Plinths



To enhance the appearance of the instruments (not included) described above, a choice of two plinths with cutouts is offered. The plinths are made from MDF board are finished in a satin light oak veneer and designed for wall mounting by two slots on the back of the plinth. Two or four hole cutouts available.

Dimensions

2-holes: 210 x 115 x 20mm
 4-holes: 410 x 115 x 20mm

Order Code	Type	Price each
ZZ00A	Dual Plinth	£8.99
AQ79L	Quad Plinth	£9.99

PRESSURE GAUGES
Blood Pressure Monitor



A portable, easy to use, digital blood pressure tester for measuring systolic and diastolic pressures, and pulse rate. The measurements are shown on an LCD along with an 'inflation mark', a 'heart mark' and a 'deflation mark' that appear at various stages of operation. Briefly, when the unit is switched on and ready, a buzzer sounds and the inflation mark flashes to indicate the start of proceedings. The cuff is wrapped around the upper arm. The rubber bulb is used to rapidly inflate the cuff to 30 to

40mmHg above systolic pressure or until the unit beeps. Once pumping is finished, the cuff pressure decreases slowly at a rate of 2 to 3mmHg per second. As the pressure decreases the heart mark will appear along with a beeping sound to indicate that measurement is taking place. When a one second beep indicates that measurement is complete, systolic and diastolic pressures will be displayed for three seconds then the pulse rate will be displayed for two seconds. The deflation mark will also be shown. These displays will alternate until the cuff has been deflated. Once the cuff is exhausted, the systolic and diastolic pressures will reappear, along with the inflation mark, and remain until the monitor is switched off or reused. If it is not reused within three minutes, the monitor switches itself off to conserve battery power. The monitor is supplied with cuff, rubber bulb, vinyl case, full instructions for use and battery.

Specification

Measurement range –
 Cuff pressure 0 to 300mmHg
 Pulse: 40 to 150 beats/min

Accuracy –
 Cuff pressure ±3mmHg
 Pulse: ±5% of reading
 Operating temperature: +50°F to +104°F
 Operating humidity: 85% Rh or below
 Storage temperature: 29°F to +149°F
 Power required: 1 x PP3 battery

Dimensions –
 Cuff: Standard adult size to fit 9 to 12 1/2 in. circumference

Monitor:
 Weight: 152 x 80 x 28.6mm
 160g with battery

Order Code	Type	Price each
XG60Q	A1 Blood Press Tester	£42.99

Auto-Inflating Digital Blood Pressure Monitor



A portable, easy to use, digital, blood pressure tester designed to remove the complexities of measuring blood pressure and pulse rate, particularly for those who are not familiar with the technique. The monitor takes readings from the left index finger and shows the systolic and diastolic pressures, and pulse rate on an LCD. Also, a 'ready to measure' symbol and a 'heart' symbol appear at various stages of operation. To use, set the 'finger size' button to the left, insert the left index finger into the finger cuff and press the 'on/off' button, whereupon various symbols will appear on the display. When the monitor is ready to start it beeps and the 'ready to measure' symbol flashes. The 'finger size' button is moved to the right until the 'too tight' LED is illuminated. Sliding the button one notch to the left will turn off the LED. Now press the start button. The monitor has its own pump so no manual pumping is required. It will automatically inflate to a pressure of around 200mmHg, then start decreasing the pressure slowly. Pressure readings will continue to be shown and when measurements begin, the 'heart' symbol will be shown, flashing. If

initially it cannot obtain a reading, the monitor will make several attempts, raising the pressure further, until it can take a reading or display an error message. Once measurement is complete, the monitor beeps, deflates automatically, and then displays the blood pressure and pulse rate. These alternate every few seconds until the monitor is reused or switched off. Also shown is the 'ready to measure' symbol. If it is not reused immediately the monitor will switch itself off after 1 1/2 minutes to conserve battery power. The monitor is supplied with full instructions and batteries.

Specification

Measurement range –
 Finger cuff pressure: 0 to 300mmHg
 Pulse: 40 to 150 beats/min

Accuracy –
 Finger cuff pressure: ±3mmHg or ±2% of reading which ever is greater

Pulse: ±5% of reading
 Operating temperature: +50°F to +104°F
 Operating humidity: 30% to 85% Rh
 Storage temperature: -4°F to 122°F
 Storage humidity: 30% to 95% Rh
 Dimensions: 140 x 95 x 46mm
 Weight: 240g with batteries

Order Code	Type	Price each
GX01B	B1 Auto Inflate BP Test	£74.99

JOYSTICKS

Super Nintendo™ Control Pad



This ergonomically designed six-button control pad with auto-fire and slow motion feature is designed for use with the Super Nintendo™ Entertainment System (SNES). The contoured shape allows the control pad to sit in the palm of the hand for comfort and ease of use. Auto-fire is engaged by a three-position slide switch (off and two speeds), and there is an individual switch for each of the six fire buttons. The two speeds are five and nine shots per second. The slow motion button is operated by a two-position slide switch which slows the game down by repeatedly turning the pause button on and off. Also, there is a direction button, a start/pause button and a select button. This attractive unit, which is finished in light grey, comes with approximately 1.8m of cable with an SNES connector attached.

Order Code	Type	Price each
UK87U	C4 SNES Control Pad	£10.99

MAPLIN
KEY CALL
Phone 01702 556751

Arcade Joystick for SNES™ and Mega Drive™ **NEW**



An arcade cabinet-style joystick for use with the Super Nintendo™ Entertainment System (SNES) and Mega Drive™. Housed in a large durable metal case with non-slip feet, the unit is designed to sit on a computer desk or table. The joystick can be used for either type of machine by plugging the appropriate console's cable into the back of the joystick (the joystick connector is a 15-way D-type). Both types of cable are supplied with the joystick.

The joystick has six fire buttons, all of which work on the SNES but, when used with the Mega Drive™, the joystick only works as a three fire button type and not as a six button joystick. The unit has a three-speed auto-fire facility which works by repeatedly pressing the button you want on auto-fire and pressing the desired auto-fire speed. A green LED will flash to indicate that the chosen button is on auto-fire; the LED flashes faster for higher speeds. The button can be locked on by depressing it and pressing the 'LOCK' button - a red LED housed on the lock button lights when 'LOCK' is activated. You can auto-fire and/or lock as many fire buttons as needed. 'LOCK' is disengaged by simply pressing it again.

A handy feature is the three-speed slow motion option. This uses the same speed buttons as the auto-fire mode and is activated by pressing and holding the 'SLOW START' button (in effect pausing the game) and pressing the desired 'SPEED' button. The 'SLOW START' button is also used as the pause button. Additional controls on the unit are a control stick and a 'SELECT' button. Finished in charcoal this high quality unit will enhance the pleasure of your Super Nintendo™ and Mega Drive™.

Order Code	Type	Price each
UK88V	Arcade Joystick	£24.99

QuickShot® Control Pad for Super Nintendo™ **NEW**



Designed for use with the Super Nintendo™ Entertainment System (SNES), this 8-direction thumb control pad is ideal for the games enthusiast. Ergonomically designed, the control pad features 4-positive response fire buttons, dual speed turbo fire selector, start/select switch, slow motion function and left and right buttons. Supplied with 1.8m of connecting cable and 7-pin connector.

Order Code	Type	Price each
AB30H	Control Pad For SNES	£9.99

QuickShot® Control Pad for Sega Megadrive™ **NEW**



This ergonomically designed control pad is suitable for the Sega Genesis and Megadrive 16-bit video entertainment system. This superb control pad features 3-fire buttons, 3-independent turbo fire buttons, start button, turbo fire speed selector, slow motion control and dual-speed turbo fire capability. Supplied with 1.8m of connecting cable and a 9-pin connector.

Order Code	Type	Price each
AB40T	Joystick For Sega	£14.99

QuickShot® Joystick for Super Nintendo™ **NEW**

A high quality joystick for the Super Nintendo™ Entertainment System featuring 6-fire buttons, turbo fire selector for A, B, X, Y fire buttons and slow motion capability. This well designed joystick is finished in an attractive light grey with bright coloured buttons and has stabilising suction cups. Supplied with 2.5m of connecting cable and 7-pin connector.



Order Code	Type	Price each
AB20W	Joystick For SNES	£12.99

Quickshot® Joystick for Atari and Commodore Game Systems **NEW**

A specially contoured joystick for maximum control and speed to suit Atari and Commodore game systems. The ergonomically designed joystick features primary and secondary positive response fire buttons, and four stabilising suction cups. Supplied with 1.8m of connecting cable and a 9-pin connector.



Order Code	Type	Price each
AB50E	Atari/Comm Joystick	£8.99

RADIO CONTROL ACCESSORIES Servo TK-S03

A servo complete with motor and electronics. The servo is supplied with actuator horns. The three wire system requires 5V DC on the red wire, 0V on the black wire and a 3V to 5V pulse on the white wire between 0.75 and 2.25ms long every 18ms approx.



Specification	
Supply voltage:	5V DC
Current drain:	Standby 8mA Max 550mA
Speed:	0.26sec/60°
Torque:	2.3kg. cm
Input pulse:	0.75ms to 2.25ms
Rotation:	170° ±10°
Operating temperature:	-35° to +65°
Life:	1 million operations (approx.)
Size:	39 x 38 x 19mm
Fixing centres:	47 x 10mm
Spline:	6mm diameter

Order Code	Type	Price each
FS35Q	Servo Motor TK-S03	£13.99

22,000 rpm AK-523/5

A DC motor which is suitable for replacement in most radio control applications. Supply voltage is 7.2 to 8.4 volts. Can be used in high torque situations. Uses oil bearings on both ends. Recommended continuous running time is 8 mins. Ideal for beginners.



Order Code	Type	Price each
KU37S	Motor AK-523/5	£9.99

27,000 rpm HP-230GS2

A high speed DC motor which can be used in both 2 or 4 wheel drive applications. Supply voltage is 7.2 to 8.4 volts. Has a chrome plated case with aluminium bell end. The carbon brushes can be replaced and the timing angle varied. Approx. continuous running time 8 mins (for 2WD) 6 mins (for 4WD).



Order Code	Type	Price each
KU39N	Motor HP-230GS2	£23.49

30,000 rpm HP-230GD1

This DC motor is high torque, especially designed for off road competitions. The armature is double wound. Supply voltage is 7.2 to 8.4 volts. This motor is ideal for sprint races with a continuous running time of 4 mins. The carbon brushes can be replaced and the timing angle varied. Has a chrome plated case with an aluminium end bell.



Order Code	Type	Price each
KU38R	Motor HP-230GD1	£29.99

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TELEPHONES

Aerials	63	Fax Machines	65	Telephone Accessories	66
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INTERCOMMS

2-Channel Wired Intercom



An inexpensive wired intercom that is ideal for situations where the stations are to be used in permanent positions. The two stations are connected by 20 metres of twin cable via 3.5 mm mono jacks. The master station houses the 9V PP3 battery (not supplied) and has a socket for an external 9V supply. The stations can be wall mounted or free standing on a convenient surface. The master station is normally left switched off. To make a call, the 'call' key is pressed at either station, a call signal will follow and the master station is switched on. To speak from the master station, the 'call/talk' key is held down and the LED lights, the key is released to listen to the substation. The LED on the substation will now light, and the substation can now speak to the master station, without pressing a key. When the conversation is over, the master station is switched off. A volume control is provided on the master station.

Dimensions (each) 130 x 90 x 46mm. Supplied in pairs only. Cable clips included.

Order Code	Type	Price each
BZ61R	2-Chnl Intercom Pr	£9.99

2-Channel FM Wireless Intercom

A very high quality intercom which is mains operated and transmits and receives via the mains wiring. No interwiring is required, simply plug each unit into a 240V AC mains outlet socket. The operating system is FM with phase locked loop receivers which gives high quality sound without interference from the mains. The units can transmit or receive on either of two channels which are selected by a switch. Any number of units can be connected, but if there are more than two (or three) then a call on a particular channel will sound the buzzer in more than one unit. (In a master and 2 slaves installation, the master can call each unit, but slaves calling the master may have to call another slave simultaneously depending on which channel the master was left at.)

All units are normally left switched on with volume control at half-setting. To make a call, select the appropriate channel and press the call button. At the unit normally switched to that channel, the buzzer will sound. When the buzzer stops, the called station should press and hold the talk button and speak. When the talk button is released, the calling station can now speak by pressing his talk button. The volume control can now be adjusted for best received signal level. At the end of the conversation, the calling station will automatically be in standby awaiting the next call.

By pressing the lock button, a unit can be locked in transmit mode. Thus the unit could be placed in a baby's room and will transmit continuously to any unit on the same channel which can be moved around with the parents or babysitter and plugged into the mains to receive anywhere in the house.



It may also be possible to communicate with neighbours up to about half-a-mile, although this will depend on whether both houses are on the same mains phase and on the same outlet on the local substation transformer.

Channel carrier frequencies are 120kHz and 140kHz. Overall size: 165mm wide, 115mm deep and 45mm high. Supplied with instructions and approx. 1.4m of mains lead. The attractive modem-styled light-beige units can be desk-top or wall-mounted.

Available only in pairs.

Order Code	Type	Price each
YT16S	A2 FM Intercom 2 Chn Pr	£30.49

Telephone Style Wireless Intercom



A pair of two-way telephone style intercoms which are mains operated and which transmit and receive to and from each other via the common socket ring main. Low frequency RF (230 and 350kHz) is FM modulated and superimposed on the mains supply.

The communication system includes phase locked loop receivers which provide a high quality sound with no interference from the mains. The two units are identical and have a call button for 'ringing' the other station. Operation is as with a telephone, communication is fully duplex (transmit and receive active simultaneously), and a telephone style receiver hook defeats both channels.

Each unit has four non-slip feet for table-tops or alternatively a wall bracket with screws supplied can be used for wall mounting. Dimensions 225 x 102 x 70mm including handset. RF output power 20mW, audio output 100mW. Supplied with instructions and fitted with 1.5m approx. of twin core mains lead. Supplied in pairs only.

Order Code	Type	Price each
ZA32K	B3 FM Intercom Duplx Pr	£44.99

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3-Channel FM Wireless Intercom

A 3-channel wireless intercom which transmits and receives via the mains wiring on the same phase; no additional interwiring is required. Each unit simply plugs into a 240V AC mains outlet socket. The communication system is an FM low frequency RF carrier with phase locked loop receivers which give a high quality sound without interference directly from the mains. Each unit can transmit or receive on either of three channels which are selected by a selector



switch as 'A', 'B' and 'C' to any other unit. All units have a combined on/off and low/high volume control switch. A call is made by selecting the appropriate channel and pressing the call button, which sounds a buzzer at the selected unit. Users hold down the talk button to talk, and release to listen. A unit can be locked in talk mode with a lock button and thus used as a baby alarm if necessary. Carrier frequencies are 100kHz 'A', 120kHz 'B' and 140kHz 'C'. RF output power 100mW. Audio output 500mW. Dimensions (each) 170 x 127 x 41mm. Supplied in pairs only.

Order Code	Type	Price each
ZA34M A2	FM Intercom 3 Chn Pr	£37.99

4-Channel FM Wireless Intercom



A 4-channel mains operated intercom which transmits and receives via the mains wiring, no additional interwiring is needed. Simply plug each unit into a 240V AC mains outlet socket. The communication system is FM modulated low frequency RF with phase locked loop receivers which gives a high quality sound without interference from the mains. Each unit can transmit or receive on either of four channels which are selected by a switch. Up to four stations can be connected via the same ring main, and any one unit can talk or listen to any one other unit. A call is made by selecting the appropriate channel (1 to 4) and pressing the call button, sounding a buzzer at the selected unit. Hold down the talk button to talk, and release to listen. A unit can be locked in talk mode with a lock button if required. Carrier frequencies are 80kHz '1', 100kHz '2', 120kHz '3' and 140kHz '4'. RF output power 100mW. Audio output 500mW. Dimensions (each unit) 182 x 140 x 43mm. Note that these are supplied individually only, and for a complete 4-way system four units are required.

Order Code	Type	Price each
ZA33L A1	FM Intercom 4Channel	£21.99

TELEPHONES

Low Cost Telephone

Audioline



An attractive two-piece telephone with high quality impact proof casing. This telephone is compatible with new BT star services and facilities, equipped with recall, redial, and is tone/pulse switchable.

Order Code	Type	Price each
BT32K E*	TEL8	£18.99

Telephone with 20 Direct Memories

Audioline



This telephone features 20 direct touch memories and pause facility for PABX use, and has full approval for use on the Mercury phone system. Compatible with new BT star services.

Order Code	Type	Price each
BT33L E1	TEL18	£29.99

Relate 180

BT

NEW



A smart and stylish corded telephone that is ideal for home and office, and offers easy access to network services. The telephone can be wall mounted and features 10 memories, on-hook dialling, ringer volume control, secrecy button, touch tone dialling, ringer tone options, call timer, last number redial and recall.

Order Code	Type	Price each
AF93B E1	Relate 180	£32.99

Converse 250

BT

NEW

An impressive business class telephone, for the office or study that can be wall-mounted and features easy access to network services. The Converse 250 has 20 memories, last number redial, touchtone dialling, secrecy button, ringer volume control, recall, ringer tone options, call indicator, save button, pause, on-hook dialling and hands-free operation.



Order Code	Type	Price each
AF95D E1	Converse 250	£39.99

APPROVED for connection to telecommunications systems specified in the instructions for use subject to the conditions set out in them.

Telephones on this page are approved.



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CONVERSE 400 BT **NEW**

A stylish business telephone that is ideal for the busy office or study, and features easy access to network services. This desk top, or wall mountable phone has an impressive array of features including 20 memories, last number redial, touchtone dialling secrecy button, ringer volume control, recall, ringer tone options, call indicator, save button, pause, LCD readout (with clock, alarm and calculator), on-hook dialling, hands-free operation, call-timer, name and number directory, three number redial, pre-dialling facility and quick-dial memories.

AMAZING VALUE!
£69.99
AF94C
[E1]



Freestyle 600 BT



The Freestyle 600 comprises a twin-unit cordless handset system including base station with cordless handset and a fully remote unit. Features include multi-function display, 10 number memory, channel switching facility, dual signalling, call transfer, intercom, range indicator, auto talk/ standby, PABX compatible, last number redial and secrecy. The base is provided with battery back-up.

Order Code	Type	Price each
RT94C <small>E1</small>	Freestyle 600	£174.99

CORDLESS PHONES

Freestyle 100 BT

The Freestyle 100 is a cordless phone that includes a full two-way intercom. Other features include 10 number memory, auto talk/standby, last number redial, dual signalling, channel switchable to allow the user to find the channel with the best reception, battery low indication on handset, and secrecy button. The base unit has battery back-up with charging indicator, in the event of power failure. Colour alpine white.



Order Code	Type	Price each
RT92A <small>E1</small>	Freestyle 100	£79.99

Freestyle 500 BT



The Freestyle 500 is an impressive twin-unit telephone system comprising a base station with corded handset and a remote unit with cordless handset, allowing the user to make calls from anywhere within the home, office, garden, or situations where a conventional phone is not feasible. These units also feature a two-way intercom. The base station includes full-function keypad, so can be used as the primary handset for making calls without the need for the remote unit. Features include multi-function LCD 10 number memory, range indicator, dual signalling facility, and a channel switchable facility to allow the user to find the channel with best reception. Other features are PABX compatibility, call transfer facility, auto talk/standby, secrecy and last number recall buttons. The base station has battery back-up in the event of power failure. The unit is wall mountable. Colour alpine white.

Order Code	Type	Price each
RT93B <small>E1</small>	Freestyle 500	£149.99

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KEY CALL
Phone 01702 556751

Cordless Phone FF750 Southwestern Bell **NEW**



The FF750 is an excellent high quality cordless telephone with Mercury compatibility and a noise reduction facility which significantly cuts down background interference, such as static hiss and distortion, leaving conversation really crisp and clear. The phone features a digital call guard system that stops other cordless users using your line. Features include nine memories for storing regularly used numbers, power failure backup (batteries not supplied) and up to five days standby, tone/pulse switchable for use on old and new telephone exchanges and PABXs, recall, last number redial, hearing aid compatible and a mute facility. The base unit has a talk indicator and a battery charging indicator, plus a paging facility control button. The base unit does not require a telescopic aerial. Suitable for table top or wall mounting.

Order Code	Type	Price each
RZ06G <small>E3</small>	Cordless Phone FF750	£89.99

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APPROVED for connection to telecommunications systems specified in the instructions for use subject to the conditions set out in them.

Everything on pages 62,63 and 64 is approved. Except where marked ★★★

REPLACEMENT CORDLESS PHONE AERIALS

Type K2



A chromed brass telescopic aerial extending to 340mm, and having a flat tongue at the base with a 3mm diameter screw hole, for replacing antennas with a swivel and tilt type joint, secured with a screw. Tongue is 7mm long, 6mm wide and 2mm thick and plain brass. Base is 6mm diameter.

Order Code	Type	Price each
JY84F	Phone Aerial K2	£2.99

Type K3



A chromed brass telescopic aerial with a knurled top to the bottom section and a 5mm long M3 threaded stud on the base. Intended for a long reach into a case or cover to a depth of 60mm while case supports top of lower section. Max. extended length, 340mm. Base is 6mm diameter.

Order Code	Type	Price each
JY85G	Phone Aerial K3	£2.99

Type K4



A chromed brass telescopic aerial with a knurled and threaded boss which screws into or is attached directly to equipment's case or cover. Max. extended length 270mm, and whole of lower section slides into the boss. Requires threaded hole 6.3mm diameter.

Order Code	Type	Price each
JY86T	Phone Aerial K4	£2.99

Flexible Universal Type



A short flexible antenna for a cordless telephone which incorporates a universal fitting to suit most cordless 'phone handsets and can be adapted to fit a new or broken telescopic antenna up to 6mm diameter, using a socket and clamp screw arrangement. Length 200mm.

Order Code	Type	Price each
JY87U	Phone Aerial KR5	£6.99

TELEPHONE ANSWERING MACHINES

Type 831

Audioline



A microprocessor controlled answering machine that uses one micro-cassette for both incoming and outgoing messages. Also features announcement only option, call screening, memo recording facility, and message received indicator and counter. Additionally, there is full remote control of playback, repeat playback, cancelling and saving of messages using D.T.M.F. signals over the line from a D.T.M.F. encoder telephone or pocket tone keypad (not included). The transport has rewind, playback and fast-forward functions. Colour white.

Order Code	Type	Price each
BT34M E1	Answermachine 831	£39.99

Response 50 Answering Machine

BT



Single microcassette answering machine with clear, easy to use controls and a remote access facility. The remote control unit has an interrogating system using a two digit security code and allows the user to play back messages from any tone telephone or the remote tone controller. Other features include time and day announcement, voice call counter, call screening, call intercept, audible message alert, memo messages, message counter, ring time selector, volume control, remote switch-on, play, pause, fast-forward, rewind and save controls. The remote access features include preset security code, time save facility, play, automatic message save, and reset. Colour charcoal grey.

Order Code	Type	Price each
RT95D E3	Response 50	£59.99

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IT'S A FACT!

DUAL TONE MULTI FREQUENCY TONES

Dual Tone Multi Frequency (DTMF) tones are used on all modern telephones and ancillary equipment to both dial a telephone number, and to access various types of remote equipment, such as answering machines and computers. The chart shows the two frequencies used to generate the required tones. Interestingly, the tones are made to sound discordant on purpose, so that any 'musical' type sound that is accidentally picked up by the telephone mouthpiece, will not instigate false triggering of the telephone system.

Telephone Keypad Notation	Frequencies Hz
1	697, 1209
2	697, 1336
3	697, 1447
4	770, 1209
5	770, 1336
6	770, 1447
7	852, 1209
8	852, 1336
9	852, 1447
*	941, 1209
0	941, 1336
#	941, 1447

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3

Response 80 Answering Machine

BT

A twin tape answering machine with clear, easy to use controls and a remote access facility. The remote control unit has an interrogating system using a two digit security code and allows the user to play back messages from any tone telephone or the remote tone controller. Other features include time and day announcement, voice call counter, call screening, call intercept, automatic message save, memo messages, message indicator, ring time



selector, volume control, remote switch-on, play, pause, fast-forward, and rewind controls. The remote access features include preset security code, time save facility, announcement skip, automatic message save, remote announcement change, remote switch-off, play, pause, fast-forward, save and rewind.

Colour charcoal grey.

Order Code	Type	Price each
RT96E	E4 Response 80	£99.99

Response 120 Digital Answerphone

BT



A combined business class telephone with 10 number memory, and tapeless answering machine that is easy to use having high quality voice reproduction on both incoming and outgoing messages. All incoming and outgoing messages of the answering machine have a maximum of five minutes recording time and are stored on an IC chip. Colour alpine white.

Order Code	Type	Price each
RT97F	E1 Response 120	£69.99

Response 1000 Plus Digital Answering Machine

BT

An impressive, stand-alone, high quality automatic answering machine with easy to use controls and a large, enhanced, LCD display. Information shown includes time, date, and number of incoming messages. Incoming messages can be up to 20 minutes long, with each individual incoming message receiving a time and day stamp. The machine can be set up to accept an extended message of 26 minutes maximum. Features include outgoing message only, autosave, skip facility, outgoing message skip, outgoing message change, selective message save/ delete, message counter.



memo message, programmable turn on/off, conversation recording, call screening, call intercept, voice call counter, helpful voice prompts, ring time selector, message and memo message play pause, skip forwards and skip back controls. Colour metallic grey.

Order Code	Type	Price each
RT98G	E1 Response 1000	£129.99

Clock, Radio and Telephone Audioline



An elegant clock, radio and telephone that would not be out of place in any bedroom. Features AM/LW/FM radio with 12 hour LED clock, snooze button, variable sleep countdown timer and selective radio or sounder alarm. The telephone features last number redial, recall for access to 'star services', reset button, adjustable ringer/volume, time break recall, and automatic radio mute on outgoing and incoming calls.

Order Code	Type	Price each
BT39N	E1 Clock/Radio Phone	£29.99

Pocket Tone Dialler Pad

A universal key tone pad which emits audible Dual-Tone Multi-Frequency (D.T.M.F.) encoded signals, for controlling a growing number of products and services which are steadily coming on-stream in the UK, and which require the use of tone signalling over the telephone line. These items include answering machines, home banking facilities, home shopping and computer based services etc. The pocket sized key tone pad allows you to quickly and conveniently enter the D.T.M.F. tone codes required by many such services. Having accessed the service by dialling a line in the conventional manner, the speaker of the tone pad is placed over the microphone of the telephone handset and then the D.T.M.F. encoded numbers are transmitted to the receiving device, wherever you may be. Many new answering machines due to be released in the UK do not come supplied with such a tone pad. Suitable for use with answering machines shown elsewhere in this section. Powered by two AG13 type button cells, supplied. Size: 89 x 55 x 16mm.



Order Code	Type	Price each
ZB19V	Tone Pad	£6.99



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BS 5750 Part 2 1987
Level B:
Quality Assurance RS12750

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Miniature Tone Dialler



A pocket size tone dialler that can be attached to a key ring and easily slipped into a pocket. Powered by two AG-12 batteries (included), the dialler emits DTMF tones for accessing remote equipment i.e. answering machines or computer services etc.

Order Code	Type	Price each
CK25C	Tone Dialler	£4.99

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PAYPHONES

Payphone PP2110

Southwestern Bell

The PP2110 is a payphone that represents an evolutionary development in domestic telephone technology. This telephone was specifically developed for the domestic market so that all the family can use the phone and pay-as-you-go towards the next phone bill. The payphone, which can be secured to the tabletop or mounted on the wall, is line powered, tone/pulse switchable, operates on tariff control five, and uses the new 10p coin. For those concerned with the type of call being made (e.g. parents) a feature of this payphone is a number barring facility, plus all international calls are barred and all those costly 0898 and premium calls are barred. Other features include a pay on answer, microphone mute, and a local exception codes facility.



Order Code	Type	Price each
RZ00A E1	PP2110 Payphone	£109.99

Payphone PP1/Q

Southwestern Bell

This payphone represents an evolutionary development in payphone technology. It incorporates a unique intelligent coin operating mechanism which is programmable to accept any coin or token. The payphone, which can be secured to a table-top or wall mounted, uses the keypad via tariff control 9 for easy programming and autodial 9 for use with PABX systems. Up to 25 exception/barring codes can be entered along with three 'taxi' codes. The intelligent coin operating mechanism has a unique 'coin/token learning mode allowing the use of 10p, 20p, 50p, and £1 coins or the user's own choice. Other features include a large LCD display, tone/pulse dialling, pay on answer, next call facility, redial facility, receive volume control, payphone ID tone, owner mode. The line power is supported by battery back-up.

Dimensions: (H)210 x (W)180 x (D)180mm.
Weight: 1.65kg
Battery back-up: Lithium Manganese Dioxide



Order Code	Type	Price each
RZ01B E3	Payphone PP1/Q	£169.99

FAX MACHINES

DF 200 Fax Machine

BT



The DF200 fax machine is a compact, low-cost, feature packed unit providing a fine resolution with 16 grey scales. These features include LCD, on hook dialling, recall key, pause key, 10 one-touch dial keys, 30 two-touch abbr. dial keys, five page auto document feed, delayed transmission, polling, page counter, activity report/receipts, memo function and message save. Uses a 30m paper roll.

Order Code	Type	Price each
RZ05F H3	Fax Phone DF200	£399.99

TELEPHONE SYSTEMS

D-I-Y Telephone System



A simple to use telephone system that allows users with only one telephone line to make, receive, hold and transfer calls in complete privacy from any of up to four different locations of the users choice. Standard (pulse or tone) and cordless telephones can be used to access all features of the system. Special phones, answering machines, modems and other equipment with a REN of 1 can be connected to the system, making it ideal for home-based businesses. Additional features include: intercom between extensions, call-hold during internal enquiry, baby monitoring facility, day and night time ringing selection, 'ring-me-back' when line becomes free, courtesy tone when caller is 'on hold', and 'do not disturb this extension' facility. The system comes with adhesive quick reference labels, for use with MF tone dial telephones, and four extension sockets.

Order Code	Type	Price each
KC60Q 42	DIY Phone System	£139.99

Renown Phone Organiser

BT

The Renown phone organiser is a simple, compact and cost-effective communications system for the home or small business, planning to use more than one phone on one line. The Renown Control Unit allows up to four extensions to be used on one incoming line, at any one time one internal and one external call will be allowed to be in progress. These calls cannot be overheard by other extension users. The Renown is designed for PABX or direct exchange line connection. It is compatible with any approved push-button telephone fitted with recall, however, the Renown Systemphone has been especially developed for use with the Renown Control Unit. An installation kit



is available for DIY installation. Features of the control unit include making or taking external calls from any extension, transferring calls from one extension to another, bringing someone in for a 3-way conversation, placing a caller on hold whilst dealing with their enquiry, making internal calls to other extensions, preventing outgoing calls from certain extensions, plus the ability to link answering and fax machines into the system. Dimensions: 236 x 186 x 35mm. Weight: 600g. Features of the Systemphone include a line status indicator to warn of external calls in progress, abbreviated dialling, last number redial, a mute button, and tone volume control. Dimensions: 255 x 155 x 85mm. Weight: 720g. The installation kit comprises four master sockets, 60 metres of cable, 195 cable clips and two installation tools.

Order Code	Type	Price each
RZ02C H4	Renown Control Unit	£149.99
RZ03D E2	Renown Systemphone	£68.99
RZ04E C5	DIY Inst Pack	£32.99

APPROVED for connection to telecommunications systems specified in the instructions for use subject to the conditions set out in them.

Everything on pages 65 and 66 is approved. Except where marked ★★★

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TELEPHONE ACCESSORIES

Extension Kit

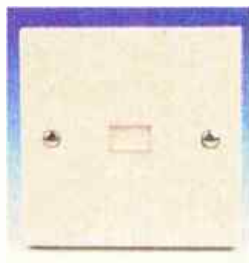


A complete kit containing everything you need to provide an outlet for a second (or subsequent) telephone extension. The kit simply plugs into an existing socket and provides a new socket at that point for the existing telephone to plug back into. 15m of cable is pre-connected to this plug and a pack of 45 (approx.) cable clips are provided. The cable is connected to the extension socket included in the kit using the special tool supplied. Full instructions are supplied with the kit. This kit is approved for private DIY installation, see Important Note on next page.

Order Code	Type	Price each
YT54J	A1 15m Extension Kit	£7.99

Flush Fitting Master Line Jack Unit 3/4A Secondary Line Jack Unit 3/6A

Standard BT type Master Line Jack Unit, including bell capacitor, surge arrester and 'out of service' resistor. A standard BT type Secondary Line Jack is also available in the same style. For flush fitting to a wall. Screw terminal connections. BT has the franchise for fitting the first socket on every exchange line at an installation, thus the Master socket will only be required by private individuals and companies for PBX extensions etc. Size 84 x 84mm.



Order Code	Type	Price each
FJ27E	Flush Mstr L/Jck 3/4A	£3.79
FJ34M	Flush Sec L/Jck 3/6A	£2.49

Large Locking Plate

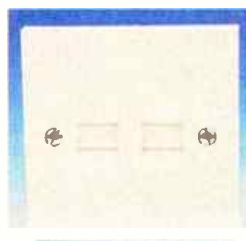


A strip which when fitted to master or secondary Line Jack units 3/4A or 3/6A by using the two cover retaining screws, will lock the line plug into position so that it cannot be removed.

Order Code	Type	Price each
FV95D	Large Locking Plate	60p

Twin Flush Mounting Master Jack Unit 5/4A Secondary Jack Unit 5/6A

A flush mounting Master or Secondary Jack Unit having two commoned outlets. For use where two appliances may need to share one socket, e.g. telephone and answering machine, modem etc. Size 84 x 84mm.



Order Code	Type	Price each
FT46A	Twin Master Jk 5/4A	£4.99
FT47B	Twin Second Jk 5/6A	£3.99

Small Surface Mounting Master Jack Unit 1/4A Secondary Line Jack Unit 1/6A

A miniature version of the Master Jack Unit 2/4A and matching Secondary Jack Unit 2/6A.



Order Code	Type	Price each
FT49D	Sm Sfce Mstr Jk 1/4A	£4.79
FT50E	Sm Sfce Sec Jk 1/6A	£3.65

FAX YOUR ORDER NOW!
01702 553935

Surface Mounting Master Jack Unit 2/4A Secondary Line Jack Unit 2/6A

A wall or surface mounting Master or Secondary Jack Unit. Size 67 x 67 x 29mm deep.



Order Code	Type	Price each
FT48C	Sfce Mt Mstr Jk 2/4A	£3.79
FG28F	Line Jack Unit 2/6A	£2.79

Small Locking Plate



A locking strip for use with the small Master and Secondary Line Jack units 2/4A and 2/6A, fitting is identical with large locking plate.

Order Code	Type	Price each
FV94C	Small Locking Plate	49p

Compact Surface Mounting Secondary Line Jack Unit

A wall-mounted Secondary Line Jack Unit for extension telephones. Screw terminal connections.



Size 57mm high, 30mm wide, 20mm deep.

Order Code	Type	Price each
JK74R	Compact Line Jack	£2.29

4-Wire 4-Way Junction Box

A white junction box containing a 4-way screw terminal block for joining 4-way telephone leads.



Four breakouts are provided in the edge of the cover and up to two flat IPC type 'phone leads can be fitted in any one of these side by side. The terminals are labelled for conductors 2 to 5. The base has two fixing holes for 3mm countersunk screws. The cover is retained by two self-tap screws.

Order Code	Type	Price each
JY88V	Phone Junction Box	£1.49

Line Plug to Line Plug Adaptor

An adaptor that enables two line plugs to be connected together to facilitate cord extension, cord matching etc. Note that the plug inserted into the deeper socket will not be easy to remove without the use of a small screwdriver.



Order Code	Type	Price each
FV97F	In Line Skt/Ext Skt	£1.99

Dual Output Adaptor

An adaptor that can be plugged into any BT Line Jack unit to convert it to a dual outlet for 4-way line plugs.



Order Code	Type	Price each
FJ30H	Dual Adaptor	£2.99

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Line Plug/ Screw Terminal Adaptor ★★★

An adaptor that matches existing telephone equipment to standard BT type Line Plugs. The screw terminals are contained in a small terminal box for neat and easy connection to telephone spade terminals. This adaptor is not approved for use on the BT, Mercury or Hull telephone networks.



Order Code	Type	Price each
FJ31J	L/PLg-S/T Adp L/L/BT	£4.49

Line Plug/USA Socket Adaptor ★★★

An adaptor allowing equipment fitted with American type phone plugs to be connected to standard BT type Line Jack Units. This adaptor must not be used on the BT, Mercury or Hull telephone networks.



Order Code	Type	Price each
FJ32K	L/Plg-US-Skt USA/BT	£5.99

15m TELEPHONE EXTENSION REEL

A handy extension lead in a white moulded case with carrying handle. Cable can be simply pulled out and then wound back in using the rotary handle for easy stowage. Ideal for use in the garden, garage, workshop etc.



BT to US Socket Adaptor ★★★



UK telephone socket to an American telephone socket adaptor, for connecting equipment which has an American-style modular connector.

Order Code	Type	Price each
RZ79L	BT/US Socket Adaptor	£2.49

UK to US Telephone Plug Extension Cord ★★★



This telephone extension line cord has a length of approximately 3.7m and has a UK type telephone plug at one end and a US type telephone plug at the other.

Used as an extension for fax and modem machines etc.

Order Code	Type	Price each
RZ75S	UK/US Ext Line Cord	£2.29

IMPORTANT NOTE

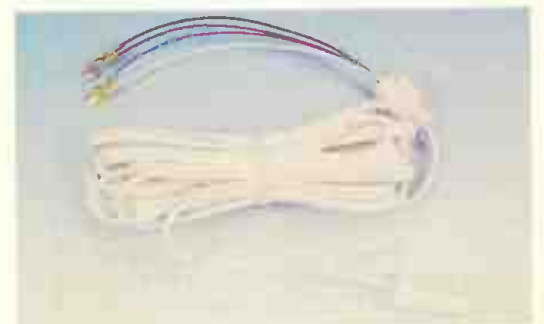
Private individuals may now connect secondary extensions within their own home or office provided that BT (or Mercury or Hull) have installed a master socket of the type, or similar, to those shown on this page. The master sockets must only be used for PBX extensions. All secondary sockets are supplied with wiring details and other information to help you install these products correctly. Connections to the master socket must only be made using the 4-way or 6-way Line Plugs (FJ33L/FT52G) and these plugs can only be connected to the Flat IPC Telephone Cord (XR86T/XS03D). The Dual Adaptor FJ30H facilitates connecting your extension wiring (4-way only) and leaving your main telephone connected to the master socket as well if required. This is our interpretation of the law as it stands at present. If you are unsure or require further information to that supplied with the secondary sockets, please contact your local Office of Telecommunications. Their telephone numbers are in your local telephone directory.



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

3m Line Cord and Line Plug



Standard PTC Line Cord with a moulded on Line Plug at one end and four spade terminals at the other. A square grommet is moulded onto the outer sheath at the spade end for entry into a telephone. The four wires are coloured either Red, Black, Green and Yellow, or Red, Blue, Green and White.

Order Code	Type	Price each
FG29G	PTC Line Cord	£2.49

▶ IT'S A FACT! ◀

ADDING EXTRA TELEPHONES

The new style BT 'Linebox' is increasingly being installed in place of the old style of master socket. This new design makes the connecting of extra telephones a simple and inexpensive job. The design allows the connection of cables inside the box instead of through the usual adaptor arrangement. The result is a very neat and tidy installation.

Follow the wiring list as shown, and insert the correct wire into the terminals that are located on the back of the front cover. Use the IPC insertion tool (FT51F), and press the wire into the connector. Trim off any excess wire.

Cable Colour	Connector Number
Green with white ring	1
Blue with white ring	2
Orange with white ring	3
White with orange ring	4
White with blue ring	5
White with green ring	6

PROHIBITED from direct or indirect connection to public telecommunication systems. Action may be taken against anyone so connecting this apparatus.

★★★

APPROVED for connection to telecommunications systems specified in the instructions for use subject to the conditions set out in them.

Everything on pages 67 and 68 is approved. Except where marked ★★★

5m Telephone Line Jack Extension Cord with Dual Outlet

A 5-metre line extension cord having a standard 4-way IPC plug at one end and twin outlet at the other. Very useful for telephones used with modems, answering machines etc.



Order Code	Type	Price each
FS21X	Double Skt Lead 5m	£4.99

5m Telephone Line Jack Extension Cord



A 5 metre line extension cord having a standard 4-way IPC plug at one end and matching line socket at the other; a quick and simple means of extending telephone or modem leads etc.

Order Code	Type	Price each
FT45Y	5m Telephone Ext Ld	£3.99

3m Extension Lead/4-Way Adaptor

A 3-metre long extension lead terminated with a 4-pin Line Plug at one end and a 4-way adaptor socket at the other, allowing up to four extensions to share one master socket.

Dimensions of adaptor: 75 x 61 x 29mm.



Order Code	Type	Price each
ZB18U	3m 4w Tel Ext Lead	£7.99

Standard 4-Way and 6-Way Line Plugs 431A and 631A

Standard BT type 4-way and 6-way Line Plugs using Insulation Piercing Contacts (IPC), with strain relief. To fit the flat line cord (shown in the Cables Section) to an IPC plug, simply provide a clean cut across the end, and strip off 11 to 12mm of the outer sheath. Allow the wires to separate from one another by approximately 1mm, then push and tease them gently into the plug, which has locating guides built in for each conductor.

Once fully home (the coloured wires can be seen through the slot behind the contacts) use heavy duty pliers or a small vice to press all the gold coloured contacts flush with the plug body; push down the small strain relief members immediately behind the contacts, then force down the cable clamp at rear.



Order Code	Type	Price each
FJ33L	Line Plug 4way 431A	49p
FT52G	BT Plug 6-Way 631A	60p

IPC Insertion Tool



An insertion tool for attaching the BT IPC cable to master or secondary jack units having the BT type numbers with suffix /3A, which have IPC terminations as opposed to /6A types with screw terminal blocks. The tool is used to force the four wires of the line cord into the Insulation Piercing Connectors of the jack unit.

Order Code	Type	Price each
FT51F	BT IPC Insrtn Tool	49p

Plug-In Ringer



A self contained unit which can be plugged into a Line Jack unit, having its own plug extension at rear. The ringer will give an audible alarm of an incoming call being received.

Order Code	Type	Price each
FV96E	Telephone Ringer	£6.99

Phoneguard Rathdown



Provides complete control over whoever uses your telephone, and what kind of calls they can make. This small, unobtrusive unit plugs directly into your existing telephone socket and is locked in position with a special key. The telephone then simply plugs into the front of Phoneguard in the usual way. Phoneguard stops unauthorised use of this telephone and any other extension telephones on the same line. It allows all incoming calls as normal, and always allows outgoing emergency (999) calls. Free 0800 and fault reporting 151 calls are also always allowed, but any type of call is only allowed to holders of a secret code number. In addition operator calls, international calls and premium rated calls (0898, 0836, 0860) always need the secret number. The special key is also needed to change the secret code number. The keyholder can choose to allow or disallow uncoded calls made during cheap rate periods, or local calls, for national calls, calls longer than a predetermined duration, calls made during office hours, and calls made during evenings and weekends. Four dialling codes beginning with zero may be programmed as local, and Phoneguard protects the LD telephone connected to it and any other LD extension telephones on the same line. It is entirely battery powered and requires no external power supply. Requires four AA size alkaline cells (not supplied). Not suitable for use with D.T.M.F. telephones.

Order Code	Type	Price each
ZB20W	Phoneguard	£29.99



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Level B: Quality Assurance
RS12750

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▶ IT'S A FACT! ◀

Alexander Graham Bell (1847 to 1922) was the inventor of the telephone. It was on the afternoon of June 2nd 1875 in Boston USA, when Professor Alexander Bell and his associate, Thomas A. Watson, made the first working telephone connection. Over nine months later on March 3rd 1876, his birthday, Professor Bell received from the United States a patent No. 174465.

The Bel is a unit for comparing two levels of power, volage, current or sound intensity equal to the logaritn to the base 10 of the ratio of the two levels. A Decibel (dB) is one tenth of one bel.

RADIO COMMUNICATIONS

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SCANNERS

Yupiteru MVT-7100 with SSB
100kHz - 1650MHz
"The World's Best Scanner"



- ★ Direct entry
- ★ Variable steps
- ★ 1000 Memories
- ★ Backlight display

This is our best seller. Covers every service you can imagine including the short wave service. Includes ni-cad battery pack, mains unit capable of charging and powering the receiver, and whip aerial. It searches out signals at a blistering speed of 30 channels per second!

Size: 64 x 159 x 40mm
Steps: 50Hz - 100kHz
Power: 4 x AA cells
Ext 12V DC
Ant: 50 Ohms BNC

Order Code	Type	Price each
RU00A H1	MVT-7100	£389.95
RU01B	Case OP-50	£19.95

Yupiteru MVT-7000
100kHz - 1300MHz AM/FM



- ★ Direct entry
- ★ Variable steps
- ★ 200 Memories
- ★ Backlight display
- ★ Signal Meter

A lovely scanner that has no vices and gives superb reception on VHF and UHF. If you don't require short wave coverage this is the best! You'll hear all the emergency services, aircraft, marine, in fact everything.

Size: 64 x 159 x 40mm
Steps: 5kHz - 100kHz
Power: 4 x AA cells
ext 12V DC
Ant: 50 Ohms BNC

Order Code	Type	Price each
CM00A H1	MVT-7000	£329.95
RU01B	Case OP-50	£19.95

All Scanners on this page are now stocked by all Maplin shops.

PRO-46 68MHz - 956MHz*



- ★ AM/FM
- ★ 5/12.5kHz steps
- ★ 100 Memories
- ★ Direct entry

Ideal for those who want a high performance scanner on a budget. Covers all the major services including emergency, civil airband, marine, ham radio etc. Well made and compact enough to fit into the pocket, its an ideal scanner to take with you when you are out and about.

* Excludes: 88 - 108MHz, 174 - 406MHz, 512 - 806MHz.
Size: 151 x 66 x 37mm
Power: 4 x AA cells
Weight: 220g

Order Code	Type	Price each
AG97F C1	Pro-46	£199.95

PRO-44 68 - 512MHz*



- ★ AM/FM
- ★ 5/12.5kHz steps
- ★ 50 Memories
- ★ Direct entry

Designed for those who don't need the top range above 512MHz. This scanner is just as sensitive as its more expensive partners. Only the frequency range and memory capacity has been reduced. We don't know of a cheaper scanner that maintains such a high specification.

* Excludes 174 - 380MHz
Size: 151 x 66 x 37mm
Power: 6 x AA cells
Weight: 220g

Order Code	Type	Price each
AG98G C1	Pro-44	£149.95

Technical Information on 0702 206835

WATERS & STANTON

Communications Specialists

All these products now available through Maplin by Mail Order

Yupiteru VT225
Professional
Airband Monitor
Civil & Military

This airband receiver has just been released into the UK and is the first handheld to cover military as well as civil frequencies. Its superb sensitivity and professional design make this the ideal monitor for the enthusiast or professional organisation. It is supplied with Ni-cads and AC charger.

FM 149 - 160MHz
AM 108 - 142MHz
AM 222 - 391MHz
100 Memories
10 - 100kHz steps
AA Ni-cads
12V Ext Supply
Size 59 x 147 x 38mm

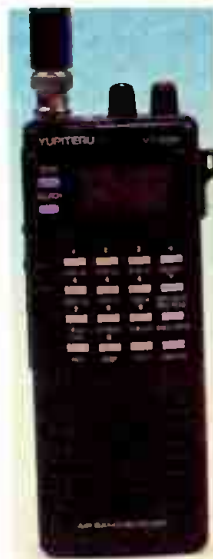
Order Code	Type	Price each
CM81C H2	VT-225	£269.95
RU02C	Case OP-225	£14.95

VT125
Civil Airband
Receiver

Similar to the VT225 but covers just the civil band. Our most popular air band monitor. Used extensively at airshows etc.

AM 108 - 142MHz
30 Memories
25kHz steps
AC PSU
3 AA Ni-Cads
12V Ext. Supply
57 x 127 x 35mm
Helical aerial

Order Code	Type	Price each
CM01B H1	VT-125	£189.95
RU03D	Case OP125	£14.95



Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

Airband/Marine/Broadcast Monitor Receiver SAB-9 MkII

Ideal for the beginner and those on a budget. It covers the civil airband, marine, amateur, emergency and FM broadcast bands. One of our most popular "birthday presents" it offers hours of entertainment. Very popular at air displays and the like, particularly at this price. It is powered by 4 x AA cells and covers LW/MW plus 108 - 176MHz. There is a headphone socket for private listening and a telescopic whip.



Order Code	Type	Price each
CM83E H2	SAB-9	£24.95

Gift Pack SAB-9EP

As above but gift packed with headphones and Air Traffic Control Handbook and binoculars.

Order Code	Type	Price each
RU04E H2	SAB-9EP	£34.95

SAB-11 VHF Airband Monitor



- ★ Civil Airband
- ★ Very Compact
- ★ Broadcast
- ★ Good Audio

NEW!

Ideal for aircraft enthusiasts who want a simple receiver to monitor aircraft movements. Also popular with private pilots, it doubles as a broadcast receiver.

Range: 108 - 136MHz
88 - 108MHz
540 - 1600kHz
Size: 140 x 80 x 30mm
Power: 4 x AA cells

Order Code	Type	Price each
AG99H	SAB-11	£14.95

Scan King Mobile Aerial 100 - 1300MHz

Magnetic mount, wide frequency range. Height 26in with 4m of cable terminated with BNC plug.

NEW!



Order Code	Type	Price each
AB88V	Mobile Scan-K	£19.95

On-Glass Mobile Scan Aerial 30 - 1300MHz



Ideal for the modern car, attached using adhesive pad. Whip is 26in long and may be unscrewed. Internal junction box fitted with 14ft of coax and BNC plug.

Order Code	Type	Price each
RU76H	TGSP	£32.95

AOR AR-8000 UK SCANNER RECEIVER 500kHz-1.9GHz AM/NFM/WFM/USB/LSB

NEW!

- ★ Spectrum Display
- ★ 4 Display Modes
- ★ Dual Frequency Display
- ★ Computer Control
- ★ Fast Scan Speed
- ★ Data Storage
- ★ 1000 Memories
- ★ True SSB Filters
- ★ Password Protection
- ★ High Sensitivity

The latest scanner to be released from Japan. It has the widest frequency range ever offered with frequency steps down to 50Hz. You also get separate filters for SSB AM and FM and frequency correction when switching sidebands. Features include Dual Vfo, Alphanumeric data storage, Signal Meter, Band Scope, Password Protection, New User and Expert Modes, Computer Control Option and Clone facilities.

Supply: Internal Ni-Cd or 12V Battery Size: 66 x 39 x 155mm
Consumption: 160mA (20mA battery save) Weight: 345g

Order Code	Type	Price each
RU98G C1	AR-8000	£449.95

Scan King Base Aerial 500kHz - 1300MHz

Give your scanner a big boost by fitting a good external aerial. This model is constructed of fibreglass with 4 x 20cm radials.

Length: 110cm
Radials: 20cm
Socket: 'N' type



Order Code	Type	Price each
RU06G B	Scan-K Base	£39.95

QS-200 Dashboard Mount

- ★ Ideal for All Models
- ★ Suits Modern Cars
- ★ Mounts in Seconds



The QS-200 snaps onto any louvred grill and holds your handheld securely. Ideal for scanners and ham radio portables.

Order Code	Type	Price each
RU07H	QS-200	£9.95

SE-1300 Base Discone 25 - 1300MHz

A favourite antenna for those who want the best coverage antenna, in the loft or outside. Comes with mast clamps.

Height: 1.7m
Weight: 1kg

Order Code	Type	Price each
CM09K H4	SE-1300	£49.95

QS-300 Desk Mount

Ideal for desk mounting handheld radios and scanners. Fitted with SO-239 socket



Order Code	Type	Price each
AB89W	QS-300	£12.95

DC Curly Lead

Supplied with all 5 common DC plug adaptors and 3.5mm plug. Reversible DC connector.



Order Code	Type	Price each
AB98G	DC Curly Lead	£9.95

ALINCO SCANNER DJ-X1D AM/FM/ 20kHz - 1300MHz

Available in Maplin shops

- ★ No Gaps
- ★ 100 Memories
- ★ Battery Save
- ★ Ultra Sensitive
- ★ Compact
- ★ Rugged
- ★ Programmable
- ★ Helical Whip



The ideal scanner for those who need a rugged unit that is compact and sensitive. Very popular with aircraft enthusiasts because of its excellent UHF performance.

Antenna: BNC 50 Ohms
Supply: Ni-Cads or 12V DC
Includes: Ni-cads & Charger
Steps: 5 - 100kHz
Size: 110 x 53 x 37mm
Weight: 370g

Order Code	Type	Price each
CM84F H1	DJ-X1	£329.95
RU05F	Case	£14.95

Sky Scan Antennas Desk-Top 1300

- ★ 25 - 1300MHz
- ★ Compact Size
- ★ 4m Cable with BNC Plug
- ★ Needs No Adjustment
- ★ Ideal for Office or Home



Height: 36 ins.
Width: 9 ins.

Order Code	Type	Price each
RU10L C	D-1300	£49.95

Mobile M-1300

- ★ 25 - 1300MHz
- ★ Magnetic Rubber Mount
- ★ 4m Coax with BNC Plug
- ★ Superb Efficiency



Now you can take your scanner mobile and enjoy base station performance. Reduces noise and enhances signals.

Order Code	Type	Price each
RU11M B	M-1300	£24.95

Technical Information on 0702 206635

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

ADI (Accessories)

Order Code	Type	Price each
CM90X	RBP-072 Nicad Pack	£29.95
CM91Y	CHA-072 Charger	£12.95
CM92A	CMP-145 Speaker/Mic	£24.95

ALINCO DJ-180EB 2m 2W FM Handheld

- ★ Tx 144 to 146MHz
- ★ Rx 137 to 174MHz
- ★ Ni-cad Pack
- ★ AC Charger

This new budget transceiver from ALINCO gives you a powerful handheld with a pedigree second to none. Designed for the radio amateur, this is offered at a price that will enable all ham radio operators to carry a handheld with them. 10 memory channels and repeater shift plus toneburst are included and an optional battery pack will give you 5 watts output! Reliable, lowest price in the UK and our 12 month warranty. You won't find a better deal.



Display: LCD
Steps: 5 - 25kHz
Toneburst: 1750Hz
Aerial: BNC Helical supplied
Supply: Ni-cads or 13.8V Ext.
Size: 132 x 58 x 33mm

Order Code	Type	Price each
CM87U H2	DJ-180	£229.95

DJ-180 Accessories

EBP-28N	High power 12V 700mAh pack
EBP-26N	Spare standard 7.2V pack
EDH-11	6 x AA cell dry battery case
EMS-9	Speaker/Microphone
ESC-18	Leatherette case (EBP-26)
EJ-14U	50 memory expansion module
EDH-12	12V adaptor module
EDC-26	12V cigar light lead/filter

Order Code	Type	Price each
RU12N	EBP-28N	£59.95
RU13P	EBP-26N	£40.95
RU14Q	EDH-11	£13.95
RU15R	EMS-9	£35.95
RU16S	ESC-18	£14.95
RU17T	EJ-14U	£19.95
RU18U	EDH-12	£9.95
RU19V	EDC-36	£18.95

ADI SENDER 145 (SENDER 450) 2m (70 cms) 2-5W Transceiver

- ★ 3 Power Levels
- ★ 5 Watts Max. (12V)
- ★ Receive 130 - 170MHz (420 - 462MHz)
- ★ 20 Memory Channels
- ★ Scan Features
- ★ 4 & 6 x Battery Boxes
- ★ Battery Save
- ★ Auto Power Off
- ★ Programmable Steps
- ★ 1750Hz Tone
- ★ Repeater Shift

The Sender-145 is the latest handheld from ADI. Built to show that a fully featured transceiver does not have to be expensive, this unit provides a complete amateur station in a very small package. Solidly built, its clear LCD display provides accurate frequency information and the key pad enables direct entry of frequencies as well as programming functions. The unit is supplied complete with a 54 page handbook, aerial and belt clip plus a full 12 month's warranty. Another great value for money product from your favourite ham radio supplier.

Aerial: 50 Ohms BNC
Transmit: 144 - 146MHz (430 - 440MHz)
Sensitivity: 0.25µV (0.4µV)
Size: 83 x 55 x 31mm

Order Code	Type	Price each
CM88V H1	ADI-145	£199.95
CM89W H1	ADI-450	£219.95

Brackets indicate 70cms version



ADI-450 fully meets UK novice licence

Microset Amplifiers

Here's a range of 144MHz and 432MHz linear SSB/FM rf power amplifiers, some designed for use with handheld radios, others for use with mobile or base stations. Each amplifier is fully protected against high VSWR and incorporates a receive GaAsFET pre-amplifier. All units feature rf sensing or direct switching. Maximum output is achieved with maximum allowable input. Input/output figures shown right.



R-25	2m	1-4Win/30W out
RV-45	2m	3-15Win/45W out
R-50	2m	1-7Win/50W out
SR-100	2m	4-25Win/100W out
SR-200	2m	10-50Win/200W out
RU-20	70cm	1-6Win/30W out
RU-45	70cm	3-15Win/45W out
R-432-90	70cm	6-12Win/90W out

Order Code	Type	Price each
CM13P D1	R-25	£84.95
CM14Q D1	RV-45	£99.95
CM15R D1	R-50	£109.95
CM16S H1	SR-100	£169.95
CM17T H3	SR-200	£319.95
CM18U E1	RU-20	£129.95
AH25C C1	RU-45	£179.95
CM19V H1	R-432-90	£489.95

2m Mobile 30W Amplifier P-335

- ★ RF sensing
- ★ 1 to 6W input
- ★ Ideal for FM

Here's a way to boost your handheld power so that you can compete

with the high power modules. The P335 represents excellent value and is suitable for all 2m handhelds.

Frequency: 144-148MHz
Mode: FM
Supply: 13.8V
Size: 74 x 50 x 24mm

Order Code	Type	Price each
RU20W B	P-335	£59.95



ALINCO DJ580E 2m/70cm Handheld

- ★ CTCSS Option
- ★ Full Duplex
- ★ 5 Watts Max.
- ★ Auto Remote Repeater
- ★ Receives Airband 108 - 143MHz
- ★ Receives 800 - 945MHz 130 - 174MHz 400 - 470MHz

The DJ-580E is the most successful handheld transceiver to come from ALINCO. It provides an incredible number of features including full duplex operation and the ability to function as a self-contained repeater! Other features include wide band receiver capability plus AM airband. Its rugged construction and 5 watt capability make it ideal for mobile operation as well. No less than 8 scanning modes are included and a memory bank of 40 channels is provided. The radio is supplied with ni-cads and AC charger plus helical whip.

Display: LCD
Transmit: 144 - 146MHz, 430 - 440MHz
Steps: 5 - 25kHz
Toneburst: 1750Hz
Supply: Ni-cads or 13.8V
Size: 140 x 58 x 33mm

Order Code	Type	Price each
CM93B H2	DJ-580E	£419.95
RU21X	ESC-17 Case	£14.95



NOTE: Amateur radio transceivers can only be used to transmit when the operator is in possession of a valid UK Amateur Radio Licence. Details available from DTI.

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

DIAMOND MOBILE AERIALS DP-2HE 145MHz

Length: 0.26m
Gain: 0dB
Base: PL259

NEW



M-285 145MHz

Length: 1.34m
Gain: 3.4dB
Base: PL259

EL-2E 145MHz

Length: 1.81m
Gain: 4.5dB
Base: PL-259

NR-77S 145/435MHz

Length: 0.39m
Gain: 0dB
Base: PL-259

NR-770R 145/435MHz

Length: 0.98m
Gain: 3/5.5dB
Base: PL-259

NR-790 145/435MHz

Length: 1.46m
Gain: 4.5/7.2dB
Base: PL-259

Order Code	Type	Price each
RU79L	DP2HE Aerial	£8.95
XP73Q B	M285 Aerial	£19.95
XP74R C	EL2E Aerial	£46.95
RU80B	NR-77S Aerial	£32.95
XP75S B	NR-770R Aerial	£41.95
RU81C	NR-790 Aerial	£69.95

Gutter Mount(SO-239)

EC-H cable kit is 4m long and fitted with PL-259 and SO-239 bases. AM-L bracket is alloy adjustable and accepts EC-H kit.



Order Code	Type	Price each
XP76H	EC-H Cable Kit	£12.95
ZA02C	AM-L Gutter Mount	£17.95

Magnetic Bases

Two models available. Mag-1000 is the standard unit with SO-239 socket, 4m cable and PL259



plug. KISM 3.5 is similar but with a thin rubber skirt that provides amazing adhesion, even for the longest whips.

Order Code	Type	Price each
RU82D	Mag-1000	£12.95
ZA04E A1	KISM Base	£27.95

"On-Glass" Mobile Aerials

GM-144
Type: 27" 144MHz Halfwave
Gain: 2.5dB

GM-270
Type: 26" Dual band 2m/70cm
Gain: 0dB/2.5dB

Both models supplied with 14ft cable, and PL-259 plug.

Order Code	Type	Price each
RU83E	GM-144	£29.95
RU84F	GM-270	£39.95

DIAMOND 2m/70cms Base Co-Linear Aerials 'The Best In The World'

- ★ Fibreglass Encapsulated
- ★ Stainless Steel Fittings
- ★ All Mounting Hardware
- ★ Fully Weatherproof
- ★ Pre-tuned
- ★ Excellent VSWR

DIAMOND are the world's leaders in base station antennas for the VHF/UHF ham bands. Each antenna covers 2m and 70cms and is ready to go; no tuning or adjusting is necessary and we guarantee a low VSWR. Fibreglass encapsulation means long, trouble free life. Each aerial is adjusted for maximum gain possible. And remember, every 3dB of gain is equivalent to doubling the transmit power!! That means that even the baby X50 will make a 2 metre 50 watt transmitter have an effective radiated power of 100 watts. Base connection is 50 ohm SO239 on all models except X510 which is 'N' connection.

Order Code	Type	Price each	Model	Gain dB	Length
CP00A	H2 X-30	£66.95	X-30	3/5-5	1-3m
CP01B	H2 X-50	£82.95	X-50	4-5/7-2	1-7m
CP02C	H3 X-300	£129.95	X-300	6-5/9	3-1m
CP03D	H6 X-510N	£189.95	X-510N	8-3/11-7	5-2m
CP04E	H8 X-700H	£319.95	X-700H	9-3/12	7-2m



Opto-3300 Frequency Counter 1MHz-2.4GHz



Sensitivity: 300µV at 450MHz
3mV at 800MHz
Impedance: 50Ω 1MHz - 2.8GHz
1MΩ 1MHz - 20MHz
Gates: 4(0.01-10secs)
Resolution: 0.1Hz(1MHz - 250MHz)
10Hz(250MHz - 2.4GHz)
Dimensions: 85 x 65 x 29mm

Order Code	Type	Price each
JM38R A2	OPTO 3300	£169.95

Opto - M1 Frequency Counter 10MHz-2.8GHz



Sensitivity: 300µV at 450MHz
3mV at 800MHz
Impedance: 50Ω 1MHz - 2.8GHz
1MΩ 1MHz - 20MHz
Gates: 6(0.01-10secs)
Resolution: 0.1Hz(10Hz - 200MHz)
10Hz(200MHz - 2.8GHz)
Dimensions: 125 x 72 x 35mm

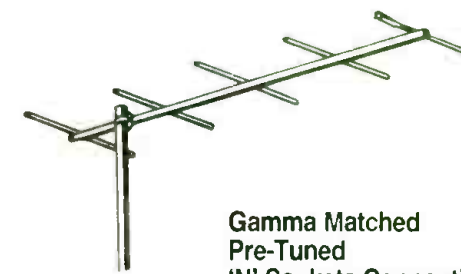
Order Code	Type	Price each
JM39N A2	OPTO-M1	£249.95

- Both models feature:
- ★ LCD Readouts
 - ★ Ranges of 100-200ft
 - ★ Internal Ni-Cads
 - ★ AC Chargers
 - ★ Helical Aerials
 - ★ 50 Ohm BNC Inputs
 - ★ M1 Model Also Features:
 - ★ RF Bargraph
 - ★ Filter and 3 Memories
 - ★ Data Output

TONNA VHF/UHF Beams

The range of Amateur Band Tonna antennas are the most widely used in Europe. These well respected designs are the product of F9FT, the famous French radio amateur. Used extensively by contest groups, clubs, moonbounce experimenters, satellite work etc., the facts speak for themselves. The design features light solid elements for durability, 'N' connectors for low loss, and optimum spaced elements for maximum forward gain. Supplied complete with 2" mast clamps. There's a model to suit every application, so if you want the best possible performance, look no further.

Model	Description
20505	50-52MHz 5 element 10dBi 3-45m
20804	144-146MHz 4 element 8-9dBi 0-93m
20808	144MHz 4 element 0.93m
20809	144-146MHz 9 element 13-1dBi 3-47m
20089	Portable version of above
20818	144-146MHz 9 element crossed 13-1dBi 3-47m
20822	144MHz 11 element crossed 4.62m
20811	144MHz 11 element 14.1dB 4.62m
20817	144-146MHz 17 element 15-3dBi 6-57m
20899	144/430MHz 9/19 element 3.47m
20909	435MHz 9 element 13-0dBi 1-24m
20919	435MHz 19 element 16-2dBi 2-82m
20438	435MHz 19 element crossed 16-2dBi 2-82m
20921	435MHz 21 element 18-2dBi 4-6m
20623	1296 23 element 18-0dBi 1-75m
20655	1296MHz 55 element 21-5dBi 4-64m
20635	1296MHz 35 element 20.6dB 3m
20624	1250MHz 23 element TV 18dB 1.85m



Gamma Matched Pre-Tuned 'N' Sockets Connection

Order Code	Type	Price each
CM31J H8	20505	£72.95
CM32K D2	20804	£42.95
RU22Y D2	20808	£52.95
CM33L F4	20809	£44.95
CM34M F4	20089	£49.95
CM35Q H6	20818	£86.95
RU23A H6	20822	£115.95
RU24B H6	20811	£77.95
CM36P H10	20817	£92.95
RU25C H6	20899	£85.95
CM37S F2	20909	£43.95
CM38R H3	20919	£52.95
CM39N H4	20438	£61.95
CM40T H6	20921	£68.95
CM41U D2	20623	£48.95
CM42V H6	20655	£72.95
RU26D H4	20635	£59.95
RU27E G3	20624	£48.95

RAMSEY Radio Kits from USA – They're so easy!

Amateur Radio Receivers



These single band radios use direct conversion with varicap tuning and have amazing sensitivity. They offer reception of SSB, CW and AM, and are ideal as part of a QRP station.

Models: 20m; 40m; 80m
Output: 8 ohm headphones
Supply: 9V

Order Code	Type	Price each
CP13P	HR-20m	£31.95
CP14Q	HR-40m	£31.95
CP15R	HR-80m	£31.95

FR-1 FM Broadcast Receiver

Ideal for the novice, this builds into an FM receiver covering 88 – 108MHz FM and has enough power to easily drive a speaker. Everything is provided apart from the optional case.

Order Code	Type	Price each
CP19V	FR-1	£22.95
CP18U	Case CAA	£14.95

AR-1 AM Airband VHF Receiver

Ideal for the air enthusiast, this kit features a superhet design and incorporates both squelch and volume controls. There's also enough volume to easily drive a speaker.

Order Code	Type	Price each
CP17T	AR-1	£29.95
CP20W	Case CRR	£14.95

FR-146 2 metre Receiver

This radio covers the 2 metre amateur band but can easily be extended to cover the marine band. Features double conversion with ceramic IF filter, squelch and AFC for stability. Features latest Motorola chip.



Order Code	Type	Price each
CP21X	FR-146	£31.95
CP22Y	Case CRF	£14.95

RF Sniffer Probe Ready Wired 100kHz – 1-2GHz

Lets you read weak RF signals on your DC test meter. Ideal for servicing and alignment. Comes ready built with test prod clip and "banana plugs" for meter.



Order Code	Type	Price each
RU31J	RF-1	£21.95

QRP HF CW Transmitters

Low power operation on the ham bands is great fun and these kits offer a complete variable xtal controlled transmitter delivering 1 Watt output. VXO provides 7kHz shift and there's even a diode T-R switch included! Xtals are centred on 14.060kHz, 7.040kHz, and 3.579kHz.

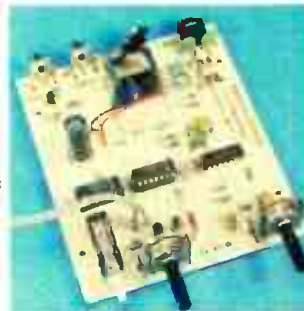


Models: 20m; 40m; 80m
Power: 12V at 400mA approx.
Mode: CW

Order Code	Type	Price each
CP09K	QRP-20	£31.95
CP10L	QRP-40	£31.95
CP11M	QRP-80	£31.95
CP12N	CQRP	£14.95

Ramsey CW-7 Electronic Keyer

This is an ideal project for ham radio enthusiasts. A complete electronic keyer that interfaces between any paddle key and all modem hf rigs. Front panel controls adjust speed and sidetone monitor volume. Simply connect a speaker for code practice sessions. An internal pot adjusts tone frequency.

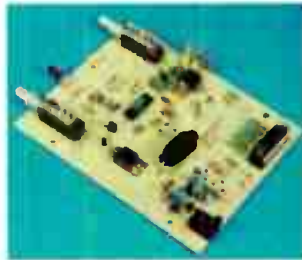


Speed: 5 – 50 WPM
Dimensions: 120x102mm
Power: Internal PP3 type (not supplied)

Order Code	Type	Price each
RU90X	CW-7	£24.95
RU91Y	Case CWC	£14.95

Ramsey Dr. Ni-Cad

Charges and conditions ni-cads from 2 - 10 cells. Runs from 12 - 15 Volts DC and permits fast or standard charging. Includes timer, discharger and safety sensor. Can be configured to match all types of ni-cad packs.



Order Code	Type	Price each
AM34M	DN-1	£49.95

LC-1 Capacitance-Inductance Meter Kit

This unit will save you hours of time in testing those old components, checking values and creating designs. Use with any multimeter and we even supply calibration components. Just plug inductor or capacitor into test socket supplied and read value.

Range: 01µH – 10mH
2pF – 2.0µF
Supply: 9V

Order Code	Type	Price each
RU38R	LC-1	£39.95
RU39N	CLC Case	£14.95

HOWES KITS-UK

QRP CW HF Transmitters

Great fun for holidays etc., there's models for 80m, 40m and 20m. Each one is complete with crystal for the UK QRP frequency. There's also an optional matching vfo model CVF. (50pF tuning capacitor needed).

Output (max.): 20m:10W
40m:3W
80m: 5W
Supply: 13.8V

Order Code	Type	Price each
RU40T	CTX-40	£16.95
RU41U	CTX-80	£16.95
RU42V	MTX-20	£29.95
RU43W	CVF-20	£12.95
RU44X	CVF-40	£12.95
RU45Y	CVF-80	£12.95

ASL-5 SSB/CW Audio Filter



Dramatically improves SSB and CW signals. Plugs into receiver headphone or speaker socket. Gives you sharp band-pass filtering for SSB and 300Hz selectivity for CW. Requires 12V DC and provides 1W output. Ideal for improving scanner reception. Case 180 x 204 x 32mm

Order Code	Type	Price each
AB99H	ASL-5	£16.95
AM33L	ASL-5 Case	£14.95

DcRx Ham Band Receivers SSB & CW

The basic receiver kit that builds into a highly sensitive single band receiver and is an ideal companion for QRP transmitters. Full band



coverage is provided together with 1 Watt of audio. The only additional components you need are two 50pF variable capacitors.

Frequency: 20m; 40m; 80m
Supply: 12 – 14V

Order Code	Type	Price each
RU46A	DcRx-20	£17.95
RU47B	DcRx-40	£17.95
RU48C	DcRx-80	£17.95

Active HF Antenna 150kHz – 30MHz

A high performance active aerial for the shortwave listener. All you need to provide "long wire" performance in a small space. Just add 6 to 8ft of wire to pull the stations in.

Supply: 12 – 14V @ 25mA

Order Code	Type	Price each
RU49D	AA-2	£9.95

Active Antenna 25MHz – 1300MHz

For scanner owners, here's your chance to build an active aerial at a real down to earth price. For outside use it can be simply housed in a standard 1.5in plastic pipe. Receiver interface included for permitting 12V supply to be fed up coax cable.

Order Code	Type	Price each
RU50E	AA-4	£20.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

LOWE SRX50 Short Wave Receiver



- ★ Short Wave + Broadcast
- ★ Stereo FM (Inc. Headphone)
- ★ Digital Display/Alarm Clock
- ★ 20 Memory Capacity

Special Purchase

This compact receiver covers the domestic and major shortwave broadcast bands. Digital display gives precise frequency readout and also doubles as a travel clock and alarm. Now you can wake up in the morning and hear the world news as it happens. Very sensitive and superb value. Ideal for overseas travellers.

Range 153-281/531-1602kHz
5.9 - 15.5MHz
87.5 - 108MHz

Power 3 x AA

Size 180 x 120 x 35mm

Order Code	Type	Price each
CP24B E2	SRX-50	£39.95

LOWE HF-150 Communications Receiver



- ★ Professional Performance
- ★ Coverage 30kHz- 30MHz
- ★ Synchronous Detection on AM
- ★ Narrow & wide Filters
- ★ 60 Memories
- ★ Dual Conversion
- ★ USB/LSB/CW/AM

Now selling across the world, this British design has won glowing reports about its performance. Compact dimensions and solid construction enclose an electronic design that performs better than some receivers costing much more. It is also finding wide applications in the commercial field. Thoroughly recommended for the serious DX listener who demands good sensitivity and the ability to cope with strong adjacent channel signals.

Aerial 600 ohm/50 ohm/whip
Power 12V DC (AC adaptor inc.)
Internal ASA cells

Speaker 8 ohm built-in

Size 185 x 80 x 160mm

Order Code	Type	Price each
CM23A H4	Lowe HF-150	£389.95

SONY ICF-SW55 - SSB/AM/FM Short Wave Receiver Package

The best short wave portable in its class. It will pull in the weakest of stations and has 125 memories with programmable station data base.



Ideal for home or travel, it can be powered from batteries or its own mains supply adaptor. You also get telescopic whip, wire aerial, soft case and frequency guide. Covers 150kHz - 30MHz AM and SSB, plus FM 76 - 108MHz. This gives you full broadcast coverage plus short wave radio, aeronautical, marine and many other long distance stations. Now you can wake up to Radio Australia!

Power: 4 x 'AA' batteries or external 6V mains adaptor supplied

Size: 194 x 127 x 39mm

Weight: 0.9kg

Order Code	Type	Price each
CP23A H6	ICF-SW55	£279.95

Roberts RC-818 Short Wave Receiver and Cassette Recorder

- ★ Auto Scan
- ★ AM/FM/SSB
- ★ Timer/Record
- ★ 45 Memories
- ★ Dual Clocks
- ★ Keypad Entry



A high performance communications receiver with built-in cassette player that lets you time and record your favourite programmes, or that rare DX station. Continuous coverage from 150kHz to 30MHz plus FM broadcast 87.5 to 108MHz. Features built-in telescopic aerial, external aerial socket, RF gain, large LCD read-out and choice of dry cell or mains operation.

Supply: 4 x D plus 3xAA Cells
230V AC Mains

Dimensions: 296 x 192 x 68mm

Weight: 2kg

Order Code	Type	Price each
RU92A H4	RC-818	£219.95

ANT-60 Portable SW Aerial

Ideal for RC-818 receiver or similar. Unrolls to 30ft in seconds. Supplied with 3.5mm plug.



Order Code	Type	Price each
RU93B	ANT-60	£14.95

Short Wave Wire Aerial

- ★ 1.5MHz - 30MHz
- ★ 50m long
- ★ Ready to go



The ideal wire system for short wave reception. Its length may be reduced with only a small reduction in low frequency performance. Ready assembled, 50m stranded copper wire, with insulators and 20m of feeder plus nylon support cord.

Order Code	Type	Price each
RU52G	SWL-DX1	£25.95

A REAL CRYSTAL SET KIT! Ideal School Project



A chance to step back in time and experience the thrill and lure of 'cats whisker' detection. This kit includes a genuine Galena crystal, one of earth's natural minerals. For comparison you can switch over to a modern day diode - but there's not much difference! This is both a nostalgic radio and an educational kit that demonstrates the natural semiconductor properties of Galena. Kit includes all you need to get it working including a high impedance ear piece and a multi-tapped coil.

Coverage: 530 - 1750kHz
Size: 155 x 90 x 40mm

Order Code	Type	Price each
AB83E	CS-1	£19.95

Steepletone MBR-7 Wideband Receiver



- ★ 150 - 315kHz
- ★ 525 - 1650kHz
- ★ 2.3 - 22MHz
- ★ 87 - 109MHz
- ★ 107 - 176MHz

This new item is designed for those who want to explore the world of radio and get maximum frequency coverage in one package. In addition to your normal LW/MW and FM stations you'll be able to hear long distance broadcasts from across the world, VHF airband and marine traffic, emergency services, taxis and much more. Features include direction finder aerial, telescopic whip, S-meter, external antenna socket, PA facility, frequency book and carrying strap.

Power: 4 x HP2 or 240V AC
Size: 369 x 273 x 132mm

Order Code	Type	Price each
RU53H D2	MBR-7	£69.95

AT-2000 SWL Antenna Tuner

The most widely used short wave receiver tuner in use today. Used by enthusiasts throughout the world.



Freq: 100kHz to 30MHz
Antennas: Long wire/coax/twin feed
Connector: SO239
Size: 150 x 67 x 146mm

Order Code	Type	Price each
CM08J C1	AT-2000	£99.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

ES-200 Handheld 40 channels 4 watts

Ideal for portable operation such as camping and walking etc. It fully conforms to UK channel specification. LED readout gives channel numbers (can be switched off to save battery) and there's a squelch control for silent "standby". Can also be used mobile or base on an external antenna such as those described on this page.



Frequency: 27MHz 40 x UK channels
Power: 4 watts or 1 watt
Supply: 8 x AA dry or 10 x ni-cads
External 12V DC
Antenna: Flexible with BNC
Size: 189 x 70 x 49mm

Order Code	Type	Price each
CM30H E1	ES-200	£79.95

CB Spring Loaded Aerials

- ★ 27 MHz Band
- ★ Magnetic Base
- ★ Chrome Spring
- ★ Adjustable Tuning
- ★ 16ft Co-Ax

These smart antennas can be instantly mounted on your vehicle. W-1400 features short length with centre loading and slimline spring. Model B-202 has longer fibre glass whip with base loading and larger spring.



Order Code	Type	Price each
RU95D	B-202	£12.95
RU96E	W-1400	£18.95

SWR / Power Meter SWR-12

Ideal for adjusting antennas and checking power output of rig. Designed especially for 27MHz.

Frequency: 1.8 to 30MHz
Power: 10 Watts
Size: 85 x 55 x 60mm



Order Code	Type	Price each
CP27E	SWR-12	£11.95

SO-239 to 3/8" Adaptor

Lets you mount any 3/8" antenna onto the standard ham radio SO-239 socket.



Order Code	Type	Price each
RU55K	PL-5/8	£3.95

Midland 104 CB Mobile

Superb compact 40 channel mobile rig (or base with 12V DC supply). Ideal for keeping in touch with other drivers in unfamiliar parts or during traffic delays. Supplied complete with mobile mount and microphone.



Frequency: 27MHz UK spec. Antenna: SO 239 socket
Output: 4 Watts Size: 4" x 1" x 6"
Supply: 12 to 14V DC Weight: 1kg

Order Code	Type	Price each
CM29G E2	104 CB	£79.95

Midland 77-095 Mobile **NEW**



Super low price on this compact and simple to use mobile. Keep in touch with your CB friends with this delightful little rig. Features 40 channels, LED display, separate squelch and volume controls, electronic up/down tuning etc. Supplied complete with mic, mobile bracket and DC lead. MPT approved.

Channels: 40(UK System)
Dimensions: 165x120x35mm
Weight: 750g

Order Code	Type	Price each
RU97F D3	77-095	£59.95

Team 3004-UK Base Station

This smart desk top unit has been chosen by us for its performance and features. It includes variable power, optional "Roger Bleep", RF gain, signal meter, etc.



Frequency: 27MHz 40 UK channels
Power: 4 Watts
Antenna SO-239
Size: 85 x 55 x 60mm

Order Code	Type	Price each
CP26D F2	3004-UK	£179.95

MTS-161 3/8" Gutter Mount

- ★ 3/8" socket
- ★ 4m cable
- ★ PL-259 plug
- ★ Cast clamp
- ★ Adjustable



Standard CB mounting kit for all CB 3/8" aerial systems.

Order Code	Type	Price each
RU57M	MTS-161	£9.95

MTS-060 3/8" Magnetic Mount

- ★ 155mm magnet
- ★ 4m cable
- ★ PL-259 plug



Order Code	Type	Price each
RU58N	MTS-060	£10.95

CB Mobile Aerial Kit Mobile-27

A complete 27MHz CB mobile whip aerial system with magnetic base, whip and 12ft. cable terminated in a PL259 plug.

Ready tuned
Size 4ft. 7in.
Weight 0.75kg



Order Code	Type	Price each
CP28F H1	Mobile-27	£19.95

CB Base Aerial GP 26-28

- ★ 3.9dB Gain
- ★ High Performance

This base station aerial is a half wave omni-directional aerial that gives a gain equivalent to doubling your transmitter power. Completely self supporting and pre-tuned, absolutely no adjustment is necessary. Cannot be used legally in the UK for transmitting.

Height: 16ft
Power: 1000 watts
Fixing: 2in. mast
Base: 50 ohms SO239



Order Code	Type	Price each
CP25C H5	GP 26-28	£29.95

CB GP-127 Base Short Length Aerial

Conforms to the official UK limit put on CB aerials and is also ideal for loft use. Upper element length is 1.3m which comprises a helical winding for efficiency. The three radials are of similar construction and length.

Frequency: 27MHz
Max. Power: 100W
Total length: Approx. 2.2m



Order Code	Type	Price each
RU59P F3	GP-127	£24.95

Panther Mobile Whip 3/8" Mount

This highly efficient base loaded mobile aerial will fit the standard 3/8" mounts shown adjacently. Very cost effective yet a higher performer, this has been selected for its performance and value for money.

Length: 61"
Max. Power: 500W



Order Code	Type	Price each
RU60Q	Panther	£9.95

4

Radio Frequency Balun

1:1 50 Ohm current balun covering the range 3.5 - 30MHz and rated to 2kW. Ideal for dipoles and beams. Fitted SO-239 socket.
Length: 24cm
Weight: 450g

NEW



Order Code	Type	Price each
AB84F	RF Balun B1-2K	£25.95

Radio Frequency Line Isolator

Prevents common mode transmitter currents flowing down coaxial cable. Chokes off RF and prevents RF from flowing down coax cable and into chassis. Ideal for reducing interference problems. covers 3 - 30MHz and rated up to 2kW. Fitted SO-239 both ends.
Length: 24cm
Weight: 450g

NEW



Order Code	Type	Price each
AB85G	RF Line Iso 4K-L1	£25.95

DIAMOND VSWR & POWER METERS

SX-200 VSWR/Power Meter



Freq: 1.8-200MHz
Power Range: 5W/20W/200W
Readings: RMS or PEP
Accuracy: ±5%
Sensitivity: 1W
Insertion Loss: 0.15dB
Impedance: 50 Ohms
Connectors: SO239
Dimensions: 155W x 63H x 103D mm
Weight: 540g

Order Code	Type	Price each
XP70M B	SX-200 VSWR Meter	£89.95

SX-400 VSWR/Power Meter

Exactly the same as SX-200 but with a range of 140-525MHz.

Order Code	Type	Price each
XP71N B	SX-400 VSWR Meter	£104.95

SX-600 VSWR/Power Meter

Same basic specification as SX-200 with the following exceptions:



Specifications

Sensor 1: 1.8 - 160MHz; Sensor 2: 140 - 525MHz
Sensitivity: Sensor 1: 1W; Sensor 2: 4W

Order Code	Type	Price each
XP77J B	SX-600 VSWR Meter	£164.95

SX-1000 VSWR/Power Meter

Same basic specification as SX-200 with the following additions.

Sensor 1: 1.8 - 160MHz
Sensor 2: 430 - 13000MHz
Power: 5W/20W/200W
Accuracy: ±10%
Sensitivity: 1W (sensor 1)
2W (sensor 2)

Order Code	Type	Price each
XP72P B1	SX-1000 VSWR Meter	£229.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

COAXIAL RF SWITCHES SO239 or N Sockets

Freq: DC-1000MHz
Impedance: 50 ohms
Loss: 0.2dB
Power: 1000 watts
Isolation: 200MHz 70dB, 1500MHz 50dB
Sockets: 'N' or 'SO239'
Size: 85W x 62H x 61D mm



Order Code	Type	Price each
CM55K	CX-201G N	£26.95
CP30H	CX-201 239	£18.95

GLOBAL CX-401 4-Way Switch

A unique 4-way coax switch with SO239 sockets plus a centre earth position and a static discharge protector.

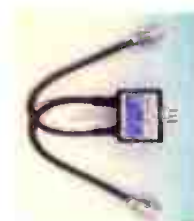
Freq: DC-1GHz
Impedance: 50 ohms.
Loss: 0.2dB
Power: 1000 Watts.



Order Code	Type	Price each
CM56L A2	CX-401	£49.95

RF DUPLEXERS

Pass Band: 1.6-150MHz, 400-450MHz
Impedance: 50 ohms
Power: 100W PEP
Loss/Isolation: 0.3dB/50dB
Connectors: PL-259 or 'N'



Order Code	Type	Price each
ZA08J A1	D24 Duplexer	£34.95
ZA09K A1	D24N Duplexer	£36.95

1.5in. Ferrite Filters

NEW

Wind speaker leads, mains lead or signal leads around the material for effective cure of RF interference.



Order Code	Type	Price each
AM35Q	Ferrite Filter	£1.95

Just Arrived! The MFJ Short Wave Regenerative Receiver Kit or Ready Built

- ★ Major ham & broadcast bands
- ★ High performance
- ★ AM SSB CW RTTY
- ★ Vernier reduction tuning drive
- ★ Smooth Regeneration
- ★ RF gain control

We had tremendous fun building this, and you will too. Designed as a beginners kit project or ready to go, it uses modern technology to reproduce one of the most successful receiver designs of years gone by. On just ten feet of wire indoors you will hear plenty of signals from all corners of the world. And the smooth regeneration helps you adjust both sensitivity and selectivity. Price includes case and cover (not shown). Ideal for youngsters from 12 to 100! Coverage is 3.5 - 4.32, 5.96 - 7.4, 9.56 - 12.05, 13.21 - 16.5, 17.6 - 22MHz.

Order Code	Type	Price each
RU61R C	8100-Kit	£71.95
RU62S D	8100-Wired	£99.95

RF 50 OHM DUMMY LOADS L-20 (PL-259) L-20N "N"

Power: 15W Continuous, 100W 30 secs.
Freq: DC - 500MHz
VSWR: 1.15 (worst)



Order Code	Type	Price each
ZA10L A1	L20 Dummy Load	£20.95
ZA05F A1	L20N Dummy Load	£29.95

MFJ-250 2kW Dummy Load

Ideal for handling high power. It will withstand 1kW of CW for ten minutes of 2kW of SSB. 2 litres of transformer oil (or vegetable oil) is needed.



Frequency: 1.8-400MHz
Size: 170 x 190mm

Order Code	Type	Price each
CP31J B2	MFJ-250	£49.95

MFJ-704 Low Pass Filter

- ★ 1.8 to 30MHz
- ★ 1.5kW
- ★ Low Loss

Dramatically reduces the chance of TV interference from ham radio and CB. Low pass filters are recommended by the DTI.



Order Code	Type	Price each
CP29G A1	MJF-704	£46.95

HP4A TVI Filter

The HP4A is a combined braid breaker and high pass filter. Fully encapsulated and fitted with Belling Lee connectors, it can be plugged directly into the TV receiver. The high measure of rejection ensures that transmitter RF is prevented from reaching the TV receiver via the coaxial aerial cable.



UHF TV use
HF rejection 70dB
VHF rejection (144MHz) 30dB
Insertion loss 2dB

Order Code	Type	Price each
ZA11M	HP4A	£10.95



MFJ-1278BX Data Controller Now with PACTOR!



- ★ Packet ★ SSTV ★ CW ★ Contest Keyer
- ★ Pactor ★ FAX ★ AMTOR
- ★ ASCII ★ RTTU ★ Navtex

Ham radios best selling data modem. Simply connects to audio lines of receiver or transceiver to give you all these modes. Designed for use with IBM compatible machines. Can be used with many shareware programs or for comprehensive performance order the matching 1289 software package.

Order Code	Type	Price each
CP32K H3	MFJ-1278 BX	£339.95
RU64U	1289-3.5"	£69.95
RU65V	1289M-5.25"	£69.95

Packet Radio Kit Ramsey Kit



- ★ Free Software ★ IBM Compatible
- ★ VHF/UHF Packet ★ Powered from RS232 Socket
- ★ Radio TNC

This must be one of the most remarkable kits to be offered. You get a kit of parts to build a complete Packet Radio terminal and also free software for IBM computers. In just a few hours you could be sending and receiving Packet Radio at a fraction of the cost of any ready built unit. Full instructions are supplied and the unit is powered directly from the serial port of your computer. Ideal for those that have not yet tried Packet Radio and want a simple, no nonsense unit that will work first time. Ideal for schools and club projects. Amazing value!!! For a suitable case, order C-IBM.

Order Code	Type	Price each
CP36P A	P-IBM	£59.95
CP37S A	C-IBM	£14.95

DPS-2012 20 Amp PSU



Ideal for test bench purposes and powering Ham Radio transceivers. Over current and over voltage protected, the unit features variable voltage control, dual meters and a lighter socket. Supplied with fitted 13Amp plug.

Voltage: 0 - 15V
Current: 20A (25A peak)
Dimensions: 145 x 237 x 225mm
Weight: 7.75kg

Order Code	Type	Price each
RU99H H16	DPS-2012	£99.95

MICROREADER MKII CW and RTTY Decoder Morse Tutor

This little package has taken the market by storm. Simply plug it into your short wave receiver and watch the



LCD screen as it decodes Morse and RTTY signals. And if you are interested in learning Morse code then this unit will generate random code at adjustable speeds and display it on the screen. You can even plug a key in for Morse practice and watch the screen display your sending!

Size: 135W x 123H x 54D mm
Power: 12V @ 150mA
Display: 18 character LCD
LED Tuning Indicator
CW: Copy 5-80 WPM
Tuition 8-25 WPM
Bauds: 45, 50, 75
Shifts: Selectable
Supply: 13-8V 150mA

Order Code	Type	Price each
XP81C C1	Microreader	£199.95

Morse Practice Kit

Here's a great way to learn Morse code. This package has been put together to help all those who want to learn Morse code. Ideal for novice licence students, the package comprises morse key, adjustable oscillator and a copy of 'The Secret of Learning Morse Code'.



Order Code	Type	Price each
CP35Q A1	Pack-CW	£36.95

MFJ948 ATU 1.8 - 30MHz

The UK's best selling aerial tuner for amateur radio operators. Lets you match our transmitter to balanced feeder, coaxial feed and end fed wires. Includes cross needle VSWR/power meter, PEP readings, 3-way aerial switch and 'through' selector.



Power: 300 Watts
Frequency: 1.8-30MHz
Size: 78 x 260 x 172mm

Order Code	Type	Price each
CP38R H4	MFJ-948	£149.95

MFJ16010 200W Random Wire Tuner

This tuner will match any wire to a 50 ohm transceiver in the range 1.8 - 30MHz. Rated at 200 watts it is ideal for portable work or those on a restricted budget. Just connect between aerial and transceiver.



Order Code	Type	Price each
CP39N A1	MFJ-16010	£49.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

Radio Station Clock MFJ108B

This dual 24-hour and 12-hour clock lets you see at a glance your local time and any international time. The large LCD readout against a satin finish will beautifully complement your station.



Order Code	Type	Price each
CP40T	MFJ-108B	£24.95

VHF & UHF Wavemeters

WA1 120 - 450MHz

WA2 50 - 210MHz

WA3 1.8 - 92MHz



Designed to meet the UK Amateur Radio Licence requirements, these units will measure the presence and frequency bands of RF. DC amplifier is included plus a whip aerial.

Size: 120 x 60 x 45mm
Power: PP3 Battery

Order Code	Type	Price each
XP84F	WA-1	£29.95
CP41U C1	WA-2	£29.95
CP42V	WA-3	£54.95

Microset Power Supplies

Microset are well known for their high quality and reliability. This range of power supplies has been selected by us because of their rugged construction and excellent performance, either for hobby or industrial purposes.



Each unit is over current and over voltage protected. Variable supplies are also metered. All are designed for 240V AC input.

PT-107	7 Amp 13.5V fixed	100 x 180 x 165mm
PT-1012	12 Amp 13.5V fixed	110 x 200 x 240mm
PC-110	10 Amp 5 - 13.5V	110 x 200 x 240mm
PT-120	20 Amp 13.5V fixed	130 x 200 x 275mm
PC-120	20 Amp 8 - 13.5V	130 x 200 x 240mm
PT-135	35 Amp 13.5V fixed	170 x 200 x 240mm
PC-30	30Amp 8 - 15V	170 x 200 x 240mm

Order Code	Type	Price each
CM48C H7	PT-107	£62.95
CM49D H10	PT-1012	£79.95
CM52G H10	PC-110	£99.95
CM50E H15	PT-120	£134.95
CM53H H16	PC-120	£169.95
CM51F H17	PT-135	£159.95
RU66W H16	PC-30	£169.95

4

Active Receiving Antennas

Attention flat dwellers or those with small gardens. These low profile antennas are for you.



- ★ Only 8ft. long
- ★ 200kHz to 100MHz
- ★ Built-in preamplifier
- ★ No antenna tuning required
- ★ Power and RF through same cable
- ★ 11V DC @ 220mA power supply included
- ★ AD270 indoor, AD370 outdoor version

Order Code	Type	Price each
CM72P	A1 AD270	£59.95
CM73Q	B2 AD370	£79.95

Audio Filters



Whether you are a shortwave listener or an amateur radio enthusiast, these audio filters allow you to hear clearly signals that you never knew existed before.

- ★ 10 to 16V DC operation
- ★ Very easy to connect to your receiver
- ★ FL2 and FL3 have a low pass filter, high pass filter and a manual notch filter
- ★ FL3 has an extra automatic notch filter to remove whistles from signals automatically
- ★ FL2/A circuit module upgrades FL2 to FL3
- ★ ANF is a stand alone automatic notch filter

Order Code	Type	Price each
CM61R	A1 FL3	£149.95
CM65V	A1 FL2	£99.95
CM66W	A1 FL2/A	£54.95
CM68Y	ANF	£79.95

Converters

Does your shortwave receiver not cover the frequencies you want to hear? These converters allow you to use your existing receiver to listen to new frequencies.



- ★ 10 to 18V DC @ 50mA operation
- ★ Connects to the antenna socket
- ★ Model VHF lets a 28 to 30MHz receiver tune to 2m signals at 144 to 146MHz
- ★ Model VLF lets a 28 to 29MHz receiver tune to 0 to 1000kHz

Order Code	Type	Price each
CM64U	B2 VHF	£49.95
CM67X	B2 VLF	£39.95

The Datong D70 Morse Tutor

Learn Morse the easy way.



- ★ Thousands in use
- ★ Use anywhere – anytime
- ★ Generates random morse letters and numbers
- ★ Internal speaker, battery & earpiece included
- ★ Variable speed and delay
- ★ Built-in practice oscillator for use with morse key

Order Code	Type	Price each
CM63T	A1 D70	£64.95

DT-1 Dual Time Quartz Clock

Ideal for business use and radio amateurs where there is a need to have both local and overseas time displayed at a glance.



Dual clock movements let you set and view two different time zones. The front panel is attractively finished in brushed aluminium, and the unit is set in a wood frame for wall mounting.

Batteries:	2 x AA Cells	NEW!
Size:	225 x 310 x 25mm	
Weight:	225g	

Order Code	Type	Price each
AQ29G	DT-1	£24.95

BP-1 Packet Radio Modem Including Software

A completely self contained Packet Radio modem for use on VHF radio. Operates at 1200 Bauds and plugs directly into the RS-232 port of a standard PC; no external power being necessary. Simply connect supplied lead to audio and mic



sockets of your VHF transceiver for instant Packet communications. Software is included on 5.25" disk.

Connector:	RS232	NEW!
Software:	Baycom and Baypack	
Dimensions:	60 x 55 x 18mm	

Order Code	Type	Price each
CB03D	BP-1	£49.95

W9GR Digital Processing Filter



- ★ Reduces electrical interference
- ★ Eradicates static
- ★ Cleans up random noise etc.

Digital signal processing techniques bring the opportunity to dramatically reduce most kinds of interference suffered when using short wave radio receivers or transceivers. Effective on voice signals where the filter uses an LMS algorithm which can differentiate between random noise and the wanted signals. A similar technique is used to optimise the bandwidth for various data and CW signals. In addition there is a multiple notch filter included to remove heterodynes. Simply insert between audio output and headphones or speaker for dramatic noise reduction and fatigue free monitoring.

Output:	2W
Supply:	12V
Dimensions:	165 x 140 x 38mm
Weight:	600g

Order Code	Type	Price each
CB04E	C2 W9GR	£299.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

MFJ-259 Aerial Analyser and Frequency Counter 1.8 - 170MHz

'Turns Hours into Minutes and Ideas into Aerials'

NEW!



- ★ VSWR
- ★ Impedance
- ★ Resonance
- ★ Frequency
- ★ Self powered

Ideal for aerial designers and installers. Just connect it to any coaxial fed system and measure the critical parameters necessary for matching and efficiency. Does in minutes what previously took hours. Battery powered, the unit enables you to adjust your aerials on site without needing to apply power to them. Simple to use, this unit will soon pay for itself in saved time and frustration. Also doubles as a frequency counter. Use with beams, dipoles, vertical whips, helicals etc.

Frequency:	1.8-170MHz
Impedance:	10-500Ω
Gate Times:	4 (0.01-10secs.)
Inputs:	SO-239(Aerial) BNC(Counter)
Power:	8xAA or 12V ext.

Order Code	Type	Price each
CB05F	C1 MFJ-259	£249.95

MFJ-411 Morse Trainer

- ★ 5-50 WPM
- ★ 12 Modes
- ★ Random characters
- ★ Random words
- ★ Self contained
- ★ Built-in speaker
- ★ Simulated Ham Radio contacts



Just the thing for learning Morse code quickly. Take it with you, use it for student tuition or club use, this trainer is the most comprehensive we have seen. You can vary speed, tone, modes, character combinations and even select beginner or advanced options. The LED display and menu system allows instant adjustment of modes as you progress with your learning.

Order Code	Type	Price each
CB06G	MFJ-411	£89.95

Technical Information on 0702 206835

WATERS & STANTON Communications Specialists

All these products now available through Maplin by Mail Order

49MHz No Licence Needed! Equipment conforms to MPT 1336

This compact handheld radio has 5 channels, squelch control, call button, telescopic antenna and nicad charge socket. With a typical range of 500yds its the ideal low cost way of keeping in touch without the need for a licence. These units are rugged and reliable. Optional charger and ni-cads available.



Power: 4 x AA cells
Current: 20mA standby
50mA transmit
Size: 158 x 66 x 36mm

Order Code	Type	Price each
RU71N	49-HD	£49.95
AB87U	Charger	£9.95
AB86T	AA Pack	£3.95

Maxon 49SX Headset Transceiver



Ideal for hands free communications for engineers, and restaurant staff etc. Includes headset boom mic and belt-clip control box. Switching can be automatic or voice operated. Typical range is 400yds. No licence required.

Power: 2 x AA cells
Frequency: 49MHz band

Order Code	Type	Price each
JM34M	MAXON 49-SX	£34.00

AR-300XL Aerial Rotator Suitable for VHF Beams

Ideal for VHF ham radio or TV aerials with boom lengths up to 4m. Comprises 240V control box with compass bearings and low voltage rotator. Requires 3-core control cable and motor accepts mast size 28 - 44mm diameter.



Maximum vertical load 220kg.

Order Code	Type	Price each
RU72P	H8 AR-300XL	£59.95

SP-140 Mobile Speaker

This high quality speaker matches all modem ham radio and CB transceivers.



Standard 8 ohm unit terminated in 3.5mm plug. Size 75 x 60mm, rated at 5 watts max. and includes mobile mounting bracket.

Order Code	Type	Price each
RU73Q	SP-140	£9.95

TALKING DIGITAL MULTIMETER

This ingenious 'talking' digital multimeter provides additional safety and convenience when working on mains or high voltage equipment, or in conditions where positioning of the test probes makes reading a meter difficult or impossible. Housed in a slim and easy to hold case, the probes are not detachable, but when not in use, are wrapped round the outside of the case and held in a recess. The probe tips are held in two receptacles on the side of the case for safety. Because of its slim size, the meter can conveniently be slipped into a pocket or toolbox. A 3-position 'voice' switch selects either off, single or auto. In single mode, an announcement is made only when a 'talk' button on the positive probe is pressed, or when there is a change of range in manual mode or change of function. In auto mode, an announcement is made whenever a new reading is captured. Another handy feature is the 'memory' switch, which is used to record the measured data and recall the last memory entry. The 'mem' button is pressed once to record the data, and voice confirmation of the recorded data will follow. To recall the last record, the 'mem' button is pressed and held for two seconds. The meter will hold the current displayed data and speak out the last memory entry. The meter is very easy to use having bright 'easy to read' buttons and switches. The function switch selects off, voltage, ohms and diode check, and a push button selection switch changes from DC to AC, in the voltage measuring mode, or changes to continuity check in the resistance measurement mode. When the meter is switched on, autoranging is automatically selected, to switch to the manual ranging mode press the 'range hold' button - 'R' is displayed and if voice is on, the meter will speak "RANGE". Pressing the button a second time switches the instrument to the lowest range, and with subsequent button pressing operations the ranges are cycled through. Holding the 'range hold' button down for



more than one second reverts to autoranging mode. Additional features include a visual low battery indicator and automatic polarity function, which displays '-'

on the display for negative polarity and no indication for positive polarity. The case has a built-in fold-away stand and retractable hook for 'hands-off' operation. Instruction manual supplied.

AMAZING VALUE!
£39.95
BU88V
A1

Measuring method:	Dual integration mode	Diode check:	0 to 2V
Display:	3.5 digit LCD, max reading of 1999 with auto polarity	Accuracy, DC:	±1.6% rdg ±2 dgts.
Sampling:	2 times/second	AC:	±2.3% rdg ±5 dgts.
Voltage Range, DC:	2V, 20V, 200V, 400V (max)	Resistance:	±2% ±2 dgts.
AC:	2V, 20V, 200V, 400V (max)	Diode check:	±10% rdg ±2 dgts.
Resistance:	200Ω to 2MΩ	Power requirements:	4 x AAA size batteries
Continuity check:	200Ω (max)	Power consumption:	20mW typical (no voice)
		Size:	148.5 x 73 x 25.4mm
		Weight:	240g approx. (without batteries)

IT'S A FACT!

MORSE CODE

In 1838 Samuel Morse devised a simple code of dots and dashes to enable messages to be transmitted over a single wire system.

Interestingly, the easily memorised letters, 'S-O-S', the international distress signal, were only given the catch-phrase, 'Save Our Souls' some time later.

Timing of the code is very important if any sense is to be made of the dots and dashes received by the listener. All timings are a function of the dot length, i.e. 1 dot = 1 unit

Dot (·) = 1 unit,	Dash (-) = 3 units
Pause between elements of one character	= 1 unit
Pause between the characters of a word	= 3 units
Pause between each word	= 7 units

THE CODE

A ..	J	S ...	2
B	K ...	T -	3
C	L	U ...	4
D ...	M ..	V ...	5
E ...	N ..	W ...	6
F	O ...	X	7
G	P	Y ...	8
H	Q	Z	9
I ...	R ...	1	0

Period	.....	Comma	.....
Error	.....	Wait	.....
Question Mark	.....	End of Message	.....
Dash or Hyphen	.....	Colon or +	.....
Prelim. Call	.....	Quotation Marks	.....
Apostrophe	.....	Open Parenthesis	.....
Close Parenthesis	.....	Equal Sign	.....
Plus Sign	.....	Multiplication Sign	.....
Stroke	.....	Warning	.....
Understood	Trans. Received
Close Signal	Closing Down Tx

AUDIO AND VIDEO

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SPARE PARTS FOR RECORD DECKS

Amstrad Drive Belt

A replacement drive belt to suit Amstrad, Fidelity, Hinari, Saisho and BSR P267/P274 models.



Diameter: 128mm
Width: 6mm
Thickness: 0.5mm Inside circumference: 402mm

Order Code	Type	Price each
JR19V	Belt Amstrad AS8128	£1.79

BSR Drive Belt

A replacement drive belt to suit models BDS95 and P163.

Diameter: 123mm Width: 5mm
Thickness: 0.8mm Inside circumference: 387mm

Order Code	Type	Price each
YW58N	BSR Drive Belt	£1.99

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Garrard Drive Belt

A replacement drive belt to suit models SP25V, 86SBI, 86SB11, 125SB, GT10, GT20, GT35, GT55, 35SB.

Diameter: 138mm Width: 5mm
Thickness: 0.8mm Inside circumference: 434mm

Order Code	Type	Price each
FQ36P	Garrard Drive Belt	£1.99

Drive Belts For Japanese Turntables

A range of Record Turntable Drive Belts for the most popular Japanese record decks. All types have a flat cross-section and are 0.7mm thick.

	Pioneer	Sony/ Nat Pan	Hitachi
Diameter:	189	195	210
Width:	5	5	5
Inside Circumference:	594	613	660

Order Code	Type	Price each
FJ19V	Dr/Belt Pionr AS8189	£1.99
FJ20W	Dr/Belt Sony AS8195	£1.99
FJ23A	Dr/Belt Htchi AS8210	£1.99

CARTRIDGES

Mono Crystal BSR X5M

A crystal mono cartridge which is suitable for playing stereo records. Supplied with carrier for centre hole fixing or standard 1/2 in. fixing. Overall size: 28 x 15 x 11mm (excl tabs and lugs). Fitted with a diamond stylus.



Output at 1cm/sec: 400mV
Tracking Weight: 3 to 6gm
Frequency Response: 40Hz to 10kHz
Recommended Load: 2MΩ and 100pF
Stylus Fitted: ST12 or ST15 LP/LP
Changeover
Replacement stylus: ST12 or ST15

Order Code	Type	Price each
HR01B	Ctrdg BSR X5M	£5.79

Stereo Ceramic BSR SC12M and SC12H

A ceramic stereo cartridge supplied with carrier for centre hole fixing or standard 1/2 in fixing. Overall size: 28 x 9 x 8mm (excl tabs and lugs). Fitted with a diamond stylus.



Output at 1cm/sec: 100mV (12M), 170mV (12H)
Tracking weight: 2 to 6g (12M), 4 to 6g (12H)
Stylus fitted: ST20 LP or ST17
Replacement stylus: ST20

Order Code	Type	Price each
HR09K	Ctrdg BSR SC12M	£6.79
HR10L	Ctrdg BSR SC12H	£6.79

MAGNETIC CARTRIDGES

Sonotone V100

A stereo magnetic cartridge. Standard 1/2 in fixing only. Overall size: 28 x 11.5 x 13mm (excl tabs and lugs). Fitted with a diamond stylus.



Output at 5cm/sec: 7mV rms
Tracking weight: 2 to 2 1/2 gm
Frequency response: 20Hz to 20kHz
Stereo separation: >20dB at 1kHz
Recommended load: 47kΩ
Channel balance: <2dB at 1kHz
Stylus: 0.0006in diamond
Replacement stylus: V100

Order Code	Type	Price each
HR17T	Ctrdg Sono V100	£11.99

Goldring G800

A stereo magnetic cartridge. Standard 1/2 in fixing only. Overall size: 28 x 13.5 x 15mm (excl tabs and lugs). Fitted with a diamond stylus.



Output at 5cm/sec: 5mV rms
Tracking weight: 1 1/2 to 2 1/2 gm
Frequency range: 20Hz to 20kHz
Stereo separation: 20dB at 1kHz
Recommended load: 47kΩ to 100kΩ
Channel balance: 2dB
Compliance (static): 20 x 10⁻⁶ cm/dyne
Tip mass: 1 mgm
Cartridge weight: 7.5gm
Stylus: 0.0005in diamond
Replacement stylus: D110SR

Order Code	Type	Price each
HR16S	Ctrdg Goldring G800	£23.99

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Goldring G800H

A stereo magnetic cartridge. Standard 1/2in fixing only. The heavier tracking version of the G800, ideal for playing 45's owing to its slightly larger stylus tip. Overall size: 28 x 13.5 x 15mm (excl tabs and lugs). Fitted with a diamond stylus.



Output at 5cm/sec: 8mV
 Tracking weight: 2 1/2 to 3 1/2 gm
 Frequency range: 20Hz to 20kHz
 Stereo separation: 20dB at 1kHz
 Recommended load: 47kΩ to 100kΩ
 Channel balance: 2dB
 Compliance (static): 18 x 10⁻⁶ cm/dyne
 Tip mass: 1.2mgm
 Cartridge weight: 8gm
 Stylus: 0.0007in diamond.

Order Code	Type	Price each
FQ38R	Ctrdg Goldring G800H	£19.99

Shure Encore ME70-B

A stereo magnetic cartridge. 1/2in fixing only.



Output, 1kHz at 5cm/sec: 6mV
 Tracking force: 1 1/2 to 3gm
 Frequency response: 20Hz to 20kHz
 Stereo separation: 20dB
 Channel balance: <2dB
 Stylus: 0.0006in spherical diamond N70B

Order Code	Type	Price each
FV16S	ME70-B Shure Cart	£17.99

Shure Encore ME95-ED

A high quality stereo magnetic cartridge which when introduced was second only to the Shure V15 Mk III. Its high trackability performance and flat frequency response is aided by a low-loss/high output magnetic pole-piece, and a low mass biradial elliptical stylus. 1/2in fixing only.



Output 1kHz at 5cm/sec: 4.7mV
 Tracking force: 3/4 to 1 1/2 gm
 Frequency response: 20Hz to 20kHz
 Stereo separation: 25dB
 Channel balance: <2dB
 Stylus: 0.0002 x 0.0007in elliptical diamond NE95ED

Order Code	Type	Price each
FV18U	ME95-ED Shure Cart	£37.99

Tenorel T2001D

A stereo magnetic cartridge. Standard 1/2in fixing only.



Output at 5cm/sec: 5.5mV
 Tracking weight: 1.5 to 3gm
 Frequency range: 15Hz to 25kHz
 Stereo separation: 25dB at 1kHz
 Recommended load: 47kΩ
 Channel balance: 2dB at 1kHz
 Compliance (static): 20 x 10⁻⁶ cm/dyne
 Tip mass: 1 mgm
 Cartridge weight: 7gm
 Stylus: 0.0006in diamond
 Replacement stylus: N2001D

Order Code	Type	Price each
FQ40T	Ctrdg Tenorel T2001D	£14.99

Tenorel T2001ED

A high quality stereo magnetic cartridge with a nude elliptical stylus. Standard 1/2in fixing only.

Output at 5cm/sec: 5.5mV
 Tracking weight: 1 to 2.5gm
 Frequency range: 15Hz to 32kHz
 Stereo separation: 25dB at 1kHz
 Recommended load: 47kΩ



Channel balance: 1.2dB at 1kHz
 Compliance (static): 25 x 10⁻⁶ cm/dyne
 Tip mass: 0.75mgm
 Cartridge weight: 7 gms
 Stylus: Elliptical 0.0007in x 0.0002in diamond N2001ED
 Replacement stylus: N2001ED

Order Code	Type	Price each
FQ41U	Cdg Tenorel T2001ED	£16.99



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JAMES CLERK MAXWELL (1831-79) was a British physicist, whose profound contributions to the mathematical analysis of electromagnetic radiation has placed him among the great scientists of the 19th and 20th centuries. Continuing the work of the British scientist Michael Faraday on the electromagnetic field, Maxwell concluded that light is an electromagnetic phenomenon. His work paved the way for the investigations of the German physicist Heinrich Rudolf Hertz, who experimentally confirmed Maxwell's theories. The unit of magnetic flux, the Maxwell, was named in his honour.

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STYLI

High quality diamond tipped styli suitable for use as replacements for the models shown in the charts below. To keep your records in perfect condition, your stylus should be changed once or twice a year, depending on use.

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
ADC R-SQ3011	JX33L	1	Sharp STY104	FV28F	18
Audio-Technica ATN3400	BK07H	2	Sharp STY123	FG94C	19
BSR ST17	HR47B	3	Sharp STY146	JX34M	20
BSR ST21	HR74R	4	Sharp STY717	HR99H	21
Goldring D110H	HR77J	5	Shure N75-ED	FV30H	23
Goldring D110SR	HR48C	5	Shure N95-ED	FV33L	24
Goldring D120SR	HR49D	6	Sonotone V100	HR61R	25
Panasonic EPS24CS	JX25C	8	Sony ND15G	YX27E	26
Panasonic EPSP30	JX24B	9	Sony ND143G	JX29G	27
Panasonic EPS270	FV23A	10	Sony ND150G	JX30H	28
Pioneer PN290	JX23A	11	Stanton D5107AL	BK19V	29
Pioneer PN305	JX35Q	12	Tenorel 2001D	FQ51F	30
Sanyo ST-G6	FV22Y	13	Tenorel 2001ED	FQ52G	30
Sanyo ST-G10	JX31J	14	Tetrad T30MD	FV20W	31
Sanyo ST3	JX26D	15	Tetrad T50HD	JX28F	32
Sanyo ST37LD	JX22Y	16	Toshiba N15C	JX32K	33
Sanyo ST48D	FV24B	17	Toshiba N243	JX27E	2

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
ADC R-SQ3011	JX33L	1	JVC (Victor/Nhivo) DT25	FV24B	17
Aiwa AN5	BK07H	2	JVC DT38L	JX27E	2
Aiwa AN6	FV23A	10	JVC DT45	JX35Q	12
Aiwa AN10	JX31J	14	JVC DT45E	JX35Q	12
Aiwa AN36	FV24B	17	JVC DT57	JX35Q	12
Aiwa AN1100	FG94C	19	JVC DT60	FG94C	19

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Akai RS33	JX35Q	12	Lenco M95	HR49D	6
Akai RS35	JX35Q	12	Marantz CT5S	JX27E	2
Akai RS82	FG94C	19	Marantz CT6S	JX27E	2
Akai RS84	JX22Y	16	Marantz CT65	JX27E	2

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Audio Technica ATN91	FG94C	19	Mitsubishi 3D47M	BK07H	2
Audio Technica ATN93	JX35Q	12	Mitsubishi 3D48M	FV24B	17
Audio Technica ATN3400	BK07H	2	Mitsubishi 3D56M	JX35Q	12
Audio Technica ATN3401	JX27E	2	Mitsubishi 3D57M	JX35Q	12
Audio Technica ATN3410	JX27E	2	Nagaoka MP5	JX31J	14
Audio Technica ATN3450	JX27E	2	Nagaoka N51	JX32K	33
Audio Technica ATN3451E	BK07H	2	Nagaoka 321B	FV23A	10
Audio Technica ATN3472E	JX35Q	12	NEC LP60D	FV24B	17
Audio Technica ATN3472	JX35Q	12	NEC LP335D	BK07H	2
Audio Technica ATN3600	FG94C	19	NEC LP5100D	FV28F	18
Audio Technica ATN3609L	FG94C	19	NEC 305M	JX22Y	16
Audio Technica ATN3601	FG94C	19	Onkyo DN31	HR74R	4
Audio Technica ATN3651	FG94C	19	Onkyo DN52	BK07H	2
Audio Technica ATN3651E	FG94C	19	Onkyo DN61	FG94C	19

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
BSR ST16	HR47B	3	Onkyo DN63	FG94C	19
BSR ST17	HR47B	3	Onkyo DN107	FV24B	17
BSR ST20	HR74R	4	Panasonic (National/Technics) EPS-P30	JX24B	9
BSR ST21	HR74R	4	Panasonic (National/Technics) EPS-P33	JX24B	9

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
C.E.C. (Chuo Denki) N103	JX35Q	12	Panasonic (National/Technics) EPS13	JX26D	15

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Columbia (Denon) DSN66	JX31J	14	Panasonic (National/Technics) EPS24CS	JX25C	8
Columbia (Denon) DSN68	JX34M	20	Panasonic (National/Technics) EPS27CS	JX25C	8
Columbia (Denon) DSN72	FG94C	19	Panasonic (National/Technics) EPS28CS	JX25C	8

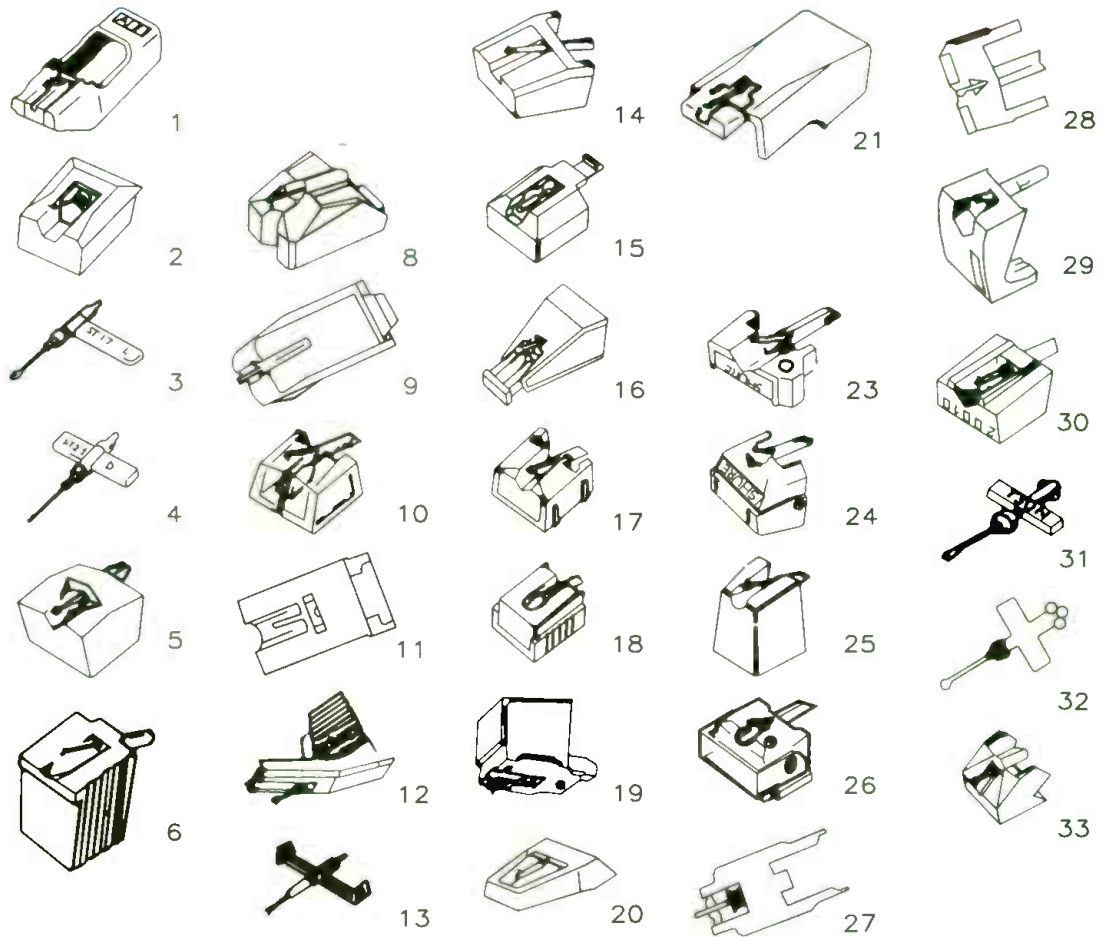
Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Dual DN235	FG94C	19	Panasonic (National/Technics) EPS31CS	JX25C	8
Dual DN239	FG94C	19	Panasonic (National/Technics) EPS41	JX26D	15
Dual DN360	FV33L	24	Panasonic (National/Technics) EPS43	FG94C	19
Dual DN450	JX35Q	12	Panasonic (National/Technics) EPS51CS	JX25C	8

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Fisher ST29D	JX32K	33	Panasonic (National/Technics) EPS53CS	JX25C	8
Fisher ST35D	JX27E	2	Panasonic (National/Technics) EPS56CS	JX25C	8
Fisher ST37LD	JX22Y	16	Panasonic (National/Technics) EPS71CS	JX35Q	12
Fisher ST44J	JX35Q	12	Panasonic (National/Technics) EPS75	JX27E	2
Fisher ST55D	JX32K	33	Panasonic (National/Technics) EPS77	JX27E	2

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Goldring G800	HR48C	5	Panasonic (National/Technics) EPS91SMAD	JX35Q	12
Goldring G800H	HR77J	5	Panasonic (National/Technics) EPS270	FV23A	10
Goldring G850	HR49D	6	Panasonic (National/Technics) EPS430ES	JX25C	8

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Hitachi DS-ST7	HR99H	21	Philips GP209	JX34M	20
Hitachi DS-ST12	JX35Q	12	Philips GP371	FV24B	17
Hitachi DS-ST14	JX35Q	12	Philips GP499	BK07H	2
Hitachi DS-ST18	JX35Q	12	Piezo YM818	JX31J	14
Hitachi DS-ST35	BK07H	2			
Hitachi DS-ST36	BK07H	2			
Hitachi DS-ST110	HR61R	25			
Hitachi HF110	HR61R	25			

Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Jeico MC45	JX35Q	12			
Jeico ND-45D	JX35Q	12			



Model	Order Code	Diagram Number	Model	Order Code	Diagram Number	Model	Order Code	Diagram Number	Model	Order Code	Diagram Number
Pioneer PN-K65	JX22Y	16	Sharp STY104	FV28F	18	Sony ND15G	YX27E	26	Toshiba N15C	JX34M	20
Pioneer PN-K75	JX22Y	16	Sharp STY114	FV28F	18	Sony ND25E	YX27E	26	Toshiba N16D	JX32K	33
Pioneer PN250	JX35Q	12	Sharp STY117	FV24B	17	Sony ND50D	YX27E	26	Toshiba N50C	FG94C	19
Pioneer PN290	JX23A	11	Sharp STY118	JX27E	2	Sony ND80D	YX27E	26	Toshiba N51D	JX32K	33
Pioneer PN295	JX35Q	12	Sharp STY123	FG94C	19	Sony ND110D	BK07H	2	Toshiba N60DY	BK07H	2
Pioneer PN300T	JX23A	11	Sharp STY130	BK07H	2	Sony ND138G	BK07H	2	Toshiba N61C	JX26D	15
Pioneer PN305	JX35Q	12	Sharp STY131	JX35Q	12	Sony ND143G	N710	1	Toshiba N70DY	BK07H	2
Ronette MPC7	FV24B	17	Sharp STY132	FV22Y	13	Sony ND145G	BK19V	29	Toshiba N71D	BK07H	2
Ronette RC2/4	HR74R	4	Sharp STY141	FG94C	19	Sony ND147G	BK19V	29	Toshiba N243	JX27E	2
Sansui SN-P313	JX35Q	12	Sharp STY143	JX31J	14	Sony ND150G	BK19V	29	Toshiba N293DY	JX27E	2
Sansui SN-P515	JX35Q	12	Sharp STY145	JX34M	20	Sony ND150P	BK19V	29			
Sansui ST34D	FV24B	17	Sharp STY146	JX34M	20	Sony ND155G	BK19V	29			
Sanyo STC20	FG94C	19	Sharp STY147	JX31J	14	Stanton D5100	BK19V	29			
Sanyo ST-G5D	FG94C	19	Sharp STY149	JX31J	14	Stanton D5100E	BK19V	29			
Sanyo ST-G6	FV22Y	13	Sharp STY1717	HR99H	21	Stanton D5107A	BK19V	29			
Sanyo ST-G10	JX31J	14	Shure N75ED	FV30H	23	Stanton D5107AL	BK19V	29			
Sanyo ST-G11	JX31J	14	Shure N95ED	FV33L	24	Stanton D5107E	BK19V	29			
Sanyo ST-G33	JX34M	20	Sonotone V100	HR61R	25	Stanton D5110	BK19V	29			
Sanyo ST3	JX26D	15				Teleton RP150	FV24B	17	Trio N52	BK07H	2
Sanyo ST5D	JX26D	15							Trio N63	JX35Q	12
Sanyo ST29D	JX32K	33									
Sanyo ST35D	JX27E	2									
Sanyo ST37LD	JX22Y	16									
Sanyo ST41J	JX27E	2									
Sanyo ST42D	BK07H	2									
Sanyo ST44J	JX35Q	12									

Order Code	Type	Price each
JX33L	ADC-R-SQ3011	£8.99
BK07H	Audio Tech ATN3400	£8.99
HR47B	BSR ST17	£2.79
HR74R	BSR ST21	£2.79
HR77J	Goldring D110H	£6.49
HR48C	Goldring D110SR	£6.49
HR49D	Goldring D120SR	£6.49
JX25C	Nat-Pan EPS24CS	£8.99
JX24B	Nat-Pan EPSP30	£7.99
FV23A	Panasonic EPS270	£9.49
JX23A	Pioneer PN290	£7.99
JX35Q	Pioneer-PN305	£8.99
FV22Y	Sanyo ST-G6	£2.79
JX31J	Sanyo ST-G10	£7.99
JX26D	Nat-Pan Sanyo ST3	£7.99
JX22Y	Sanyo ST37LD	£11.99
FV24B	Sanyo ST48D	£8.99

Order Code	Type	Price each
FV28F	Sharp STY104	£8.49
FG94C	Sharp STY123	£8.99
JX34M	Sharp-STY146	£5.99
HR99H	Sharp STY717	£5.99
FV30H	Shure N75-ED	£21.99
FV33L	Shure N95-ED	£25.99
HR61R	Sonotone V100	£7.99
YX27E	Sony ND15G	£8.99
JX29G	Sony ND143G	£11.99
JX30H	Sony ND150G	£8.99
BK19V	Stanton D5107AL	£13.99
FQ51F	Tenorel 2001D	£8.49
FQ52G	Tenorel 2001ED	£13.99
FV20W	Tetrad T30MD	£2.79
JX28F	Tetrad T50HD	£2.79
JX32K	Toshiba N15C	£8.99
JX27E	Toshiba N243	£8.99

CD Carrying Box



A compact disc storage/carry box in the same style as the cassette boxes. Will take 15 single discs or 3 double disc packs with 8 singles. Dimensions 295 x 150 x 150mm.

Order Code	Type	Price each
ZA84F	CD Carry Box	£3.99

Stack-A-Tier Storage System



A very versatile storage system for CDs, computer game cartridges, video cassettes and audio cassettes. By assembling the rack with the shelf supports in various positions, the system can hold up to 56 CDs, or 34 audio cassettes, or 9 video cassettes in film cases (10 in slip cases) or various combinations of each. The rack is stackable, up to a recommended maximum of three high, and can be expanded horizontally, simply by placing units side by side. Supplied flat packed for easy carriage, the unit can be assembled to your requirements by means of straightforward push-fit joints. Overall assembled dimensions: 325(H) x 340(W) x 138(D)mm. Colour: black.

Order Code	Type	Price each
MJ13P	Stack-A-Tier	£6.99

CASSETTE ROTA-RACK DOUBLE

An attractive transparent smoke grey plastic cassette rack that revolves on a circular base. Has two tiers holding a total of 40 cassettes or 64 cassettes without their library boxes. When fully loaded, the rack requires a space of 250mm diameter to revolve in and the height is 265mm. Supplied in a neat flatpack and easily assembled.

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AUDIO TERMS

Wow and Flutter - These are speed fluctuations, that are normally associated with turntables and tape recorders, and produce a 'wavering' or 'quivering' effect on the sound - a very noticeable effect on piano. Fortunately, CD players are virtually free of wow and flutter, but tape transport systems can obviously be affected by wow and flutter in both record and playback. Fluctuations in sound, below about 6Hz are called wow, and fluctuations from about 6Hz to 20Hz are called flutter.

Harmonic Distortion - Regardless of how well an amplifier circuit has been designed, there will always be odd or even harmonics produced that were not present in the input signal. These harmonics combine with the original input signal and produce distortion - normally a result of the system being non-linear. The distortion is normally quoted as a percentage and is the ratio of the root mean square (r.m.s) voltage of the total harmonics in the output signal to the total r.m.s voltage of the input signal.

Intermodulation Distortion - This is the result of a low frequency signal modulating a high frequency signal in an amplifier.

CASSETTE CARE PRODUCTS

NOTE: All cassette care products can be successfully used with computer cassette players and car cassette players.

Safeclene

A tape drive cleaning fluid with an internationally approved solvent for cleaning delicate equipment. It is used with Safewipes and Safebuds for cleaning tape drives. It will dissolve light oil and grease, and leaves no residue and will not affect sensitive plastics. Supplied in 300gm aerosol can.



Order Code	Type	Price each
DM80B	Safeclene Plus	£8.99

Head Cleaner Cassette TDK



This head cleaner is a non-abrasive, simple to use head cleaner that effectively removes harmful oxide accumulations from cassette deck heads. It will help to maintain optimum sound quality and peak operating performance from virtually any cassette deck.

Order Code	Type	Price each
KR07H	Head Cleaner	£1.99

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Cassette Head Cleaner and Demagnetiser

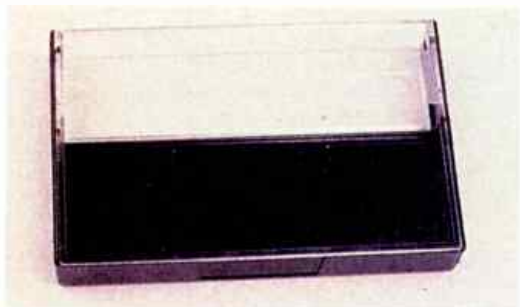
Incas



This cassette contains a special cleaning tape and also incorporates a revolving magnet which quickly demagnetises the tape heads as well as cleaning them. The cassette is supplied with a bottle of head cleaning fluid

Order Code	Type	Price each
YW89W	Cassette Cln & Demag	£1.99

Library Cases



Empty plastic library cases for single or double cassettes.

Order Code	Type	Price each
RB03D	Cassette Case Single	38p
JK64U	Cassette Case Double	60p

Cassette Fast Winder

Bib



The cassette tape winder enables you to wind tape quickly by hand whilst listening to another tape. Suitable for a battery player/recorder, because battery consumption is high when rewinding. The rewind time for a C90 tape is 60 seconds – faster than most recorders! The winder comprises a stowable handle attached to a large gear wheel that drives a hexagonal shaft through a pinion. The gears are housed in a tough plastic housing.

Order Code	Type	Price each
RT57M	Fast Tape Winder	£3.99

Cassette Carrying Boxes



Stylish cassette carrying boxes made from black plastic. The small box will hold 12 cassettes and the large box 24 cassettes.

Dimensions, small box 295 x 75 x 130mm, large box 295 x 75 x 250mm.



Order Code	Type	Price each
XM95D	Small Cas Box	£1.99
XM96E	Large Cas Box	£3.49

TOP QUALITY PRODUCTS AT SUPER LOW PRICES!

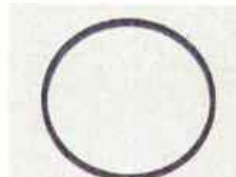
SPARE PARTS FOR CASSETTE RECORDERS

Walkman-Type Drive Belts

Two good quality drive belts for use with Walkman-type cassette recorders. The following sizes are both available with a square cross-section.

Diameter	Cross-section
26mm	1mm ²
30½mm	1mm ²

Order Code	Type	Price each
FD44X	Drive Belt 26mm	48p
FD45Y	Drive Belt 30.5mm	48p



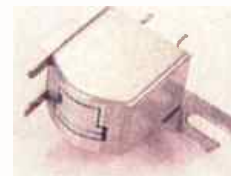
Cassette Player Drive Belts

A range of good quality drive belts for use with cassette recorders. All belts have a square cross-section of 1.2mm². The following sizes are available: 19mm, 30mm, 35mm, 46mm, 57mm, 66mm, 70mm, 75.5mm, 83mm, 90mm, 100mm and 110mm.

Order Code	Type	Price each
FD36P	Drive Belt 19mm	48p
FD37S	Drive Belt 30mm	48p
FD38R	Drive Belt 35mm	48p
YX76H	Drive Belt 46mm	48p
YX77J	Drive Belt 57mm	48p
YX78K	Drive Belt 66mm	48p
RK99H	Drive Belt 70mm	48p
YX79L	Drive Belt 75.5mm	48p
FD39N	Drive Belt 83mm	48p
YX80B	Drive Belt 90mm	48p
FD40T	Drive Belt 100mm	48p
FD41U	Drive Belt 110mm	48p

Cassette Tape Heads Stereo Sendust

A long life very high quality sendust cassette tape head with standard fixing bracket. Designed for use on stereo cassette recorders as the record and/or playback head. Has tape guide fitted.



Specification	
DC Resistance:	280Ω
Impedance:	1KΩ at 1kHz
Record current:	41μA (at 333Hz)
Bias current:	450μA at 80kHz
Playback sensitivity:	330μV at 333Hz (-68dB ±2dB)
Dimensions of head:	Width: 10.5mm Depth: 15.5mm Height: 8.5mm
Bracket fixing centres:	17-19mm x M2 clear

Order Code	Type	Price each
FQ63T	Stereo Cassette Head	£25.49

Standard Mono

A standard quality replacement cassette tape head with standard fixing bracket. Designed for use on mono cassette recorders as the record and/or playback head. Has tape guide fitted.



Specification	
DC Resistance:	250Ω
Impedance:	550Ω at 1kHz
Record current:	56μA
Bias current:	720μA at 50kHz
Playback sensitivity:	550μV at 330Hz
Dimensions of head:	Width: 11mm Depth: 12.6mm Height: 8.5mm
Bracket fixing centres:	17mm x M2 clear

Order Code	Type	Price each
FQ64U	Mono Cassette Head	£5.99



01702 554161

Erase

A standard quality replacement cassette tape head with standard fixing bracket. Designed for use on mono or stereo cassette recorders as the erase head. Has tape guide fitted.



Specification

DC Resistance: 5.2
 Impedance: 130Ω at 100kHz
 Erase current: 50mA
 Dimensions of head: Width: 10.5mm
 Depth: 12.4mm
 Height: 9.2mm
 Bracket fixing centres: 15.5mm x M2 clear

Order Code	Type	Price each
FQ66W	Cassette Erase Head	£3.99

Standard Stereo

A standard quality replacement cassette tape head with standard fixing bracket. Designed for use on stereo cassette recorders as the record and/or playback head. Has tape guide fitted.



Specification

DC Resistance: 220Ω
 Impedance: 850Ω at 1kHz
 Record current: 35μA
 Bias current: 350μA at 50kHz
 Playback sensitivity: 250μV at 333Hz
 Dimensions of head: Width: 11mm
 Depth: 12.6mm
 Height: 8.5mm
 Bracket fixing centres: 17mm x M2 clear

Order Code	Type	Price each
FQ65V	Stereo Cassette Head	£7.49

Fax your orders to:
01702 553935

CASSETTE TAPES

Micro Cassettes

TDK



A micro cassette for dictation machines and compact Micro Cassette players. The D-MC60 is a TDK ferric-oxide tape ideal for speech and general purpose use including music, total playing time 60 minutes.

Order Code	Type	Price each
CT40T	D Micro MC-60	£2.49

TDK Cassette Tapes

Presenting an extensive range of top quality audio cassette tapes selected from one of the world's leading manufacturers of magnetic tape. The different grades of ferrous/normal, chrome-dioxide and metal formulated cassette tapes we have available are as follows.

Oxide	TDK Type	Stock Code
Normal	D-60	CT02C
	D-90	CT03D
	AD-90	CT09K
	AR-90	KR02C
CrO ₂	SA-60	CT23A
	SA-90	CT24B
	SA-X60	CT26D
	SA-X90	CT27E

Normal



Cassette tapes utilising a fine-grained ferric-oxide coating for high sensitivity and minimum background noise. The D type is an ideal low cost choice for general purpose usage with consistently good performance. The AD type offers improved high frequency response with lower background noise, and the AR has non-porous NP ferric particles which combine excellent MOL with low noise. All types available with total playing times of 90 minutes and some with 60 minutes.

CrO₂



Chrome-dioxide tapes provide a frequency response, dynamic range and signal-to-noise ratio much superior to ferric-oxide tapes. Cassette shells are precision injection moulded for best phase characteristics. Types SA will accept high recording levels over the full audio band providing high output with very low inherent tape noise. The SA-X types offer an even better signal-to-noise ratio and crystal clear clarity. Both types available in 60 and 90 minute sizes.

Order Code	Type	Price each
CT02C	TDK D-60	98p
CT03D	TDK D-90	£1.28
CT09K	TDK AD-90	£1.55
KR02C	TDK AR-90	£1.75
CT23A	TDK SA-60	£1.75
CT24B	TDK SA-90	£2.15
CT26D	TDK SA-X60	£2.10
CT27E	TDK SA-X90	£2.45

VIDEO CASSETTES

TDK Range of Video Cassettes for VHS, VHS-C and 8mm



A range of very high quality VHS tapes using TDK's 'Super Avilyn' technology. The HS-E180 is recommended for regular daily use and time-shift recording. Its high energy formulation ensures better pictures and sound. Increased efficiency 'Super Avilyn' magnetic particles, individually encapsulated in

the new TDC (Three Dimensional Binder) ensures higher image quality and durability. The E-HG E180 extra high grade is recommended for long play



(6 hours), camcorder and library building. High packing density, ultra fine 'Super Avilyn' particles, achieved through the latest in particle surface control and orientation

technology, has created a high grade tape approaching professional quality. The Hi-Fi E180 extra high grade tape, with its tough TDC binder, super smooth base film and extra low drop-out performance, is recommended for music and stereo broadcasts. When only the best will do, camcorders, editing, mastering and all professional applications, the HD-X PRO E180 is the answer – the ultimate in VHS performance.

For VHS-C applications the E-HG EC45 tape is available and the 'Super Finavix' metal particle HS-100 is for use in 8mm equipment.

Tape	Total Playing Time (normal play)
HS-E180	3 hrs
E-HG E180	3 hrs (6 hrs LP)
Hi-Fi E180	3 hrs
HD-X Pro E180	3 hrs
E-HG EC45	3/4 hr
HS-100	1 hr 40 mins (3 hrs 20 mins LP)

Order Code	Type	Price each
KR03D	TDK HS-E180	£3.49
KR04E	TDK E-HG E180	£4.49
KR05F	TDK Hi-Fi E180	£4.99
KR06G	TDK HDX Pro E180	£9.99
BU68Y	TDK E-HG EC45	£4.99
BU69A	TDK HS-100	£6.99

VIDEO ACCESSORIES

Tape Head Cleaner Aerosol

Removes contaminants from all magnetic tape heads, including critical video recording heads. Ensures peak response and best quality reproduction. It is electrically inert and safe in contact with all paints, rubbers and plastics. Leaves no residue.



Supplied in 100ml aerosol can.

Order Code	Type	Price each
DM81C	Tape Head Cleaner	£5.75

Video Tape Head Cleaning Tools

Optum

A pack of five specially shaped tools for reaching the head in video cassette recorders. The probe tip is covered with a special material which will quickly clean the delicate precision head.



Order Code	Type	Price each
YN99H	Video Head Cleaner	£1.16

Wet/Dry Video Head Cleaning Tape



If there is one form of tape recording machine that is exceptionally fussy about tape head cleanliness, it must be the home video recorder. Because the video head has to be able to record or playback signals on video tape at frequencies bordering on the limits of tape recording as a medium (typically 6MHz), even moderate deposits of dirt and grime can be sufficient to cause enough drop-out so as to lose the picture entirely.

These video head cleaner cassettes contain a blue fibre tape into which cleaning fluid slowly permeates. The cleaning fluid is dripped into a hole in the top of the cassette. The cassette is then played in the machine for 10 to 20 seconds during which time the fluid will act on the video head drum and all other heads and tape guides. After a few seconds the cleaning fluid is used up and the remaining tape then dries the components. The tape may then be rewound and reused. Do not use more often than necessary; about once every 20 to 30 hours is sufficient. Available for VHS systems only.

Order Code	Type	Price each
FV39N	VHS Video Head Clean	£4.99

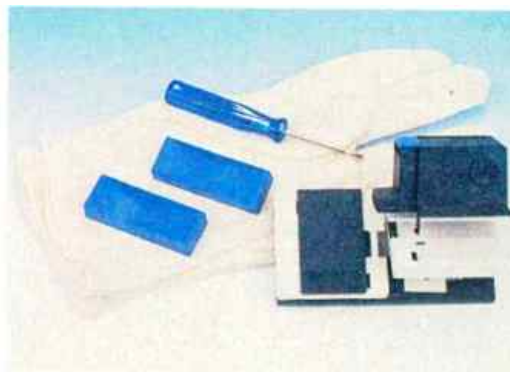
Tape Head Cleaning Fluid

An 18cc bottle of specially formulated cleaning fluid for use with the cleaning tools and as a replacement for the fluid supplied with the Head Cleaner Tapes.



Order Code	Type	Price each
FS88V	Head Cleaner Fluid	75p

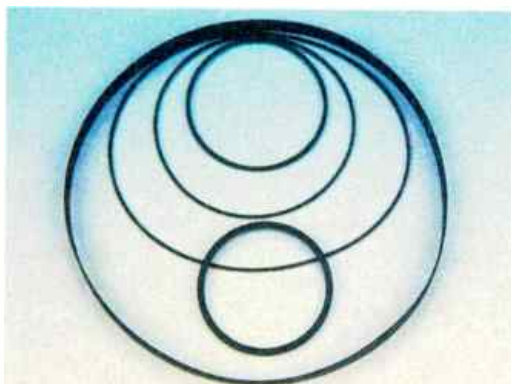
Automatic Video Cassette Tape Splicer



A very easy-to-use video cassette tape splicer which automatically dispenses a piece of pre-cut splicing tape onto the precise position of the tape join. Extremely detailed instructions are supplied showing how to repair the sort of typical damage that can be inflicted on VHS and Beta cassettes. The splicer is supplied with a screwdriver for dismantling cassettes; tape spool holders; a pair of gloves; and two spare blades. Replacement splicing tape cartridges are available.

Order Code	Type	Price each
YP60Q	Auto Video Splicer	£18.99
FS63T	Vid Splicer Cartridge	£2.49

Video Recorder Drive Belts



A range of kits each containing a complete set of replacement drive belts for the most popular video recorders.

Type	Use with Video Recorders type
HR3300	JVC HR3300/3320/3330/3600; Ferguson 3292; Baird 3V22
	JVC HR3360/3660; Ferguson 3V16; Telefunken VR440
NV7000	Panasonic NV7000
VTC9300	Sanyo VTC9300/9500; Fisher VRS7000

VC7300	Sharp VC7300/7700
VC9300	Sharp VC9300
SLC7	Sony SL-C7/J7/C5
VCR4600	Amstrad VCR4600
VCR6000	Amstrad VCR6000
3V29	Ferguson 3V29
3V35	Ferguson 3V35
VX611	Hinari/Saisho VX611
VT11	Hitachi VT11
NN333	Panasonic NN333
NNG10	Panasonic NNG10

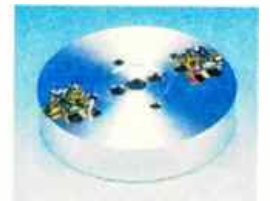
Order Code	Type	Price each
FJ06G	Video Belts HR3300	£2.99
FJ12N	Video Belts NV7000	£2.49
FJ10L	Video Belts VTC9300	£2.99
FD51F	Video Belts VC7300	£2.49
FD52G	Video Belts VC9300	£2.49
FJ08J	Video Belts SLC7	£2.99
MJ28F	Video Belts VCR4600	£2.99
MJ29G	Video Belts VCR6000	£2.99
MJ30H	Video Belts 3V29	£2.99
MJ31J	Video Belts 3V35	£2.99
MJ32K	Video Belts VI611	£2.99
MJ33L	Video Belts VT11	£2.99
MJ34M	Video Belts NV333	£2.99
MJ35Q	Video Belts NVG10	£1.99

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Video Recorder Replacement Heads

Replacement video heads for some of the most popular VCR mechanisms. The range of available heads for specific VCRs are shown as follows.

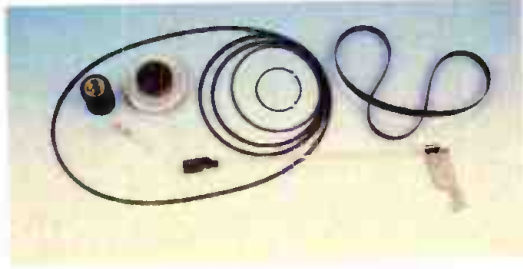


Type	Video Recorder
VCR4600	Amstrad VCR4600
VCR6000	Amstrad VCR6000
3V29	Ferguson 3V29
3V35	Ferguson 3V35
FV11	Ferguson FV11
VX611	Hinari/Saisho VX611
VT11	Hitachi VT11
NV333	Panasonic NV333
NVG10	Panasonic NVG10
VC9300	Sharp VC9300

Order Code	Type	Price each
MJ18U	Video Head VCRH600	£24.99
MJ19V	Video Head VCR6000	£24.99
MJ20W	Video Head 3V29	£14.99
MJ21X	Video Head 3V35	£14.99
MJ22Y	Video Head FV11	£29.99
MJ23A	Video Head VI611	£29.99
MJ24B	Video Head VT11	£24.99
MJ25C	Video Head NV333	£14.99
MJ26D	Video Head NVG10	£29.99
MJ27E	Video Head VC9300	£24.99

Video Recorder Service Kits

Complete service kits for some of the most popular VCRs; each kit comprises a set of belts, pinch roller, replacement friction clutch assembly, LED tape leader sensor lamp and back-tension brake band.



Type	Video Recorder
VCR6000	Amstrad VCR6000
3V29	Ferguson 3V29
3V35	Ferguson 3V35
FV11	Ferguson FV11
VT11	Hitachi VT11
NV333	Panasonic NV333
NVG10	Panasonic NVG10
VC9300	Sharp VC9300

Order Code	Type	Price each
MJ37S	Service Kit VCR6000	£19.99
MJ38R	Service Kit 3V29	£19.99
MJ39N	Service Kit 3V35	£19.99
MJ40T	Service Kit FV11	£14.99
MJ41U	Service Kit VT11	£24.99
MJ42V	Service Kit NV333	£16.99
MJ43W	Service Kit NVG10	£14.99
MJ44X	Service Kit VC9300	£16.99

Cassette Adaptor

This cassette adaptor will prove to be a handy tool for advance viewing of those camcorder takes. This adaptor will accept any VHS-C format compact video cassette tapes for recording or playback and fits into a standard VCR. The adaptor is constructed of durable plastic and metal, and in use, the top cover is slid back to accept a VHS-C tape and then closed. To play, the adaptor is placed into the VCR and used in the normal way as for a standard cassette.



Order Code	Type	Price each
RT59P	VHS-C Adaptor	£14.99

VIDEO ENHANCERS

Note that all video enhancers operate in the 0 to 6MHz video frequency range, *not* at UHF frequencies. They cannot be used in aerial leads or connected to the aerial input of a TV set. However, they can be used on TV monitor inputs if your TV set has one of these. Normally they would be connected between two video recorders. Enhancers are designed to minimise generation loss when dubbing or to improve sharpness and detail for viewing, but they will *not* provide better copies than originals!

Video Colour Processor

This quality video colour processor allows the user to correct colour saturation and contrast from a camcorder or VCR. The unit features a gain control for improving the image when shooting under low-light



conditions, a colour control to provide colour compensation for improved colour saturation, plus editing facilities in the form of video and audio fade controls. A fade bypass/on slide switch is also provided. Phono sockets are provided to allow input from a camcorder and an output to a VCR. When in use the video recording is monitored by connecting a TV to the VCR. Requires a 12V DC 200mA mains adaptor (XX09K).



Specification		
Video		
Input level:	0.8V to 1.5V (p-p)	
	1.0V p-p nominal	
Input impedance:	75Ω	
Output contrast level:	Unity ±1dB	
	-40dB to +4dB adjustable	
Output colour level:	-40dB to +4dB adjustable	
Output impedance:	75Ω	
Audio		
Input impedance:	100kΩ internally adjustable	
Output level:	Unity to -60dB	
Signal to noise ratio:	70dB	
THD:	0.01%	
Dimensions:	225 x 120 x 45mm	
Weight:	332g	
Order Code	Type	Price each
CC02C 31	Video Colour Proc	£42.99

Video Enhancer with Sharpness Control



A video/audio controller designed to improve the TV picture quality when dubbing or playing back home video, and is instrumental in improving poor recordings. A recording can be made on two VTR's at the same time, while audio can be recorded in stereo, or left and right channels may be combined for recording in a mono system VTR. On playback the VTR can transmit to a remote TV monitor via 75Ω coaxial cable up to 100 metres in length, without degrading picture quality. Controls are provided for the adjustment of contrast and sharpness for optimum results. A filter will eliminate noise in the ALC circuit caused by repeated dubbing operations. Requires 1 PP3 battery (supplied), or an external 9V supply via a DC input jack socket. See note above.

Order Code	Type	Price each
XG59P E1	Video Enhancer VH607	£52.99

Video Enhancer/Editor



This high quality home video enhancer/editor, with stereo sound, ideal for editing, processing and enhancing home videos, quickly and easily whilst adding an extra sound track and narration. The unit is provided with three sound channels to allow mixing of the original sound track with music and narration, plus a master control to set overall audio output, which can be monitored on two VU meters. The unit has sockets for connecting inputs from a camcorder, VCR or laser video player, CD player, tape deck, radio cassette or microphone, and connecting outputs to a VCR and headphones. The video can be monitored via the VCR. Other features include video enhancer controls for sharpness, contrast and brightness, switched enhancer bypass and a stereo/mono selector. The unit is supplied with a microphone, interconnection leads, mains adaptor and instructions.

Specification		
Audio		
Audio input sensitivity		
Microphone:	-60dB 600Ω	
Music:	-10dB 50kΩ	
VCR Audio:	-10dB 47kΩ	
Audio output level(Master VR):	0dB ±2dB 5kΩ	
Audio frequency response:	40Hz to 14kHz ±1dB	
Signal to noise ratio:	>40dB	
Channel separation:	>25dB	
Video input:	1.0V (pk-to-pk) 75Ω	
Video output - bypass:	1.0V (pk-to-pk) 75Ω	
- enhancer:	0.6V to 1.2V ±0.2V (pk-to-pk)	
Power required:	12V DC 500mA (supplied)	
Operation temperature:	0°C to 40°C	
Dimensions:	250 x 160 x 48mm	

Order Code	Type	Price each
MJ09K C3	Video Processor	£59.99

CALL CASHTEL NOW PHONE 01702 552941

VIDEO PROCESSOR WITH SPECIAL EFFECTS

NEW



Now you can create exciting home videos with this superb video editing processor. The processor has a wide range of diverse video effects including fade in/out and over 30 wipe patterns which allows you to cut and mix images from two different sources (i.e. a video recorder and camcorder) to enhance your videos. The fade in/out can be from a black and white or colour background. The borders of the wipe pattern can have a 'halo' effect which can be varied from sharp to a very soft focus. Similarly, the pattern angle can be varied from horizontal to vertical. In addition, there is a built-in stereo audio mixer which features three stereo inputs. This allows the audio output from the camcorder to be mixed with background music and a voice over. The audio master volume adjusts the volume of the over-all mix – an LED stereo bargraph is provided to assist in setting the master volume control. The video master control adjusts the fade under 'fade' mode, or the wipe pattern position on screen under 'wipe' mode. A microphone jack socket is provided for an external microphone for commentaries and voice overs.

A headphone output allows the audio mix to be monitored via headphones. A black and burst output provides synchronising pulses to cameras, VCRs and time base correctors (TBC) that can accept such information. A 'genlock' switch is provided to select operation with a genlock source. For normal use this will be operated in the normal position. Dimensions 380 x 250 x 65mm. Requires an external 12V DC supply.

GREAT VALUE!
£199.99
 RJ90X
 [E6]

2.2 Inch Pocket LCD Colour TV



This pocket sized colour TV uses the latest state-of-the-art LCD and SMT technology to give you a crystal clear colour picture on its V56mm flat LCD display, with electro-luminescent backlight. Measuring just 138 x 81 x 38mm and weighing 350g, it has electronic auto search tuning with an on screen tuning indicator and a telescopic aerial. Other controls are ON/OFF, volume, brightness and colour, and a channel recall button. The internal loudspeaker gives good quality sound reproduction and for private listening a headphone jack socket is provided. There are also inputs for an external aerial and 6V DC from a special mains adaptor or car adaptor. Power requirements, 4 off AA sized alkaline cells (FK64U), battery life is approximately 3 hours. Supplied with 4 test batteries (1 hour life) and a soft case. TV is compatible with UK standard PAL transmissions.

Order Code	Type	Price each
YT76H A1	Casio TV-470	£99.99

Video Camera Colour Monitor Adaptor



An innovative adaptor kit for use with Casio LCD Colour TV's, which allows them to be used as a monitor on a colour video camera. The adaptor kit contains a swivel bracket, shoe mount, inter-connecting lead, two cable adaptors and a small cross point screwdriver. Now at last, recordings can be monitored in full colour.



Order Code	Type	Price each
YT82D A1	Casio OS51 Attach	£34.99

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Casio TV-7100 Pocket Television

NEW!



Simulated picture

A compact 3.3in. miniature colour television, that fits neatly into your pocket, allowing you to watch your favourite programmes wherever you go. The unique tuning controls offer selection of channels 21 through to 68, with just two buttons. Press one button to tune up the band, and the other to tune down. Connections to the television include an external antenna socket, earphone jack, external power socket (9V DC) and an audio/video socket. A telescopic aerial is supplied with the unit, and gives good quality reception in almost every situation. Six AA batteries are required to power the unit or alternatively, an external power supply (not supplied). Approximately three hours viewing is possible from alkaline-manganese batteries.

Specification

Supply voltage: 9V DC
 Supply current: 1,400mA
 Power consumption: 6.5W
 Dimensions: 93 x 110 x 55mm (W x H x D)
 Weight: 440g (including batteries)

Order Code	Type	Price each
AQ78K A1	Pocket TV-7100	£199.99

LCD Colour TV Mains Adaptors

These AC mains adaptors allow Casio LCD Colour TVs to be operated off 240V AC mains, thus conserving internal battery life.

YT78K	Output: 6V DC
Input: 240V AC	
YT80B	Output: 9V DC
Input: 240V AC	



Order Code	Type	Price each
YT78K	Casio ADK65 Mains	£12.99
YT80B A1	Casio ADK90 Mains	£19.99

LCD Colour TV 12V Car Adaptors



These 12V car adaptors allow Casio LCD Colour TVs to be operated off 12V DC from a car cigarette lighter/accessory socket, thus conserving internal battery life.

YT79L	Output: 6V DC
Input: 12V DC	
YT81C	Output: 9V DC
Input: 12V DC	

Order Code	Type	Price each
YT79L	Casio CAK65 Car	£15.99
YT81C	Casio CAK90 Car	£15.99

SCART CONNECTORS

Scart Extension Leads

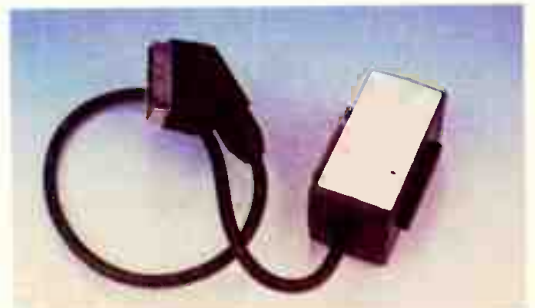


Three 1m long extension leads with 1 to 2-way, 1 to 3-way or 1 to 5-way adaptors, connecting a Scart plug at one end to two, three or five Scart sockets in a box 98 x 70 x 30mm, or 125 x 70 x 30mm, or 188 x

70 x 30mm respectively. The cable is a sleeved loom 10mm in diameter containing individually screened conductors where required. The lead is merely an extension and does not include any in/out line reversals; all pins on the plug connect directly to all equivalent pins in all sockets simultaneously. Use to connect two TVs to one VCR, etc. with the aid of twin plug connection leads (as above). Note that contention from more than one audio/video etc. outputs sharing one conductor must be avoided, but one output to two or more inputs is allowable. Colour black.

Order Code	Type	Price each
ZB29G	Scart Ext/Adaptor 2W	£8.99
AQ17T	Scart Ext/Adaptor 3W	£6.99
AQ18U	Scart Ext/Adaptor 5W	£9.99

21-way Peritel (SCART) Switchable 'T' Adaptor



This clever switched adaptor removes the need to keep unplugging and reconnecting your video recorder, satellite receiver, computer, video game and TV, depending on which you are using or watching, or want to record. The unit consists of a box which has two interconnected 21-way Peritel (SCART) sockets mounted on it, and a 45cm long output cable terminated in a 21-way plug, which can be switched to either of the two sockets, by means of a latching push-button switch, also mounted on the box. The adaptor is suitable for Composite Video and Stereo Audio, and internal diodes prevent function control conflicts. Uses include connecting a satellite receiver and a video recorder to a single TV, or viewing a video recorder/satellite receiver on two TVs simultaneously. Please note if one of the video sources has 12V on the switching line and the other source does not, then certain unwanted effects can result.

A suitable plug to plug cable for use with this adaptor is Peritel Connecting Cable, JW36P. Extension leads ZB29G and JZ26D are also suitable.

Order Code	Type	Price each
CC00A	SCART T-Adaptor	£9.99

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5

UNIVERSAL REMOTE CONTROL UNIT

The 'One for all 4' infra-red remote control unit is compatible with almost all TVs, Video Recorders, Satellite Receivers and Cable TV installations that use infra-red remote control units. It can be used as a replacement for lost or broken units, or to control up to four separate appliances, in any combination, removing the need for four separate infra-red remote control units.

Programming is straightforward and requires only four keystrokes plus your appliance's 3-digit code, which is listed in the comprehensive Instruction Guide and Code Book.

All the necessary codes are pre-programmed into this unit so, unlike similar universal remote units, there is no need to use the original remote units for programming.

The unit requires four AAA size alkaline batteries, such as FK63T or JY50E (not included). Overall dimensions: 190 x 62 x 15mm

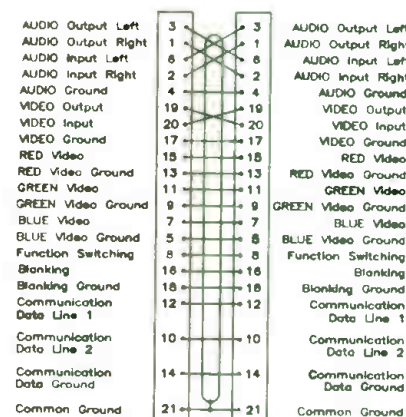


GREAT VALUE!
£29.99
MJ05F

Peritel (SCART) Plug to Plug Connecting Cable (Universal)



A 21-way Peritel (SCART) plug to plug connecting cable with all 21 pins connected for interconnecting video equipment, such as TV's, VCR's and computers. This cable provides connection for composite video, RGB video, blanking, stereo audio, data communication and function switching. Length (approx.) 1.5m. The diagram below shows the connections between the plugs.

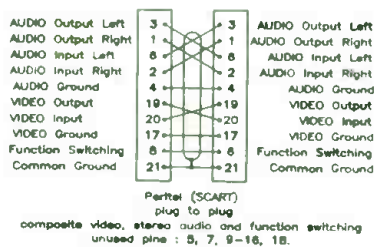


Order Code	Type	Price each
JW37S	Peritel Univsl Cable	£6.99

Peritel (SCART) Plug to Plug Connecting Cable (Composite Video & Audio)



A 21-way Peritel (SCART) plug to plug connecting cable for interconnecting video equipment, such as TV's and VCR's. This cable provides connection for composite video, stereo audio and function switching. Length (approx.) 1.5m. The diagram below shows the connections between the plugs. Please Note: this cable does not provide connections for Data Communication, RGB Video and Blanking signals, for applications requiring these connections use Universal Cable (JW37S).



Order Code	Type	Price each
JW36P	Peritel StAud&ComVid	£4.99

Peritel (SCART) Switching Unit

A switch box providing an easy method of coupling a TV up to three separate items of ancillary video equipment using Peritel (SCART) video and audio

connectors. With the TV plugged into the 'TELEVISION' outlet socket and set to the A/V or SCART input mode, any one of three inputs can be selected for viewing using the latch-button selector bank on the right-hand side of the front panel ('1', '2', '3'). These can be VCRs, satellite receivers, camcorders or computers having SCART standard composite video and sound output. The first two input sockets on the switch box are labelled 'VCR-1' and 'VCR-2', while the third is labelled 'VCR-3/SATELLITE/COMPUTER'.



In addition signals from either input socket 2 or 3 can be recorded by a VCR on socket 1 using the left-hand switch bank if required. Left and right audio output for Hi-Fi or stereo from the selected channel is also available via two output phono sockets.

The unit is housed in a black steel case with a non-slip foam base. Overall dimensions: 145(W) x 130(D) x 45(H)mm.

Order Code	Type	Price each
MK36P	Scart Switching Unit	£21.49

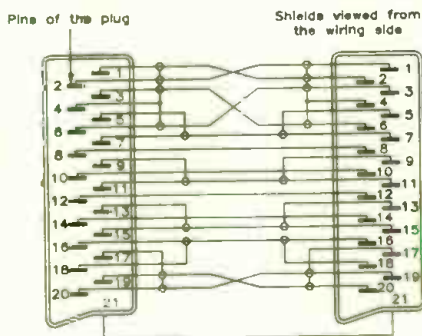


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Level B: Quality Assurance
RS12750



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Peritel (SCART) Plug to Peritel (SCART) Plug Connection Lead (Universal)



A 1.5m long connection cable for two items of equipment having the Peritel (SCART) style sockets. Comprises a right-angled plug at each end of a flat ribbon of individually screened conductors 32mm wide. Colour black. This cable provides connection for composite video, RGB video, blanking, stereo audio, data communications and function switching. Intended for use between VCR and TV with video and audio connections, colour monitor etc.

Order Code	Type	Price each
ZB28F	Scart to Scart Cable	£9.99

Peritel (SCART) Plug to Phono & BNC Plugs

A 21-way Peritel (SCART) plug to standard phono and BNC plug connecting cable, for interconnecting audio/video equipment fitted with mating phono plugs and BNC connectors. This cable provides connection to audio pins (left/right audio input and left/right audio output) and composite video pins (video input and



video output). Length: 1400mm. Please note that this cable does not provide any connections for Function switching, Data communication, RGB Video and Blanking signals.

Order Code	Type	Price each
CC04E	Scart - Phono Cable	£8.99

Mono Video Copying Kit

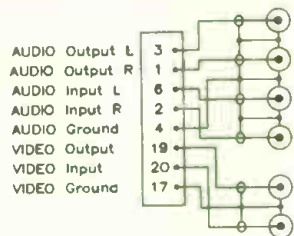


With the contents of this universal video kit you can make up to six different video leads plus six different audio connecting leads.

- | | |
|---------------|------------------------------------|
| Video BNC-BNC | 5 pin DIN plug to 5-pin DIN plug |
| BNC-UHF | 5-pin DIN skt to 2 phono plugs |
| UHF-UHF | Phono plug to phono plug |
| Phono-Phono | 5-pin DIN plug to 3.5mm jack plug |
| Phono-BNC | Phono plug to 3.5mm jack plug |
| Phono-UHF | 3.5mm jack plug to 3.5mm jack plug |

Order Code	Type	Price each
RK71N	Video Kopy Kit	£6.99

Peritel (SCART) Plug to Phono Plugs Connecting Cable



A 21-way Peritel (SCART) plug to phono plug connecting cable for interconnecting audio/video equipment fitted with phono connectors. This cable provides connection to audio pins (left & right audio input, left & right audio output) and composite video pins (video input, video output). Length (approx.) 1.5m. The diagram shows the connections between the plugs. Please Note: this cable does not provide connections for Function Switching, Data Communication, RGB Video and Blanking signals.

Order Code	Type	Price each
JW34R	Peritel-Phono Cable	£8.99

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Stereo Video Copying Kit



A universal connector kit for interconnecting audio/video equipment. The kit contains the following items: 2 off Peritel (SCART) Plug to 6-pin DIN socket with input/output switch, 2 off 6-pin DIN socket to 3 x phono plug (0.2m), 2 off 5-pin (180°) DIN plug to 2 x phono socket (0.2m), 6-pin DIN plug to 6-pin DIN plug (2m), phono plug to 2 x phono socket (0.15m), 8-pin mini DIN (360°) to 6-pin DIN socket, 2 off PL-259 to phono socket adaptor, 2 off BNC plug to phono socket adaptor, 2 off 3.5mm mono jack plug to phono socket adaptor. Please Note: this cable does not provide connections for Function Switching, Data Communication, RGB Video and Blanking signals.

Order Code	Type	Price each
JW35Q	Peritel Uni Conn Kit	£12.49

Did You Know?

Alan Dower Blumlein (1903 to 1942) was well known in the world of audio for his work on stereophonic sound. His scientific work is recorded in no less than 129 patents of which only a few are in the field of stereophonics. Part of his work described a means of recording two signals in the same record groove, which is the 45°-45° system that is used today. His other contributions cover wireless, telephony, television and radar. During World War II, he was at the forefront of airborne radar development, which proved to be a decisive factor in the Battle of Britain. Ironically, he died in a Halifax plane that crashed - the one that was used in the radar research.

SPEAKERS AND SOUNDERS

6

Anti-Acoustic Mounts	119	Earpieces	101	Piezo Sounders	96
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TRANSDUCERS Ultrasonic Transducers

Sting

A high sensitivity ultrasonic transmitter and receiver, sold only in pairs, for sending and receiving ultrasonic sound through the air, either as a continuous wave or pulses. Applications include burglar alarm systems, proximity switches, liquid level meters, anti-collision devices, counters for moving objects, TV remote control systems etc.



Characteristics

	T40-16 Transmitter	R40-16 Receiver
Sensitivity (dB)	17±6*	-56±6†
Resonant freq. (kHz)	40±1	40±1
Max. input (Vrms)	7	—
Impedance (Ω) approx	200	70k
Capacitance (pF) ±20%	1400	1400
Pulse rise time (msec)	2	0.5
Max input voltage, pulse operation:	60V p-p	—

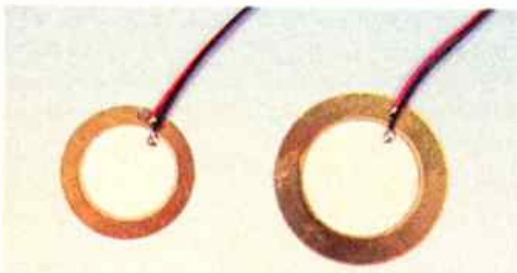
* 0dB = 1µBar/V/m

† 0dB = 1V/µBar with 47kΩ shunt.

Overall size 15mm dia x 12mm deep (connecting pins protrude a further 9mm) Pins are 10mm apart.

Order Code	Type	Price each
HY12N	Ultrasonic Transducer	£4.99

Piezo Transducers



These ceramic piezo transducer elements generate a range of audible tones and frequencies when energised by 3V peak square wave. They can be driven direct from CMOS IC's with low power consumption. They are supplied unmounted and with wires attached. Provided they are mounted rigidly in the prescribed manner, outputs of up to 90dB can be achieved. In addition to a wide range of applications where audible warnings or indications are preferred to visual, other uses include toys, clocks and watches,

calculators and electronic games, using the transducer in place of a speaker. Because there are no moving parts to wear out, these elements are reliable for use in professional, commercial and industrial applications. They withstand severe environmental conditions and prove durable in domestic appliances without causing r.f. interference. A range of different sizes is available.

Specifications

Piezo Transducer 27mm/1.8kHz

Resonant frequency:	1.8kHz ±0.5kHz
Impedance at resonance:	800Ω
Capacitance:	25nF ±30%
Maximum input voltage:	30V p-p
Operating temperature:	-20°C to +70°C

Piezo Transducer 27mm/4.2kHz

Resonant frequency:	4.2kHz ±0.5kHz
Impedance at resonance:	500Ω
Capacitance:	14nF ±30%
Maximum input voltage:	30V p-p
Operating temperature:	-20°C to +70°C

Piezo Transducer 35mm/2.8kHz

Resonant frequency:	2.8kHz ±0.5kHz
Impedance at resonance:	450Ω
Capacitance:	20nF ±30%
Maximum input voltage:	30V p-p
Operating temperature:	-20°C to +70°C

Piezo Transducer 35mm/2.8kHz with feedback electrode

Resonant frequency:	2.8kHz ±0.5kHz
Impedance at resonance:	450Ω
Capacitance:	19nF ±30%
Maximum input voltage:	30V p-p
Operating temperature:	-20°C to +70°C

Piezo Transducer 41mm/2.0kHz for speech

Resonant frequency:	2.0kHz ±0.5kHz
Frequency range:	750Hz to 20kHz
Impedance at resonance:	600Ω
Capacitance:	40nF ±30%
Maximum input voltage:	15V p-p
Operating temperature:	-20°C to +70°C

Piezo Transducer 50mm/2.8kHz

Resonant frequency:	2.8kHz ±0.5kHz
Impedance at resonance:	500Ω
Capacitance:	20nF ±30%
Maximum input voltage:	30V p-p
Operating temperature:	-20°C to +70°C
Nodal ring diameter:	34mm

Note: These transducers are supplied unmounted and with wires attached. If it is required to remove/reattach wires this must be carried out extremely carefully. Soldering to the silvered electrode must be done with the minimum of heat for a fraction of a second, or destruction of the silvering begins to occur.

The brass rim of the transducer acts as a heatsink and will require more heat, but the minimum of solder should be used. The transducers may be mounted to a surface using any suitable adhesive.

Order

Code	Type	Price each
YU87U	Piezo Xducer 27/1.8	30p
QY13P	Piezo Xducer 27/4.2	30p
YU85G	Piezo Xducer 35/2.8	35p
YU86T	Piezo Xducer 35/2.8F	45p
YU83E	Piezo Xducer 41/2.0S	49p
YU82D	Piezo Xducer 50/2.8	65p

Rubber Disc

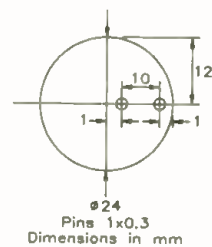
A rubber disc for use with the Piezo Transducers. Fitted over the transducer it can be tapped to produce either sounds or an electrical signal. 27mm diameter.



Order

Code	Type	Price each
QY16S	Rubber Disc 27mm	12p

PIEZO SOUNDERS PCB Mounting



A piezo electric sounder for direct mounting on pcb's. Two 1mm dia. holes are required 10mm apart.

Resonant frequency:	4kHz ±500Hz
Resonant resistance:	300Ω max.
Electrostatic capacitance:	17nF ±30%
Max. input voltage:	30V p-p
Nominal drive voltage:	10V p-p
Output at 10V p-p:	95dB @ 30cm
Size:	24mm dia. 5.5mm thick

Order

Code	Type	Price each
JH24B	PCB Piezo Sounder	75p

Very Low Profile Piezo Sounder

A piezoelectric sounder which can supply levels of over 100dB at a distance of 30cm, yet is only 4mm high. It can therefore be used wherever space is at an absolute premium. It requires an external driver which should operate on, or as near as possible to, the buzzer's resonant frequency of 5500 Hz. This source should present a maximum drive voltage of 30V peak-to-peak to the buzzer. 100mm lead-out wires with tinned ends are provided. Mounting lugs with 2.5mm holes are moulded into the buzzer's cream-coloured case.



Resonant frequency: 5500Hz ±500Hz
 Resonant resistance: 300Ω max.
 Electrostatic capacitance: 12000 pF (±30%)
 Sound output at 30cm: 103dB max.
 Height: 4mm
 Diameter: 23mm
 Length (lug tip to tip): 35mm
 Fixing centres: 29mm x 8BA/M2

Order Code	Type	Price each
KU57M	Low Profile Sounder	69p

Wire-Ended Piezo Sounder

A piezo electric sounder ideal for use in applications where space is at a premium owing to its small size.



Resonant frequency: 4.6kHz
 Electrostatic capacitance: 20nF
 Nominal drive voltage: 3 to 30V p-p
 Output at 10V p-p: 80dB @ 30cm
 Size: 31mm dia. x 8mm thick.
 Fixing centres: 35mm x 8BA/M2

Order Code	Type	Price each
FM59P	Min Piezo Sounder	72p

BUZZERS Miniature Buzzer

Sting

A miniature solid state buzzer featuring long life, high reliability, low current drain, no moving contacts, no arcing, no r.f. noise. It is small but with a clear penetrating sound.



Dimensions: 23 x 16.5 x 15.5mm deep.
 Fixing centres: 27.5mm x 8BA
 Overall length: 33.5mm.

Finished in cream plastic.
 Two types are available:

Specification	Type	Voltage range	Impedance	Frequency	Output at 30cm
6V	4 to 9V	240Ω	400Hz	75dB	
12V	9 to 20V	480Ω	400Hz	75dB	

Buzzers are for DC operation only and approx 100mm of lead attached is colour coded: Red – positive; Black – negative.

Order Code	Type	Price each
FL39N	Buzzer 6V	99p
FL40T	Buzzer 12V	99p

Round Buzzers

Sting



Small, round electronic buzzers similar in principle to the miniature solid state buzzers above, but louder. 6V and 12V types are available. Each buzzer measures 41mm across mounting lugs, 26.4mm diameter and 17.6mm high. Fixing centres 32mm.

Specification	Type	Voltage range	Current	Frequency	Output at 30cm
6V	4 to 9V	35mA	450Hz	80dB	
12V	9 to 20V	35mA	450Hz	80dB	

Order Code	Type	Price each
FK81C	6V Buzzer	£1.30
FK82D	12V Buzzer	£1.30

Low-profile PCB-mounting Buzzer

Sting

A miniature solid state, PCB mounting buzzer having a loud but pleasant 75dB tone and operating from a 12V DC supply. It is only 7mm high when mounted on the PCB. It will work with supply voltages ranging from 3 to 24V DC. Supply polarity is marked on the bottom of the case as an aid to installation. Two 2mm dia. holes are required 18mm apart. The case is finished in a cream colour.



Resonant frequency: 3.5kHz
 Operating voltage: 3 to 24V DC
 Current consumption at 12V: 5mA
 Sound output at 12V DC: 75dB at 30cm
 Temperature range: -20 to 70°C
 Diameter: 23mm
 Height (without leads): 7mm
 Lead length: 8mm

Order Code	Type	Price each
KU58N	PCB Buzzer	£1.15

DC-Operated Piezo Buzzer

Sting

An extremely loud PCB-mounting, piezoelectric buzzer designed to operate over a wide range of supply voltages. It has a built-in driver circuit and requires only a DC voltage to drive it. Working with a 24V DC supply voltage, this tiny unit can supply sound levels of over 95dB at a 30cm distance. The unit will operate well with 5V TTL voltages drawing only around 2mA. It will therefore make an excellent 'bell' or warning alarm for digital systems. Two 1.5mm dia. holes are required 16mm apart. The case is finished in a cream colour, and features a dot to indicate the side with the positive terminal.



Resonant frequency: 2700Hz ±500Hz
 Operating voltage: 3 to 24V DC
 Current at 12V DC: 10mA max.
 Sound output at 30cm: 90dB typical (12V DC)
 Operating temperature: -10 to 60°C
 Size, excluding pins: 16mm high x 24mm dia.
 Length of pins: 5mm

Order Code	Type	Price each
KU56L	DC Piezo Buzzer	£1.55

Wire-Ended Piezo Buzzer

Sting

A buzzer with a loud, clear, penetrating tone for use where direct pcb mounting is not convenient. The buzzer has two 3.5mm clear mounting holes 38mm apart, and two wires are provided for making the connection.



Resonant frequency: 2kHz ±500Hz
 Operating voltage: 3 to 15V DC
 Current at 12V DC: 10mA
 Sound output at 30cm: 90dB typical (12V DC)
 Size: 30mm dia., 22mm high
 46mm across mounting ears

Order Code	Type	Price each
CR34M	DC Piezo Buzzer Wire	£1.15

3-Tone Piezo Buzzer



A loud and compact buzzer which will operate with DC voltages in the range 6 to 12V. In addition to the red positive and black negative supply leads, there are three other leads which, if connected in certain combinations, will determine the sound that the buzzer will produce. If the green and yellow wires are connected together a two-tone siren sound is produced; if the green and orange wires are connected together the unit emits a pulsed tone, and if all wires are left unconnected, the output is a continuous tone. Two lugs with 3mm holes are provided for mounting purposes.

Supply voltage range: 6 to 15V DC
 Recommended operating voltage: 12V DC
 Current consumption at 12V DC: 95mA
 Sound pressure level (at 1m): 107dB (with 12V supply)
 Overall frequency: 2.8kHz
 Operating temperature: -20°C to +70°C
 Overall dimensions: 39mm dia. x 22mm height
 Mounting lugs: 55mm tip to tip; 3mm holes
 Lead length: power (red, black): 150mm (approx); tone select (org, gm, yell): 60mm (approx)

Order Code	Type	Price each
KU60Q	3-Tone Piezo Siren	£2.99

High Power Buzzer



An extremely loud piezo electric buzzer with integral drive circuit and a very wide operating voltage range.

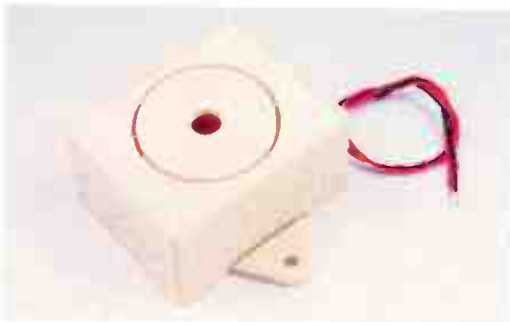
Resonant frequency:	3kHz
Impedance:	1kΩ approx.
Voltage range:	3V to 24V DC
Output at 12V:	103dB at 1m
Size:	39mm dia. 26mm high
Fixing centres:	50mm x slots 5 x 3mm
Overall width:	60mm

For DC operation only. Approx 100mm leads are attached, red is positive, black negative.

Order Code	Type	Price each
FK84F	HP Buzzer	£1.99

Two-Tone Mini-Siren

Sting



An extremely loud two-tone piezo-electric siren mounted in a sturdy cream plastic case. The electronics which drive the piezo element, and give the siren its characteristic sound, are contained within the unit on a PCB, and the overall frequency range can be varied by means of a preset on this board. Two links, A and B, are also present which, if bridged with solder, determine the mode of operation (see table). The board is accessible by removing the bottom mounting plate (secured by four screws) from the main body.

Operating Modes

Both links open:	Single tone operation
Link A bridged:	Pulsed high tone
Link B bridged:	Two-tone (as supplied)
Both links bridged:	Pulsed low tone

The unit will work with supply voltages between 6 and 15V DC and is connected to the supply with the two colour-coded 150mm long leads (red: +V; black: 0V) provided. At 12V DC, the unit will supply 110dB of sound level (at 30cm) while drawing only 90mA. Two mounting lugs are moulded onto the bottom mounting plate, which will accommodate M3 screws, and are spaced 58mm apart. Overall case dimensions, 52 x 42 x 27.5mm. The mounting lugs are 68mm from tip to tip.

Order Code	Type	Price each
KU65V	Two-Tone Mini Siren	£2.99

Twin-unit Piezo Siren

Sting

A very piercing two-tone siren housed in a very tough cream plastic housing. It is essentially the same as KU65V, except that two piezo elements have been incorporated into the larger case. As a result this unit offers an extremely high sound pressure level (105dB at 1m). Connection to the unit is by two colour-coded leads (red: +V; black: 0V). Two mounting lugs spaced 97mm apart are moulded into the case which allow the unit to be secured to a surface using M3 size screws.



Specification

Supply voltage range:	6 to 15V DC
Recommended operating voltage:	12V DC
Current consumption at 12V DC:	85mA max.
Sound pressure level (at 1m):	105dB

Frequency: 2.5 to 2.8kHz (Preset provided for adjustment)

Operating temperature range: -20°C to 70°C

Overall dimensions: 84 x 55 x 32mm

Mounting lugs: 106mm tip to tip;

3mm holes

Leads: Approx. 150mm long

Operating Modes

Both links open:	Single tone operation
Link A bridged:	Pulsed high tone
Link B bridged:	Two-tone (as supplied)
Both links bridged:	Pulsed low tone

Order Code	Type	Price each
KU61R	Twin Piezo Siren	£3.99

Multi-Tone Piezo Buzzer

Sting



An extremely loud piezo electric buzzer in a cream housing. Removing the back carefully with a screwdriver reveals screw terminal connections for the positive and negative DC power supply. A further three screw terminals if left open circuit make the buzzer emit a continuous tone. If screws 1 and 2 are connected together the buzzer emits a pulse tone and if screws 1 and 3 are connected together the buzzer emits a siren-like sound.

Resonant frequency:	2.8kHz
Impedance:	40Ω approx.
Voltage range:	6V to 15V
Output at 12V:	115dB at 1m
Size:	92 x 92 x 34mm high
Fixing centres:	72 x 72 x 4mm clear

Order Code	Type	Price each
JH25C	Multi-Tone Buzzer	£5.99

Musical Buzzer

Sting

A musical buzzer which plays seven traditional American tunes. Two 100mm wires red for positive and black for negative are provided for connection to the power supply. Two additional red wires are provided which when shorted, trigger the next tune in the sequence. If the wires are permanently connected, the tunes play continuously. If the battery is removed, on reconnection the first tune to play is always the first in the sequence.



The tunes are:

Yellow Rose of Texas
Dixieland
Red River Valley
American Patrol
Oh My Darling Clementine
When The Saints Go Marching In
She Wore A Yellow Ribbon

Voltage range:	6V to 12V
Current at 9V:	6mA
Output at 9V:	85dB at 1m
Size:	32.2mm dia. 13.9mm high
Fixing centres:	38mm x slots 3.5 x 4.5mm
Overall width:	44.6mm

Order Code	Type	Price each
FK80B	Musical Buzzer	£2.79

Panel Mounting Buzzers

Sting

A range of three panel mounting buzzers in a black plastic housing, differing only in the tone produced by the 'door bell', pulse, or continuous tone. The positive and negative connections are standard 'Lucar' style 1/4 in. receptacles (HF10L). A M28 plastic screw ring is used to secure the buzzer to a suitable panel with a 29mm diameter hole. The buzzers can operate over a wide voltage range and have a low power consumption. The 'door bell' version, in particular, produces a very distinctive and noticeable output.



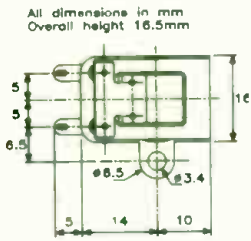
Specification

Supply voltage range:	8 to 12V DC
Frequency:	2600Hz
Current consumption (@ 12V):	20mA
Sound output (@ 12V):	90dB (@ 30cm.)
Size:	45 x 36mm dia.

Order Code	Type	Price each
BZ54J	Doorbell Buzzer	£2.99
BZ55K	Pulsetone Buzzer	£2.99
BZ56L	Continuous Buzzer	£2.99

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12V AC Buzzer



A miniature 12V mechanical buzzer that works from an AC supply. Single hole fixing.

Specification

Voltage range (AC): 8V to 28V
Current @ 12V: 60mA
@ 24V: 130mA
Sound output: 80dB @ 30cm
AC resistance: 120Ω ± 20Ω

Order Code	Type	Price each
BZ57M	12V AC Buzzer	99p

SIRENS

Micro Siren

A miniature, but very loud siren housed in a black ABS case fixed to a swivel mounting bracket. The siren has a rapid rising and falling tone.



Specification

Operating voltage: 12V DC
Voltage range: 6V to 12V
Current: 150mA
Sound output: 110dB at 1m
Frequency: 2kHz to 2.8kHz
Size: 43 x 39 x 59mm long

Order Code	Type	Price each
JK42V	Micro Piezo Siren	£5.49

Miniature Piezo Siren



A very small, but extremely loud siren housed in a black ABS case fixed to a swivel mounting bracket. The siren has a rapid rising and falling tone.

Operating voltage: 12V DC
Voltage range: 6V to 12V
Current: 300mA
Sound output: 115dB at 1m
Frequency: 2kHz to 2.8kHz
Size: 61 x 56 x 86mm long

Order Code	Type	Price each
JK43W	Min Piezo Siren	£8.49

Low-Cost Electronic Siren

A compact electronic alarm siren, self-contained in a plastic housing with swivel mounting. Offers a low current drain.



Specification

Voltage: 12V DC
Current: 300mA
Impedance: 8 ohms
Sound output: 98dB at 1m
Case: Plastic with metal bracket
Size: 98mm dia x 60mm
Weight: 175g

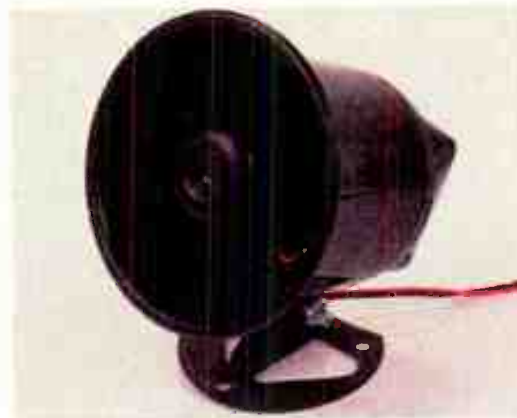
Order Code	Type	Price each
YK60Q	Low-Cost Electrnc Srm	£6.49

HOT TIP

Distorted sound, especially at low volume, can be caused by an off centre voice coil rubbing on its magnet. This can be checked by gently pressing around the cone with your fingers, to feel where any rubbing is taking place.

Mini Siren

Sting



A compact yet powerful siren capable of generating a piercing sound pressure level of 113dB (at 1m) while drawing a maximum of 700mA. The siren's robust black plastic case is sealed and therefore suitable for vehicle or exterior use. It is mounted on a metal swivel bracket. The supply voltage is connected to the unit by means of a colour-coded trailing lead (red: +V; black/red: 0V)

Specification

Supply voltage: 6 to 12V DC
Current drain: 700mA max.
Sound output: 113dB (at 1m)
Dimensions: 97 x 110 x 88mm
Net weight: 367g
Lead length: 400mm (approx.)

Order Code	Type	Price each
ZC45Y	Mini Siren	£7.49

Staccato Electronic Sounder



A weatherproof electronic siren which is completely self contained. The unit has a genuinely high output of up to 116dB combined with a low current consumption, making it ideal for use with intruder and automotive alarm systems and external bell housings. The finish is in black plastic with a metal fixing bracket. The reliability of the unit is improved with the design of the connection between the speaker head and the electronics.

Specification

Voltage: 6 to 16V DC (12V nominal)
Current: 300mA
Sound output: 116 dBA
Frequency range: 0.6 to 1.2kHz
Size: 90mm dia. x 110mm long

Order Code	Type	Price each
YZ03D	Electronic Sounder	£9.49

Power Siren



A very powerful alarm siren built round a rectangular horn speaker, capable of sound pressure levels of 118dB (at 1m). The unit has some limited weather resistance but is not sealed. The siren is not suitable for exterior use unless installed under cover. The case is made from high impact black plastic and is supplied with an adjustable, swivel mounting bracket. Power is connected by a 250mm colour-coded cable (red: +V).

NB. It is advisable to cover and protect ears when powering up this siren as very high sound levels are produced.

Specification

Supply voltage: 12V
Current drain: 1.6A to 1.8A
Sound output: 118dB ±3dB at 1m
Output frequency: 1800 to 2000Hz
Overall size: 125 x 115 x 80mm
Weight: 707g

Order Code	Type	Price each
ZC46A A2	Power Siren	£17.49

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HORN SPEAKERS

10W

A weatherproofed 10W horn speaker with standard 3-point mounting bracket for fixing to car roof or to a bracket across a car roof, etc. For maximum sound effect, four of these units mounted at right angles to each other will be found to be more efficient than one large speaker, since they are fairly directional. The mounting bracket is adjustable with 10mm (AF) clamping bolt and nut, and the whole unit is moulded in black ABS.



Nominal power Handling: 10W (15W max.)
 Impedance: 8Ω
 Usable frequency Response: 1.4kHz to 4kHz
 Horn diameter: 136mm
 Overall depth of horn: 120mm

Order Code	Type	Price each
XQ73Q A1	Plastic Horn 5	£7.49

15W

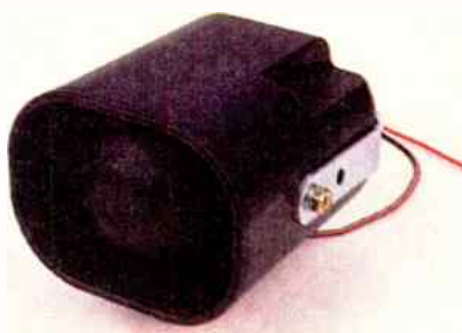


A weather-proofed horn speaker with bracket for bolting to car roof or to a bracket across car roof etc. For maximum dispersion two or more of these units mounted in opposing directions will be found far more efficient than one large speaker since they are fairly directional. The mounting bracket is adjustable and the horn is finished in grey.

Nominal power: 15W
 Impedance: 8Ω
 Horn diameter: 152mm

Order Code	Type	Price each
XQ74R A2	Car PA 15W	£16.99

20W



A weather-proof black plastic rectangular horn speaker with an adjustable bracket for bolting to a car roof or to a bracket across the car roof etc.

Maximum power: 20W
 Impedance: 4Ω
 Frequency response: 600Hz to 8kHz
 Overall size: 125 x 115 x 80mm
 Weight: 680g

Supplied with approx 290mm of connecting lead.

Order Code	Type	Price each
BZ66W A2	20W Horn	£12.99

30W



A weather-proof white plastic, rectangular horn speaker with heavy rectangular plastic mounting base on which the horn tilts up and down.

Nominal power: 30W
 Impedance: 8Ω
 Frequency response: 200Hz to 8kHz
 Horn size: 200 x 106mm
 Horn length: 234mm
 Bracket base: 100 x 60mm with six 5mm clear fixing holes.

Supplied with approx. 250mm of connecting lead.

Order Code	Type	Price each
XG97F A2	5 x 8 Horn Speaker	£15.99

DOOR BELLS AND ACCESSORIES

Ding-Dong Door Bell

Sting



A low-cost, attractive, battery operated two-tone doorbell. It will greet your guests with a pleasant but loud 'ding-dong' chime. A bell push is supplied along with approx. 2m of bell wire. This is connected between the push and bell, screw terminals being provided on both units to accept the wires. If longer distances than 2m are anticipated, then additional wire will be required. A suitable type is XR39N, which can be found in the 'Cables' section of this catalogue. The bell unit is an attractive cream colour and is decorated with a floral motif. The system is powered by two AA cells and is supplied with full fitting instructions. Overall dimensions: 140 x 84 x 38mm (bell unit); 46 x 28 x 18mm (bell push).

Order Code	Type	Price each
ZC44X	Ding Dong Doorbell	£5.99

Melody Door Chime



This attractive, battery operated, 16 melody door chime, will greet your guests with up to 64 notes from the following popular tunes:

Twinkle Twinkle Little Star	London Bridge is
Cuckoo Waltz (1)	Falling Down
Eency Weency Spider	Little Brown Jug
Lullaby	Butterfly
Santa Lucia	Long Long Ago
Oh My Darling Clementine	Cuckoo Waltz (2)
Mary Had a Little Lamb	Are You Sleeping
The Train is Running Fast	Rockabye Baby
Dream of Home and Mother.	

The chime is ivory white with gold stripes and a flower motif. Supplied with push-button. Requires 2 x HP7 batteries (not supplied). Size: 140mm high x 85mm wide x 35mm deep. Weight: 160g.

Order Code	Type	Price each
YP31J	Melody Door Chime	£4.99

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Bell

3 to 8V AC or DC bell with white case and polished chrome 70mm dia. gong. Overall size 144 x 70 x 39mm.



Order Code	Type	Price each
FL38R	AC Bell	£4.99

Bell Transformer

Sting



A transformer housed in a white plastic case. Primary 240V AC, secondary 4, 8 and 12V AC at 1A. Internally fused primary winding with Fuse 20 63mA. Overall size excluding case fixing nut 74 x 54 x 38mm.

Order Code	Type	Price each
FL37S	Bell Xformer	£7.99

Bell Push Switch

Sting

A rectangular push-to-make doorbell switch. The switch has a black plastic base plate housing the electrical contacts and terminals. The base plate is fixed into position with the screws provided and after the necessary connections have been made the outer cover with the push button is snapped into position. The push button is of white plastic with a matt black or creamy white housing.



Overall size: 41 x 20 x 18mm deep. Button size: 20 x 15mm

Order Code	Type	Price each
FS17T	Bell Push	65p

HOT TIP

When covering the front of a speaker cabinet with black speaker cloth, remember to paint any screws on the baffle with matt black paint. This will prevent the screws from being seen through the cloth afterwards. The baffle board can also be painted matt black and this should be done before the loudspeaker units are mounted. It is advisable to cosmetically finish the cabinets before mounting the loudspeaker units.

FAST NiCd CHARGER WITH DISCHARGER

CALVYN INDUSTRIAL

A fast, compact NiCd charger that will charge 2 or 4 'AAA' or 'AA' type batteries in 2h. A slide switch selects either the charge or discharge function. After the batteries have been discharged, they are fast charged for 2h and then automatically switched to a trickle charge mode. This sequence will prevent the 'memory' effect that is often found in NiCd batteries.

The unit will automatically adjust for 'AA' or 'AAA' type batteries - 380mA for 'AA', and 100mA for 'AAA' with a trickle charge of 20mA. LEDs indicate when the unit is in the fast, trickle or discharge mode. Dimensions 125 x 85 x 50mm.



EARPIECES

Magnetic



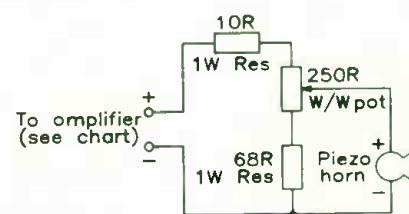
A standard magnetic earpiece having an 8Ω impedance and 950mm of lead terminated in either a 2.5mm or 3.5mm jack plug. The 3.5mm type is also available with a 4m lead.

Order Code	Type	Price each
LB23A	Mag Earpiece 2.5mm	48p
LB24B	Mag Earpiece 3.5mm	75p
FE73Q	Earphone 4 Metre	86p

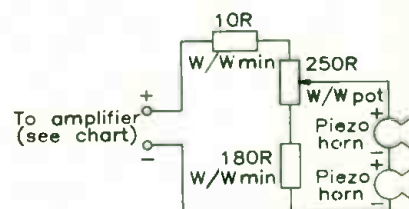
PIEZO ELECTRIC TWEETERS

These tweeters which can be added to any existing speaker system having not more than 200W power capability offer many advantages over ordinary (dynamic) tweeters. The elimination of the voice coil results in a very low dynamic mass in the driver which greatly improves the transient response of the speaker. The result is a beautifully clean sound with low distortion and a minimum of ringing. The piezo electric tweeter has a very high impedance (over 1000Ω at 1kHz and still over 20Ω at 40kHz) and thus presents no added load to the amplifier. It rejects low frequencies without needing a crossover network.

Connection details



Connection Diagram A



Connection Diagram B

Impedance of existing speaker system	Amplifier rms power output (W)	Use Circuit Diagram
4Ω	up to 100W	A
4Ω	up to 200W	B
8Ω	up to 200W	B
16Ω	up to 200W	B

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Crystal



A standard crystal earpiece with a very high impedance and 1m of lead terminated in a 3.5mm jack plug.

Order Code	Type	Price each
LB25C	Crystal Earpiece	£1.69

Continued on next page

Continued from previous page

The speaker is simply connected as shown in the drawings above and the adjustment potentiometer is provided so that the tweeter output sound level can be made equal to the existing speakers. However, if adjustment after initial setting-up is not required then the pot could be removed and replaced by two 1W resistors having the nearest values to those measured on each side of the pot. If exceptionally loud treble output is required, one (in the case of system A) or two in series (in the case of system B) can be wired in parallel with the existing tweeter/s.

2 inch Direct Radiant Tweeter

This tweeter is ideal as the high frequency unit in three-speaker systems.



Average harmonic distortion: <0.75%
 Output sound level at 457mm from front of speaker with 4V rms pink noise input: 101.5dB
 Frequency response: 4.8kHz to 20kHz ±3dB
 Max continuous rms input voltage: 16V
 Max peak music power: 35V
 Overall diameter: 51mm
 Overall depth: 18mm
 Total width: 70mm
 Fixing centres: 62mm
 Panel cut-out: 48mm dia
 Weight: 8g

Order Code	Type	Price each
YW52G	2in Piezo Tweeter	£3.25

3 3/4 inch Direct Radiant Tweeter

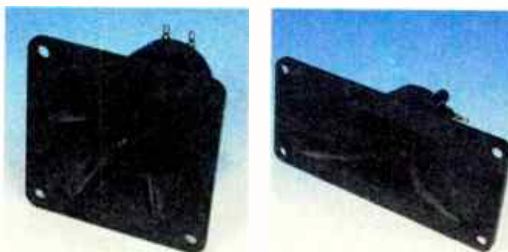


This tweeter is ideal for use in bookshelf speaker systems and smaller high fidelity speakers where it will greatly enhance the high frequency response.

Harmonic distortion: <0.75%
 Output sound level at 457mm from front of speaker with 4V rms pink noise input: 100dB
 Frequency response: 2.2kHz to 32kHz ±3dB
 Max continuous rms input voltage: 16V
 Max pk music power: 35V
 Overall diameter: 95mm
 Overall depth: 21mm
 Fixing centres: 60 x 60mm
 Panel cut-out: 60mm dia.
 Weight: 36g

Order Code	Type	Price each
WF54J	Direct Radiant Piezo	£4.99

Small Square and Rectangular Horns



Piezo electric horn tweeters ideal for medium sized 2-way and even 3-way speaker systems. The high impedance of the piezo electric material means that the unit can simply be connected directly across the terminals of the main driver to add extra treble sparkle. Two different designs are available, a square-faced circular horn and an equivalent rectangular horn offering wider horizontal dispersion.

Basic specification

Frequency response: 4kHz to 28kHz
 Maximum continuous rms input voltage: 20V (= 100W into 4Ω)
 Maximum pk input voltage: 28V

Square type

Overall size: 85 x 85mm
 Overall depth: 67.7mm
 Fixing centres: 71 x 71mm
 Panel cut-out: 80mm dia.

Rectangular type

Overall size: 145 x 67.3mm
 Overall depth: 50.9mm
 Fixing centres: 132.2 x 54mm
 Panel cut-out: 125.5 x 47mm

Order Code	Type	Price each
RT60Q	Square Piezo Tweeter	£3.99
CJ83E	Rect Piezo Tweeter	£5.99

Large Rectangular Horn

A wide dispersion horn tweeter designed to give a wide pattern and therefore ideal for stereo use and does not insist that the listener be exactly on axis with the driver unit itself.



Basic specification

Frequency response: 2kHz to 28kHz
 Max. continuous rms input voltage: 20V (= 100W into 4Ω)
 Max. pk input voltage: 28V
 Overall size: 187.3 x 79mm
 Overall depth: 108.64mm
 Fixing centres: 86 x 86 x 63.2mm
 Panel cut-out: 158 x 54mm

Order Code	Type	Price each
RT61R	Large Rect Horn	£6.99

Standard Horn

This tweeter is designed for general purpose use in high fidelity, disco & PA speakers of all sizes.

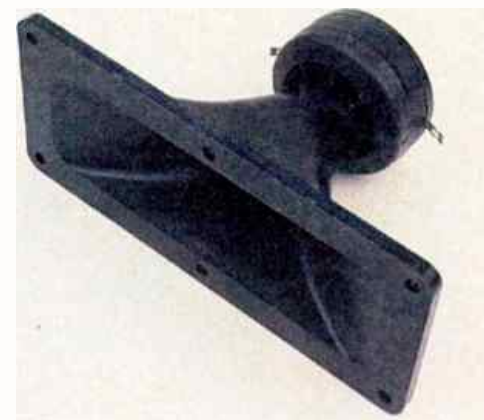
Average harmonic distortion: 1%
 Output sound level at 457mm from front of speaker with 4V rms pink noise input: 103dB
 Frequency response: 3.9kHz to 28kHz ±3dB
 Max continuous rms input voltage: 16V
 Max peak music power: 35V
 Overall size: 85 x 85 x 70mm deep
 Fixing centres: 71 x 71mm
 Panel cut-out: 76mm dia
 Weight: 63g



Available in two types. With mounting flange flush with front of horn. With mounting flange recessed 12mm so that front of horn may be more nearly flush with front of baffle when mounted.

Order Code	Type	Price each
WF09K	Piezo Horn Flush	£5.99
WF55K	Piezo Horn Recessed	£5.99

Wide Dispersion Horn



This tweeter is designed to give a wide dispersion pattern and is therefore ideal in stereo hi-fi systems and in high quality discos etc.

Average harmonic distortion: 0.5%
 Output sound level at 457mm from front of speaker with 4V rms pink noise input: 104dB
 Frequency response: 2kHz to 32kHz ±3dB
 Max continuous rms input voltage: 20V
 Max peak music power: 35V
 Overall size: 185 x 83 x 108mm
 Fixing centres: 86 x 86 x 63.5mm
 Panel cut-out: 155 x 51mm
 Weight: 130g

Order Code	Type	Price each
WF56L	Wide Angle Piezo	£9.99



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TWEETERS

Dome Tweeter



A slim dome tweeter with a heavy duty ceramic magnet.

Frequency response: 2kHz to 20kHz
 Power handling (max): 50W
 Impedance: 8Ω (suitable for 4 to 8Ω systems)
 Dimensions: Baffle cut-out: 78mm dia
 Fixing centres: 68 x 69mm x 4BA (M4)
 Mounting plate: 96 x 96mm
 Overall depth: 31mm
 Crossover point: 4.5kHz approx.

Order Code	Type	Price each
WF43W	Dome Tweeter	£8.49

20W Bullet Tweeter

A high quality high frequency transducer with a substantially level frequency response from 5kHz to 25kHz, in a cast alloy body with a brushed finish front mounting flange and centre 'bullet'. A high quality tweeter for domestic hi-fi and all other music systems.



Flux density: 11,500 Gauss
 Freq range: 5kHz to 40kHz
 System power rating: 100W using HPX2 crossover
 Unit power rating: 20W rms
 Impedance: 8Ω
 Acoustic output: 96dB (sensitivity 1W @ 1 metre)
 Crossover freq: 5kHz min @ 18dB octave
 Overall diameter: 98mm
 Overall depth: 45.5mm
 Fixing centres: 4 x 8.4 x 5mm clear
 Overall weight: 490g (17ozs)

Order Code	Type	Price each
YJ01B A1	Tweeter 20W 8R	£22.99

40W Compression Driver

A 40W compression driver for use as part of a treble horn unit having a 1in. throat size. It offers exceptional natural reproduction and freedom from distortion over a frequency range of 1kHz to 20kHz. It has a 45mm diameter titanium diaphragm which combines outstanding frequency response with an absence of colouration, and has total resistance to fracturing through fatigue. The diaphragm is allied to a lightweight polyimide former with a double layer, high temperature voice coil, and driven by a massive magnet system. The driver may be used with any high quality professional horn that will fit a 1in. throat.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 580Hz
 Usable frequency response: 1.5 to 20kHz
 Nominal power handling: 40W rms
 Sensitivity: 116dB
 Voice coil diameter: 50.8mm
 Magnet weight: 34oz
 Dimensions: 135.4mm dia. x 54mm deep
 Fixing centres: 0.25in. UNC threaded holes

Order Code	Type	Price each
RC97F B4	40W Compression Driver	£54.99

Horn for Compression Drivers

Eminence

A superb quality standard fitting fibreglass horn with a 1in. throat designed for use with compression drivers. This horn offers a radial dispersion pattern, and when combined with such a driver it will be suitable for high-power high-reliability applications such as PA and disco.



Rolloff: 1.2kHz
 Lowest recommended crossover point: 1.2kHz
 Dispersion: 90 x 40°
 Fitting holes: 3 M6 Holes on a 57mm PCD
 2 M6 Holes on a 76mm PCD
 Flanged throat: 1in. (25mm)
 Overall dimensions: 290 x 160 x 160mm
 Weight: 535g

Order Code	Type	Price each
ZC43W A1	Compression Horn	£36.49

70W Horn Tweeter



A rectangular horn tweeter having a solid cast body 184 x 76mm, with a six hole fixing. It is a rectangular horn tweeter which disperses its sound output on a lateral plane, and has a horn cut-off frequency fixed at 820Hz, although the lowest input frequency should be double this to maintain efficiency.

Flux density: 9000 Gauss
 Frequency range: 1.7kHz to 17kHz
 System power rating: 70W using HPX2 crossover
 Unit power rating: 50W
 Impedance: 8Ω
 Acoustic output: 97dB (sensitivity 1W @ 1m)
 Crossover frequency: 1.7kHz min
 Overall width x height: 184 x 76mm
 Overall depth: 160mm
 Fixing centres: 6 x 86mm + 86mm x 64mm, x 5mm clear
 Overall weight: 647g

Order Code	Type	Price each
YJ02C A1	Tweeter 70W 8R	£24.99

600W Wide Angle Horn Tweeter

Eminence



A constantly directive horn with a square section, designed to provide a smooth response up to 20kHz fully over the angles 90° horizontal and 90° vertical. A crossover must be used with this driver and the crossover point must be 3.5kHz or greater. Suitable crossovers can be YJ03D, WF03D, YT44X or YT45Y, depending on the system power handling required.

Specification

Impedance: 8Ω
 Frequency response: 2kHz to 18kHz ±3dB
 Sensitivity: 100dB
 Recommended crossover point: >3.5kHz
 Power handling, using 6kHz, 18dB/octave crossover: 600W rms
 Dispersion: 90° horizontal x 90° vertical
 Dimensions: 160mm wide x 140mm high x 107.2mm deep
 Weight: 800g

Order Code	Type	Price each
RC98G B3	600W Wide Angle Horn	£37.99

THE BEST OF SERVICE

600W High Power Horn Tweeter

Eminence

A high power, square faced horn tweeter with circular section horn, suitable as a treble unit in 2-way and 3-way PA, disco, organ and similar sound amplification systems. It offers low distortion and an exceptionally flat frequency response over the range 2kHz to >20kHz, and radiated evenly over 60° horizontal and vertical angles. A crossover must be used with this driver and the crossover point must be 3.5kHz or greater. Suitable crossovers can be YJ03D, WF03D, YT44X or YT45Y, depending on the system power handling required.



Specification

Impedance:	8Ω
Frequency response:	2kHz to 20kHz ±2dB
Sensitivity:	101dB
Recommended crossover point:	>3.5kHz
Power handling, using 6kHz, 18dB/octave crossover:	600W rms
Dispersion:	60° x 60°
Dimensions:	87 x 87mm x 73.5mm deep
Weight:	700g

Order Code	Type	Price each
RC99H B3	600W Horn Tweeter	£29.99



BS 5750 Part 2 1987
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CROSSOVER NETWORKS

HPX2



A two-way crossover with a 12dB/octave high pass filter operating at 5kHz. Power handling capability up to 200 watts. Ideal for use with our 50W Bullet and 70W Horn Tweeters.

Order Code	Type	Price each
YJ03D	Crossover HPX2	£10.99



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Two-way 6dB/Octave



A crossover network enclosed in a small plastic box. The crossover allows a woofer and tweeter to work together. Overall size (excluding solder tags) 85 x 51 x 30mm high. Impedance 8Ω. Power handling 40W. Crossover frequency approx. 2.5kHz at 6dB/octave.

Order Code	Type	Price each
YT47B	X-over 2-Way 6dB	£2.99

Two-way 12dB/Octave

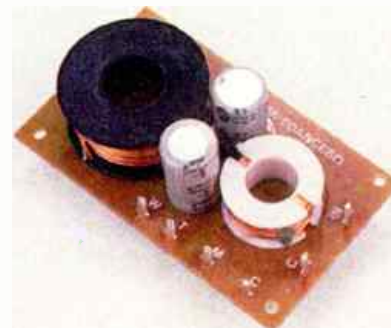


A cross-over network for operating a woofer and a tweeter together. Components are mounted on a plastic panel (100 x 60mm) for fixing inside a cabinet. Power handling: 40W rms. Cross-over is at approx. 3kHz (12dB/octave).

Order Code	Type	Price each
WF02C	Crossover 2-Way	£5.99

Three-way 6dB/Octave

A crossover network for operating a woofer, tweeter and mid-range speaker together. Components are mounted on a paxolin pcb 100 x 60mm, for fixing inside a cabinet. Power handling 60W. Impedance 8Ω. Crossover frequencies approx. 1kHz and 5kHz at 6dB/octave. Overall height 30mm.



Order Code	Type	Price each
YT46A	X-over 3-Way 6dB	£4.29

Three-way 12dB/Octave

A cross-over network for operating a woofer, tweeter and mid-range speaker together. Components are mounted on a plastic panel (100 x 60mm) for fixing inside a cabinet. Power handling: 60W rms. Crossovers are at approx. 700Hz (6dB/octave) and 3kHz (12dB/octave).



Order Code	Type	Price each
WF03D	Crossover 3-Way	£6.99

Three-way 100W



A crossover network for operating a woofer, tweeter and mid-range speaker together. Components are mounted on a paxolin pcb 115 x 95mm, for fixing inside a cabinet. Power handling 100W. Impedance 8Ω. Crossover frequencies approx. 1kHz and 4kHz at 12dB/octave. Overall height 30mm.

Order Code	Type	Price each
YT44X	X-over 3-Way 100W	£7.49

Three-way 150W

A crossover network for operating a woofer, tweeter and mid-range speaker together. Components are mounted on a paxolin pcb 151 x 90mm, for fixing inside a cabinet. Power handling 150W. Impedance 8Ω. Crossover frequencies approx. 1.2kHz and 5kHz at 12dB/octave. Overall height 30mm.



Order Code	Type	Price each
YT45Y	X-over 3-Way 150W	£7.99

HPX7 Crossover

The HPX7 is primarily designed for use with the 50W Compression Driver and suitable bass drivers but is suitable for any use requiring a 2.2kHz crossover. The HPX7 crossover is of the LC type with a crossover operating at 2.2kHz. The bass section rolls off from 2.2kHz at 12dB/octave and the high-pass section operates at the same frequency but at 18dB/octave. The maximum power handling capacity is 400W with no attenuation and when using the attenuators the power rating is 250W. It should be noted that the power distribution at 2kHz for normal music programme is 80% to the bass and 20% to the HF units. Also incorporated in the design is the opportunity for the user to select or vary the amount of HF brilliance/loudness by attenuating or reducing the HF output in 1dB steps to -6dB to achieve a perfect sound balance between the bass and the treble units. This is done by a constant impedance technique which keeps the HF section matched to its stated impedance of 8Ω.



Order Code	Type	Price each
XJ56L	X-over 2.2kHz 400W	£34.99

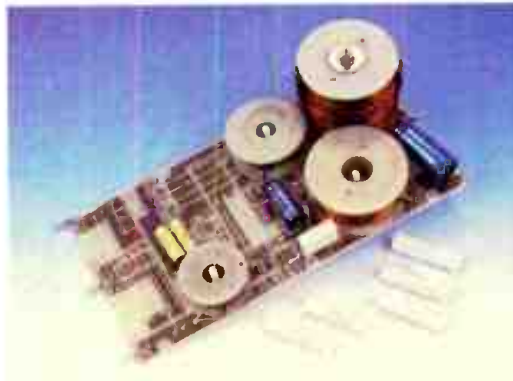
HPX8 Crossover



The HPX8 is an 18dB/octave high pass filter operating at 5kHz in systems with power handling up to 250W. This crossover is designed specifically for use with the 50W Compression Driver (XJ55K). An attenuator resistor is supplied with the network and may be connected if required to decrease the sensitivity or increase power handling.

Order Code	Type	Price each
XJ57M	X-over 5kHz 250W	£16.99

HPX9 Crossover



The HPX9 designed for use with the Big Cat loudspeaker range. The HPX9 crossover is of an LC type 3-way four section crossover operating at 500Hz and 6.5kHz. The bass and mid sections roll off at 12dB/octave and the mid and tweeter sections roll off at 12dB/octave. The maximum power handling capacity is 400W with no attenuation and when using the attenuators the power rating is 250W. It should be noted that the power distribution at 500Hz for normal music programme is 60% to bass and 40% to mid range. Also incorporated in the design is the opportunity for the user to select or vary the amount of HF and midrange unit loudness by attenuating these sections by -2dB or -4dB to achieve the best sound balance between the selected loudspeakers. This is done by a constant impedance technique which keeps each section matched to its stated impedance of 8Ω.

Order Code	Type	Price each
XJ58N	X-over 500Hz/6.5kHz	£54.99

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SPEAKERS

Miniature

A range of miniature loudspeakers with alnico magnets and paper cones. Various sizes are available with 8Ω voice coils and some with 64Ω voice coils for direct single-transistor drive.



8Ω Types

Type	Dia. (mm)	Depth (mm)	Power (W)	f ₀ (Hz)	Frequency range (Hz)
388	38	17	0.1	550±100	f ₀ to 3500
458	45	17	0.1	500±80	f ₀ to 3500
508	50	19	0.2	450±60	f ₀ to 4000
578	57	20	0.25	400±40	f ₀ to 4000
668	66	21	0.3	350±40	f ₀ to 4500
778	77	23	0.5	300±30	f ₀ to 4500

Type	Sensitivity (dB/W)	Magnet weight (oz)	Flux density (Gauss)	Net weight
388	87±2	0.35	5700	22g
458	87±2	0.35	5700	24g
508	87±2	0.35	6000	39g
578	88±2	0.35	6000	42g
668	89±2	0.35	6000	45g
778	90±2	0.35	6000	50g

64Ω Types

Type	Dia. (mm)	Depth (mm)	Power (W)	f ₀ (Hz)	Frequency range (Hz)
3864	38	17	0.1	550±100	f ₀ to 3500
5064	50	19	0.2	450±60	f ₀ to 4000
5764	57	20	0.25	400±40	f ₀ to 4000
6664	66	21	0.3	350±40	f ₀ to 4500

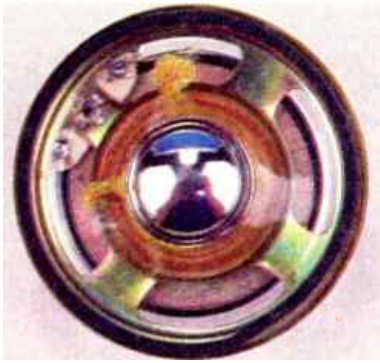
Type	Sensitivity (dB/W)	Magnet weight (oz)	Flux density (Gauss)	Net weight
3864	87±2	0.35	5700	22g
5064	87±2	0.35	6000	39g
5764	88±2	0.35	6000	42g
6664	89±2	0.35	6000	45g

Order Code	Type	Price each
WB04E	L/S Lo-Z 388	£1.15
YT27E	L/S Hi-Z 3864	£1.15
WB05F	L/S Lo-Z 458	£1.15
WB08J	L/S Lo-Z 508	£1.30
YT28F	L/S Hi-Z 5064	£1.30
WB09K	L/S Lo-Z 578	£1.30
YT29G	L/S Hi-Z 5764	£1.30
WB13P	L/S Lo-Z 668	£1.40
WF57M	L/S Hi-Z 6664	£1.40
YW53H	L/S Lo-Z 778	£1.40

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Mylar



A range of mylar cone speakers with ferrite magnets designed primarily for use in sirens and buzzers. The mylar cone and silvered plastic centre dome combined with a card gasket around the cone make the units fully weather and splashproof from the front. They are therefore ideal for use as sounders in portable equipment and in external burglar alarm boxes. Four types are available without mounting (round type) and three in a square metal chassis.

Specifications

	Round 2 inch	Round 2 1/2 inch
Power input (max.)	0.5W	0.05W
Power output (1W at 1m)	90dB	93dB
Frequency range	400Hz - 5.5kHz	350Hz - 4kHz
Resonant frequency	400Hz	350Hz
Impedance	8Ω	8Ω

	Round 2 1/2 inch	Round 3 inch
Power input (max.)	0.8W	1W
Power output (1W at 1m)	92dB	90dB
Frequency range	320Hz - 4.2kHz	280Hz - 4.5kHz
Resonant frequency	320Hz	280Hz
Impedance	8Ω	8Ω

	Square 3 inch	Square 3 inch 1/2	Square 4 inch
Power input (max.)	5W	10W	15W
Power output (1W at 1m)	96dB	98dB	96dB
Frequency range	250Hz to 4.5kHz	350Hz to 4kHz	280Hz to 4kHz
Resonant frequency	250Hz	350Hz	280Hz
Impedance	8Ω	8Ω	8Ω

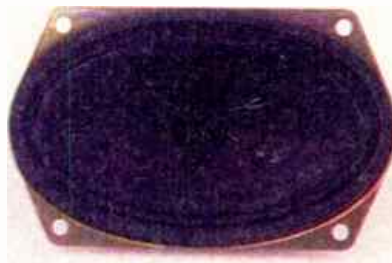
Order Code	Type	Price each
YM97F	Mylar Spkr 2 inch	£1.89
YM98G	Mylar Spkr 2.25 inch	£1.89
YM99H	Mylar Spkr 2.5 inch	£2.25
YN00A	Mylar Spkr 3in Rnd	£2.49
YN01B	Mylar Spkr 3in Sqr	£3.65
YN02C	Mylar Spkr 3.5 inch	£4.49
YN03D	Mylar Spkr 4 inch	£4.99

Low-Cost Elliptical Speakers

Low-cost loudspeakers primarily intended as replacements for unit audio equipment and television sets, mounting on the inside surface of the baffle. Two models are available: A (5in. x 3in.) and B (6in. x 4in.).

Type	Size (mm)	Baffle cut-out (mm)	Fixing centres (mm)	Depth (mm)
A	125 x 77	117 x 68	90 x 65 x M5	36
B	153 x 101	138 x 91	110 x 73 x M5	44

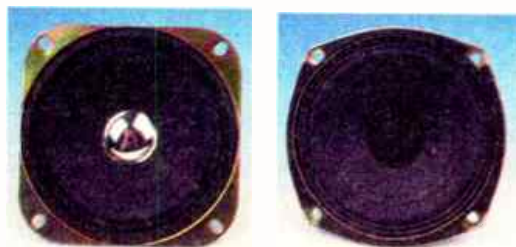
Type	Power (W)	Z (Ω)	f ₀ (Hz)	Frequency range (Hz; -10dB max.)	Sensitivity (dB/W)
A	3	8	145±29	f ₀ to 22k	96±3dB
B	6	8	120±24	f ₀ to 13	97±3dB



Order Code	Type	Price each
GL16S	3W Elliptical Spkr	£2.29
GL17T	6W Elliptical Spkr	£2.99

Low-Cost Round Speakers

A range of low-cost round speakers of good quality that vary in size from a 3.5in. 1.5W type to a 10in. 50W speaker. They have a variety of applications, such as replacing or up-rating those used in radios and 'ghetto blasters', extension speakers, car systems and music centres/rack systems. The higher powered units, when used with a suitable tweeter and crossover, will form the basis of an excellent low-cost high fidelity speaker system. Type E is fitted with a centrally mounted chromed plastic cone to enhance the treble response.



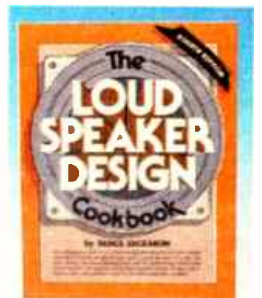
Type	Overall size (mm)	Baffle cut-out (mm)	Fixing centres (mm)	Depth (mm)
A	100 x 100	95 dia.	85 x 85 x M5	36
B	120 x 120	110 dia.	85 x 85 x M5	42
C	120 x 120	110 dia.	85 x 85 x M5	42
D	165 dia.	144 dia.	110 x 110 x M5	55
E	206 dia.	185 dia.	140 x 140 x M5	69
F	256 dia.	234 dia.	175 x 175 x M5	100

Type	Power (W)	Z (Ω)	f ₀ (Hz)	Frequency range (Hz; -10dB max.)	Sensitivity (dB/W)
A	1.5	8	180±30	f ₀ to 10k	90±2
B	3	8	140±25	f ₀ to 8k	91±2
C	6	8	120±24	f ₀ to 9.2k	99±3
D	10	8	80±16	f ₀ to 9k	99±3
E	15	8	45±9	f ₀ to 3.5k	101±3
F	50	8	40±8	f ₀ to 4.3k	96±3

Order Code	Type	Price each
YT25C	1.5W Low Cost Spkr	£1.60
YJ16S	3W Low Cost Speaker	£2.25
GL12N	6W Low Cost Speaker	£2.49
GL13P	10W Low Cost Speaker	£3.49
GL14Q	A1 15W Low Cost Speaker	£5.99
GL15R	A1 50W Low Cost Speaker	£10.49

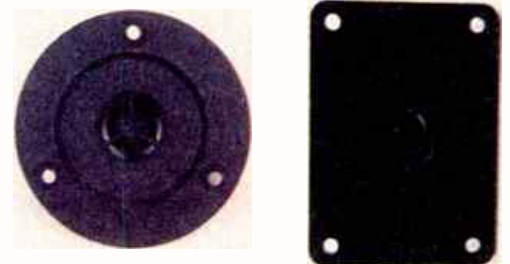
AUDAX LOUDSPEAKERS

A superb range of loudspeakers for building into complete high fidelity loudspeaker systems, that includes treble, mid-range, bass/midrange and bass drivers. By careful design of cabinet size and crossover frequencies, loudspeakers offering excellent sound quality can be constructed at a fraction of the cost of comparable commercially available systems. The book 'Designing, Building and Testing Your Own Loudspeaker Systems' by D. B. Weems (WG82D) is highly recommended. For a more in-depth analysis of loudspeaker design then the highly regarded 'The Loudspeaker Design Cookbook' by Vance Dickason (AA75S) is recommended. Another book that is worth reading is 'An Introduction to Loudspeakers and Enclosure Design' by V. Capel (WS31J).



40W Miniature Dome Tweeters

Audax



A miniature dome tweeter available with a round or rectangular escutcheon. This state-of-the-art advanced technology high performance tweeter, has excellent spatial dispersion and a transient response matching that of digital audio discs. It has a 10mm ultra-light polymer dome, active horn loaded and a formerless ferrofluid cooled voice coil. It can be used with a first order crossover of between 2.2μF and 4.7μF.

Specification

Flux density:	10,600 Gauss
Frequency response:	2500Hz to >25kHz
Power handling:	40W at 5kHz (DIN 45573)
Impedance:	8Ω
Coil diameter:	10.5mm
Free air resonance:	2900Hz ±400Hz
Acoustic output:	91.3dB (1W at 1m)

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Round Type
 Chassis diameter: 74mm
 Fixing centres: Three equidistant 4.2mm clear holes on a 60mm diameter circle.
 Baffle cut-out: 48mm

Rectangular Type
 Chassis size: 89 x 63.8mm
 Fixing centres: 74.5 x 48.5mm, 5mm clear
 Baffle cut-out: 48mm

Order Code	Type	Price each
FD94C	Mini Dome Twtr Rnd	£5.49
FD95D	Mini Dome Twtr Rect	£5.49

25W Shielded Dome Tweeter

A very compact, 10mm polymer dome tweeter with ultra-light moving parts and a formerless, ferrofluid cooled voice coil. The piston area is equally composed of dome and active suspension (balanced drive concept) offering a combination of musical qualities: spatial dispersion, exceptional transient response and a rich reproduction of harmonics. The tweeter is easily coupled using a 1st order crossover. The magnet is fully shielded (with a compensation magnet and shield) for audio/video applications where the speaker is in close proximity to a TV screen. The sensitivity is increased by 1.5dB due to concentrated flux in the gap.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 2,900Hz
 Frequency response: 2.5 to 20kHz
 Nominal power handling: 25W
 Sensitivity: 91dB
 Voice coil diameter: 10mm
 Minimum impedance: 6.4Ω
 DC resistance: 5.5Ω
 Voice coil inductance: 27μH
 Voice coil length: 2mm
 Number of coil layers: 2
 Magnet dimensions: 29 x 5mm
 Drive magnet weight: 17.1g
 Compensation magnet weight: 17.1g
 Flux density: 1.27T
 Magnetic gap height: 1.5mm
 Linear excursion: 0.25mm
 Dimensions: 60 x 60mm
 Fixing centres: 4 x 4.2mm dia. holes on 60mm dia. circle

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the dome.

Order Code	Type	Price each
RC75S	25W Shld 10mm Dome	£5.99

50W Dome Tweeter

A dome tweeter with a 25mm impregnated fabric soft dome. Its perfect linearity coupled with absence of colouration accounts for its high reputation for reproducing natural sound. An attractive metal domgrille is also available for use with this speaker.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 900Hz
 Frequency response: 800Hz to 20kHz
 Nominal power handling: 50W
 Sensitivity: 91dB
 Voice coil diameter: 25mm
 Minimum impedance: 6.5Ω
 DC resistance: 5.8Ω
 Voice coil inductance: 11μH
 Voice coil length: 1.6mm
 Former: Aluminium
 Number of coil layers: 2
 Magnet dimensions: 72 x 15mm
 Flux density: 1.5T
 Magnetic gap height: 3mm
 Linear excursion: 0.3mm
 Dimensions: 100mm diameter
 Fixing centres: 4 x 5mm dia. holes

Order Code	Type	Price each
YN43W A1	Hi-Fi Dome Tweeter	£14.99
FD93B	Grille for Dome Twtr	£1.55

70W 25mm Soft Dome Tweeter

A 1in. (25mm) impregnated textile dome tweeter suitable for the most demanding applications such as studio monitoring and Hi-Fi. It combines very high efficiency, high power handling and a wide frequency response that makes a lower than normal crossover frequency point possible. The critically damped textile dome ensures an exceptionally smooth roll-off, an absence of colouration and is generally responsible for this speaker's ability for highly accurate detail and natural sound. The faceplate is solid aluminium.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 1200Hz
 Frequency response: 1k to 20kHz
 Nominal power handling: 70W
 Sensitivity: 91dB
 Voice coil diameter: 25mm
 Minimum impedance: 7Ω
 DC resistance: 5.8Ω
 Voice coil inductance: 13μH
 Voice coil length: 1.6mm
 Former: Aluminium
 Number of coil layers: 2
 Magnet dimensions: 75 x 15
 Flux density: 1.6T
 Magnetic gap height: 3mm
 Linear excursion: 0.3mm
 Dimensions: 100mm diameter
 Fixing centres: 4 x 5mm dia. holes on 120mm dia. circle

Order Code	Type	Price each
RC81C	70W 25mm Soft Tweetr	£15.99

70W Titanium Composite Tweeter

A dome tweeter where the diaphragm is made from pure titanium which is ion deposited onto an advanced, glass fibre reinforced, soft polymer 1in. diaphragm. The composite that results offers increased stiffness with high internal damping, combining the advantages of pure metal domes while retaining the low distortion of soft domes. The result is a detailed sound reproduction for the best musical quality.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 1,500Hz
 Frequency response: 2 to 20kHz
 Nominal power handling: 70W
 Sensitivity: 93dB
 Voice coil diameter: 25mm
 Minimum impedance: 7Ω
 DC resistance: 5.8Ω
 Voice coil inductance: 13μH
 Voice coil length: 1.6mm
 Former: Aluminium
 Number of coil layers: 2
 Magnet dimensions: 72 x 15mm
 Magnet weight: 240.1g
 Flux density: 1.6T
 Magnetic gap height: 3mm
 Linear excursion: 0.3mm
 Dimensions: 100mm dia.

Order Code	Type	Price each
RC79L	70W Titanium Tweeter	£13.99

4in. 30W Mid-Range

A mid-range loudspeaker with a closed back sealed tuned cavity that is integrated into the chassis. The speaker has a formerless ferrofluid cooled voice coil attached to a paper cone with a coated corrugated paper suspension.



Specification
 Nominal impedance: 8Ω
 Resonant frequency: 1150Hz
 Useable frequency response: 900Hz to 12kHz
 Nominal power handling: 30W
 Sensitivity: 91dB
 Voice coil diameter: 10mm
 Minimum impedance: 7.1Ω
 DC resistance: 6.0Ω
 Voice coil inductance: 0.22μH
 Voice coil length: 5mm
 Number of coil layers: 2
 Magnet dimensions: 29 x 5mm
 Flux density: 1.0T
 Magnetic gap height: 2mm
 Linear excursion: 1.5mm
 Moving mass M_{ms} : 1.0 x 10⁻³kg
 Effective piston area S_d : 3.2 x 10⁻³m²
 Dimensions: 102 x 102 x 35.7mm deep
 Fixing centres: 4 x 4.5mm dia. holes on 98.2mm dia. circle
 Baffle cutout: 80mm dia.
 Total mass of unit: 0.67kg

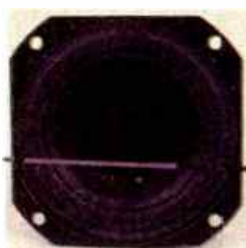
Order Code	Type	Price each
YN26D	Hi-Fi Spkr Mid-Range	£7.99

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3in. 20W Shielded Bass Driver

The compact size, low resonance and long throw capabilities of this driver make it ideal for use in miniature and bookshelf enclosures. The paper cone with half-roll foam suspension combine to produce a well extended frequency response. The high temperature, $\frac{3}{4}$ in. voice coil ensures good power handling. The magnet structure is fully shielded, including a compensation magnet, to allow close proximity of the speakers to magnetically sensitive items such as recording tapes and TV picture tubes without harm. Chassis is pressed steel.



Specification

Nominal impedance:	8Ω
Resonant frequency:	90Hz
Useable frequency response:	100Hz to 5kHz
Nominal power handling:	20W
Sensitivity:	83dB
Former:	Aluminium
Voice coil diameter:	20mm
Voice coil length:	7mm
Number of coil layers:	2
Magnet dimensions:	45 x 9mm, same for compensation magnet
Flux density:	0.8T
Magnetic gap height:	4mm
Linear excursion:	1.5mm
Dimensions:	78 x 78 x 58mm deep
Fixing centres:	4 x 4mm dia. holes on 84mm dia. circle
Baffle cutout:	78mm dia.
Total mass of unit:	0.31kg

Thiele-Small Parameters

Resonant frequency	F_s :	90Hz
Minimum impedance	Z_{min} :	6.6Ω
DC resistance	R_e :	5.8Ω
Voice coil inductance:	L_e :	0.2μH
BL product	BL:	2.6T-M
Suspension compliance	C_{ms} :	$1.3 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.78
Electrical Q factor	Q_{es} :	0.92
Total Q factor	Q_{ts} :	0.69
Mechanical resistance	R_{ms} :	0.47kg/s
Moving mass	M_{ms} :	$2.3 \times 10^{-3}kg$
Effective piston area	S:	$2.9 \times 10^{-3}m^2$
Volume equivalent air at C_{as}	V_{as} :	$1.6 \times 10^{-3}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC82D	20W 3in. Bass Spkr	£12.99

4in. 30W Shielded Bass Driver

The low free air resonance and compact paper cone of this 4in. bass and midrange driver make it ideally suited to miniature and bookshelf enclosures. The high temperature voice coil ensures good power handling up to 30W. The magnet structure is fully shielded and includes a compensation magnet for close operation to sensitive equipment in audio-video applications. Chassis is pressed steel.



Specification

Nominal impedance:	8Ω
Resonant frequency:	80Hz
Useable frequency response:	60Hz to 10kHz
Nominal power handling:	30W
Sensitivity:	83dB

Voice coil diameter:	25mm
Voice coil length:	10mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	(60 x 10mm) + (55 x 12mm)
Flux density:	0.87T
Magnetic gap height:	4mm
Linear excursion:	3mm
Dimensions:	104 x 104 x 66mm deep
Fixing centres:	4 x 5.2mm dia. holes on 106mm dia. circle
Baffle cutout:	91mm dia.
Total mass of unit:	0.56kg

Thiele-Small Parameters

Resonant frequency	F_s :	90Hz
Minimum impedance	Z_{min} :	6.6Ω
DC resistance	R_e :	5.7Ω
Voice coil inductance	L_e :	0.3μH
BL product	BL:	3.9T-M
Suspension compliance	C_{ms} :	$0.9 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.20
Electrical Q factor	Q_{es} :	0.82
Total Q factor	Q_{ts} :	0.60
Mechanical resistance	R_{ms} :	0.91kg/s
Moving mass	M_{ms} :	$4.0 \times 10^{-3}kg$
Effective piston area	S:	$5.8 \times 10^{-3}m^2$
Volume equivalent air at C_{as}	V_{as} :	$4.5 \times 10^{-3}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC83E	30W 4in Bass Spkr	£14.99

5in. 40W Bass Driver

A low resonance driver with compact paper cone with half roll foam surround suspension. This 5 $\frac{1}{4}$ in. bass to midrange driver is ideally suited for use in miniature speaker enclosures and 2-way bookshelf systems. The high temperature, 1in. voice coil ensures good power handling up to 40W r.m.s. Chassis is pressed steel.



Specification

Nominal impedance:	8Ω
Resonant frequency:	52Hz
Useable frequency response:	40Hz to 10kHz
Nominal power handling:	40W
Sensitivity:	88dB
Voice coil diameter:	25mm
Voice coil length:	11mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	84 x 15mm
Flux density:	1.1T
Magnetic gap height:	5mm
Linear excursion:	3mm
Dimensions:	142mm dia. x 65mm deep
Fixing centres:	4 x 5.2mm holes on 128mm dia. circle
Baffle cutout:	113mm dia.
Total mass of unit:	0.91kg

Thiele-Small Parameters

Resonant frequency	F_s :	52Hz
Minimum impedance	Z_{min} :	7.5Ω
DC resistance	R_e :	6.3Ω
Voice coil inductance	L_e :	0.3μH
BL product	BL:	5.5T-M
Suspension compliance	C_{ms} :	$1.7 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	1.47

Electrical Q factor	Q_{es} :	0.36
Total Q factor	Q_{ts} :	0.29
Mechanical resistance	R_{ms} :	1.16kg/s
Moving mass	M_{ms} :	$5.2 \times 10^{-3}kg$
Effective piston area	S:	$8.1 \times 10^{-3}m^2$
Volume equivalent air at C_{as}	V_{as} :	$1.6 \times 10^{-2}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC84F	40W 5.25in Bass	£15.99

6in. 50W Bass/Midrange

A bass and midrange loudspeaker that offers an extended frequency response, low resonance and high sensitivity at a very attractive price. Ideally suited for use in small volume 2-way systems, this unit features a paper cone with foam surround and a high temperature aluminium voice coil that offers excellent power handling and linearity.



Specification

Nominal impedance:	8Ω
Resonant frequency:	51Hz
Useable frequency response:	50Hz to 10kHz
Nominal power handling:	50W
Sensitivity:	90dB
Voice coil diameter:	25mm
Voice coil length:	11mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	84 x 15mm
Flux density:	1.1T
Magnetic gap height:	5mm
Linear excursion:	3mm
Dimensions:	173mm dia. x 74mm deep
Fixing centres:	4 x 5.2mm dia. holes on 157mm dia. circle
Baffle cutout:	142mm dia.
Total mass of unit:	0.95kg

Thiele-Small Parameters

Resonant frequency	F_s :	51Hz
Minimum impedance	Z_{min} :	7.5Ω
DC resistance	R_e :	6.6Ω
Voice coil inductance	L_e :	0.2μH
BL product	BL:	5.8T-M
Suspension compliance	C_{ms} :	$1.2 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.05
Electrical Q factor	Q_{es} :	0.51
Total Q factor	Q_{ts} :	0.41
Mechanical resistance	R_{ms} :	1.27kg/s
Moving mass	M_{ms} :	$8.1 \times 10^{-3}kg$
Effective piston area	S:	$1.4 \times 10^{-2}m^2$
Volume equivalent air at C_{as}	V_{as} :	$3.3 \times 10^{-2}m^3$

Order Code	Type	Price each
YJ17T A1	Hi-Fi Spkr 40W 6.5in	£13.99

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6in. 50W Fibreglass Cone Bass Driver

A very high quality bass and mid-range loudspeaker with a varnished, woven, fibreglass cone that is coupled to a half-roll, high loss rubber surround. The loudspeaker features a large magnet and low resonance, and produces a very detailed, clear sound with a smooth frequency response. Chassis is pressed steel.



Specification

Nominal impedance:	8Ω
Resonant frequency:	44Hz
Useable frequency response:	45Hz to 7kHz
Nominal power handling:	50W
Sensitivity:	90dB
Voice coil diameter:	25mm
Voice coil length:	11mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	100 x 18mm
Flux density:	1.3T
Magnetic gap height:	6mm
Linear excursion:	2.5mm
Dimensions:	173mm dia. x 78mm deep

Fixing centres:	4 x 5.2mm holes on 157mm dia. circle
Baffle cutout:	142mm dia.
Total mass of unit:	1.5kg

Thiele-Small Parameter

Resonant frequency	F_s :	44Hz
Minimum impedance	Z_{min} :	7.5Ω
DC resistance	R_e :	6.5Ω
Voice coil inductance:	L_e :	0.12μH
BL product	BL:	6.6T·m
Suspension compliance	C_{ms} :	$1.25 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.66
Electrical Q factor	Q_{es} :	0.43
Total Q factor	Q_{ts} :	0.37
Mechanical resistance	R_{ms} :	1.09kg/s
Moving mass	M_{ms} :	$1.05 \times 10^{-2}kg$
Effective piston area	S:	$1.4 \times 10^{-2}m^2$
Volume equivalent	V_{as} :	$3.3 \times 10^{-2}m^3$

Order Code	Type	Price each
YN25C C4	Hi-Fi Spkr Fib-Glass	£24.99

6in. 50W Kevlar Cone Bass Driver

Ideally suited for top-end systems, this 6½ in. bass to midrange driver features a black woven kevlar cone coupled to a half-roll, butyl rubber surround suspension. The large magnet, high temperature voice coil and low free air resonance contribute to the clarity, transient response and excellent musical tonal quality produced by this driver. Chassis is pressed steel.



Specification

Nominal impedance:	8Ω
Resonant frequency:	43Hz
Useable frequency response:	50Hz to 7kHz
Nominal power handling:	50W
Sensitivity:	89dB
Voice coil diameter:	25mm
Voice coil length:	11mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	100 x 18mm

Flux density:	1.3T
Magnetic gap height:	6mm
Linear excursion:	2.5mm
Dimensions:	173mm dia. x 77.8mm deep
Fixing centres:	4 x 5.2mm dia. holes on 157mm dia. circle
Baffle cutout:	142mm dia.
Total mass of unit:	1.5kg

Thiele-Small Parameters

Resonant frequency	F_s :	43Hz
Minimum impedance	Z_{min} :	7.5Ω
DC resistance	R_e :	6.5Ω
Voice coil inductance:	L_e :	0.12μH
BL product	BL:	6.6T·M
Suspension compliance	C_{ms} :	$1.2 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.26
Electrical Q factor	Q_{es} :	0.48
Total Q factor	Q_{ts} :	0.39
Mechanical resistance	R_{ms} :	1.32kg/s
Moving mass	M_{ms} :	$1.1 \times 10^{-2}kg$
Effective piston area	S:	$1.4 \times 10^{-2}m^2$
Volume equivalent	V_{as} :	$3.3 \times 10^{-2}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC87U C4	50W 6.5in Kevlar	£26.99

8in. 45W Bass/Midrange Driver



The corrugated paper surround of this 8in. diameter bass to midrange driver is coated with a proprietary, visco-elastic damping compound making its performance ideal for 2-way and 3-way systems. The high 1in. temperature voice coil is specially wound to ensure good power handling capability.

Specification

Nominal impedance:	8Ω
Resonant frequency:	58Hz
Useable frequency response:	60Hz to 10kHz
Nominal power handling:	45W
Sensitivity:	92dB
Voice coil diameter:	25mm
Voice coil length:	10mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	72 x 15mm
Flux density:	1.0T
Magnetic gap height:	4mm
Linear excursion:	3mm
Dimensions:	209mm dia. x 86mm deep
Fixing centres:	4 x 5.2mm dia. holes on 199mm dia. circle
Baffle cutout:	184mm dia.
Total mass of unit:	0.74kg

Thiele-Small Parameters

Resonant frequency	F_s :	58Hz
Minimum impedance	Z_{min} :	6.5Ω
DC resistance	R_e :	5.7Ω
Voice coil inductance	L_e :	0.2μH
BL product	BL:	4.0T·M
Suspension compliance	C_{ms} :	$8.0 \times 10^{-4}m/N$

Mechanical Q factor	Q_{ms} :	3.77
Electrical Q factor	Q_{es} :	1.31
Total Q factor	Q_{ts} :	0.97
Mechanical resistance	R_{ms} :	0.95kg/s
Moving mass	M_{ms} :	$9.8 \times 10^{-3}kg$
Effective piston area	S:	$2.14 \times 10^{-2}m^2$
Volume equivalent	V_{as} :	$5.2 \times 10^{-2}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC89W A3	45W 8in. Paper Bass	£16.99

8in. 50W Low Resonance Bass Driver



The paper cone with half-roll foam surround of this 8in. diameter bass to midrange driver offers a combination of extended frequency response, low resonance (37Hz) and high sensitivity. The driver is ideally suited for 2-way and 3-way systems in modest sized ported or unported cabinets. The high temperature 1in. diameter voice coil ensures excellent power handling capability up to 50W r.m.s. Chassis is pressed steel.

Specification

Nominal impedance:	8Ω
Resonant frequency:	37Hz
Useable frequency response:	40Hz to 7kHz
Nominal power handling:	50W
Sensitivity:	92dB
Voice coil diameter:	25mm
Voice coil length:	11mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	84 x 15mm
Flux density:	1.1T
Magnetic gap height:	5mm
Linear excursion:	3mm
Dimensions:	213mm dia. x 88mm deep
Fixing centres:	4 x 5.2mm holes on 199mm dia. circle
Baffle cutout:	184mm dia.
Total mass of unit:	1kg

Thiele-Small Parameters

Resonant frequency	F_s :	37Hz
Minimum impedance	Z_{min} :	7.5Ω
DC resistance	R_e :	6.5Ω
Voice coil inductance	L_e :	0.34μH
BL product	BL:	6.1T·M
Suspension compliance	C_{ms} :	$1.2 \times 10^{-3}m/N$
Mechanical Q factor	Q_{ms} :	2.51
Electrical Q factor	Q_{es} :	0.58
Total Q factor	Q_{ts} :	0.47
Mechanical resistance	R_{ms} :	1.4kg/s
Moving mass	M_{ms} :	$1.4 \times 10^{-2}kg$
Effective piston area	S:	$2.4 \times 10^{-2}m^2$
Volume equivalent	V_{as} :	$9.1 \times 10^{-2}m^3$

Note that the voice coil overhangs the magnetic gap to ensure linear excursion of the cone.

Order Code	Type	Price each
RC88V A3	50W 8in. Bass Spkr	£19.99

8in. 55W Fullrange Driver



An 8in. diameter fullrange driver with a very high sensitivity and a dual cone to extend frequency response. It is ideally suited to public address and background music applications. The corrugated paper surround is coated with a visco-elastic damping compound to control the paper cone throughout the extended range. Chassis is pressed steel.

Specification

Nominal impedance:	8Ω
Resonant frequency:	55Hz
Useable frequency response:	60Hz to 15kHz
Nominal power handling:	55W
Sensitivity:	94dB
Voice coil diameter:	25mm
Voice coil length:	7mm
Former:	Aluminium
Number of coil layers:	2
Magnet dimensions:	100 x 18mm
Flux density:	1.3T
Magnetic gap height:	6mm
Linear excursion:	0.5mm
Dimensions:	209mm dia. x 93mm deep
Fixing centres:	4 x 5.2mm dia. holes on 199mm dia. circle
Baffle cutout:	184mm dia.
Total mass of unit:	1.5kg

Thiele-Small Parameter

Resonant frequency	F_s :	55Hz
Minimum impedance	Z_{min} :	8.1Ω
DC resistance	R_e :	7.6Ω
Voice coil inductance	L_e :	0.27μH
BL product	BL:	5.8T-M
Suspension compliance	C_{ms} :	9.3×10^{-4} m/N
Mechanical Q factor	Q_{ms} :	2.91
Electrical Q factor	Q_{es} :	0.69
Total Q factor	Q_{ts} :	0.56
Mechanical resistance	R_{ms} :	1.08kg/s
Moving mass	M_{ms} :	9.1×10^{-3} kg
Effective piston area	S:	2.16×10^{-2} m ²
Volume equivalent air at C_{as}	V_{as} :	6.1×10^{-2} m ³

Order		
Code	Type	Price each
RC90X	B4 55W 8in. Twin Cone	£19.99

IN-CAR LOUDSPEAKERS

Eminence

A range of high power loudspeaker drivers specifically designed for use in cars and in particular for mounting into a rear parcel shelf. All the drivers are designated 'free air' types, that is, they have been specially developed to operate in a closed box volume (infinite baffle type enclosure), and they *must not* be installed in any type of ported enclosure. The half-roll cone surround not only makes for good bass response but also helps isolate the cone from vehicle vibrations, ensuring a clearer reproduction with less colouration. In addition the cone is coated to resist damp and add extra rigidity to stabilise the cone material against the wide range of temperature variations that are commonly experienced in the car.

Powerful magnet assemblies are designed to provide extended travel for the speaker cone through using an 'overhanging' voice coil where the magnetic gap height is typically only half of the total voice coil length. This

allows the cone to operate more linearly when driven hard. These are not modified Hi-Fi or PA speakers, nor are they merely scaled-up 'ordinary' car speakers, but have been specially developed for parcel shelf operation. It is also possible to operate these drivers in an infinite baffle enclosure with the equivalent closed volume.

'Killer Car Stereo on a Budget' by Daniel L. Ferguson (AA77J) provides a wealth of information about in-car speaker systems.



▶ IT'S A FACT! ◀

LOUDSPEAKER SENSITIVITY

Loudspeaker sensitivity is the sound pressure level (SPL) a loudspeaker produces at 1m, when it is driven with 1W of pink noise. Pink noise is defined as random noise with equal energy per octave. A sensitivity of 93dB SPL is generally high and is typical of studio monitors and PA systems. A sensitivity of 85dB SPL is generally considered low and is typical of small compact domestic loudspeakers. The following formula calculates the maximum output capability of a loudspeaker - that is, the sound pressure level at 1m:

$$\text{dB SPL} = 10 \log(P) + S$$

P is the continuous sine wave power rating of the loudspeaker, and S is the sensitivity rating in dB SPL/1W/1m.

Thus for a loudspeaker rated at 100W rms, and its sensitivity is 92dB SPL/W/m, then its maximum output is:

$$10 \log(100) + 92 = 112\text{dB}$$

6in. 100W Bass to Midrange Driver



Offers high power in a compact size, with a smooth frequency response in any range from bass to midrange in 2-way systems, and selected midrange or bass ranges in multi-way systems.

Specification

Nominal impedance:	4Ω
Resonant frequency:	66Hz
Usable frequency response:	60Hz to 3kHz
Nominal power handling:	100W
Sensitivity:	90dB
Voice coil diameter:	38mm
Magnet weight:	16oz
Dimensions:	166mm dia. x 83.5mm deep
Fixing holes:	4 x 7mm
Baffle cutout:	146mm dia.
Enclosure size:	27.7L/0.98cu.ft for 80Hz min.

Thiele-Small Parameters

Resonant frequency	f_s :	66.12Hz
Impedance	R_e :	3.70Ω
Coil inductance	L_e :	0.53mH
Electromagnetic Q	Q_{es} :	0.63
Mechanical Q	Q_{ms} :	8.14
Total Q	Q_{ts} :	0.59
Compliance equivalent volume	V_{as} :	12.00L/0.42cu.ft
Peak diaphragm displacement volume	V_d :	48.59cc
Suspension mechanical compliance	C_{ms} :	0.4822mm/N
BL product	BL:	5.41T-M
Diaphragm mass including airload	M_{ms} :	12.02g
Equivalent mechanical resistance loss	R_{ms} :	0.5460N*sec/m
Efficiency bandwidth product	EBP:	104.7
Voice coil overhang	X_{max} :	3.7mm
Cone area	S_d :	133.09cm ²
Resonant impedance	Z_{max} :	57.3Ω

Order		
Code	Type	Price each
MK45Y	C5 50W 6.5in Driver	£39.99

8in. 150W Bass to Midrange Driver



Offering high power in a compact size, this driver is capable of handling 150W yet will fit in most rear parcel shelves. The extended frequency response delivers smooth sound in any range from bass to midrange in 2-way systems, and selected midrange or bass in multi-way systems.

Specification

Nominal impedance:	4Ω
Resonant frequency:	58Hz
Usable frequency response:	45Hz to 3kHz
Nominal power handling:	150W
Sensitivity:	94dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	210mm dia. x 96.5mm deep
Fixing holes:	8 x 7mm
Baffle cutout:	187mm dia.
Enclosure size:	34.5L/1.22cu.ft for 73Hz min.

Thiele-Small Parameters

Resonant frequency	f_s :	58.69Hz
Impedance	R_e :	3.10Ω
Coil inductance	L_e :	0.66mH
Electromagnetic Q	Q_{es} :	0.60
Mechanical Q	Q_{ms} :	13.71
Total Q	Q_{ts} :	0.57
Compliance equivalent volume	V_{as} :	18.43L/0.65cu.ft
Peak diaphragm displacement volume	V_d :	98.49cc
Suspension mechanical compliance	C_{ms} :	0.2863mm/N

BL product	BL:	7-02T-M
Diaphragm mass including airload	M_{ms} :	25.69g
Equivalent mechanical resistance loss	R_{ms} :	0.6910N*sec/m
Efficiency bandwidth product	EBP:	98.5
Voice coil overhang	X_{max} :	4.6mm
Cone area	S_d :	214.08cm ²
Resonant impedance	Z_{max} :	74.5Ω

Order			4636
Code	Type	Price each	
MK46A F7	100W 8in. Bass Drvr	£49.99	

10in. 200W Bass Driver



A high power, compact bass driver is capable of handling 200W yet will fit in most rear parcel shelves. This speaker is ideal in a fundamental bass role in 2-way systems and multi-way systems. Yet the extended frequency response can extend to 3 or 4kHz, allowing midrange to be accurately reproduced if necessary.

Specification	
Nominal impedance:	4Ω
Resonant frequency:	44Hz
Usable frequency response:	40Hz to 4kHz
Nominal power handling:	200W
Sensitivity:	94dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	256mm dia. x 113mm deep
Fixing holes:	8 x 7mm
Baffle cutout:	235mm dia.
Enclosure size:	109.0L/3.85cu.ft for 54Hz min.

Thiele-Small Parameters	
Resonant frequency	f_s : 43-60Hz
Impedance	R_e : 3.10Ω
Coil inductance	L_e : 0.71mH
Electromagnetic Q	Q_{es} : 0.61
Mechanical Q	Q_{ms} : 9.21
Total Q	Q_{ts} : 0.57
Compliance equivalent volume	V_{as} : 56.48L/1.99cu.ft
Peak diaphragm displacement volume	V_d : 158.66cc
Suspension mechanical compliance	C_{ms} : 0.3381mm/N
BL product	BL: 7.40T-M
Diaphragm mass including airload	M_{ms} : 39.41g
Equivalent mechanical resistance loss	R_{ms} : 1.1728N*sec/m
Efficiency bandwidth product	EBP: 71.3
Voice coil overhang	X_{max} : 4.6mm
Cone area	S_d : 344.88cm ²
Resonant impedance	Z_{max} : 49.7Ω

Order			4643
Code	Type	Price each	
MK47B H9	100W 10in. Bas; Drvr	£59.99	

12in. 200W Bass Driver



Ideal for bass reproduction in any in-car sound system, combining low resonance with a high power rating. Ideal as a common bass driver in multi-way systems, and its frequency response can extend to 3kHz, allowing midrange to be accurately reproduced if required.

Specification	
Nominal impedance:	4Ω
Resonant frequency:	42Hz
Usable frequency response:	33Hz to 3kHz
Nominal power handling:	200W
Sensitivity:	96dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	305mm dia. x 142mm deep
Fixing holes:	8 x 7mm
Baffle cutout:	284mm dia.
Enclosure size:	292.3L/4.87cu.ft for 45Hz min.

Thiele-Small Parameters	
Resonant frequency	f_s : 21-92Hz
Impedance	R_e : 4.00Ω
Coil inductance	L_e : 1.10mH
Electromagnetic Q	Q_{es} : 0.37
Mechanical Q	Q_{ms} : 11.41
Total Q	Q_{ts} : 0.36
Compliance equivalent volume	V_{as} : 858.59L/30.32cu.ft
Peak diaphragm displacement volume	V_d : 624.41cc
Suspension mechanical compliance	C_{ms} : 0.4703mm/N
BL product	BL: 12.96T-M
Diaphragm mass including airload	M_{ms} : 112.09g
Equivalent mechanical resistance loss	R_{ms} : 1.3527N*sec/m
Efficiency bandwidth product	EBP: 59.6
Voice coil overhang	X_{max} : 4.6mm
Cone area	S_d : 1140.09cm ²
Resonant impedance	Z_{max} : 128.1Ω

Order			4646
Code	Type	Price each	
MK48C H3	100W 12in. Bass Drvr	£69.99	

15in. 300W Bass Driver

If you want even more power then this driver provides an increase both in power handling and cone area. Primarily a bass speaker and, in view of its size, best utilised as a common bass driver in a 3-way system having stereo midrange and treble channels. It still maintains a broad frequency response to be useful in the midrange too.

Specification	
Nominal impedance:	4Ω
Resonant frequency:	38Hz
Usable frequency response:	25Hz to 2kHz
Nominal power handling:	300W
Sensitivity:	99dB
Voice coil diameter:	64mm
Magnet weight:	56oz
Dimensions:	383.5mm dia. x 166mm deep
Fixing holes:	8 x 7mm
Baffle cutout:	359mm dia.



Thiele-Small Parameters	
Resonant frequency	f_s : 38.3Hz
Impedance	R_e : 3.90Ω
Coil inductance	L_e : 0.97mH
Electromagnetic Q	Q_{es} : 0.93
Mechanical Q	Q_{ms} : 13.07
Total Q	Q_{ts} : 0.87
Compliance equivalent volume	V_{as} : 211.03L/7.45cu.ft
Peak diaphragm displacement volume	V_d : 312.67cc
Suspension mechanical compliance	C_{ms} : 0.2049mm/N
BL product	BL: 9.21T-M
Diaphragm mass including airload	M_{ms} : 84.28g
Equivalent mechanical resistance loss	R_{ms} : 1.5521N*sec/m
Efficiency bandwidth product	EBP: 41.1
Voice coil overhang	X_{max} : 3.7mm
Cone area	S_d : 856.34cm ²

Order			4649
Code	Type	Price each	
MK49D H14	150W 15in. Bass Drvr	£94.99	

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18in. 400W Bass Driver



The ultimate loudspeaker in this range, it is for those who firmly believe that there is no substitute for size. This driver has been optimised for bass and sub-woofer applications, and although it has a usable if limited frequency response it should not be expected to operate well in the midrange in 2-way systems. Rather it should form the common bass driver in 3-way and multi-way systems.

Specification

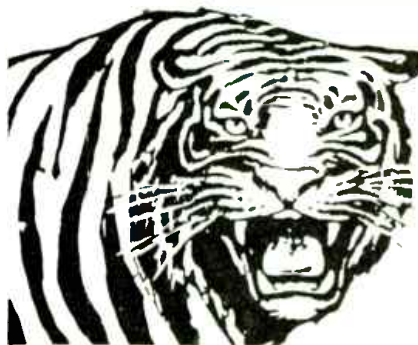
Nominal impedance:	4Ω
Resonant frequency:	22Hz
Usable frequency response:	20Hz to 1kHz
Nominal power handling:	400W
Sensitivity:	99dB
Voice coil diameter:	76mm
Magnet weight:	95oz
Dimensions:	457mm dia. x 181mm deep
Fixing centres:	8 x 7mm
Baffle cutout:	422mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	21.92Hz
Impedance	R_e :	4.00Ω
Coil inductance	L_e :	1.10mH
Electromagnetic Q	Q_{es} :	0.37
Mechanical Q	Q_{ms} :	11.41
Total Q	Q_{ts} :	0.36
Compliance equivalent volume	V_{as} :	858.59L/30.32cu.ft
Peak diaphragm displacement volume	V_d :	624.41cc
Suspension mechanical compliance	C_{ms} :	0.4703mm/N
BL product	BL:	12.96T-M
Diaphragm mass including airload	M_{ms} :	112.09g
Equivalent mechanical resistance loss	R_{ms} :	1.3527 N*sec/m
Efficiency bandwidth product	EBP:	59.6
Voice coil overhang	X_{max} :	5.5mm
Cone area	S_d :	1140.09cm ²

Order Code	Type	Price each
MK50E	H20 200W 18in Bass Dvr	£179.99

HIGH POWER, HIGH QUALITY LOUDSPEAKERS



BIG CAT

by Eminence

A versatile range of loudspeakers for guitars, bass guitars, keyboards and PA applications. To emphasise the unique qualities of the complex guitar sound, a specially tuned cone has been developed, which when used with different edge surround materials also meets the demands of other applications. The cone surround material for the majority of the speakers is plasticised linen, but other materials are used for selected units. A linen edge gives a smooth surround and excellent bass response, and is particularly suitable for bass guitars, keyboards and for bass drivers in multi-way enclosures and PA systems. For dedicated lead and rhythm guitar Eminence recognised that only a paper edge can deliver the characteristic presence peak which these instruments demand. Most of the units featured have a strong steel chassis and offer a unrivalled blend of value for money and sound quality. For those applications where only the best will do, such as professional PA and monitoring systems then those with a cast aluminium chassis should be chosen. A rigid chassis is essential to maintain tight engineering tolerances that is necessary to withstand the punishment that speakers 'on-the-road' experience.

This superb range of speakers includes loudspeakers that are suitable for the most demanding applications for musical instruments and PA installations. The term PA covers a diversity of applications from speech and music to live and pre-recorded sources, concerts, cabaret, churches, conferences, and night-clubs, both by 'mobiles' and in permanent installations.

6in. 50W Power Speaker

A compact loudspeaker designed for general purpose applications and as part of a high quality in-car entertainment system. The loudspeaker features a paper cone and a resilient foam surround.



Specification

Nominal impedance:	8Ω
Resonant frequency:	50Hz
Usable frequency response:	55Hz to 8kHz
Nominal power handling:	50W rms
Sensitivity:	89dB
Voice coil diameter:	38mm
Magnet weight:	20oz
Dimensions:	165mm dia. x mm deep
Fixing centres:	4 x 6.35mm dia. holes on 153mm dia. circle
Baffle cutout:	145mm dia.

Thiele-Small Parameters

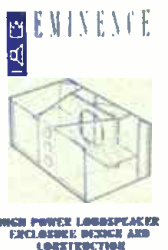
Resonant frequency	f_s :	58.2Hz
Impedance	R_e :	7Ω
Electromagnetic Q	Q_{es} :	0.64
Mechanical Q	Q_{ms} :	7.0
Total Q	Q_{ts} :	0.61

Compliance equivalent volume	V_{as} :	13.731L/0.485cu.ft
Peak diaphragm displacement volume	V_d :	46.25cc
Suspension mechanical compliance	C_{ms} :	0.6093mm/N
BL product	BL:	6.6T-M
Diaphragm mass including airload	M_{ms} :	12.3g
Equivalent mechanical resistance loss	R_{ms} :	0.6657N*sec/m
Efficiency bandwidth product	EBP:	91.0
Cone area	S_d :	126.68cm ²
Resonant impedance	Z_{max} :	43.7Ω

Order Code	Type	Price each
XP25C	C4 Speaker 6.5-50/F 8R	£32.99

Recommended Reading

Loudspeakers Enclosure Design and Construction



for Maplin's BIG CAT range of Loudspeakers

Order using code WM82D £9.95NV

8in. 100W Midrange Driver



A paper cone driver with corrugated surround optimised for midrange use over a bandwidth of 600Hz to 4kHz in 3-way systems. Because of the specialised nature of this driver it is not suitable for use on its own or as a bass unit. In a 3-way system it can be used with any of the other bass and treble drivers in the same range.

Specification

Nominal impedance:	8Ω
Resonant frequency:	550Hz
Usable frequency response:	600Hz to 4kHz
Nominal power handling:	100W rms
Sensitivity:	99.7dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	203mm dia. x 89mm deep
Fixing centres:	8 x 7mm dia. holes on 197mm dia. circle
Baffle cutout:	187.3mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	547.40Hz
Impedance	R_e :	7.08Ω
Coil inductance	L_e :	0.14mH
Electromagnetic Q	Q_{es} :	2.060
Mechanical Q	Q_{ms} :	6.83
Total Q	Q_{ts} :	1.580
Compliance equivalent volume	V_{as} :	0.76L/0.027cu.ft
Suspension mechanical compliance	C_{ms} :	0.0119mm/N
BL product	BL:	9.18T-M

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Diaphragm mass including airload	M_{ms} :	7.13g
Equivalent mechanical resistance loss	R_{ms} :	3.5198N*sec/m
Efficiency bandwidth product	EBP:	65.0
Cone area	S_d :	214.08cm ²

Order Code	Type	Price each
RC91Y	D6 100W 8in. Midrange	£29.99

8in. 100W Power Speaker



A paper cone driver with plasticised linen surround that is suitable for general purpose use such as vocal PA, keyboards, discotheques, stage monitors and bass guitar.

Specification

Nominal impedance:	8Ω
Resonant frequency:	72Hz
Usable frequency response:	72Hz to 4kHz
Nominal power handling:	100W rms
Sensitivity:	99.7dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	203mm dia. x 82mm deep
Fixing centres:	8 x 7mm dia. holes on 197mm dia. circle
Baffle cutout:	187.3mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	72.5Hz
Impedance	R_e :	7.21Ω
Coil inductance	L_e :	0.73mH
Electromagnetic Q	Q_{es} :	0.27
Mechanical Q	Q_{ms} :	5.26
Total Q	Q_{ts} :	0.26
Compliance equivalent volume	V_{as} :	27.20L/0.96cu.ft
Peak diaphragm displacement volume	V_d :	19.7cc
Suspension mechanical compliance	C_{ms} :	0.4226mm/N
BL product	BL:	11.81T-M
Diaphragm mass including airload	M_{ms} :	11.40g
Equivalent mechanical resistance loss	R_{ms} :	0.9868N*sec/m
Efficiency bandwidth product	EBP:	269.9
Cone area	S_d :	214.08cm ²

Order Code	Type	Price each
XG43W	E7 Speaker 8-10C/L 8R	£39.99

10in. 100W Power Speaker



A loudspeaker optimised for lead guitar, also suitable for bass guitar, vocal PA, keyboards, discotheques, club music systems and stage monitors. Chassis is pressed steel.

Specification

Nominal impedance:	8Ω
Resonant frequency:	71Hz
Usable frequency response:	70Hz to 7kHz
Nominal power handling:	100W rms
Sensitivity:	97dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	254mm dia. x 101mm deep
Fixing centres:	8 x 7mm on 244.5mm dia. circle
Baffle cutout:	235mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	71Hz
Impedance	R_e :	6.38Ω
Electromagnetic Q	Q_{es} :	0.36
Mechanical Q	Q_{ms} :	4.85
Total Q	Q_{ts} :	0.34
Compliance equivalent volume	V_{as} :	49.2L/1.74cu.ft
Peak diaphragm displacement volume	V_d :	31.73cc
Suspension mechanical compliance	C_{ms} :	0.2945mm/N
BL product	BL:	11.97T-M
Diaphragm mass including airload	M_{ms} :	17.06g
Equivalent mechanical resistance loss	R_{ms} :	1.5961
Efficiency bandwidth product	EBP:	195.8
Voice coil overhang	X_{max} :	0.9mm
Surface area of cone	S_d :	344.88cm ²
Resonant impedance	Z_{max} :	98.2Ω

Order Code	Type	Price each
XG46A	E8 Speaker 10-100/L 8R	£42.99

10in. 200W PA Driver



A 200W paper cone driver with corrugated surround with a performance optimised for lead guitar. Also suitable for bass guitar, vocal PA, keyboards, discotheques, club music systems and stage monitors. Chassis is pressed steel.

Specification

Nominal impedance:	8Ω
Resonant frequency:	65Hz
Usable frequency response:	60Hz to 5kHz

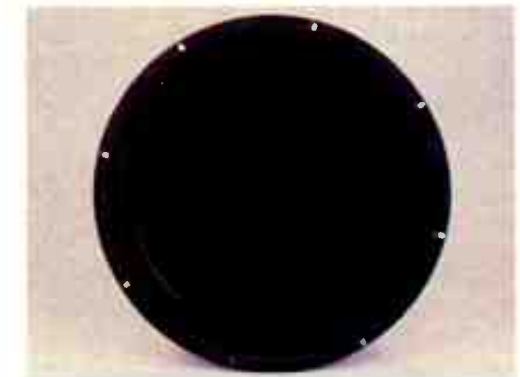
Nominal power handling:	200W rms
Sensitivity:	99dB
Voice coil diameter:	63.5mm
Magnet weight:	56oz
Dimensions:	254mm dia. x 108mm deep
Fixing centres:	8 x 7mm on 244.5mm dia. circle
Baffle cutout:	235mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	65.4Hz
Impedance	R_e :	5.67Ω
Electromagnetic Q	Q_{es} :	0.35
Mechanical Q	Q_{ms} :	8.34
Total Q	Q_{ts} :	0.33
Compliance equivalent volume	V_{as} :	35.53L/1.24cu.ft
Peak diaphragm displacement volume	V_d :	62.96cc
Suspension mechanical compliance	C_{ms} :	0.2127
BL product	BL:	13.69
Diaphragm mass including airload	M_{ms} :	27.85
Equivalent mechanical resistance loss	R_{ms} :	1.3727
Efficiency bandwidth product	EBP:	189.0
Voice coil overhang	X_{max} :	1.8mm
Surface area of cone	S_d :	344.00cm ²
Resonant impedance	Z_{max} :	142.3Ω

Order Code	Type	Price each
RC92A	G12 200W 10in. PA Driver	£54.99

12in. 100W General Purpose Power Speaker



A general purpose loudspeaker suitable for use in sound reinforcement systems, bass and lead guitar, keyboards, guitar combo's, club music systems and stage monitors. The loudspeaker has a paper cone with a plasticised linen surround and a pressed steel chassis.

Specification

Nominal impedance:	8Ω
Resonant frequency:	49Hz
Usable frequency response:	49Hz to 6kHz
Nominal power handling:	100W rms
Sensitivity:	100dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	309mm dia. x 113.5mm deep
Fixing centres:	8 x 7mm on 293.7mm dia. circle
Baffle cutout:	284.2mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	49.50Hz
Impedance	R_e :	7.08Ω
Electromagnetic Q	Q_{es} :	0.45
Mechanical Q	Q_{ms} :	7.89
Total Q	Q_{ts} :	0.41
Compliance equivalent volume	V_{as} :	128.86L/4.55cu.ft

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Continued from previous page

Peak diaphragm displacement volume	V_d :	47.80cc
Suspension mechanical compliance	C_{ms} :	0.34mm/N
BL product	BL:	12.43T-M
Diaphragm mass including airload	M_{ms} :	30.40g
Equivalent mechanical resistance loss	R_{ms} :	1.1989N*sec/m
Efficiency bandwidth product	EBP:	114.2
Voice coil overhang	X_{max} :	0.9mm
Cone area	S_d :	519.45cm ²
Resonant impedance	Z_{max} :	136.0Ω

Order Code	Type	Price each
XG49D	F9 Speaker 12-100/L 8R	£44.99

12in. 100W Twin Cone Power Speaker



A general purpose loudspeaker that features a twin cone to provide extended high frequency response. Ideal for use in full range PA systems, keyboard combos, club music systems and stage monitors. Available in 8Ω and 16Ω versions with a paper cone and plasticised linen surround. Steel chassis.

Specification

Nominal impedance:	8Ω or 16Ω
Resonant frequency:	42Hz
Usable frequency response:	42Hz to 10kHz
Nominal power handling:	100W rms
Sensitivity:	98dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions:	309mm dia. x 113.5mm deep

Fixing centres: 8 x 7mm on 293.7mm dia. circle
Baffle cutout: 284.2mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	42.21Hz
Impedance	R_e :	7.14Ω
Electromagnetic Q	Q_{es} :	0.40
Mechanical Q	Q_{ms} :	3.25
Total Q	Q_{ts} :	0.36
Compliance equivalent volume	V_{as} :	170.26L/6.01cu.ft

Peak diaphragm displacement volume	V_d :	47.42cc
Suspension mechanical compliance	C_{ms} :	0.4493mm/N
BL product	BL:	12.24T-M
Diaphragm mass including airload	M_{ms} :	31.65g
Equivalent mechanical resistance loss	R_{ms} :	2.5822N*sec/m
Efficiency bandwidth product	EBP:	105.5
Voice coil overhang	X_{max} :	0.9mm
Cone area	S_d :	519.45cm ²
Resonant impedance	Z_{max} :	65.1Ω

Order Code	Type	Price each
XG50E	F9 Speaker 12-100/TL 8R	£44.99
XG51F	F9 Speaker 12-100/TL16R	£44.99

12in. 100W Rock Speaker



A loudspeaker specifically intended for use with lead guitar. The paper cone and surround helps to recreate the legendary sound of the sixties rock scene, so providing a subtle mix of tonal and overdrive characteristics.

Specification

Nominal impedance:	8Ω
Resonant frequency:	58Hz
Usable frequency response:	60Hz to 5kHz
Nominal power handling:	100W rms
Sensitivity:	98dB
Voice coil diameter:	63.5mm
Magnet weight:	56oz
Dimensions:	309mm dia. x 118.3mm deep

Fixing centres: 8 x 7mm on 293mm dia. circle
Baffle cutout: 284mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	58.52Hz
Impedance	R_e :	6.31Ω
Electromagnetic Q	Q_{es} :	0.52
Mechanical Q	Q_{ms} :	7.04
Total Q	Q_{ts} :	0.48

Compliance equivalent volume	V_{as} :	87.06L/3.07cu.ft
Peak diaphragm displacement volume	V_d :	140.35cc
Suspension mechanical compliance	C_{ms} :	0.2297mm/N
BL product	BL:	12.02T-M
Diaphragm mass including airload	M_{ms} :	32.2g
Equivalent mechanical resistance loss	R_{ms} :	1.6823N*sec/m
Efficiency bandwidth product	EBP:	102.3
Voice coil overhang	X_{max} :	2.7mm
Cone area	S_d :	519.45cm ²
Resonant impedance	Z_{max} :	92.2Ω

Order Code	Type	Price each
XJ51F	D9 Rock Sp 12-100/P 8R	£42.99

12in. 200W Power Speaker



A 12in. 200W paper cone driver with corrugated surround, optimised for sound reinforcement systems. Also suitable for lead and bass guitar, keyboards, guitar combos, club music systems and stage monitors. Chassis is pressed steel.

Specification

Nominal impedance:	8Ω
Resonant frequency:	58Hz
Usable frequency response:	60Hz to 5kHz
Nominal power handling:	200W rms
Sensitivity:	98dB
Voice coil diameter:	63.5mm
Magnet weight:	56oz
Dimensions:	309mm dia. x 118.3mm deep

Fixing centres: 8 x 7mm on 293mm dia. circle
Baffle cutout: 284mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	58.52Hz
Impedance	R_e :	6.31Ω
Electromagnetic Q	Q_{es} :	0.52
Mechanical Q	Q_{ms} :	7.04
Total Q	Q_{ts} :	0.48

Compliance equivalent volume	V_{as} :	87.06L/3.07cu.ft
Peak diaphragm displacement volume	V_d :	140.35cc
Suspension mechanical compliance	C_{ms} :	0.2297mm/N
BL product	BL:	12.02T-M
Diaphragm mass including airload	M_{ms} :	32.2g
Equivalent mechanical resistance loss	R_{ms} :	1.6823N*sec/m
Efficiency bandwidth product	EBP:	102.3
Voice coil overhang	X_{max} :	2.7mm
Cone area	S_d :	519.45cm ²
Resonant impedance	Z_{max} :	92.2Ω

Order Code	Type	Price each
RC93B	G12 200W 12in. PA Driver	£59.99

12in. 200W PA Speaker



This high performance, rugged, loudspeaker features a cast aluminium chassis with a paper cone and plasticised linen surround. Designed for the professional user with performance optimised for studio monitoring and sound reinforcement systems. Also suitable for vocal PA keyboards, lead and bass guitar and combo's, club music systems, discos and stage monitoring.

Specification

Nominal impedance:	8Ω
Resonant frequency:	56Hz
Usable frequency response:	50Hz to 6kHz
Nominal power handling:	200W rms
Sensitivity:	99.2dB
Voice coil diameter:	76.2mm
Magnet weight:	95oz
Dimensions:	314.3mm dia. x 139.1mm deep

Fixing centres: 8 x 7mm dia. holes on 293.7 dia. circle
Baffle cutout: 283.2mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	56Hz
Impedance	R_e :	6.19Ω
Coil inductance	L_e :	1.30mH

Electromagnetic Q	Q_{es} :	0.31
Mechanical Q	Q_{ms} :	3.48
Total Q	Q_{ts} :	0.29
Compliance equivalent volume	V_{as} :	61.87L/2.18cu.ft
Peak diaphragm displacement volume	V_d :	140.35cc
Suspension mechanical compliance	C_{ms} :	0.1633mm/N
BL product	BL:	18.54T-M
Diaphragm mass including airload	M_{ms} :	49.48g
Equivalent mechanical resistance loss	R_{ms} :	5.0045N*sec/m
Efficiency bandwidth product	EBP:	178.7
Voice coil overhang	X_{max} :	2.7mm
Cone area	S_d :	519.45cm ²
Resonant impedance	Z_{max} :	74.9Ω

Order Code	Type	Price each
XJ49D	H17 PA Spkr 12-200/L 8R	£89.99

Peak diaphragm displacement volume	V_d :	78.79cc
Suspension mechanical compliance	C_{ms} :	0.2178mm/N
BL product	BL:	11.59T-M
Diaphragm mass including airload	M_{ms} :	48.44g
Equivalent mechanical resistance loss	R_{ms} :	4.0761N*sec/m
Efficiency bandwidth product	EBP:	65.5
Voice coil overhang	X_{max} :	0.9mm
Cone area	S_d :	856.34cm ²
Resonant impedance	Z_{max} :	39.7Ω

Order Code	Type	Price each
XG52G	G11 Speaker 15-100/L 8R	£49.99

15in. 300W PA Driver



A 15in. 300W diameter paper cone driver with corrugated surround suitable for all high power bass applications, including bass guitar. Chassis is pressed steel.

Specification	
Nominal impedance:	8Ω
Resonant frequency:	39Hz
Usable frequency response:	40Hz to 4kHz
Nominal power handling:	300W rms
Sensitivity:	103dB
Voice coil diameter:	76.2mm
Magnet weight:	80oz
Dimensions deep	381mm dia. x 155mm
Fixing centres:	8 x 7mm dia. holes on 369.9 dia. circle
Baffle cutout:	359mm dia.

Thiele-Small Parameters	
Resonant frequency	f_s : 39.35Hz
Impedance	R_e : 4.97Ω
Electromagnetic Q	Q_{es} : 0.33
Mechanical Q	Q_{ms} : 7.55
Total Q	Q_{ts} : 0.32
Compliance equivalent volume	V_{as} : 208.2L/7.35cu.ft
Peak diaphragm displacement volume	V_d : 156.33cc
Suspension mechanical compliance	C_{ms} : 0.2022mm/N
BL product	BL: 17.37T-M
Diaphragm mass including airload	M_{ms} : 80.92g
Equivalent mechanical resistance loss	R_{ms} : 2.6488N*sec/m
Efficiency bandwidth product	EBP: 119.4
Voice coil overhang	X_{max} : 1.8mm
Cone area	S_d : 856.34cm ²

Order Code	Type	Price each
RC94C	H19 300W 15in.PA Driver	£92.99

HOT TIP

If you have to test a loudspeaker drive unit out of its cabinet, remember to keep the volume low! Without an airtight cabinet, many speakers can be damaged if their cones are allowed to travel too far whilst reproducing sound.

15in. 200W Bass Power Speaker



A higher power version of the 15in. 100W (XG52G) featuring an extended low frequency response. This loudspeaker is specifically intended as a bass driver in multiway systems and for bass guitar. The loudspeaker has a paper cone with plasticised linen surround and pressed steel chassis.

Specification	
Nominal impedance:	8Ω
Resonant frequency:	46Hz
Usable frequency response:	45Hz to 5kHz
Nominal power handling:	200W rms
Sensitivity:	99dB
Voice coil diameter:	63.5mm
Magnet weight:	80oz
Dimensions:	381.7mm dia. x 153.6mm deep
Fixing centres:	8 x 7mm dia. holes on 369.9 dia. circle
Baffle cutout:	359mm dia.

Thiele-Small Parameters	
Resonant frequency	f_s : 46Hz
Impedance	R_e : 6.39Ω
Electromagnetic Q	Q_{es} : 0.67
Mechanical Q	Q_{ms} : 4.77
Total Q	Q_{ts} : 0.59
Compliance equivalent volume	V_{as} : 224.09L/7.91cu.ft
Peak diaphragm displacement volume	V_d : 231.38cc
Suspension mechanical compliance	C_{ms} : 0.2176mm/N
BL product	BL: 12.33T-M
Diaphragm mass including airload	M_{ms} : 55.02g
Equivalent mechanical resistance loss	R_{ms} : 3.3325N*sec/m
Efficiency bandwidth product	EBP: 68.8
Voice coil overhang	X_{max} : 2.7mm
Cone area	S_d : 856.34cm ²
Resonant impedance	Z_{max} : 52Ω

Order Code	Type	Price each
XG53H	H14 Speaker 15-200/L 8R	£62.99

15in. 100W Bass Power Speaker



A loudspeaker specifically intended as a bass driver, and ideal for use in multiway systems and for bass guitar. The loudspeaker is fitted with a paper cone and a plasticised linen and a pressed steel chassis.

Specification	
Nominal impedance:	8Ω
Resonant frequency:	49Hz
Usable frequency response:	50Hz to 4kHz
Nominal power handling:	100W rms
Sensitivity:	100dB
Voice coil diameter:	50.8mm
Magnet weight:	38oz
Dimensions: deep	381.7mm dia. x 153.6mm
Fixing centres:	8 x 7mm on 369.9mm dia. circle
Baffle cutout:	359mm dia.

Thiele-Small Parameters	
Resonant frequency	f_s : 49Hz
Impedance	R_e : 6.74Ω
Electromagnetic Q	Q_{es} : 0.75
Mechanical Q	Q_{ms} : 3.66
Total Q	Q_{ts} : 0.62
Compliance equivalent volume	V_{as} : 224.29L/7.92cu.ft

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15in. 300W Bass PA Driver



NEW

A high performance loudspeaker featuring a die-cast aluminium chassis, paper cone and plasticised cloth surround that has been designed for the most demanding applications. The speaker features a kapton coil former with a polyamide-imide coated copper voice coil. Primarily intended for all bass applications, but suitable for stage PA guitar combos, general purpose bass and electronic keyboards.

Specification

Nominal impedance:	8Ω
Resonant frequency:	48Hz
Usable frequency response:	45Hz to 5kHz
Nominal power handling:	300W rms
Sensitivity:	99dB
Voice coil diameter:	76.2mm
Magnet weight:	95oz
Dimensions:	384.2mm dia. x 161mm deep
Fixing centres:	8 x 7mm dia. holes on 369.9 dia. circle
Baffle cutout:	360.3mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	47.9Hz
Impedance	R_e :	6.51Ω
Electromagnetic Q	Q_{es} :	0.41
Mechanical Q	Q_{ms} :	5.01
Total Q	Q_{ts} :	0.38
Compliance equivalent volume	V_{as} :	203.57L/7.16cu.ft
Peak diaphragm displacement volume	V_d :	93.8cc
Suspension mechanical compliance	C_{ms} :	0.1977mm/N
BL product	BL:	16.29T-M
Diaphragm mass including airload	M_{ms} :	55.85g
Equivalent mechanical resistance loss	R_{ms} :	3.3548N*sec/m
Efficiency bandwidth product	EBP:	116.2
Voice coil overhang	X_{max} :	1.2mm
Cone area	S_d :	856.34cm ²
Resonant impedance	Z_{max} :	85.6Ω

Order Code	Type	Price each
AB90X	H18 15in. 300W PA Driver	£109.99

15in. 500W PA Driver

A precision engineered loudspeaker for the discerning professional user and musician, that has been designed, engineered and manufactured to astonishing tolerances to produce a loudspeaker offering outstanding sound quality and reliability. The paper cone is supported by a corrugated plasticised cloth surround, and the huge 4in. diameter voice coil is made from polyamide-imide coated copper wound on a kapton former. Magnet composition is APS ferrite. Chassis is diecast aluminium.

Specification

Nominal impedance:	8Ω
Resonant frequency:	38Hz
Usable frequency response:	40Hz to 4kHz
Nominal power handling:	500W rms
Sensitivity:	98dB
Voice coil diameter:	101.6mm
Magnet weight:	109oz
Dimensions:	384.2mm dia. x mm deep
Fixing centres:	8 x 7mm
Baffle cutout:	360.3mm dia.



Thiele-Small Parameters

Resonant frequency	f_s :	38.81Hz
Impedance	R_e :	5.27Ω
Coil inductance	L_e :	1.45mH
Electromagnetic Q	Q_{es} :	0.29
Mechanical Q	Q_{ms} :	4.72
Total Q	Q_{ts} :	0.27
Compliance equivalent volume	V_{as} :	198.7L/7.02cu.ft
Peak diaphragm displacement volume	V_d :	469cc
Suspension mechanical compliance	C_{ms} :	0.1929mm/N
BL product	BL:	19.68T-M
Diaphragm mass including airload	M_{ms} :	87.17g
Equivalent mechanical resistance loss	R_{ms} :	4.5053N*sec/m
Efficiency bandwidth product	EBP:	134.1
Voice coil overhang	X_{max} :	6.25mm
Cone area	S_d :	856.34cm ²

Order Code	Type	Price each
RC95D	H25 500W 15in. PA Driver	£169.99

18in. 400W Fundamental Bass PA Driver



A high performance loudspeaker featuring a die-cast aluminium chassis, paper cone and plasticised linen surround that has been designed for the most demanding applications. Primarily intended for all bass applications, but suitable for stage PA guitar combos, general purpose bass and electronic keyboards.

Specification

Nominal impedance:	8Ω
Resonant frequency:	33Hz
Usable frequency response:	30Hz to 800Hz
Nominal power handling:	400W rms
Sensitivity:	98dB
Voice coil diameter:	76.2mm
Magnet weight:	95oz
Dimensions:	457.2mm dia. x 180.8mm deep
Fixing centres:	8 x 7mm dia. holes on 438.2 dia. circle
Baffle cutout:	422.3mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	33.5Hz
Impedance	R_e :	6.54Ω
Electromagnetic Q	Q_{es} :	0.45
Mechanical Q	Q_{ms} :	8.13
Total Q	Q_{ts} :	0.43
Compliance equivalent volume	V_{as} :	460.771L/16.27cu.ft
Peak diaphragm displacement volume	V_d :	124.88cc
Suspension mechanical compliance	C_{ms} :	0.2524mm/N
BL product	BL:	16.55T-M
Diaphragm mass including airload	M_{ms} :	89.43g
Equivalent mechanical resistance loss	R_{ms} :	2.3139N*sec/m
Efficiency bandwidth product	EBP:	74.6
Voice coil overhang	X_{max} :	1.1mm
Cone area	S_d :	1140.09cm ²

Order Code	Type	Price each
XG54J	H23 Spkr 18in 400W 8R	£129.99

18in. 600W PA Driver



A precision engineered loudspeaker for the discerning professional user and musician, combining unrivalled engineering accuracy with good value and outstanding reliability. A loudspeaker that combines high power

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handling with the sound quality needed in digital recordings with the strength and reliability needed for touring. The paper cone is supported by a corrugated plasticised cloth surround, and the huge 4in. diameter voice coil is made from polyamide-imide coated copper wound on a kapton former. Magnet composition is APS ferrite. Chassis is diecast aluminium.

Specification

Nominal impedance:	8Ω
Resonant frequency:	38Hz
Usable frequency response:	40Hz to 4kHz
Nominal power handling:	600W rms
Sensitivity:	98dB
Voice coil diameter:	101.6mm
Magnet weight:	109oz
Dimensions:	457.2mm dia. x mm deep
Fixing centres:	8 x 7mm dia. holes on 438.2 dia. circle
Baffle cutout:	422.3mm dia.

Thiele-Small Parameters

Resonant frequency	f_s :	25.3Hz
Impedance	$Z_{e,0}$:	5Ω
Coil inductance	L_e :	1.30mH
Electromagnetic Q	Q_{es} :	0.28
Mechanical Q	Q_{ms} :	5.20
Total Q	Q_{ts} :	0.27
Compliance equivalent volume	V_{as} :	530.21L/18.72cu.ft
Peak diaphragm displacement volume	V_d :	634.86cc
Suspension mechanical compliance	C_{ms} :	0.2809mm/N
BL product	BL:	19.51T-M
Diaphragm mass including airload	M_{ms} :	140.41g
Equivalent mechanical resistance loss	R_{ms} :	4.3027N*sec/m
Efficiency bandwidth product	EBP:	89.9
Voice coil overhang	X_{max} :	6.25mm
Cone area	Sd:	1159.17cm ²

Order Code	Type	Price each
RC96E	H26 600W 18in. PA Driver	£189.99

LOUDSPEAKER CABINETS

Professional Type



A range of very robust, high quality speaker cabinets designed for disco or PA use. Each is finished in hard wearing black vynide, and has carrying handles inset into both sides. All models have a removable grille covered in a smart black cloth. Speaker drivers are loaded from the front of the front baffle to ensure a perfect seal once they have been fitted. The cabinets are not lined internally, and the sound quality can be

greatly improved by lining the cabinets with our Acoustic Wadding (RY06G) shown elsewhere in this section. Cut outs for speakers are provided on the baffle (see table below). Each cabinet is supplied with four clamps to hold the large bass speakers in place, and 8mm holes have been drilled at 90° intervals around the bass cut out of each cabinet, and threads have been fitted which accept the clamp bolts. The tweeters are held in place by screws (not included). There are three models in the range: Type 1 (GL23A) will accommodate a single 12in. bass unit and two bullet-type tweeters; Type 2 (XB28F) will accommodate two 12in. bass units and two bullet-type tweeters; and Type 3 (GL24B) will accommodate a single 15in. bass unit, two bullet-type tweeters and a horn tweeter. All cabinets are provided with two 35mm holes on the rear for installing flush-mounting sockets. A part-drilled hole, which has been sunk into the inside of the bottom panel, is included, which can be opened fully with a keyhole saw or similar, so that a tripod mount (such as our KU54J) can be fitted, by using the minimum of necessary woodworking.



Model	Overall dimensions (mm)	Approx. internal volume (cm ³)	Cutouts provided
Type 1	H: 526mm W: 450mm D: 287mm	51,000	284mm (bass) 2 x 70mm (treble)
Type 2	H: 786mm W: 450mm D: 280mm	71,000	2 x 284mm (bass) 2 x 70mm (treble)
Type 3	H: 725mm W: 512mm D: 357mm	111,000	354mm (bass) 2 x 70mm (treble) 53mm x 154mm* (horn treble)

* Please note that the vertical dimension of the horn tweeter cut out on the Type 3 cabinet increases to 70mm towards one end. This is to enable the magnet assembly to be inserted through the cut out.

Order Code	Type	Price each
GL23A	H26 12in Bass Cabinet	£59.99
XB28F	H30 2x12in Bass Cabinet	£59.99
GL24B	H42 15in Bass Cabinet	£69.99

COVERING CLOTHS

Vynide Covering Cloth

A high-quality embossed black vynide for covering cabinets. Very hard-wearing. Available in two widths: 1.3m (51in.) and 0.6m (23½in.) and sold per ¼m length (9.8in.).



Note: Price shown is for ¼m length. We will cut to length required in multiples of ¼m only. Max length in one piece 24m.

Please order in multiples of ¼m, i.e. to order 1m of XR95D, order 4 XR95D; to order ¾m of XR95D order 15 XR95D. Shops only stock pre-cut lengths.

Order Code	Type	Price each
XR95D	Vynide 51in.	£2.49
XS05F	Vynide 23.5in.	£1.49

Buffalo Covering Cloth

A high-quality heavily-embossed shiny black plastic material with a "buffalo-skin" design. Very hard wearing. Available in two widths: 1.27m (50in.) and 0.6m (23.5in.) and sold per ¼m length (9.8in.).



Note: Price shown is for ¼m length. We will cut to length required in multiples of ¼m only. Max length in one piece 25m.

Please order in multiples of ¼m, i.e. to order 1m of XR96E, order 4 XR96E; to order ¾m of XR96E, order 15 XR96E. Shops only stock pre-cut lengths.

Order Code	Type	Price each
XR96E	Buffalo 50in.	£2.49
XS06G	Buffalo 23.5in.	£1.49

LOUDSPEAKER CABINET WADDING

A high quality wadding, acoustically designed for use in loudspeaker cabinets. The material is approx 19mm (approx. ¾ in) thick, but may be layered to make up greater thicknesses. Available in 0.61m (24in) widths only, and is sold per ½m (19½in.).

Note: Price shown is for ½m length. We will cut to length required in multiples of ½m only. Max. length in one piece: 20m.

Please order in multiples of ½m, i.e. to order 1m of RY06G, order 2 RY06G; to order ¾m order 7 RY06G.

Order Code	Type	Price each
RY06G	Acoustic Wadding	99p

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GRILLE CLOTHS

Diamond Pattern Loudspeaker Grille Cloth

A high quality black plastic fibre cloth woven into a small diamond pattern, for use as grille cloths on loudspeaker cabinets. The material is acoustically highly transparent. It is available in two widths: 1.32m (52in.) and 0.61m (24in.) and is sold per 1/4m (9.8in.) length.



Note: Price shown is for 1/4m length. We will cut to length required in multiples of 1/4m only. Max length in one piece 24m.

Please order in multiples of 1/4m, i.e. to order 1m of XS14Q, order 4 XS14Q; to order 3/4m of XS14Q, order 15 XS14Q. Shops only stock pre-cut lengths.

Order Code	Type	Price each
XS14Q	Diamond Cloth 1.32m	£3.99
XS15R	Diamond Cloth 0.61m	£2.49

Stripe Pattern Loudspeaker Grille Cloth

A black plastic fibre cloth woven into an attractive stripe pattern and suitable for use as grille cloths on loudspeaker cabinets etc. The material is available in two widths 1.49m (58.7in.) and 0.72m (28.3in.) and is sold per 1/4m (9.8in.) length.



Note: Price shown is for 1/4m length. We will cut to length required in multiples of 1/4m only. Max length in one piece 40m.

Please order in multiples of 1/4m, i.e. to order 1m of XS07H, order 4 XS07H; to order 3/4m of XS07H, order 15 XS07H. Shops only stock pre-cut lengths.

Order Code	Type	Price each
XS07H	Stripe Cloth 1.49m	£3.99
XS09K	Stripe Cloth 0.72m	£2.49

Loudspeaker Grille

A solid black nylon grille material for loudspeaker cabinets. Available only 0.61m (24in.) wide and sold per 1/4m (9.8in.) length.



Note: Price shown is for 1/4m length. We will cut to length required in multiples of 1/4m only. Max length in one piece 15m.

Please order in multiples of 1/4m, i.e. to order 1m of XR94C, order 4 XR94C; to order 3/4m of XR94C, order 15 XR94C. Shops only stock pre-cut lengths.

Order Code	Type	Price each
XR94C	Black Nylon Grille	£1.99

Open Weave Loudspeaker Grille Cloth



An acoustically transparent loudspeaker grille cloth in black with either a fine open weave pattern or a large 'diamond' pattern.

Note: The cloth is sold in multiples of 1/2m in a width of approximately 40in. We will cut to length required in multiples of 1/2m only. To order 1m of AB60Q quote 2 AB60Q. To order 2 1/2m of AB70M quote 5 AB70M. Shops only stock pre-cut lengths.

Order Code	Type	Price each
AB60Q	Fine Weave Cloth	£1.99
AB70M	Large Weave Cloth	£1.99

ACCESSORIES

Round Loudspeaker Grilles

A range of protective, circular metal grilles to complement the Big Cat range of speakers. The grilles are finished in matt black and have a PVC covering strip around the edge. Fitting is by loudspeaker fixing clamps, (e.g. FJ40T). Available in the following sizes: 5, 8, 10, 12, 15 and 18 inches diameter.



Order Code	Type	Price each
FJ38R	5in Speaker Grille	£1.49
FJ39N	8in Speaker Grille	£1.80
YK71N	10in Speaker Grille	£2.29
YK72P	12in Speaker Grille	£2.99
YJ04E A1	15in Speaker Grille	£3.49
YJ05F A1	18in Speaker Grille	£6.99

Loudspeaker Fixing Clamp

A fixing clamp suitable for speakers of 10, 12 and 15 inch dimensions. Made from tough moulded plastic, fixing is by nut and bolt. When clamping down, the fixing clamp bends slightly to give the fixture a high degree of resilience.



Order Code	Type	Price each
BK3DH	Spkr Fixing Clamp	30p

Loudspeaker Stand

A very sturdy, heavy duty, tubular loudspeaker stand that extends to a height of 1.98m. The stand is supported by three legs which are 36mm diameter. The main stem is also 36mm diameter, the telescopic section is 33mm diameter. Strong handled bolts are used to clamp the movable parts in position. A wide removable loudspeaker plate is provided to fix the stand to the loudspeaker. Finished in hard wearing black paint. Supplied with fixing screws. Max. weight on stand 32kg.



Order Code	Type	Price each
XM28F H6	HD Speaker Stand	£42.99

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'Top Hat' Speaker Stand



A heavy-duty pole mounting speaker stand which has been designed to be recessed in a speaker cabinet. This system is intended for use with PA and mobile disco speakers which need to be transported often and set up quickly. In particular, it is suitable for our GL23A, GL24B and XB28F cabinets which already have a hole part-drilled for this purpose. To fit, a 44mm diameter hole is drilled in the bottom of the cabinet, the top hat is inserted and its flange is secured in place by 4 screws (9mm holes being provided for this purpose). A 105mm long 'hollow' with a diameter of 35mm is then available which will safely accommodate poles or tripods of between 25mm and 33mm in diameter. The maximum weight that the overall support system can carry is limited by the stand used and the cabinet. However, it must not exceed 150kg. The top hat is made from aluminium, weighs 380g and is black in colour. The flange, which is 3mm tall and 110mm in diameter, could be flush-mounted on the cabinet bottom if a suitable recess is provided. Overall height: 115mm. Mounting: 4 equally spaced 9mm holes on an 80mm PCD.

Order Code	Type	Price each
KU54J	Top Hat Speakr Stand	£4.99

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Metal Speaker Clamping Kit



A sturdy loudspeaker clamping kit comprising 4 1/4 in Whitworth bolts 38mm long, 4 T-nuts, 4 star washers and 4 clamps in 3mm thick black finish steel. The kit may be used without the clamps to fix 10 or 12 inch speakers to the front or the rear of a baffle using the holes in the speaker chassis. If rear mounting, the bolts may have to be cut short with a hacksaw if they protrude too much through to the front. Put a nut on first before sawing, then removing the nut will clean up the end of the thread as it is unscrewed. The T-nuts require holes in the baffle of 3/8 in clearance into which they can be tapped home lightly with a hammer. Alternatively the speaker chassis can be gripped on four points around the edge by the right-angled clamps, using the bolts and T nuts in a 'stand off' position from the chassis. The clamps are 42mm long x 25mm wide, and have a 10.5mm deep fulcrum.

Order Code	Type	Price each
FJ40T	Speaker Clamp Kit	£1.99

FLOOR-STANDS FOR HI-FI SPEAKERS

Spiked Type

A pair of very well made loudspeaker stands, each supplied with four spikes. These are useful when the speaker is used on a carpet as they will pierce it, making contact with the floor underneath and providing a much more rigid support. Because the surface area at the tip of each spike is small, there is no noticeable damage done to the carpet and furthermore very few sound vibrations are in danger of being transmitted back to the turntable via the floor. The spikes are

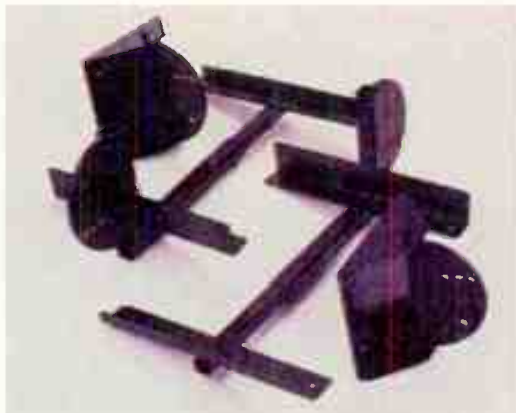


screwed into the base of the stand and can be left off if not required. The stand can safely support a weight of 25kg by virtue of its design and the high quality materials used. The speaker mounting plate is 190mm square and so should accept most speakers. Self-adhesive foam strips are supplied to stick onto the mounting plate so that the bases of the speaker cabinets are not scratched in any way. The stands are made of very strong tubular steel with stoppered ends and are finished attractively in black. Overall dimensions (excluding spikes): 410mm high x 280mm wide x 260mm long.

Order Code	Type	Price each
GL11M	H13 Spiked Speaker Stand	£34.99

Wall Brackets

A standard pair of speaker wall brackets with adjustable swivel and tilt. Speakers of 152mm to 305mm in length weighing up to 15kg can be safely carried, and foam pads are supplied which protect each speaker whilst it is being firmly gripped by the clamp. No drilling to the speakers is required. To mount a speaker, four holes must be drilled in the wall; 5mm dia. fixing holes being provided on each bracket to accommodate the four screws. These brackets are supplied with full installation instructions, and should only be used if the wall is capable of supporting the weight. Wall plugs must be used if mounting on masonry is intended. Please note that screws and wall plugs are not supplied.



Order Code	Type	Price each
GL45Y	C4 Wall Brackets	£14.99

Low-Profile Speaker Stands with Castors



A high quality pair of speaker stands which are adjustable to cater for speakers of up to 305mm in width and 25kg or less in weight. The attractive frames are made from high quality tubular steel finished in black. Four heavy duty castors are supplied per stand, along with panels that blank off the ends of the tubular steel frame. The speakers are placed on self-adhesive foam pads which are mounted on the top frame. These prevent the cabinet bottoms from being scratched in any way. Full assembly instructions are included. Overall dimensions (including pads and castors, facing forwards): 248mm high x 360mm wide x 310mm long.

Order Code	Type	Price each
GL44X	G7 Low Profile Stands	£24.99

ANTI-ACOUSTIC MOUNTINGS



A range of sharp pointed, conical mountings for CD players, turntables, tape decks and loudspeaker cabinets. The use of these devices follows the principle that the smaller the contact area between the base of the equipment and the supporting surface, then the less your music will be affected by feedback and wave resonances. Pointed spikes are a simple yet effective method of improving performance by reducing subfrequency vibration and are a must for every Hi-Fi enthusiast. In each case the conical support is accompanied by a metal disc with a central indentation for the point of the cone to rest on, protecting furniture, carpet or floor. Three different types are available:

CJ80B is a gold-plated, brass cone on a sandalwood base having a low sympathetic vibration characteristic, and is intended for use with items not exceeding 10kg in weight, which includes CD players and turntables. One complete set contains six cones and discs, three of which would be used with a CD or record player, while the other three are used with the amplifier. In use the cones are inverted with their bases carrying the bottom panel of the unit, while the points rest on the metal discs, protecting the supporting surface.

CJ81C is a composite gold-plated brass and sandalwood cone and suitable for small to medium sized loudspeaker cabinets not exceeding 20kg in weight. Three cones are used with each cabinet of a stereo pair (six supplied as a set).

CJ82D is identical to CJ81C but includes a fixing screw so that it can be physically attached to the bottom of the speaker cabinet (which must be drilled before fitting the cones). The contact points of the mounts rest on the metal discs. Three cones should be used with each cabinet (six supplied as a set).

Order Code	Type	Price each
CJ80B	Small AA Mounts	£39.99
CJ81C	Large AA Mounts	£49.99
CJ82D	Fixed AA Mounts	£59.99

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GUITAR AMPLIFIERS

10W Guitar Amp



A very compact and sturdily built 10W guitar amplifier. This amplifier is primarily intended for use as a practice amp, but if 'miked-up' could be used in other applications. Front panel controls are on/off, master volume, treble, mid and bass. An 'on' LED and 1/4 inch input socket are also fitted on the front panel.

Specification

Power output: 10W RMS 8Ω
 Input impedance: 220kΩ
 Maximum input signal level: 10V p-p

Equalisation

Bass: 8dB boost (100Hz)
 Mid: 12dB boost (500Hz)
 Treble: 20dB boost (10kHz)
 Power requirements: 240V AC 50Hz mains
 Fuse rating: 1A fast blow
 Dimensions: 245 x 265 x 165mm (excluding feet & handle)

Order

Code	Type	Price each
XM34M H9	10W Guitar Amp	£44.99

15W Guitar Amplifier

A powerful 15W rms guitar amplifier and loudspeaker in an extremely tough wooden cabinet with corner protectors and carrying handle. Two inputs are provided, one for low output and one for higher output guitars. When switched to Channel 2, the output volume is controlled by the Channel 2 level control and the Overdrive is bypassed. The three channel Equaliser controls Treble, Mid and Bass. The Treble control adds crispness to the sound, the Mid control can thin-out or fatten-up the tone when turned down or

up respectively, and the Bass control adds warmth to the sound.

The Overdrive circuit is brought into operation by switching to Channel 1. The circuit uses multiple feedback loops to create an effect similar to that heard when a valve amplifier is overdriven. Turning the Pre-gain control clockwise increases the level with the distortion occurring in the last quarter-turn. The Post-gain control cuts or boosts the level of the signal from the Overdrive circuit. It will enable the correct balance to be reached between the unchanged and overdriven signal, and works together with the Pre-gain control to set the total harmonic content, gain and operating level. When switched to Channel 1, the Channel 2 level control will still have some effect on the output volume, and the Treble control now adds bite or edge to the overall sound. Three standard 1/4 in. jack sockets are provided on the back of the amplifier. The Phones output allows a stereo headphone to be plugged in and doing this cuts off the internal speaker for private listening (the output is mono). The Line output allows an external power amp, PA system, or tape recorder to be driven from the amplifier. Finally, the Footswitch socket allows a footswitch to be connected and duplicates the Channel 1/Channel 2 switch so that the Overdrive circuit can be switched in and out during a performance.



Specification

Power output: 15W rms at 1kHz (thd = 10%)
 Loudspeaker: 8in. dia. 4Ω
 Bass boost: >8dB at 100Hz
 Mid boost: >10dB at 500Hz
 Treble boost: >20dB at 10kHz
 Frequency response: 120Hz to 20kHz (all tone controls at 1C)
 Input sensitivity: 28mV at 220kΩ (high)

Signal to noise ratio: 56mV at 20kΩ (low)
 Power source: Better than 50dB
 Power source: 240V AC 50Hz
 Fuse type: 1A 250V AC fast acting
 Size: 335 x 345 x 182mm
 Net weight: 6kg

Order Code	Type	Price each
XM11M H13	15W Guitar Amplifier	£64.99

FOR CASHTEL
 Phone 01702 552941

75W Guitar Amp



A powerful 75W amplifier that has two 1/4 inch input jack sockets (high and low). Controls are provided for 'overdrive'; pre-gain, post-gain and waveform (adjusts the harmonic content). The overdrive may be switched in or out, either from the front panel or via a foot switch (not supplied). Controls are also provided for reverb, bass, low mid, high mid, treble and master volume. An additional switch; 'bright' gives the signal more presence. The rear panel has a mains on/off switch and three jack sockets; external speaker (8Ω), pre-amp out and power amp in.

Specification

Power output: 75W RMS 8Ω
 Bass: ±15dB (50Hz)
 Low middle: ±15dB (300Hz)
 High middle: ±15dB (2kHz)
 Treble: ±15dB (10kHz)
 Bright: +8dB (3kHz) Overdrive
 gain: 80dB (1kHz)
 S/N ratio: >60dB

Input impedance

Low: 36kΩ
High: 1MΩ

Maximum input signal level

Low: 20V p-p
High: 10V p-p
Pre-amp out: 1V RMS (10kΩ)
Power amp in: 1V RMS (28kΩ)
Power requirements: 240V AC 50Hz mains
Fuse rating: 3A fast blow
Dimensions: 440 x 460 x 260mm
(excluding feet & handle)

Order Code	Type	Price each
XM35Q H33	75W Guitar Amp	£164.99

40W Bass Amp



A powerful 40W bass guitar amplifier with built-in limiter, sturdily built and ideal for on stage use. This amplifier provides two 1/4 inch input jack sockets (high and low), controls are provided for volume, bass, mid and treble. A limiter circuit is included which prevents the amplifier from being overdriven. The limiter may be switched in or out from a front panel switch, operation is indicated by an LED. Sockets are provided for line out and headphones. The on/off switch is on the rear panel and an LED on the front panel indicates power on.

Specification

Power output: 40W RMS 8Ω
Bass: ±12dB (50Hz)
Middle: ±12dB (500Hz)
Treble: ±12dB (5kHz)
Limiter range: 23dB
S/N ratio: >50dB

Input impedance

Low: 36kΩ
High: 220kΩ

Maximum input signal level

Low: 20V p-p
High: 10V p-p
Headphones output: 250mV 8Ω
Line output: 2V p-p (10kΩ)
Power requirements: 240V AC 50Hz mains
Fuse rating: 2A fast blow
Dimensions: 440 x 490 x 290mm
(excluding feet & handle)

Order Code	Type	Price each
XM36P H37	40W Bass Amp	£134.99

60W KEYBOARD AMPLIFIER

NEW



Specification

Woofer diameter: 12in.
Horn tweeter size: 135 x 80mm
Power output
4Ω load: 80W rms
8Ω load: 60W rms
Treble control (10kHz): ±15dB
Bass control (100Hz): ±15dB
S/N ratio: >60dB
Input Impedance
high: 470kΩ
low: 47kΩ
Dimensions: 510 x 307 x 515mm

GREAT VALUE!
£199.99
AG87U
[H40]

A robust, high quality, 3-channel keyboard amplifier, designed for professional keyboard use, and capable of delivering 60W rms. The amplifier drives a 12in. woofer, and a 5 1/4 x 3 1/4 in. horn tweeter.

The front panel has both high and low inputs for instrument connection, thereby allowing the user to select the correct input according to the instruments output level. Each channel is provided with separate gain controls, bass and treble controls, and a reverb control. The front panel also includes the main volume and reverb controls, and a foot switch jack to allow the user to turn the reverb on and off by using a foot pedal.

The back panel has send/return jacks to connect to external effects units. Plugging in to these jacks will break the main signal path. A slave jack is provided which can be used to connect a line level signal to an external power amplifier, PA system, or similar device. There is also an external speaker jack which allows an additional 8Ω (minimum) loudspeaker load to be added. The substantial cabinet is covered in a hard wearing material to cope with the rigours of professional use.

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75W Bass Amplifier

NEW



A robust, high quality, bass amplifier, designed for the professional bass player, and capable of delivering 75W rms. The amplifier is equipped with high and low level impedance inputs to match the instrument used. Each input has a gain control. A limiter circuit with LED indication is incorporated that will attenuate high level peaks to avoid distortion. This feature is very useful for those bass players who 'slap', 'snap' or 'hammer' the strings. The green LED indicates when the limiter is switched on. The active equaliser circuit includes four individual boost and cut controls (treble, hi-mid, lo-mid and bass) to match room or hall acoustics. Larger rooms and halls will tend to reinforce bass output, while people will attenuate the treble. Treble and bass boost will be more noticeable when the 'mid' controls are reduced.

The front panel includes a standard 1/4in. headphone jack. Plugging in headphones will remove the amplifiers output to the speaker. The back panel has an input jack to allow the main amplifier to be used with an external preamp. A line-level output allows the internal preamp to feed an external amplifier, PA system or tape recorder. 'Effect Loop Send' and 'Return' jacks are included in the line level signal path to include external effects units. The substantial cabinet is covered in a hard wearing material to cope with the rigours of professional use.

Specification

Speaker diameter:	15in.
Power output (8Ω load)	75W rms
Treble control (8kHz)	±10dB
Hi/mid range control (2kHz):	±10dB
Lo/mid range control (500Hz):	±10dB
Bass control (125Hz):	±10dB
Limiter range:	23dB
S/N ratio:	>50dB
Input impedance	
high:	470k
low:	47k
Dimensions:	448 x 326 x 436mm

Order Code	Type	Price each
AG88V H	75W Bass Amplifier	£189.99

LOUDSPEAKERS

Compact Stage Monitor



NEW

A high quality compact stage monitor which has been specially designed to allow musicians to hear themselves clearly in situations where bass and amplified instruments are being used. The unit contains a high quality 12in. woofer, and a 1 3/8in. titanium high frequency driver, which are driven through a specially designed crossover/equaliser network to give the best possible sound quality. The substantial cabinet is covered in a hard wearing material to cope with the rigours of professional use.

Specification

Frequency Response:	65Hz to 20kHz
Crossover Frequency:	2kHz
Nominal Impedance:	8Ω
Sensitivity:	97dB
Power handling	
long-term continuous:	100W
short-term peak:	200W
Dimensions:	410 x 560 x 410mm

Order Code	Type	Price each
AG85G H	Stage Monitor	£189.99

Stage Speaker System

NEW



A high quality stage speaker system, specially designed for sound reinforcement situations. It has a professional quality 12in. high power woofer and a constant directivity horn hf unit, which have been arranged in a vertical array to give the best possible sound quality. The substantial cabinet is covered in a hard wearing material to cope with the rigours of professional use.

Specification

Frequency Response:	50Hz to 18kHz
Crossover Frequency:	2kHz
Nominal Impedance:	8Ω

Sensitivity:	98dB
Power handling	
long-term continuous:	250W
short-term peak:	500W
Dimensions:	950 x 410 x 305mm

Order Code	Type	Price each
AG86T H48	Stage Speaker System	£199.99

HOT TIP

Speakers wired out of phase can cause poor bass response and inferior stereo imagery. This can easily be checked by placing the speaker cabinets face-to-face, a few inches apart. If bass response is good, they are in phase, if poor, they are out of phase. Switch off the amplifier, reverse the connections to one of the speakers only, and repeat the test.

GUITAR ACCESSORIES

Guitar Pickup



A good quality magnetic guitar pick-up for six-string acoustic guitars. The pick-up clips into the circular hole in the sound board. Tone and volume controls are provided and a 3.5mm mono jack socket. A lead is provided to connect to this socket and has a 1/4in. mono jack plug at the other end. Lead length 2m.

Order Code	Type	Price each
YT39N	Mag Guitar Pick-up	£10.99

Guitar Stand Pro-Sound

An adjustable, fold away, chromed tubular guitar stand. Suitable for use with most electric and acoustic guitars. Height: 80cm Neck Width (max): 75mm Foot Print: 42 x 42 x 56cm



Order Code	Type	Price each
XM23A C3	Guitar Stand	£15.99

Ashley Acoustic Guitar Transducers

A range of small easily fixed transducers, for use with acoustic guitars. The units offer wide frequency responses comparable with the best microphones. The onset of acoustic feedback compared to a microphone is considerably delayed, and they have a very high output. They are very convenient to use; simply attach to the bridge close to one end of the saddle using the self-adhesive material supplied. The material allows lifting and repositioning of the

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transducer without damage to the guitar. The unit may be fixed to its bevelled face to give an alternative bass response. Size: 28 x 10 x 8mm. Two types are available. Model AJ21 is the top of the range, and has an exceedingly smooth frequency response. Model AJ51 has a slightly emphasised treble response and is recommended for acoustic guitars in loud electric groups. Supplied with short lead terminated in a standard mono jack line socket.



Order Code	Type	Price each
YL08J	Pickup Transl.AJ21	£29.99
YL09K	Pickup Transl.AJ51	£19.99

THE BEST OF SERVICE

Music Stand

A robust tripod-based music stand which can extend to a height of 112cm, each section being lockable to give rigidity. The stand can be quickly folded away to an easily transportable size. It is supplied with a 440 x 240mm manuscript holder which also folds away. This item screws onto the stand via an adaptor which is supplied. The same adaptor will allow a microphone holder with a standard 5/8 in. diameter threaded base to be fitted to the stand.



Order Code	Type	Price each
GK96E	F6 Tripod Stand	£17.99

Guitar Lead



A straight extension lead of the highest quality with a brass bodied, 1/4 in. jack plug at each end. The jack plug bodies have knurled finger grips and moulded strain relief sleeves. This lead is manufactured with untinned OFC (oxygen free copper) conductors to preserve sound purity. Length 6m. Colour black.

Order Code	Type	Price each
CC39N	Guitar Lead	£7.99

Instrument Lead



A high quality, straight, instrument extension lead terminated with a standard 1/4 in. mono jack plug at each end protected with a strain relieving sheath. The 5m long lead is manufactured from quality flexible instrument type coaxial cable.

Order Code	Type	Price each
MK75S	Instrument Lead	£8.99

Neon Extension Leads



A range of very flexible quality extension leads in a bright fluorescent neon coloured cable. The ends are terminated in standard 1/4 in. jack plugs that are protected and strain relieved by black heat-shrink sleeving. Choice of three colours: green, pink, orange. Length 6m.

Order Code	Type	Price each
CC36P	Neon Lead Green	£8.99
CC37S	Neon Lead Pink	£8.99
CC38R	Neon Lead Orange	£8.99

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PRE-AMPLIFIER MODULES

EQ2S Mono



A tiny ready-built pcb suitable for use as a preamplifier for magnetic cartridges (RIAA), tape heads (NAB response) and low level microphones. Two will be required for stereo. Uses two silicon transistors.

Specification

Gain (at 1kHz):Phono: 34dB (5mV input to 240mV output)
 Response curve RIAA
 Tape: 33dB (5mV input to 220mV output)
 Response curve NAB (Microphones etc.) 38dB (3mV input to 230mV output)
 Flat:
 Max output: 2.5V (with 30mV input)
 Input impedance: ±50kΩ (approx)
 Output impedance: ±5kΩ (approx)
 Power supply: 10V ±2V at 1mA (e.g. 9V battery PP3)
 Supply range: 8 to 12V DC
 Size: 60 x 35 x 20mm
 Fixing centres: 50 x 25mm x 6BA clear.

Supplied with connecting instructions.

Order Code	Type	Price each
LB97F	Pre-Amp EQ2S	£8.99

Tone Control Module Mono TC-2S

A monophonic tone control board comprising a two transistor Baxandal type tone control circuit with input buffer. It additionally requires two linear 50kΩ potentiometers to operate.



Specification

Bass boost: +18dB @ 100Hz
 Bass cut: -12dB @ 100Hz
 Treble boost: +17dB @ 10kHz
 Treble cut: -13dB @ 10kHz
 Gain, 'flat': 1.5dB @ 1kHz
 Input impedance: ±50kΩ
 Output impedance: 5kΩ (approx)
 Power supply: +10VDC ±2V at 2.5mA
 Supply range: 8 to 12V DC
 Dimensions: 65 x 45 x 23mm

Supplied with connecting instructions.

Order Code	Type	Price each
FM10L	TC Module TC-2S	£11.99

MUSICAL EFFECTS UNITS

Noise Gate



A noise gate for electric guitars and similar instruments which can be used to stop annoying noise and hum being amplified between playing

Continued on next page

Continued from previous page

sessions. The unit has two control knobs for 'sensitivity' and 'decay'. 'Sensitivity' determines at what signal level the gate should open and the signal be allowed through, and then close again when input ceases. 'Decay' provides some time delay after input ceases to prevent the gate shutting off too soon and interfering with normal silent moments in the music, and allows normal decay of stringed instruments to be properly heard.

Specification

Input impedance: 500k Ω
 Output impedance: 200 Ω
 Gain: 0dB
 Signal to noise ratio: 90dB
 Dimensions: 125 x 75 x 55mm
 Weight: 310g

Order Code	Type	Price each
CJ21X	Noise Gate Pedal	£39.99

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Stereo Flanger



This unit has stereo outputs and is a versatile flanger with rate, depth, manual and feedback rotary controls to allow adjustment of the overall effect produced. The control knobs are colour-coded pastel green.

Specification

Input impedance: >300k Ω
 Output impedance: 200 Ω
 Gain: 0dB
 Signal-to-noise ratio: 70dB
 Frequency response: 70Hz to 5kHz

Order Code	Type	Price each
YN21X	Flanger	£49.99

Tube Driver



This device is for those who wish to reproduce the 'classic' sound of valve amplifiers, as used by groups in the 60s and 70s. This tube driver features 'level', 'distortion' and 'hi' and 'low' equalisation controls to alter the effect. The rotary control knobs are colour-coded white.

Specification

Input impedance: 470k
 Output impedance: 220 Ω
 Gain: 60dB
 Equalisation range: \pm 15dB
 Signal-to-noise ratio: 75dB
 Frequency response: 70Hz to 7kHz

Order Code	Type	Price each
BZ31J	Tube Driver	£34.99

Compressor



A useful device when increased sustain is desired without adding unwanted distortion. 'Attack' and separate 'sustain' controls provide a variable adjustment of the actual compression range to be developed. A 'level' control is also provided which regulates the effect's level. Suitable for all amplified instruments especially electric guitar and bass. The rotary control knobs are colour-coded lemon yellow.

Specification

Input impedance: >300k Ω
 Output impedance: 200 Ω
 Compression range: 40dB min.
 Attack time: 1ms max.
 Signal-to-noise ratio: 80dB min.
 Frequency response: 70Hz to 5kHz

Order Code	Type	Price each
YB88V	Compressor	£39.99

Ultra Metal



One of the very best examples of this kind of effect available today, it is ideal for the 'heavy metallist' who needs more overdrive. The ultra-metal features a finely tuned voicing and extended range and has four controls 'hi', 'lo', 'distortion' and 'level'. The unit can provide sounds ranging "from a fairly gentle blues sustain to a blistering heavy-metal overdrive" - International Musician. The rotary control knobs are colour-coded light-grey.

Specification

Input impedance: >300k Ω
 Output impedance: 200 Ω
 Gain: 60dB max.
 Signal-to-noise ratio: 70dB min.
 Frequency response: 70Hz to 5kHz
 Eq range: \pm 18dB

Order Code	Type	Price each
YN22Y	Ultra Metal	£42.99

Stereo Chorus



This chorus unit has stereo outputs and has separate 'depth', 'rate' and 'intensity' controls. The 'rate' control varies the speed of the effect, whilst the 'depth' and 'intensity' controls regulate the short-time delay and chorus effects. The rotary control knobs are colour-coded electric-blue.

Specification

Input impedance: >300k Ω
 Output impedance: 200 Ω
 Gain: 0dB
 Rate: 0.2Hz to 10Hz
 Delay time: 2.5ms to 12.8ms
 Signal-to-noise ratio: 75dB min.
 Frequency response: 70Hz to 5kHz

Order Code	Type	Price each
YN20W	Chorus	£49.99

Phaser



One of the most useful effects in contemporary music. The 'depth' and 'feedback' controls give variations in the sound from a clean phase effect to a deep "rolling" effect. Effect width is adjusted automatically in accordance with the speed selected on the 'rate' control. The rotary control knobs are colour-coded salmon-pink.

Specification

Input impedance: >300k Ω
 Output impedance: 200 Ω
 Max input level: 0dBm
 Gain: 0dB
 Signal-to-noise ratio: 70dB min.
 Frequency response: 70Hz to 5kHz
 Sweep rate: 0.1Hz to 10Hz
 Phase shift: 720°

Order Code	Type	Price each
YN23A	Phaser	£39.99

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 Phone 01702 552941

Analogue Delay

This analogue stereo delay unit produces echo and reverberation effects using the latest BBD (bucket brigade delay line) technology, and noise reduction circuitry ensures the unit produces high quality sound. The 'delay' control adjusts the delay time of the repeats, and effects such as echo, reverb, slap back controlled feedback and many more can be easily produced. The 'repeat' control adjusts the number of repeats between one and infinity, while the 'depth' control adjusts the level of the effects sound.



Two output jacks are provided to feed two separate amplifiers, and the second output can be switched to 'direct' to produce an enhanced effect. The rotary control knobs are black and the battery cover is orange, for easy identification.

Specification

Input impedance:	240kΩ
Output impedance:	10kΩ
Maximum level (0dB = 1V):	
input:	-1dB
output:	0dB
Noise level (input short 0dB=1V):	-68.5dB
Delay time:	50 to 300ms
Size:	127 x 73 x 55mm
Weight:	325g (including batteries)

Order Code	Type	Price each
CK71N	Delay	£89.99

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ECHO CHAMBER



A good quality solid state echo unit housed in a matt black case. The front panel, accommodates all the controls and input/output jacks. The unit provides two standard 1/4 in input sockets, a low impedance (50dB 10kΩ) socket for the microphone and a (-20dB 330kΩ) socket for instruments and line outputs of hi-fi, organ, synthesisers, etc. There is a footswitch jack on the front panel for a remote control switch. The delay time control is variable between 30 and 200ms and there are three selectable output levels of (0, -20dB and -40 dB) to allow connection to any amplifier. There is also a peak level indicator to show when the input level is too high and likely to cause distortion.

★ All prices include VAT. A, B etc. indicates there is an additional carriage charge for this item: see end of catalogue for details. ★

125

The balance control adjusts the equilibrium of direct/echo sound and may be set to minimum to allow direct (no echo), or through to maximum (total echo). The repeat control sets the echo sound repetition rate and the dial is rotated clockwise to increase the speed.

Dimensions

Case:	245 x 150 x 61mm
Front panel:	270 x 67mm
Fixing hole centres:	258 x 48mm.

Order

Code	Type	Price each
YP67X	C4 Echo Chamber	£64.99

TUNING DEVICES

Guitar Tuner



An easy to use, fully automatic or manual note selection, tuner that can be used with electronic or acoustic instruments. Standard 1/4 in. input and output jacks allow the guitar tuner to be used in line during a performance with no detrimental effect on the sound quality. A built-in microphone allows the tuner to be used with acoustic instruments, if required. A function switch and a 'note select' switch are provided. With the function switch set to 'manual', the 'note select' switch sets the unit to the string to be tuned, indicated by one of six LEDs on the note indicator. With the function switch set to 'auto', when an instrument is played an LED closest to the note will be illuminated on the note indicator. The meter scale is calibrated -50 cent to +50 cent and 430Hz to 450Hz with a centre reading of zero. A ±3 cent deviation from standard pitch is acceptable. (100 cents is equivalent to one fret or a half-step). The unit requires a PP3 battery (JY60Q).

Specification

Measurement method:	Automatic measurement by quartz contr of microcomputer
Notes and pitch:	1st string - 1E (329.63Hz) 2nd string - 2B (246.94Hz) 3rd string - 3G (196.00Hz) 4th string - 4D (146.83Hz) 5th string - 5A (110.00Hz) 6th string - 6E (82.41Hz)
Tuning range:	±1 octave for each key to be tuned
Accuracy:	±1/4 cent
Size:	128 x 70 x 33mm
Weight:	150g (excluding battery)

Order Code	Type	Price each
AY24B	Auto Guitar Tuner	£24.99

Chromatic Guitar Tuner



A wide ranging guitar tuner covering a full octave from C1 to B7, which can be used to measure the tuning of both electric and acoustic guitars. It can even cater for other instruments and be used for voice training. Input can be by a 1/4 in. jack socket or by a built-in microphone for acoustic instruments. The reference pitch can be altered to match other instruments if necessary, prior to tuning the instrument. In use, one of a range of LEDs, in a display which mimics one octave of a piano keyboard, will light if the note struck corresponds to that note. A secondary tuning indicator will show how well the note matches, and 'flat' and 'sharp' LEDs will show in which direction the note is in error.

The tuner uses one PP3 size 9V battery (not supplied). Dimensions: 120 x 67 x 22mm.

Specification

IC accuracy:	±1 cent
Pitch selection:	435 to 446Hz
Tuning range:	7 octaves
Weight:	120g

Order

Code	Type	Price each
CJ19V	Chromatic Tuner	£29.99



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A pair of piano type pedals in a neat black box with rubber feet. A free-standing unit, it is ideal for electronic pianos. Each pedal operates its own single changeover (SPDT) contact. Contacts have solder tags and the cable passes through a grommet in the rear of the box, via a cable grip. Overall height: 57mm.

Order Code	Type	Price each
XB21X	A2 Piano Pedal	£19.99

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★ All prices include VAT. A, B etc. indicates there is an additional carriage charge for this item: see end of catalogue for details. ★

127

Digital Guitar Tuner



128 • Sound Equipment

35W PA Amplifier

NEW!



A general purpose mono 35W PA amplifier that features three mic inputs (1/4 in. mono jack sockets), and can be powered from the mains or a suitable 12V DC supply. One of the mic inputs is switchable between mic, aux or phono (magnetic cartridge). Two slider controls are provided for master volume and tone control, which provides treble cut, and a three position switch is used for bass cut. Other useful features include a seven LED bargraph (five green and two red) and a monitor LED, which illuminates when the output clips. The pilot LED illuminates when power is applied, whether 12V or mains. The output can be 100V line or 16, 8 or 4Ω, and a 3-pin DIN socket is provided for record/playback. This robust amplifier is ideal for school fêtes, sports days, car boot sales and general public address.

Specification

Power supply: 220 to 240V AC or 12 to 14V DC
 Power output: 50W maximum
 40W with 10% THD
 35W with 3% THD

Input channels

mic: 0.5mV/2kΩ
 phono: 3mV/47kΩ
 aux: 200mV/250kΩ
 Preamp output: 200mV (20Hz to 20kHz ±1dB)
 Frequency response: 70Hz to 15kHz ±3dB
 Tone control treble: -10dB
 Music/speech switch: 0dB, -5dB, -10dB (at 100Hz)
 S/N ratio: >60dB
 Output impedance: 4/8/16Ω & 100V line
 Size: 340 x 260 x 105mm
 Weight: 7kg

Order

Code	Type	Price each
AQ51F	H15 35W PA Amplifier	£199.99

Specification

Input power: 15W rms, 30W max.
 Frequency response: 275Hz to 5kHz.
 SPL at 1kHz: 106dB/1W/1m,
 118dB/15W/1m.
 Dimensions: 290 x 210mm dia.
 Weight: 1.83kg
 Material: Aluminium

Order

Code	Type	Price each
AQ52G	H 15W PA Horn Speaker	£49.99

MIXERS

Camcorder Audio Mixer



A 4 channel stereo mixer intended for editing and dubbing audio soundtracks on video recordings, i.e. at the camcorder to domestic VCR transcription stage. Inputs are provided for L/R microphones, tape/tuner/CD, turntable and camcorder audio soundtrack. Each channel can be faded in and out using the slide fader level controls. The turntable input is switchable between magnetic and ceramic pick-ups. A master fader controls the output level. With the exception of the 1/4 inch jack socket microphone inputs, all signal inputs and outputs are via phono connectors. Requires a 9V PP3 battery to operate, alternatively an external 9V DC supply may be used.

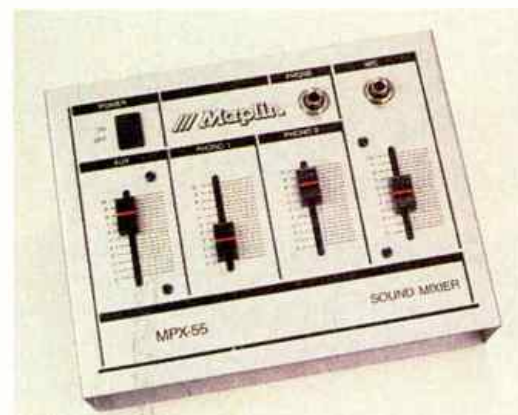
Specification

Power requirements: 9V PP3 battery or 9V DC supply
 Mic input: 1mV/600Ω
 Phono (mag): 3mV/50kΩ (RIAA equalised)
 Tape/CD/tuner input: 150mV/50kΩ
 Camcorder input: 150mV/50kΩ
 Output level: 500mV
 Distortion: <0.5%
 S/N ratio: >55dB
 Frequency response: 20Hz to 20kHz ±2dB
 Dimensions: 267 x 68 x 192mm

Order

Code	Type	Price each
YU71N	B3 Camcorder Mixer	£37.49

Battery Operated Stereo Mixer



A high quality low-cost battery powered stereo mixer incorporating sophisticated solid-state circuitry to ensure low-noise performance. The unit is enclosed in

an attractive black case designed to eliminate hum while allowing the switch-control panel to be operated with ease. This mixer's range of facilities includes an input for a microphone (600Ω), a headphone socket, two phono inputs (RIAA compensated for magnetic pick-ups), and one auxiliary input for tuner/tape etc. Slide type gain controls on the front panel enable fingertip control for complete mixing and fading. All the input/output phono sockets are at the rear of the unit with the exception of the 1/4 in. mono jack socket for the microphone and the 1/4 in. jack socket for the headphones, which are positioned on the front panel. A PP3 9 volt battery provides the power to run this unit or alternatively a 9 volt DC battery eliminator, such as our XX09K may be used. The battery is fitted inside the mixer case and access is via a removable cover in the base. The battery eliminator connection is a 2.1mm power socket on the rear panel.

Specification

Frequency response: 20Hz to 20kHz ±1dB
 Distortion: <0.5%
 Signal to noise ratio: >55dB
 Output: 220mV (max 2V) at 50kΩ
 Mic input: 0.3mV at 600Ω
 Phono inputs: 3mV at 50kΩ
 Aux input: 120mV at 50kΩ
 Current consumption: 12mA
 Overall dimensions: 228 x 178 x 80mm
 Weight: 1176g

Order

Code	Type	Price each
XJ14Q	B3 Sound Mixer	£27.49

Professional 8-Channel Mixer



A superb 8-channel mixer that offers a wide range of inputs and facilities, and provides three independently controlled stereo outputs; master, monitor and sub. Separate stereo record and a mono 'effect send' outputs are also provided. Mono channels 1 to 6 inputs are switchable between line or unbalanced microphone (if balanced microphones are used, a matching transformer must be used). Channels 7 and 8 each feature a built-in stereo RIAA-equalised phono preamplifier, for turntables with magnetic cartridges. This circuit can be switched out and replaced by a mono microphone input. Each of the eight channels has controls for input signal gain, treble, mid, bass and effect. High quality faders control the signal level that is fed to the main outputs. Additionally, channels 1 to 6 have a pan pot which adjusts the relative amplitude in the left and right channels of the output and allows the channel to emanate from the left or right, or somewhere in between. Channels 7 and 8, being stereo, have balance controls in place of pan pots. The effect control alters the level of the mix-down being fed to the effect send output. This effects output can feed an echo unit, or similar, the return feed can then be added to the stereo bus, via a level control pot. A stereo auxiliary input facility is available that can be added to the stereo bus via bass and treble controls only. Each channel can be added to the (PFL) bus, which can then be monitored through headphones or the monitor loudspeakers, if used. When depressed, an LED lights and indicates that the channel has been selected to the bus, then by adjusting the gain control

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PA Horn Speaker



A round, public address horn speaker with adjustable mounting bracket, and finished in dark grey. The speaker is lightweight, weatherproof and produces a crisp, clean sound with minimum distortion and uniform output. There is an in-built 100V line matching transformer with 15W/10W/5W/2.5W rating taps that is accessible via a removable transparent 'window' at the rear of the horn. The voice coil is wound on an aluminium former which helps to produce an efficient loudspeaker.

the desired level can be set on the VU meters. Alternatively, the master or sub outputs can be monitored. All microphone input sockets and the headphone monitoring socket are 1/4in. mono jacks, all other sockets are phono. The free-standing mixer is of sturdy metal construction with black finished wooden end cheeks and is mains powered. Dimensions 400 x 325 x 115mm approx.

Specification

input sensitivity	
Mic:	1mV into 1kΩ
Phono:	3mV into 50kΩ (RIAA)
Aux & line:	150mV into 100kΩ
Effect return:	0.775mV into 100kΩ
Output level	
Master, sub, mon:	1.5V rated, 8V max.
Record:	0.775V rated, 8V max.
Effect send:	0.775V rated, 8V max.
Output impedance:	
Harmonic distortion:	600Ω
Frequency response:	0.01% (rated o/p) 20Hz to 20kHz ± 1dB (RIAA ± 2dB)
S/N ratio	
Mic:	75dB
Phono:	70dB
Line:	80dB
Aux:	80dB
Effect:	80dB
Tone controls	
Frequency:	100Hz, 1kHz, 10kHz
Boost/cut:	±12dB
Power requirements:	
	240V AC 50Hz

Order Code	Type	Price each
BZ65V	H13 8-Channel Mixer	£299.99

9-CHANNEL STEREO DISCO MIXER



GREAT VALUE!
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XM39N
[H13]

A very smart high quality audio mixer primarily intended for disco/audio visual applications. The control panel is finished in semi-matt silver/grey with white and red legend. The nine input channels have individual gain controls and side faders. Channels one to three are for use with microphones and have additional high/low equalisation controls on each channel. Channels 4 and 5 are turntable inputs and are RIAA equalised accordingly. Channels 6 and 7 are tape/CD inputs. Channels 8 and 9 are auxiliary/video (soundtrack) inputs. Channels 4 to 7 are equipped with auto start outputs for controlling low voltage motors on turntable or cassette decks. An overall master fader controls the output signal level, a balance control is also provided. Output levels are displayed on twin 11 LED VU bargraph displays. To compensate for room acoustics a stereo 10 band equaliser allows fine adjustment of the output signal.

If required the equaliser can be bypassed by operating the EQ/bypass switch. A stereo/mono switch is also provided. The monitoring section allows monitoring of any of the individual input channels or the master output. A 1/4 inch stereo headphone socket is provided on the front panel for the monitor output, the level of which can be adjusted by an adjacent control. With the exception of the microphone input and start outputs, all connections are via phono connectors.

Specification

Input Sensitivity		Phono:	70dB
Mic:	3mV/20kΩ	Video:	80dB
Phono:	3mV/50kΩ (RIAA equalised)	Tape:	80dB
Video:	150mV/100kΩ	Aux:	80dB
Tape:	150mV/100kΩ	CD:	80dB
Aux:	150mV/100kΩ	Tone Control (Mic inputs)	
CD:	150mV/100kΩ	Frequency:	100Hz & 10kHz
Output Level (Master)		Boost/cut:	±12dB
(Rated):	2.2V/600Ω	Monitor Output:	1W/8Ω
(Max):	8V	Equaliser	
Output Level (Record)		Boost/cut:	±12dB
(Rated):	1.5V/600Ω	Centre Frequencies:	31Hz, 62Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz
(Max):	8V	Start Output:	
Harmonic Distortion:	0.002% at rated output	4 outputs rated at 24V DC/500mA	
Frequency Response:	20Hz-20kHz ±0.5dB	Dimensions:	
S/N Ratio		428 x 290 x 125mm	
Mic:	70dB		

IT'S A FACT!

Karl Friedrich Gauss (1777 to 1855) was a German mathematician and scientist whose interests were varied. His mathematical calculations of magnetic force are used in the design of modern electric generators. The unit of force in a magnetic field, the Gauss, is named after him.



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MICROPHONE INSERTS

Crystal Microphone Inserts



Two small crystal microphone inserts, one in a plastic box and one with a metal body. Size 25mm diameter x 10mm (11mm with plastic). Both require amplifier input impedance $\geq 1M\Omega$.

Order Code	Type	Price each
LB93B	Crystal Mic In Plas	£1.25
HY33L	Crystal Mic In Metal	£1.49

Dynamic Microphone Inserts



Two dynamic coil microphone inserts, DU-3 is omnidirectional and is fitted in a round plastic case 23mm diameter x 11mm thick. Two solder pads provide means for connection to a screened cable. The screen should be soldered to the pad that is one end of the large circular band underneath.

Type UF-27 is unidirectional and contained in a black plastic body 30mm long x 27mm diameter overall. The rear of the body is stepped to facilitate insertion into some sort of rubber grommet or suspension. Connects via two solder pads.

Specification		DU3	UF27
Frequency response:		100Hz to 10kHz	50Hz to 14kHz
Impedance:		500 Ω	600 $\Omega \pm 30\%$ @ 1kHz
Sensitivity:		-80dB ± 2 dB @ 1kHz	-82dB ± 3 dB @ 1kHz
Weight:		13g	22g

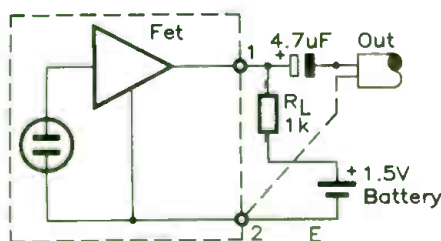
Order Code	Type	Price each
FK43W	Omni Insert Dyn DU3	£2.25
FK44X	Uni Insert Dyn UF27	£5.49

Electret Microphone Inserts

Omnidirectional Ultra Miniature



Type EM-10B is an ultra-miniature omnidirectional electret condenser microphone only 6mm diameter and 5.2mm thick.

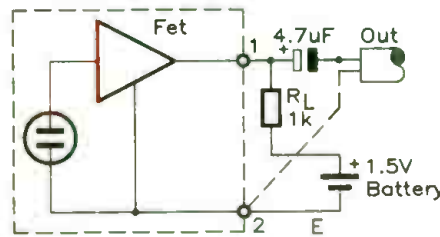
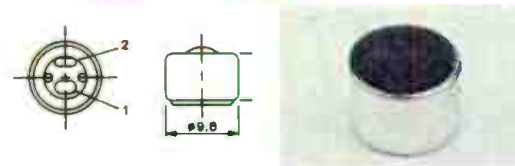


Specification	
Response:	Omnidirectional
Frequency response:	50Hz to 13kHz
Sensitivity:	-60dB ± 3 dB (0dB = 1V/ μ bar at 1kHz, V_{cc} = 4.5V, R_L = 1k Ω)

Impedance: 1k Ω maximum
 S/N ratio: >40dB
 Sound pressure level: 120dB maximum
 Power supply: 1.5V to 10V DC
 Recommended voltage: 4.5V (optimum performance)
 Current drain: <0.5mA

Order Code	Type	Price each
QY62S	Ultramin Omni Insert	£1.75

Omnidirectional Sub-Miniature



Type EM-60B is a sub-miniature omnidirectional electret condenser microphone only 9.8mm diameter and 7mm thick.

Specification	
Response:	Omnidirectional
Frequency response:	50Hz to 13kHz
Sensitivity:	-60dB ± 3 dB (0dB = 1V/ μ bar at 1kHz, V_{cc} = 4.5V, R_L = 1k Ω)
Impedance:	1k Ω maximum
S/N ratio:	>40dB
Sound pressure level:	120dB maximum
Power supply:	1.5V to 10V DC
Recommended voltage:	4.5V (optimum performance)
Current drain:	<0.4mA

Order Code	Type	Price each
FS43W	Submin Omni Insert	99p

Lapel Microphone

A low-cost crystal lapel microphone with lapel clasp and 900mm long lead terminated with a 3.5mm jack plug.



Order Code	Type	Price each
LB68Y	Lapel Mic	£2.99

CASSETTE MICROPHONES

Low-Cost Dynamic Microphone



A budget priced omnidirectional dynamic microphone that makes an ideal replacement for the type supplied with portable cassette recorders. It has a black plastic body and it features a remote switch, the contacts of which are terminated in a 2.5mm jack plug. Connection to the microphone itself is by means of a 1 1/2m lead with 3.5mm plug. A stand bracket is incorporated for desktop use.

Specification	
Frequency response:	200Hz to 10kHz
Impedance:	250 $\Omega \pm 30\%$ at 1kHz
Sensitivity:	-78dB ± 3 dB at 1kHz
Size:	115 x 30mm dia.
Weight:	50g

Order Code	Type	Price each
ZA31J	Low Cost Dynamic	£3.49

Dynamic Stereo Pair



A pair of carefully matched omnidirectional dynamic microphones for stereo recording. Attractively styled with chrome plated plastic surround to the meshed top. Two desk stands are supplied and each microphone has 1m of lead terminated in a 3.5mm jack plug. An integral on/off switch is built into the stem. Supplied only in pairs.

Specification	
Frequency response:	90Hz to 11kHz
Impedance:	200 to 600 Ω
Sensitivity:	-76dB (150 μ V) at 1kHz
Size:	160 x 43mm dia.
Weight:	50gm

Order Code	Type	Price each
LH87U	Dynamic Stereo Mics	£23.99

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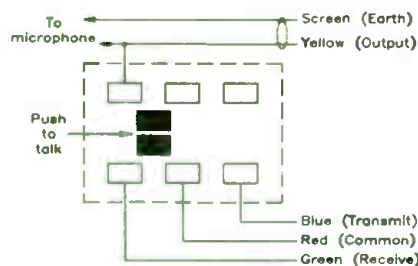
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COMMUNICATIONS MICROPHONES

Standard Type



A hand-held communications type microphone with integral push-to-talk switch. Supplied with 1.5m of coiled black cable and a screw-on bracket so that the microphone can be hung up when not in use. Lead is supplied with prepared ends for connection of plug to suit your equipment. Yellow lead is the microphone signal wire and its screen is the earth. The push-to-talk switch is a change-over type where the red wire is connected to the green while in the 'normal' position; or the red is connected to the blue in the 'closed' position. Impedance 600Ω, dynamic.



Order Code	Type	Price each
WF05F	Communications Mic	£12.49

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Hand-Held Power Microphone with Compressor



The output signal is carried on the yellow wire, with the screen as earth. The push-to-talk switch connects the red or common wire to the green wire in the 'normal' position, or the blue wire in the 'transmit' position. The internal 9V supply is only switched on when transmitting.

Specification
Output Level: -40dB (10mV)
Impedance: 1kΩ
Cable: 1.8m (6ft) 4 core screened lead
Dimensions: 95 x 65 x 45mm
Weight: 155gms with battery
Supplied with connecting diagram.

Order Code	Type	Price each
RK04E	Power Mic	£18.99

TIE-CLIP MICROPHONES

Standard Tie-Clip Microphone



A smart high quality electret tie-clip microphone supplied complete with 3m of lead terminated in a standard 1/4 in. mono jack plug, tie clip holder and 1.35V button battery. A knurled screw-on-cap seals the battery compartment, and the battery must be removed if the microphone is to be left un-used for long periods in order to preserve battery life.

Specification
Impedance: 600Ω @ 1kHz
Frequency response: 50 to 16kHz
Sensitivity: -60dB ±3dB @ 1kHz (700μV)
Polar pattern: Omnidirectional
Battery: H-B mercury 1.35V
Dimensions: 33 x 18.5mm dia.
Weight: 26gms

Order Code	Type	Price each
LB69A	Tie-Clip Mic	£15.99

Miniature Tie-Clip Microphone



A very high quality sub-miniature electret tie-clip microphone with remote amplifier and battery in body of jack plug. Replacement batteries are available. Suitable types are RM400R/HB/PX400/MR08. Complete with 6m of lead terminated in a standard mono jack plug. Also supplied with one chromed tie-clip holder. Polar pattern is omnidirectional.

Specification
Frequency response: 50Hz to 16kHz
Impedance: 600Ω
Sensitivity: -64dB (480μV) at 1kHz
Battery life: 6000 hours
Size: 22 x 8mm dia.
Weight: 4gm

Order Code	Type	Price each
YW71N	UM Tie-Clip Mic	£22.49

DYNAMIC BALL MICROPHONES

Vocal Dynamic Microphone



A stylish low impedance unidirectional dynamic microphone with built-in on/off switch and a spherical mesh wind shield. The microphone has a rugged black plastic body and is supplied with approximately 3m of cable, terminated in a mono 1/4 in. jack plug. The cable is not detachable.

Specification
Frequency response: 80Hz to 12kHz
Impedance: 600Ω
Sensitivity: -76dB ±3dB at 1kHz
Size: 220 x 56mm
Weight: 116g

Order Code	Type	Price each
CJ15R	Voc Dynamic Mic Blac	£5.49

Unidirectional Dynamic Microphone

Pro-Sound



A low impedance unidirectional dynamic microphone with cardioid response pattern. The microphone has a built in on/off switch and a spherical mesh windshield, the body is made from black plastic. The microphone is supplied with 3m of cable terminated in a 1/4 inch mono jack plug. The lead is not detachable.

Specification
Frequency response: 80Hz to 12kHz
Impedance: 600Ω
Sensitivity: -76dB (±3dB)
Size: 220 x 50mm dia.
Weight: 125g

Order Code	Type	Price each
YU34M	Dnmc Cardioid Lo-Z	£6.99

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HOT TIP

To lessen the possibility of floor or table noise travelling up a microphone stand and into a microphone, place a thin sheet of foam under the stand. Make sure the foam is not too thick or mechanical instability may result, which can cause the stand to topple.

Vocal and Hi-fi Microphone



A stylish low-impedance dynamic unidirectional microphone with built-in on/off switch and a spherical mesh windshield. The microphone has a tough plastic body available in matt black. The microphone is supplied with approx. 3m of cable terminated in a mono 1/4 in. jack plug. The lead is not detachable.

Specification
 Frequency response: 60Hz to 12kHz
 Impedance: 600Ω
 Sensitivity: -76dB ±3dB
 Size: 180 x 55mm dia.
 Weight: 142g (excl. cable)

Order Code	Type	Price each
YT34M	Dynamic Mic Black	£7.99

supplied with 3m of cable terminated in a 1/4 inch mono jack plug. The lead is not detachable. Available in black.

Specification
 Frequency response: 80Hz to 12kHz
 Impedance: 50kΩ & 600Ω
 Sensitivity (50kΩ): -57dB (±3dB)
 Sensitivity (600Ω): -76dB (±3dB)
 Size: 225 x 50mm dia.
 Weight: 125g

Order Code	Type	Price each
YU33L	Blk Cardioid Dual-Z	£9.99

approx. 5m cable terminated in a mono 1/4 in. jack plug. The cable connects to the microphone via a locking 3-pin XLR connector. A microphone holder and rigid carrying box are included.

Specification
 Frequency Response: 60Hz to 12kHz
 Impedance: 600Ω
 Sensitivity: -76dB ± 3dB at 1kHz
 Size: 163 x 45mm dia.
 Weight: 470g (with cable)

Order Code	Type	Price each
ZC02C A1	Unidirect Dynamic	£17.49

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Gooseneck Microphone

Pro-Sound



A quality unidirectional dynamic gooseneck microphone that provides excellent reproduction of music and speech. This microphone is ideal for use in schools, churches, night clubs, theatres as well as public address and tape recording. The microphone gooseneck plugs directly into a female 3-pin XLR connector, allowing easy removal of the gooseneck for storage and protection. The microphone is 385mm long, when straight, and is fitted with an on/off switch in the connector.

Specification
 Frequency response: 60Hz to 12kHz
 Impedance: 600Ω
 Sensitivity: -76dB ±3dB @ 1kHz

Order Code	Type	Price each
BZ80B B1	Gooseneck Mic	£22.49

3 Microphone Pack



A pack of microphones supplied in 3 popular colours, red, yellow and blue. These stylish low-impedance, unidirectional, dynamic microphones, have a built-in on/off switch and are all supplied with approximately 3m of cable terminated in a mono 1/4 in. jack plug.

Specification
 Frequency response: 100Hz to 12kHz
 Impedance: 500Ω
 Sensitivity: -80dB ±3dB
 Size: 180 x 55mm dia.
 Weight: 142g (excl. cable)

Order Code	Type	Price each
ZF50E A1	3 Mic Pack	£19.99

Unidirectional Dynamic Dual Impedance Microphone

Pro-Sound



This microphone is similar to YU34M (previous page) but has a selectable impedance of 50kΩ or 600Ω. The microphone is unidirectional and has a cardioid response pattern. The microphone has a built in low-Z/off/high-Z switch and a spherical mesh windshield, the body is made from plastic. The microphone is



A low-impedance dynamic microphone with a built-in on/off switch and tubular mesh windshield. The microphone has a matt black body and is supplied with

Vocal

A low-impedance dynamic unidirectional cardioid-pattern microphone with a built-in on/off switch and a spherical mesh windshield. The microphone has a matt grey-coloured metal body and is supplied with approx. 5m of cable terminated in a mono 1/4 in. jack plug. The cable connects to the microphone via a locking 3-pin XLR type connector. The microphone is specifically designed for vocal use.



Specification
 Frequency response: 60Hz to 14kHz
 Impedance: 500Ω
 Sensitivity: -78dB @ 1kHz
 Size: 150 x 52mm dia.
 Weight: 235g (without cable)

Order Code	Type	Price each
YN75S A1	Vocal Microphone	£29.99

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Professional Unidirectional Dynamic Microphone

Pro-Sound



A solidly built professional low impedance unidirectional dynamic microphone, with a cardioid response pattern. A mesh windshield reduces breath noise and protects the microphone capsule. The microphone has a built in on/off switch, the body is made from die-cast aluminium and is finished in semi-matt grey. Ideal for use in vocal applications. Connection to the microphone is via a 3-pin XLR connector, a 6m cable with an XLR line socket and 1/4 inch mono jack plug is supplied. A microphone holder and rigid carrying box are included.

Specification

Frequency response: 60Hz to 12kHz
 Impedance: 600Ω
 Sensitivity: -76dB (±3dB)
 Size: 165 x 48mm dia.
 Weight: 330g

Order Code	Type	Price each
YU37S A1	Prfsnl Cardioid Mic	£25.99

Professional Unidirectional Moving Coil Microphone

Pro-Sound



A solidly built professional quality unidirectional low impedance microphone with a built in on/off switch. It offers superb reproduction of both voice and music. The cardioid response pattern minimises feedback and sound spill from unwanted sound sources. A windshield integrated into the microphone body reduces breath/wind noise and also protects the microphone capsule. This microphone features a die-cast aluminium body finished in semi-matt grey. Connection to the outside world is by means of a 3-pin XLR connector. A 6 metre lead, with an XLR line socket and a 6.3mm mono jack plug is supplied. A microphone holder and rigid carrying case are included.

Specification

Frequency response: 40Hz to 17kHz
 Impedance: 500Ω
 Sensitivity: -75dB (±3dB) at 1kHz
 Size: 170 x 50mm dia.
 Weight: 315g

Order Code	Type	Price each
ZA29G A2	Prfsnl Vocal Mic	£39.99

DUAL IMPEDANCE DYNAMIC MICROPHONE

Shure

A low-cost, all-purpose microphone that is suitable for a variety of sound reinforcement applications, i.e. instrument and lectern. The microphone features a uniform unidirectional polar response and has a lockable on/off switch. Supplied with a slip-in swivel adaptor.

Specification

Type: Dynamic
 Polar pattern: Cardioid (unidirectional)
 Frequency response: 80Hz to 13kHz
 Impedance (Lo-Z): 150Ω (170Ω actual)
 Output level at 1kHz: Lo-Z Hi-Z
 open circuit voltage*: -82.5dB (0.074mV) -59.0dB (1.1mV)
 power level**: -61.0dB -61.0dB

* OdB = 1V/μbar, ** OdB = 1mW/10μbar



GREAT VALUE!
£54.99
 CY79L
 [A1]

THE BEST OF SERVICE

Professional Cardioid Microphone

A very high quality dynamic moving coil microphone with a wide uniform response curve. The microphone has a built-in spherical windshield and a self-contained filter that controls explosive breath sounds ('pop') and wind noise in outdoor locations. The cartridge pick up pattern minimises background noise and clearly picks up desirable sounds, and the pick up cartridge is shock-proofed for protection against mechanical noise such as handling noise and floor noise. The microphone comes with instructions on how to use it with a balanced line. Complete with 6 metres (20 ft) of cable with 3 pin XLR type connector for microphone and 1/4 in. mono jack plug.



Specification

Frequency response: 50Hz to 15kHz
 Impedance: 500Ω
 Sensitivity: -71dB (200μV) at 1kHz
 Size: 160 x 52mm dia
 Weight: 310g

Order Code	Type	Price each
YK69A A2	Professional Mic 4	£74.99

Prologue 10 Microphone

Shure



A dynamic, cardioid, microphone that features a slim profile and is an excellent choice for miking all musical instruments, particularly drums, horns and instrument amplifiers. The microphone has a tailored frequency response that provides vocals with clarity and crispness. Additionally, this ruggedly constructed microphone features an on/off switch, 3-pin professional audio connector, and is available in two versions – high and low impedance. The Prologue 10 provides quality and performance for the budget conscious musician, vocalist and audio/visual engineer. Supplied with a slip-in swivel adaptor.

Specification

Type: Dynamic
 Polar pattern: Cardioid (unidirectional)
 Frequency response: 80Hz to 10kHz
 Output level at 1kHz: Lo-Z version Hi-Z version
 open circuit voltage*: -76.5dB(0.15mV) -59.5db(1.1mV)
 power level**: -60.5dB -60.5dB

* OdB = 1V/μbar, ** OdB = 1mW/10μbar

Manufacturer's

Code	Code
10L-LC (Lo-Z)	CY77J
10H-LC (Hi-Z)	CY78K

Order Code	Type	Price each
CY77J A1	Prologue 10 Lo-Z	£29.99
CY78K A1	Prologue 10 Hi-Z	£31.49

Broadcast Quality Microphone

A very high quality dynamic microphone with a precise cardioid unidirectional polar sound pattern and an extremely smooth frequency response. The robust moving coil element is supported in an all-metal body, with metal mesh ball windshield, finished in satin grey. Incorporates on/off switch. Accessories include 5 metres of screened cable terminated with a Cannon-type connector for the microphone and a mono 1/4 in. jack plug, a foam windshield cover, microphone holder including 5/8 in. to 5/16 in. adaptor, and soft carry case.



Specification

Frequency response: 50Hz to 16kHz ± 5 dB
 0° axis @ 7.5cm
 Sensitivity: -76.5 ± 1 dB (109 μ V)
 Impedance: 200 Ω
 Dimensions: 165 x 52mm dia.
 Weight: 270gm (without cable)

Order Code	Type	Price each
YJ75S	A2 Broadcast Qual Mic	£99.99

Dual Impedance Vocal Microphone

Shure

An economical vocal and general sound reinforcement microphone that has a switch selectable dual-impedance output and a locking on/off switch. The unidirectional polar patterns stay exceptionally uniform at all frequencies, providing unmatched gain-before-feedback capability. The microphone features a built-in spherical windscreen/pop filter for noise free use, and is supplied with a slip-in swivel adaptor.



Specification

Type: Dynamic
 Polar pattern: Cardioid (unidirectional)
 Frequency response: 80Hz to 13kHz
 Impedance (Lo-Z): 150 Ω (180 Ω actual)
 Output level at 1kHz: Lo-Z Hi-Z
 open circuit voltage*: -82.0 dB (0.08mV) -59.5 dB (1.1mV)
 power level**: -60.5 dB -60.5 dB

* 0dB = 1V/ μ bar, ** 0dB = 1mW/10 μ bar

Manufacturer's Code 588SD-LC

Order Code	Type	Price each
CY80B	A1 Dual Imp Vocal	£64.99

Quality Professional Dynamic Microphone

Shure



A superb quality dynamic microphone at an affordable price, that delivers a crisp, detailed performance with good power and punch. This ruggedly built microphone is ideally suited for singers who are 'on the way up'. Features a built-in windscreen/pop filter for noise-free use, and supplied with a slip-in swivel adaptor.

Specification

Type: Dynamic
 Polar pattern: Cardioid (unidirectional)
 Frequency response: 55Hz to 14kHz
 Impedance: 150 Ω (270 Ω actual)
 Output level at 1kHz
 open circuit voltage*: -77.5 dB (0.13mV)
 power level**: -59.0 dB

* 0dB = 1V/ μ bar, ** 0dB = 1mW/10 μ bar

Manufacturer's Code SM48-LC

Order Code	Type	Price each
CY81C	A1 Professional Dynamic	£79.99

High Quality Professional Dynamic Microphone

Shure



A superb high quality dynamic microphone that delivers a crisp, detailed performance with maximum power and punch. This widely used microphone has a lively, intelligible sound and is ruggedly built for a long reliable life. Ideally suited for rock, R&B, pop and country vocals. Featuring a built-in windscreen/pop filter for noise-free use, the microphone is supplied with a slip-in swivel adaptor.

Specification

Type: Dynamic
 Polar pattern: Cardioid (unidirectional)
 Frequency response: 50Hz to 15kHz
 Impedance: 150 Ω (310 Ω actual)
 Output level at 1kHz
 open circuit voltage*: -75.5 dB (0.17mV)
 power level**: -56.0 dB

* 0dB = 1V/ μ bar, ** 0dB = 1mW/10 μ bar

Manufacturer's Code SM58-LC

Order Code	Type	Price each
CY82D	A1 HQ Professional Dym	£124.99

Microphone Cable

Shure

A high quality microphone cable that is 15ft (4.6m) long, with a 3-pin female XLR microphone connector and a 1/4 in. jack plug at the equipment end. Ideal for use with the Shure range of microphones.

Order Code	Type	Price each
CY83E	Cable + Connectors	£8.49

HOT TIP

When wiring together more than one loudspeaker in a sound system, such as a PA, it is important to get the phase of each loudspeaker correct, so that when a signal is applied, all the loudspeaker cones move in the same direction. Some manufacturers mark one terminal with a small spot of paint or a '+' to indicate the phase. If you have an unmarked loudspeaker, it is easy to check the phase by connecting a 1.5V battery across the loudspeaker terminals. Observe the cone and watch which way round results in the cone pushing out. Mark the terminal that is connected to the positive of the battery with a spot of red paint, or nail varnish, to identify the positive terminal. When wiring up the loudspeakers, be sure to wire the speakers with all the '+' terminals connected together, and similarly all the '-' terminals connected together.



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ELECTRET CONDENSER MICROPHONES

Electret Condenser Super Cardioid Unidirectional Microphone with Zoom

Pro-Sound



This microphone is specifically intended for use with video camera recorders. The microphone uses an electret condenser capsule and has selectable super cardioid (tele) or cardioid (normal) response pattern. Thus when you zoom in for a close-up, you can switch the microphone to 'tele' and the sound too will zoom in like the picture. The body is made from black anodised turned aluminium and has an integral tele/normal/off switch. The lower part of the microphone unscrews to facilitate fitting of a AA cell. Two connecting cables are supplied: One is short and coiled, intended for use when the microphone is attached to the camcorder (microphone holder supplied). The other cable is 7.6m long and is for hand held use of the microphone. Both cables have locking connectors at the 'microphone' end, which prevents the cable from becoming detached accidentally. Cables are terminated in 3.5mm mono jack plugs. Also supplied, a microphone windshield and rigid carrying box. AA size battery not included.

Specification

Frequency response:	80Hz-12kHz
Impedance (normal):	1kΩ
Impedance (tele):	2k3Ω
Sensitivity (normal):	-70dB (±3dB)
Sensitivity (tele):	-56dB (±3dB)
Size:	285 x 21mm dia.
Weight:	105g (excluding battery)
Power supply:	1.5V AA cell

Order Code	Type	Price each
YU36P	Spr Cardioid Cam Mic	£32.49

MICROPHONE ACCESSORIES

Microphone Windshields

Functionally styled, controlled-density foam windshields. The small type fits most slimline dynamic or electret microphones, the larger type fits most ball type microphones. Essential for suppressing explosive breath sounds, squeals and booming effects. Available only in black.



Order Code	Type	Price each
LB35Q	Mic Windshield Small	75p
JP44X	Mic Windshield Large	£1.80

Universal Microphone Holder

This microphone holder features spring-loaded jaws to hold any size microphone. 5/8 in. threaded base.



Order Code	Type	Price each
RK92A	Universal Mic Holder	£2.25

Microphone Holder 622

A microphone holder suitable for use with all our dynamic ball microphones including YU33L, YU34M, YU37S, YK69A and YJ75S. 5/8 in. threaded base.



Order Code	Type	Price each
RK93B	Mic Holder 622	£1.75

Microphone Holder 614

A microphone holder suitable for microphone YT34M. 5/8 in. threaded base.



Order Code	Type	Price each
FV08J	Mic Holder 614	£1.99

Microphone Holder 600

Microphone holder suitable for use with unidirectional Electret Condenser microphone YU36P. 5/8 in. threaded base.



Order Code	Type	Price each
FV09K	Mic Holder 600	£1.99

Microphone Adaptors



Solid metal adaptors which enable microphone holders threaded to 5/8 in. to be used with accessories having 5/16 in. or 3/8 in. threads. FV11 has 5/16 in. outer thread and 1/4 in. inner thread. FV12 has 3/8 in. outer thread and 5/16 in. inner thread.

Order Code	Type	Price each
FV11M	5/16 inch Adaptor	89p
FV12N	3/8 inch Adaptor	89p

Microphone Stand

Black plastic rectangular microphone stand with non-slip feet which can be used with any microphone holder having a 5/8 in. threaded base, but must have, in addition, one of the adaptors described above used as a fixing screw. Size: 106 x 66mm.



Order Code	Type	Price each
FV10L	Microphone Base	£1.75

Gooseneck Microphone Stands

Brightly chromed gooseneck microphone stands, threaded to accept standard microphone carriers. Base is internally threaded. Available in three lengths,



Order Code	Type	Price each
YW72P	Gsneck Mic Stand 6in	£2.49
LH88V	Gsneck Mic Stnd 13in	£2.99
WF36P	Gsneck Mic Stnd 20in	£3.79

Cast Base Microphone Stand with Gooseneck

Pro-Sound

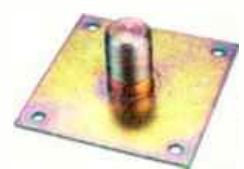
A table-top microphone stand with a chrome-plated gooseneck screwed into a heavy diecast, black textured finish base. Standard thread at top suits stand adaptors supplied with our microphones and most others. Height 353mm when straight. Base diameter 150mm.



Order Code	Type	Price each
YT40T	A2 Cast Gsnk Mic Stand	£6.99

Metal Hidden-Mounting Gooseneck Base

An all-metal base to fit our goosenecks. Threaded stud is welded to a flat base (60 x 60mm) with fixing centres on 48mm centres (4BA (M4) clearance). Cadmium-plated. Panel cut-out: 16mm dia.



Order Code	Type	Price each
WF37S	Bkt For Gsnk Stand	£1.99

MAPLIN KEY CALL
Phone 01702 556751

Gooseneck Base

A surface mounting all-metal base to fit our goosenecks. The base is chrome-plated and 44mm diameter. There are three equidistant fixing holes with centres on a 30mm diameter epicycle. Overall height 21mm. Standard 5/8 in. thread.



Order Code	Type	Price each
JH58N	Surface Gsnk Flange	£1.65

Cast Base Microphone Stand

Pro-Sound

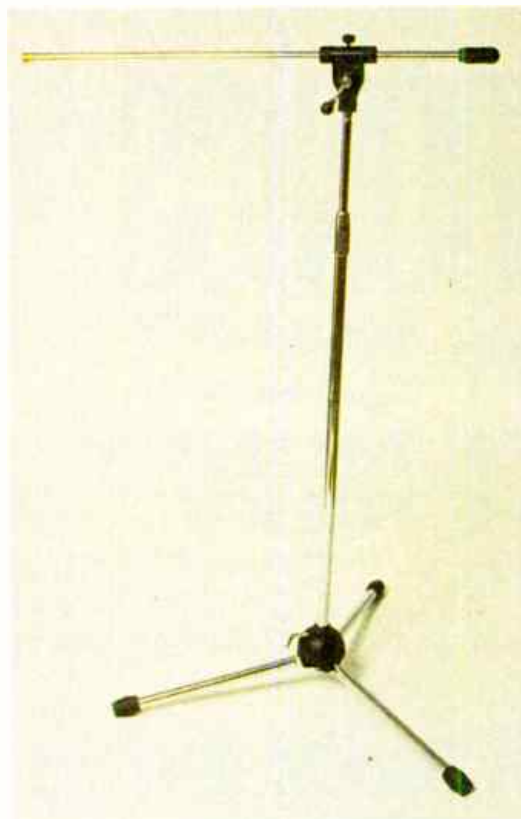
A table-top microphone stand with a chrome plated rod screwed into a heavy diecast, textured finish base. Standard thread at top suits stand adaptors supplied with our microphones and most others. Height 124mm. Base diameter 150mm.



Order Code	Type	Price each
YW75S A2	Cast Base Mic Stand	£4.99

Microphone Stand with Boom

Phoenix

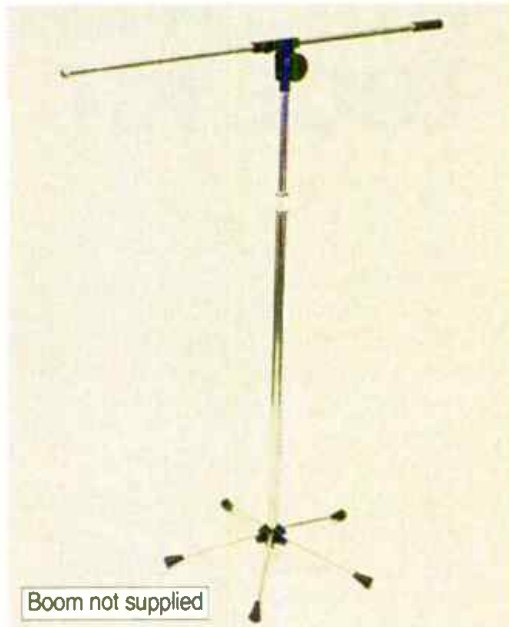


A free-standing, chrome plated, tripod microphone stand with legs that end 360mm from the centre-line of the stand, to provide a rigid base for a microphone. The main stem is adjustable from 0.89m to 1.6m in height and the sliding part of the stem is clamped with a twist friction grip. The stand is supplied with a 690mm long adjustable boom, which can be rotated through 360° and set to any desired angle, or removed and the stand used on its own. The stand is supplied with a threaded adapter, to accept standard microphone holders, that is fitted to the end of either the stand or boom, as required.

Order Code	Type	Price each
MK55K E5	Mic Stand with Boom	£29.99

5-Foot Microphone Stand

Pro-Sound



Boom not supplied

A floor-standing microphone holder with five hinged feet which end 250mm from centre of stand providing a very rigid base. Feet fold under for stowing. The stand is heavily chromed and stands 875mm high with second section fully collapsed. Second section extends up to 1575mm, but may be locked to any height with friction grip. Lower section diameter 22mm. Upper section diameter 16mm. Top is threaded to accept standard microphone holders.

Boom arm described below is shown fitted to the 5-foot Mic. Stand, but is not supplied with the stand and must be ordered separately if required.

Order Code	Type	Price each
XB45Y D3	5-Foot Mic Stand	£15.99

Boom Arm

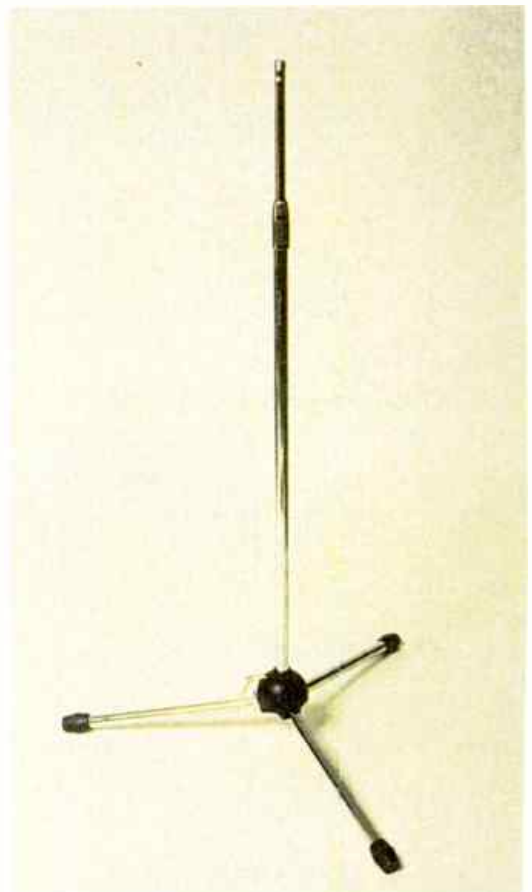
Boom is chromed and has a heavy counterweight. It can be rotated through 360° and can be set to any angle. Total length of arm 845mm. Boom length is adjustable up to 665mm from centre of stand. End of boom arm is threaded to accept standard microphone holders.

Order Code	Type	Price each
XB46A A2	Boom Arm	£7.99

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01702
552941**

Microphone Stand

Phoenix



A floor-standing, chrome plated, tripod microphone stand with legs that end 360mm from the centre-line of the stand, to provide a rigid base for a microphone. The main stem is adjustable from 0.79m to 1.517m in height and the sliding part of the stem is clamped with a twist friction grip. The end of the stand is fitted with a threaded adapter to accept standard microphone holders.

Order Code	Type	Price each
MK56L D3	Tripod Mic Stand	£22.99

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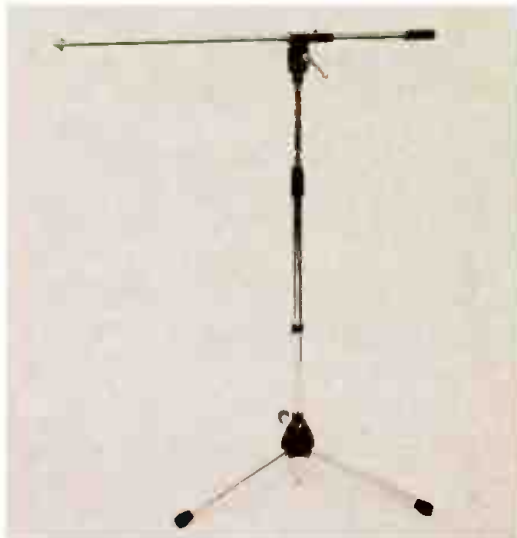
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FREE**

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Microphone Stand with Boom

Pro-Sound

A free-standing microphone stand with three hinged legs which end 320mm from the centre of the stand providing a very rigid base. Legs fold under for storage and transport. The main stem is adjustable between 0.9m and 1.65m in height. The sliding part of the main stem is clamped with a twist friction grip. The stand is supplied with an 83cm adjustable boom, which can be rotated through 360° and set to the required angle. The boom can be removed and the stand used on its own. Both the stand and boom are threaded to accept standard microphone holders. The microphone stand is available in three colours; red, black and chrome.



Order Code	Type	Price each
XM24B	Red Microphone Stand	£22.99
XM49D	Blk Microphone Stand	£22.49
XM48C	Chm Microphone Stand	£22.49

Tripod Microphone Stand

Pro-Sound

A table-top microphone stand. Chrome plated tripod legs hinge outward to give firm base. Standard thread at top suits stand adaptors supplied with our microphones and most others.



Order Code	Type	Price each
LB96E	Table-Top Mic Stand	£2.49

Balanced Microphone Lead



A 10 metre long lead having a male XLR latching connector at one end and a female XLR latching connector at the other. This lead is manufactured from high quality microphone cable, with a heavy duty black outer covering, to withstand the rigors of studio and stage use.

Order Code	Type	Price each
MK58N	Bal Mic Lead	£16.99

HOBBYISTS STARTER TOOL KIT

An easily affordable tool kit for the new electronics hobbyist, packaged to suit the typical needs of the beginner and offering considerable savings over buying the items separately. Presented in a cloth toolroll, the pack contains: side cutters; pair of long-nosed pliers with wire cutter; light-duty flat blade screwdriver 75mm long; No. 1 crosspoint screwdriver 75mm long; desoldering tool; and an Antex soldering kit with a CS iron, stand and 5m pack of 18swg multicore solder. Start as you mean to go on, with the right tools.



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See back pages of this catalogue for more details . . .

AERIALS

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CHOOSING AN AERIAL

If you want to get the best out of your FM receiver or TV set invest in a good aerial. So many people spend hundreds of pounds on a TV set or FM receiver and then never allow it to work as well as it could, because they won't spend a few more pounds on a good aerial. If at all possible always fit an aerial outside and as high as possible and for best results it should have a clear view to the horizon. Aerials in the loft can be satisfactory but they will need to be carefully positioned as they are affected by water tanks and pipes and cables.

Remember the signal level inside a roof can be as little as one tenth of the level outside, so you will need a bigger aerial to achieve the same result that an outside aerial would give. Set-top aerials are rarely completely satisfactory as they are affected by people moving in the room, cars passing by, trees moving outside and other effects of this kind. In flats, indoor aerials only work if your outside wall is on the side of the block nearest the transmitter.

The farther you live from the transmitter the bigger the aerial you will need. For colour on UHF TV or stereo on VHF radio you will need a bigger aerial than for mono, and for a teletext receiver you will need an even better aerial. For TV it is very important to ensure that you choose the right group aerial for your local transmitter. There are five groups generally in use in the UK and they are:

- Group A: Chls 21-34 Red
- Group B: Chls 39-53 Yellow
- Group C/D: Chls 48-68 Green
- Group E: Chls 39-68 Brown
- Group W: Chls 21-68 Black

Our table of transmitting stations shows which group aerial will be needed to receive the station you require. If you choose a wideband aerial in order to receive from several different transmitters it will need to be larger than its equivalent single group aerial to give the same gain over the whole band.

The aerial should point directly towards the transmitter with the cross-pieces (elements) at right angles to the transmitter. If the polarisation is horizontal (H), or mixed (M) mount the aerial so that the elements are horizontal whilst if the polarisation is vertical (V), the elements of the aerial should be vertical.

Most older VHF radio stations are gradually being converted to mixed polarisation (i.e. the transmitter power is divided equally between a horizontal component and a vertical component) in order to improve reception in cars and on portable sets. If there is a major obstruction, hill, large building,

gasometer etc. directly in line with the transmitter it can sometimes improve reception if the aerial is pointed slightly to one side of the direction of the transmitter. Raising the height of the aerial can also improve reception. Often raising an aerial by as little as one metre can be equivalent to doubling the size of the aerial. With VHF radio aerials the smallest element should be closest to the transmitter and mounted at least 600mm (2ft) from the nearest TV aerial. If you get a hiss on stereo, but not on mono you need a bigger aerial. If you get a whispering hiss or 'birdie' on mono and stereo (especially on Radio 3) the signal level is too high and it will be necessary to fit an attenuator in the lead. If you get this kind of hiss in stereo only use a bigger aerial to make it more directional. (In general the bigger the aerial the more selective it will be in picking up signals only from the front and not from the sides or rear). If high pitched sounds are distorted turn the aerial for least distortion rather than maximum signal strength and use a more directional aerial. (In this respect use of a cranked mast can help as this gives some lateral as well as rotational adjustment which can be a help). If crackles from passing vehicles are a problem mount the aerial such that the roof shields it from the road. To reduce the effects of passing aircraft causing volume changes use two aerials stacked one above the other.

In addition to the above, for TV reception graininess in a colour picture or snow in a mono picture points the need for a larger aerial. Adjust the aerial position to eliminate 'ghosts' on the picture or use a bigger more directional aerial. It may be impossible to completely eliminate ghosting and this will be a problem if you are hoping to receive teletext.

As a last resort aerial amplifiers can help, but they will only do so if the problem is a weak signal only. If there is, or also is, ghosting or other interference the results with the amplifier will be worse or at best the same as without the amplifier.

It is good practice to earth the screen of the down-lead where it enters the building, but this will have no effect on the signal received and is only there as a protection against electrical faults and to give some protection to the set in the unlikely event that the aerial is struck by lightning. In any event never touch the aerial lead during a thunderstorm.

Use a good map to assess the proper direction for the aerial to point and remember that the TV and radio aerials may well have to point in different directions. If in doubt the BBC and ITC can provide Service Area Maps for any transmitter if you send them a large stamped, addressed envelope. In particular, the BBC has

available UHF TV transmitter details which caravanners may find particularly useful, and they can offer technical advice to the public or trade on BBC reception problems either from the BBC address below or by telephoning 0345 010 313 during office hours (all calls charged at local rates).

The address to write to is:

For BBC stations:
BBC Engineering Information,
White City, 201 Wood Lane, London W12 7TS.
Telephone 0345 010313.
Also see Ceefax page 698 on BBC2.

For ITV and ILR stations:
Independent Television Commission,
Engineering Information, Kings Worthy Court,
Kings Worthy, Winchester, Hants SO23 7QA.
Telephone 0962 848647.

For Radio Licensing queries:
The Radio Authority,
74 Newman Street, London W1P 3LA.
Telephone 071 636 5858.

For Reception Difficulties:
The Radiocommunications Agency,
Waterloo Bridge House, Waterloo Road,
London SE1 8UA.
Telephone 071 215 2352.

National Transcommunications Ltd.,
Kings Worthy Court, Kings Worthy,
Winchester, Hants SO23 7QA.

For National Independent Radio:
Classic FM, Academic House,
24-28 Oval Road, Camden, London NW1 7DQ.
Telephone 071 284 3000.

For Radio Telefís Éireann:
Reception Investigations, RTE,
Baile Átha Cliath 4, Éire.
Telephone 01 642175.

For independent radio in the Republic of Ireland:
IRTC, Marine House, Calwilliam Court, Dublin 2.
Telephone 01 676 0966.

For Manx Radio:
P.O. Box 1368, Broadcasting House,
Douglas, Isle of Man.
Telephone 0624 661066

UHF TELEVISION AND RADIO STATIONS

The following is a list of UHF 625-line TV stations and Radio Stations expected to be operating by January 1995. Stations marked 'N' are broadcasting in Nicam Digital Stereo Sound, or due to be by January 1995.

Relay stations are indented.

SOUTH OF ENGLAND



TV STATIONS

Station	Channels				Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
	B	B	I	C			

Relay stations are indented

BBC1: LONDON • ITV: CARLTON/LONDON WEEKEND

Crystal Palace	26	33	23	30	A H	1000k	N
Alexandra Palace	58	84	61	54	C/D H	65	N
Asensdon	55	88	58	65	C/D V	8	N
Biggin Hill	45	52	49	67	E V	8	N
Bishop's Stortford	55	62	59	49	C/D V	29	N
Cane Hill	61	54	58	68	C/D V	25	N
Caterham	55	62	59	65	C/D V	20	N
Chipping Wycombe	51	44	41	47	B V	20	N
Chesham	40	46	43	50	B V	100	N
Chingford	58	50	52	48	C/D V	7.5	N
Croydon (Old Town)	49	56	52	67	C/D V	33	N
Dorking	51	44	41	47	B H	55	N
Dorking	51	44	41	47	B V	14	N
East Grinstead	40	56	48	59	E V	117	N
Edmonton	57	63	60	53	C/D H	25	N
Farnham	48	56	50	58	C/D V	13	N
Finchley	52	58	49	67	C/D V	16	N
Forest Row	48	54	62	66	C/D V	120	N
Gravesend	55	62	59	49	C/D V	11	N
Great Missenden	58	84	61	54	C/D V	85	N
Greenwich	56	50	52	48	C/D V	15	N
Guildford	40	46	43	50	B V	10k	N
Hammersmith	48	62	59	65	C/D V	10	N
Hampstead Heath	51	44	41	47	B H	1.25	N
Hemel Hempstead	51	44	41	47	B V	10k	N
Hemel Hempstead Town	58	84	61	54	C/D V	13	N
Henley-on-Thames	48	64	67	54	C/D V	100	N
Hertford	58	64	61	54	C/D V	2k	N
High Wycombe	55	62	59	65	C/D V	500	N
Hughenden	40	46	43	50	B V	60	N
Kenley	40	46	43	50	B V	140	N
Kensal Town	56	49	52	67	C/D H	25	N
Lea Bridge	55	62	59	59	E V	6	N
Marlow Bottom	56	64	61	54	C/D V	11	N
Mickfield	54	64	57	67	C/D V	6.2	N
Mickleham	61	55	58	68	C/D V	90	N
New Addington	84	48	54	68	C/D V	17	N
New Barnet	55	62	59	48	C/D V	5	N
Offord	57	63	60	53	C/D V	31	N
Poplar	45	66	49	68	E V	20	N
Reigate	57	63	60	53	C/D V	10k	N
St Albans	49	63	57	67	C/D V	22	N
Sluett	51	44	41	47	B V	126	N
Sutton	55	62	59	65	C/D H	6.8	N
Sutton	45	66	49	68	E V	5.3	N
Walthamstow North	45	66	49	68	E V	1.7	N
Watlyn	40	46	43	50	B V	150	N
West Wycombe	40	46	43	50	B V	28	N
Womersley	48	65	52	67	C/D V	25	N
Woolbur	49	52	56	68	C/D V	100	N
Woolwich	57	63	60	53	C/D V	630	N
World's End	43	50	46	68	E V	10	N

BBC1: SOUTH-EAST • ITV: MERIDIAN SOUTH-EAST (ITV/CH4 fed from Heathfield)

St Marks (Tunbridge Wells)	57	63	60	53	C/D V	63	N
St Marks (Tunbridge Wells)	57	63	60	53	C/D H	32	N
Tunbridge Wells	51	44	41	47	B V	10k	N

BBC1: SOUTH-EAST • ITV: MERIDIAN SOUTH-EAST

Bluebell Hill	40	46	43	65	E H	30k	N
Chatham Town	56	88	61	54	C/D V	11	N
Farleigh	28	57	21	54	W V	12	N

Dover	50	56	66	53	C/D H	100k	N
Chartham	21	27	24	31	A V	100	N
Dover Town	33	26	23	30	A V	100	N
Elham	33	26	23	30	A V	3.5	N
Faversham	22	28	25	32	A V	13	N
Folkestone	33	26	23	30	A V	200	N
Hom Street	58	44	41	47	E V	3	N
Hythe	21	27	24	31	A V	50	N
Lydden	42	68	39	84	E V	8	N
Lyminge	22	28	25	32	A V	6.9	N
Margate	22	28	25	32	A V	20	N
Newnham (Kent)	21	27	24	31	A V	35	N
Ramsgate	33	26	23	30	A V	6	N
Rye	56	44	41	47	E V	13	N
Tumpike	58	44	41	47	E V	2.5	N

Heathfield	49	52	64	67	C/D H	100k	N
Eastbourne	33	26	23	30	A V	125	N
Eastbourne (Old Town)	40	46	43	58	C/D V	4	N
East Dean	62	44	54	42	E V	8	N
Hamstreet	33	26	23	30	A V	1	N
Hastings	22	25	28	32	A V	1k	N
Hastings (Old Town)	45	39	42	55	E V	10	N
Haywards Heath	39	45	43	41	B V	37	N
Lamberhurst	54	60	62	58	C/D V	3	N
Lewes	22	28	25	32	A V	32	N
Mounfield	21	27	24	31	A V	16	N
Newhaven	39	45	43	41	B V	2k	N
Sedlescombe	33	26	23	30	A V	7	N
Steyning	45	59	42	58	E V	140	N
Wye (Ashford)	22	28	25	32	A V	31	N

Station	Channels				Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
	B	B	I	C			

Relay stations are indented

BBC1: SOUTH • ITV: MERIDIAN SOUTH

Hannington	39	45	42	66	E H	250k	N
Aldbourne	21	27	24	31	A V	7	N
Alton	49	62	59	52	C/D V	10	N
Chisbury	55	62	59	52	C/D V	25	N
Hamdean	49	52	56	59	C/D V	22	N
Hurstbourne Tarrant	22	28	25	25	A V	10	N
Lambourne	55	62	59	52	C/D V	7	N
Luccombe (I of W)	56	62	59	34	W V	25	N
Sutton Row	22	28	25	32	A V	250	N
The Bournes	47	51	59	49	E V	34.6	N
Tidworth	22	28	25	25	A V	10	N

Midhurst

Midhurst	61	55	58	68	C/D H	100k	N
Haslemere	22	28	25	32	A V	15	N

Rowridge

Rowridge	31	24	27	21	A H	500k	N
Beverdean	51	55	48	29	W V	10	N
Brading	51	44	41	47	B V	20	N
Brightstone	51	44	41	47	B V	144	N
Brighton (Central)	39	45	41	47	B H	63	N
Brighton (Whitehawk Hill)	57	63	60	53	C/D V	10k	N
Cheselbourne	57	63	60	53	C/D V	6.5	N
Cokean	65	42	44	68	E V	40	N
Corfe Castle	51	44	41	47	B V	16	N
Dorchester	51	44	41	47	B V	29	N
Findon	51	44	41	47	B V	5.9	N
Hangleton	39	45	49	42	B V	6.8	N
Hamdean	56	64	52	62	C/D V	12.5	N
Lulworth	55	62	59	65	C/D V	11	N
Luscombe Valley	39	45	49	42	B V	8	N
Millbrook	51	44	41	47	B V	35	N
Ovingdean	65	42	44	68	E H	19	N
Ovingdean	65	42	44	68	E H	0.5	N
Patcham	46	40	43	50	B H	69	N
Piddletrenthide	39	45	49	42	B V	56	N
Poole	57	63	60	53	C/D V	100	N
Portslade	51	44	41	47	B V	19	N
Salisbury	57	63	60	53	C/D V	10k	N
Saundridge	51	66	55	47	E V	14	N
Shrewton	51	44	41	47	B V	4.5	N
Singleton	46	40	43	50	B V	16	N
Till Valley	46	40	43	50	B V	75	N
Ventnor	39	45	49	42	B V	2k	N
Westbourne	51	44	41	47	B V	38	N
Winterborne St Giles	40	48	43	50	B V	1k	N
Winterborne Steepleton	39	49	45	66	E V	12	N

BBC1: SOUTH-WEST • ITV: WEST COUNTRY TELEVISION

Beecon Hill	57	63	60	53	C/D H	100k	N
Ashburton	21	27	24	31	A V	3	N
Bovey Tracey	39	45	49	42	B V	8	N
Brixham	40	46	43	50	B V	18	N
Buckfastleigh	51	44	41	47	B V	6.2	N
Chudleigh	51	44	41	47	B V	8	N
Clennon Valley	39	45	49	42	B V	4	N
Coombe	21	27	24	31	A V	6.5	N
Dartmouth	51	44	41	47	B V	10	N
Edginswell	39	49	45	67	E V	4	N
Harbertonford	39	45	49	42	B H	2	N
Hele	40	46	43	50	B H	6	N
Newton Abbot	40	46	43	50	B V	3	N
Ocombe Valley	21	27	24	31	A V	1	N
Sidmouth	39	49	45	67	E V	12	N
South Brent	40	46	43	50	B V	4	N
Tegmouthe	39	49	45	67	E V	25	N
Torquay Town	51	44	41	47	B V	45	N
Totnes	21	27	24	31	A V	3	N

Caradon Hill

Caradon Hill	22	28	25	32	A H	500k	N
Aveton Gifford	51	44	41	47	E V	1.8	N
Berrynarbor	22	28	25	32	A V	8	N
Chambercombe	21	27	24	31	A V	7	N
Combe Martin	39	45	49	42	B V	100	N
Croyde	51	44	41	47	B V	1.5	N
Dowderry	55	62	59	65	C/D V	26	N
Fowey	58	64	61	54	C/D V	10	N
Gunnislake	40	46	43	50	B V	40	N
Hartland	48	56	52	66	C/D V	30	N
Itracombe	58	64	61	54	C/D V	250	N
Ivybridge	39	45	49	42	B V	500	N
Kingsbridge	40	46	43	50	B V	200	N
Looe	40	46	43	50	B V	5	N
Lostwithiel	40	46	43	50	B V	6.3	N
Mevagissey	40	46	43	50	B H	6.6	N
Newton Ferrers	55	62	59	65	C/D V	6.5	N
North Hensary Tor	55	62	59	65	C/D V	12.5	N
Okehampton	39	45	49	42	B V	100	N
Penaligon Downs	39	45	49	42	B V	100	N
Penryn	55	62	59	65	C/D V	22	N
Plymouth (North Road)	40	46	43	50	B V	12	N
Plymouth (Plymouth)	58	64	61	54	C/D V	2k	N
Polperro	57	63	60	53	C/D V	2.8	N
Port Isaac	55	62	59	65	C/D V	22	N
St Austell	55	62	59	65	C/D V	100	N
St Neot	39	42	49	45	B V	4	N
Salcombe	51	44	41	47	W V	17	N
Slapton	48	66	55	68	C/D V	125	N
Tavistock	57	63	60	53	C/D V	100	

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio 1	Bexhill	99.2	100W	V
Radio 1	Brighton (Whitehawk Hill)	99.7	600W	M
Radio 1	Bristol Ichester Crescent	98.9	1.3kW	M
Radio 1	Caine	97.8	32W	V
Radio 1	Caterham	99.3	15W	V
Radio 1	Chafford	98.8	100W	V
Radio 1	Chippenham	98.4	10W	V
Radio 1	Cirencester Town	97.7	10W	V
Radio 1	Combe Martin	98.7	4W	V
Radio 1	Egford Hill	98.7	60W	V
Radio 1	Folkestone (Creteyway Down)	98.3	100W	V
Radio 1	Guildford	97.7	3kW	M
Radio 1	Hastings	97.7	500W	M
Radio 1	High Wycombe	99.5	50W	M
Radio 1	Isles of Scilly	98.4	60W	M
Radio 1	Kenley	98.0	25W	V
Radio 1	Les Platons	97.1	16kW	M
Radio 1	Marlborough	99.7	100W	V
Radio 1	Mickleham	99.3	25W	M
Radio 1	Nailsworth	97.8	100W	V
Radio 1	Newhaven	99.3	25W	M
Radio 1	North Hessay Tor	97.7	160kW	M
Radio 1	Okehampton	98.3	50W	M
Radio 1	Oxford	99.1	46kW	M
Radio 1	Redruth	98.2	25kW	M
Radio 1	Rowndge	99.4	20W	V
Radio 1	Salisbury	99.5	320W	M
Radio 1	St Thomas Exeter	98.6	55W	M
Radio 1	Swingate (Dover)	99.1	11kW	M
Radio 1	Ventnor	99.0	20W	H
Radio 1	Wenvoe	99.5	250kW	M
Radio 1	Westwood	97.9	50W	V
Radio 1	Weymouth	99.6	100W	V
Radio 1	Wrotham	98.8	125kW	M
Radio 2	Bamstaple	88.5	1kW	M
Radio 2	Bath	89.0	82W	M
Radio 2	Beacon Hill	88.7	1kW	V
Radio 2	Bexhill	88.2	100W	V
Radio 2	Brighton (Whitehawk Hill)	90.1	600W	M
Radio 2	Bristol Ichester Crescent	89.3	1.3kW	M
Radio 2	Caine	88.2	32W	V
Radio 2	Caterham	89.7	15W	V
Radio 2	Chafford	89.2	100W	V
Radio 2	Chippenham	88.8	10W	V
Radio 2	Cirencester Town	88.1	10W	V
Radio 2	Combe Martin	89.1	4W	V
Radio 2	Egford Hill	89.1	60W	V
Radio 2	Folkestone (Creteyway Down)	88.4	100W	V
Radio 2	Guildford	88.1	3kW	M
Radio 2	Hastings	89.5	500W	M
Radio 2	High Wycombe	89.9	50W	M
Radio 2	Isles of Scilly	88.8	60W	M
Radio 2	Kenley	88.4	25W	V
Radio 2	Les Platons	89.6	16kW	M
Radio 2	Marlborough	90.1	100W	V
Radio 2	Mickleham	89.7	25W	M
Radio 2	Nailsworth	88.2	100W	V
Radio 2	Newhaven	89.7	100W	M
Radio 2	North Hessay Tor	88.1	160kW	M
Radio 2	Okehampton	88.7	50W	M
Radio 2	Oxford	89.5	46kW	M
Radio 2	Redruth	89.7	25kW	M
Radio 2	Rowndge	88.5	250kW	M
Radio 2	Salisbury	89.8	20W	V
Radio 2	St Thomas Exeter	89.0	55W	M
Radio 2	Swingate (Dover)	90.0	11kW	M
Radio 2	Ventnor	89.4	20W	H
Radio 2	Wenvoe	89.9	250kW	M
Radio 2	Westwood	88.3	50W	V
Radio 2	Weymouth	90.0	100W	V
Radio 2	Wrotham	89.1	250kW	M
Radio 3	Bamstaple	90.7	1kW	M
Radio 3	Bath	91.2	82W	M
Radio 3	Beacon Hill	90.9	1kW	V
Radio 3	Bexhill	92.2	100W	V
Radio 3	Brighton (Whitehawk Hill)	92.3	600W	M
Radio 3	Bristol Ichester Crescent	91.5	1.3kW	M
Radio 3	Caine	90.4	32W	V
Radio 3	Caterham	91.9	15W	V
Radio 3	Chafford	91.4	100W	V
Radio 3	Chippenham	91.0	10W	V
Radio 3	Cirencester Town	90.3	10W	V
Radio 3	Combe Martin	91.3	4W	V
Radio 3	Egford Hill	91.3	60W	V
Radio 3	Folkestone (Creteyway Down)	90.6	100W	V
Radio 3	Guildford	90.3	3kW	M
Radio 3	Hastings	91.8	500W	M
Radio 3	High Wycombe	92.1	50W	M
Radio 3	Isles of Scilly	91.0	60W	M
Radio 3	Kenley	90.6	25W	V
Radio 3	Les Platons	91.1	16kW	M
Radio 3	Marlborough	92.3	100W	V
Radio 3	Mickleham	91.9	25W	M
Radio 3	Nailsworth	90.4	100W	V
Radio 3	Newhaven	91.9	100W	M
Radio 3	North Hessay Tor	90.3	160kW	M
Radio 3	Okehampton	90.9	50W	M
Radio 3	Oxford	91.7	46kW	M
Radio 3	Redruth	91.9	25kW	M
Radio 3	Rowndge	90.7	250kW	M
Radio 3	Salisbury	92.0	20W	V
Radio 3	St Thomas Exeter	91.2	55W	M
Radio 3	Swingate (Dover)	92.4	11kW	M
Radio 3	Ventnor	91.7	20W	H
Radio 3	Wenvoe	92.1	250kW	M
Radio 3	Westwood	90.5	50W	V
Radio 3	Weymouth	92.2	100W	V
Radio 3	Wrotham	91.3	250kW	M
Radio 4	Bamstaple	92.9	1kW	M
Radio 4	Bath	93.4	82W	M
Radio 4	Beacon Hill	93.1	1kW	M
Radio 4	Bexhill	94.6	100W	V
Radio 4	Brighton (Whitehawk Hill)	94.5	600W	M
Radio 4	Bristol Ichester Crescent	93.7	1.3kW	M
Radio 4	Caine	92.6	32W	V
Radio 4	Caterham	94.1	15W	V
Radio 4	Chafford	93.6	100W	V
Radio 4	Chippenham	93.2	10W	V
Radio 4	Cirencester Town	92.5	10W	V
Radio 4	Combe Martin	93.5	4W	V
Radio 4	Egford Hill	93.5	60W	V
Radio 4	Folkestone (Creteyway Down)	93.1	100W	V
Radio 4	Guildford	92.5	3kW	M
Radio 4	Hastings	94.2	500W	M
Radio 4	High Wycombe	94.3	50W	M
Radio 4	Isles of Scilly	93.2	60W	M
Radio 4	Kenley	92.8	25W	V
Radio 4	Les Platons	94.8	16kW	M
Radio 4	Marlborough	94.5	100W	V
Radio 4	Mickleham	94.1	25W	M
Radio 4	Nailsworth	92.6	100W	V
Radio 4	Newhaven	94.1	100W	M
Radio 4	North Hessay Tor	92.5	160kW	M
Radio 4	Okehampton	93.1	50W	M
Radio 4	Oxford	93.9	46kW	M
Radio 4	Redruth	94.1	25kW	M
Radio 4	Rowndge	92.9	250kW	M
Radio 4	Salisbury	94.2	20W	V
Radio 4	St Thomas Exeter	93.4	55W	M
Radio 4	Swingate (Dover)	94.4	11kW	M
Radio 4	Ventnor	93.8	20W	H
Radio 4	Wenvoe	94.3	250kW	M
Radio 4	Westwood	92.7	50W	V
Radio 4	Weymouth	94.4	100W	V
Radio 4	Wrotham	93.5	250kW	M
Radio Bnristol	Bath	104.6	82W	M
Radio Bnristol	Ichester Crescent	94.9	950W	M
Radio Bnristol	Mendip	95.5	3kW	M
Radio Cornwall	Caradon Hill	95.2	4.3kW	M
Radio Cornwall	Isles of Scilly	96.0	60W	M
Radio Cornwall	Redruth	103.9	18kW	M

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio Cymru	Wenvoe	96.8	250kW	M
Radio Devon	Bincombe Hill	103.8	1kW	V
Radio Devon	Huntshaw Cross	94.8	675W	M
Radio Devon	North Hessay Tor	103.4	15kW	M
Radio Devon	Okehampton	96.0	70W	M
Radio Devon	St Thomas Exeter	95.8	400W	M
Radio Guernsey	Les Touillies	93.2	1kW	M
Radio in Tavistock	Woodtown Tavistock	96.6	50W	S
Radio Jersey	Les Platons	88.8	3.8kW	M
Radio Kent	Folkestone (Creteyway Down)	97.6	100W	M
Radio Kent	Swingate	104.2	10kW	M
Radio Kent	Wrotham	96.7	8.7kW	M
Radio Mercury	Guildford	96.4	3kW	M
Radio Mercury	Haslemere	97.1	250W	V
Radio Mercury	Horsham	97.5	30W	M
Radio Mercury	Reigate	102.7	3.6kW	M
Radio Oxford	Fountain House Reading	104.4	1kW	M
Radio Oxford	Hannington	104.1	4kW	M
Radio Oxford	Henley	94.6	250W	M
Radio Oxford	Oxford	95.2	5.8kW	M
Radio Oxford	Windsor	95.4	500W	M
Radio Solent	Rowridge	96.1	10kW	M
Radio Sussex	Brighton (Whitehawk Hill)	95.3	1.2kW	M
Radio Sussex	Burton Down	104.8	2kW	V
Radio Sussex	Guildford	104.6	3kW	M
Radio Sussex	Heathfield	104.5	10kW	M
Radio Sussex	Horsham	95.1	40W	M
Radio Sussex	Newhaven	95.0	100W	M
Radio Sussex	Reigate	104.0	3.8kW	M
RTM Radio	Shooters Hill	103.8	160W	V
Southern FM/Classic Hits	Brighton	103.5	900W	M
Southern FM/Classic Hits	Hastings	102.0	200W	M
Southern FM/Classic Hits	Heathfield	102.4	8.2kW	M
Southern FM/Classic Hits	Newhaven	96.9	100W	M
Spre FM	Camp Hill	102.0	1.4kW	M
TEN-17	Rye Hill Water Tower, Harlow	101.7	100W	M
Wessex FM	Bincombe	97.2	1kW	M
Wey Valley 102	Windmill Hill (Alton)	102.0	100W	M

MIDLANDS AND EAST



TV STATIONS

Station	Channels B B I C C C V 4	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
Relay stations are indented				
BBC1: WEST MIDLANDS * ITV: CENTRAL SOUTH MIDLANDS				
Ridge Hill	22 28 25 32	A H	100k	
Andoversford	55 62 59 65	C/D V	56	
Eardiston	58 64 61 54	C/D V	6.5	
Ewyas Harold	51 44 67 47	E V	8	
Garth Hill	57 63 60 53	C/D V	25	
Garth Hill	57 63 60 53	C/D H	37	
Hazier Hill	51 44 41 47	B V	25	
(ITV/CH4 fed from The Wrekin)				
Hereford	51 44 41 47	B V	40	
Hope-under-Dinmore	63 57 60 53	C/D V	2	
Kington	39 45 49 42	B V	25	
Knucklas	39 45 42 49	B V	10	
Ludlow	39 45 42 49	B V	25	
(ITV/CH4 fed from The Wrekin)				
New Radnor	51 44 41 47	B V	135	
Oakeley Mynd	39 45 49 42	B V	50	
Peterchurch	57 63 60 53	C/D V	76	
Presteigne	48 56 62 68	C/D V	16	
Ross-on-Wye	55 62 65 59	C/D V	8	
St Bnavels	40 46 43 50	B V	12	
Upper Souley	40 46 43 50	B V	2	
BBC1: WEST MIDLANDS * ITV: CENTRAL WEST MIDLANDS				
Sutton Coldfield	46 40 43 50	B H	1000k	N
Allesley Park	22 28 25 32	A V	33	N
Brailes	30 52 34 59	W V	40	N
Bretch Hill	65 48 55 67	C/D V	87	N
Brighthorn	62 68 56 66	C/D V	16k	N
Brierley Hill	57 63 60 53	C/D V	10k	N
Bromsgrove	31 27 24 31	A V	2.8k	N
Cheadle	48 56 62 68	C/D V	40	N
Earl Stermdale	58 64 61 54	A V	10k	N
Fenton	31 27 24 31	A V	16	N
Gravelly Hill	66 56 62 68	C/D H	12	N
Guiting Power	51 44 41 47	B V	12	N
(ITV/CH4 fed from Oxford)				
Hamstead	21 27 24 31	A V	2.5	N
Harborne	30 48 34 67	W V	40	N
Harrington (Carnib Hill)	66 48 56 68	C/D V	33	N
Ironbridge	22 28 25 32	A V	110	N
Igstone Edge	57 63 60 53	C/D V	28	N
Ironbridge	56 64 61 54	C/D V	11	N
Kenilworth	57 63 60 53	C/D V	10	N
Kidderminster	58 64 61 54	C/D V	2k	N
Kinver	66 48 56 68	C/D H	12	N
Lark Stoke	33 26 23 29	A V	6.3k	N
Laamington Spa	56 62 66 68	C/D V	200	N
Leek	22 28 25 32	A V	1k	N
Long Compton	22 28 25 32	A V	4	N
Malvern	56 62 66 68	C/D V	2k	N
Oakamoor	2 27 24 31	A V	11	N
Perry Beaches	22 28 25 32	A V	8	N
Queslett	58 64 61 54	C/D V	12.5	N
Redditch	22 28 25 32	A V	1.6	N
Rugeley	66 48 56 68	C/D V	6	N
Tenbury Wells	57 63 60 53	C/D V	14	N
Turves Green	56 62 66 68	C/D V	56	N
Whittinglow	57 63 60 53	C/D V	6	N
Winchcombe	58 64 61 54	C/D V	6	N
Winshill	66 48 56 68	C/D H	6	N
Woodford Halse	22 28 25 32	A V	8	N
The Wrekin				
Bucknell	26 33 23 29	A H	100k	
Clun	59 45 49 42	B V	8	
Coalbrookdale	55 62 59 65	C/D V	56	
Haden Hill	51 44 47 41	B V	3.5	
Halesowen	39 52 49 42	B V	8	
Halesowen	58 64 61 54	C/D V	12.5	

Station	Channels B B I C C C V 4	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
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BBC1: EAST MIDLANDS * ITV: CENTRAL EAST MIDLANDS

Waltham	58 64 61 54	C/D H	250k	N
Ambergate	22 28 25 32	A V	30	N
(ITV/CH4 fed from Sutton Coldfield)				
Ashbourne	22 28 25 32	A V	250	N
(ITV/CH4 fed from Sutton Coldfield)				
Ashford-in-the-Water	33 26 23 29	A V	11	N
Belper	66 56 68 62</			

Stations	Transmitter Site	Freq. MHz	Power max ERP (Watts)	Polarisation
Radio 4	Llandona	103.6	21kW	M
Radio 4	Llandinam	96.1	20W	H
Radio 4	Llandindod Wells	103.8	1.5kW	M
Radio 4	Llandyfrog	104.4	87W	M
Radio 4	Llanfyllin	93.5	7W	M
Radio 4	Llanfrynnon	93.0	10W	V
Radio 4	Llanfyllin	93.3	15.6kW	M
Radio 4	Llanidloes	104.8	5W	H
Radio 4	Llanrhedraeth-y-moelwynant	94.2	50W	M
Radio 4	Llyswen	94.0	10W	V
Radio 4	Long Mountain	103.6	21W	H
Radio 4	Machynieth	103.6	60W	H
Radio 4	Mynydd Pencarreg	103.7	384W	M
Radio 4	Pennmaen Rhos	104.6	100W	V
Radio 4	Pennar	93.9	5W	V
Radio 4	Pontypool	104.8	50W	M
Radio 4	Porth	92.8	10W	V
Radio 4	Rhedra	104.8	50W	M
Radio 4	Rhymney	93.7	20W	V
Radio 4	Ton Pentre	104.3	5W	M
Radio 4	Varteg Hill	103.5	48W	M
Radio 4	Wenvoe	94.3	250kW	M
Radio Ceredigion	Blaenwylf	103.3	20kW	M
Radio Ceredigion	Mynydd Pencarreg	96.6	2kW	M
Radio Cymru	Aberdare	93.6	42W	M
Radio Cymru	Abergavenny	93.1	40W	M
Radio Cymru	Abertillery	104.3	10W	V
Radio Cymru	Betws-y-Coed	92.6	10W	H
Radio Cymru	Blaenavon	104.0	10W	V
Radio Cymru	Blaenwylf	93.1	250kW	M
Radio Cymru	Brecon	93.3	10W	H
Radio Cymru	Carmarthen	93.8	10W	M
Radio Cymru	Carmel	92.0	3.2kW	M
Radio Cymru	Clyo	104.9	10W	V
Radio Cymru	Cornwy	93.5	50W	V
Radio Cymru	Crossnac	93.4	10W	V
Radio Cymru	Cwmaman	104.5	10W	V
Radio Cymru	Demiseion	104.1	50W	V
Radio Cymru	Dolgellau	94.5	16W	H
Radio Cymru	Ebbw Vale	92.8	10W	H
Radio Cymru	Ffeithiog	92.5	49W	H
Radio Cymru	Haverfordwest	93.7	20kW	M
Radio Cymru	Kilney Hill	93.9	925W	M
Radio Cymru	Llandona	94.2	21kW	M
Radio Cymru	Llandnam	94.5	20W	H
Radio Cymru	Llandindod Wells	93.5	1.5kW	M
Radio Cymru	Llandyfrog	94.5	87W	M
Radio Cymru	Llanfyllin	94.7	7W	M
Radio Cymru	Llangolton	104.1	10W	V
Radio Cymru	Llangollen	104.3	15.6kW	M
Radio Cymru	Llinoes	92.5	5W	H
Radio Cymru	Llanrhedraeth-y-moelwynant	103.8	50W	M
Radio Cymru	Llyswen	104.4	10W	V
Radio Cymru	Long Mountain	94.0	21W	H
Radio Cymru	Machynieth	93.8	60W	H
Radio Cymru	Mynydd Pencarreg	93.1	384W	M
Radio Cymru	Pennmaen Rhos	92.3	100W	V
Radio Cymru	Pennar	103.7	5W	V
Radio Cymru	Pontypool	93.6	50W	M
Radio Cymru	Porth	104.5	10W	V
Radio Cymru	Rhedra	92.6	10W	V
Radio Cymru	Rhymney	104.9	20W	V
Radio Cymru	Ton Pentre	93.2	4.8W	M
Radio Cymru	Varteg Hill	93.3	48W	M
Radio Cymru	Wenvoe	96.8	250kW	M
Radio Wales	Blaenavon	95.1	10W	V
Radio Wales	Chrstchurch	95.9	500W	M
Red Dragon Radio	Chrstchurch	97.4	500W	M
Red Dragon Radio	Wenait	103.2	2kW	M
Swansea Sound FM	Kilney Hill	96.4	1kW	M

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
Relay stations are indented				
Hebden Bridge	22 28 25 32	A V	250	N
Heyshaw	57 63 60 53	C/D V	500	N
Holmfield	55 62 59 65	C/D V	22	N
Holmfirth	49 66 56 68	C/D V	26	N
Hope	22 28 25 32	A V	12	N
Idle	21 27 24 31	A V	250	N
Keighley	58 64 61 54	C/D V	10k	N
Keighley Town	33 26 23 29	A V	6	N
Kettlewell	49 42 39 45	B V	130	N
Luddenden	57 63 60 53	C/D V	59	N
Oughtibridge	55 62 59 65	C/D V	39	N
Oxenhope	22 28 25 32	A V	200	N
Pimrose Hill	57 63 60 53	C/D V	28	N
Ripponden	58 64 61 54	C/D V	60	N
Shatton Edge	52 58 48 54	C/D V	1k	N
Sheffield	31 27 24 31	A V	5k	N
Skipton	39 45 49 42	B V	10k	N
Skipton Town	21 27 24 31	A V	13	N
Stocksbridge	58 64 61 54	C/D V	12	N
Sutton-in-Craven	33 26 23 29	A V	12	N
Tideswell Moor	56 63 60 53	C/D V	250	N
Totley Rise	39 45 49 42	B V	12	N
Wharfedale	22 28 25 32	A V	2k	N
Wincobank (Sheffield)	55 62 59 65	C/D V	1.5	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
Relay stations are indented				
Seaham	51 44 41 47	B V	59	N
Shotleyfield	22 28 25 32	A V	200	N
Stathes	51 44 41 47	B V	6	N
Sunderland	40 46 43 50	B V	13	N
Wall	40 46 43 50	B H	25	N
Weardale	44 51 41 47	B V	1k	N
Whitcliffe	51 44 41 47	B V	15	N
Chatton	39 45 49 42	B H	100k	N
Roithury	55 62 59 65	C/D V	50	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
BBC1: NORTH-WEST (fed from Winter Hill) • ITV: YORKSHIRE				
Cornholme	58 64 61 54	C/D V	42	N
Crosthwaite	57 63 60 53	C/D V	15	N
Grasmere	57 63 60 53	C/D V	20	N
Lydgate	33 26 23 29	A V	2.5	N
Sadbergh	40 46 43 50	B V	500	N
Todmorden	39 45 49 42	B V	500	N
Walden	57 63 60 53	C/D V	50	N
Walsden South	40 46 43 53	B V	6	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
BBC1: NORTH-WEST • ITV: GRANADA				
Winter Hill	55 62 59 65	C/D H	500k	N
Austwick	39 45 49 42	B V	32	N
Backbarrow	57 63 60 50	C/D V	3	N
Becup	40 46 43 53	B V	250	N
Barrow Town Hall	51 44 47 47	E V	3.2	N
Bidston	51 44 30 47	W V	66	N
Birch Vale	40 46 43 53	B V	250	N
Blackburn	51 44 41 47	B V	8	N
Bolton	21 27 24 31	A V	21	N
Brnsall	27 21 24 31	A V	1	N
Brook Bottom	58 64 61 68	C/D V	6	N
Burbage	44 51 41 47	B V	14	N
Buxton	21 27 24 31	A V	1.2	N
Carmel	22 28 25 32	A H	7	N
Chalburn	33 26 23 29	A V	7	N
Chinley	57 64 61 47	C/D V	12	N
Congleton	51 44 41 47	B V	100	N
Dalton	40 46 43 53	B V	25	N
Darwen	39 45 49 42	B V	500	N
Daigh	33 26 23 29	A V	3	N
Dog Hill	40 46 43 53	B V	85	N
Elton	21 27 24 31	A V	63	N
Far Highfield	48 66 56 68	C/D H	16	N
Glossop	22 28 25 32	A V	250	N
Haulingden	33 26 23 29	A V	10k	N
Houghton Green	40 46 43 53	B H	7	N
Ladder Hill	33 26 23 29	A V	1k	N
Lilincaster	31 27 24 31	A V	10k	N
Lindley	21 27 24 31	A V	5	N
Lees	22 28 32 25	A H	10	N
Littleborough	21 27 24 31	A V	500	N
Macclesfield	22 28 25 32	A V	37	N
Melling	57 63 60 53	C/D V	25	N
Melling	57 63 60 53	C/D H	4.2	N
Middletown	67 34 30 48	W V	6	N
Milom Park	22 28 25 32	A V	250	N
Milthrop	48 66 56 68	C/D V	15	N
Mottram	40 46 43 53	B V	4	N
Newchurch	27 21 24 31	A H	4	N
Norden	34 67 30 57	W V	9	N
North Oldham	21 27 24 31	A V	40	N
Oakenhead	51 44 41 47	B V	100	N
Over Siddulph	34 67 30 48	W V	22	N
Parbold	51 44 41 47	B V	36	N
Pendle Forest	22 28 25 32	A V	500	N
Penny Bridge	33 26 23 29	A V	31	N
Ramsbottom	48 66 56 68	C/D V	80	N
Ribblesdale	51 44 41 47	B V	30	N
Romley	51 44 41 47	B V	11	N
Roose	26 33 29 39	W V	8	N
Roose	26 33 29 39	W H	4	N
Saddleshill	52 45 49 42	B V	2k	N
Staveley-in-Cartmel	40 46 43 53	B V	10	N
Stockport	27 24 21 31	A H	2	N
Storeton	22 28 25 32	A V	2.8k	N
Trawden	57 63 60 53	C/D V	200	N
Urswick	51 44 41 47	B V	6	N
Wardle	22 28 25 32	A H	3	N
West Kirby	34 27 24 31	A V	13	N
Whalley	40 46 43 53	B V	80	N
Whitehall	57 63 60 53	C/D V	250	N
Whinworth	22 28 25 32	A V	250	N
Woodnook	39 45 49 52	B V	3	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
BBC1: NORTH-EAST • ITV: BORDER				
Caldbeck	30 34 28 32	A H	500k	N
Ansstable	52 45 42 49	B V	100	N
Bassenthwaite	52 45 49 42	B V	160	N
Beary Peak (IoM)	40 46 43 50	B V	250	N
Beachgreen	57 63 60 53	C/D V	6	N
Crosby Ravensworth	57 63 60 53	C/D V	6	N
Dentdale	57 63 60 53	C/D V	52	N
Douglas (IoM)	68 66 48 56	C/D V	2k	N
Dumfries South	40 48 46 50	B V	23	N
Foxdale	33 26 23 29	A V	8	N
Glencoyne (Glenndding Link)	21 27 24 31	A V	5	N
Glenuce	58 64 61 54	C/D V	15	N
Glenndding	60 53 57 63	C/D V	8	N
Gosforth	58 64 61 54	C/D V	50	N
Greystoke	57 63 60 53	C/D V	11.5	N
Keswick	21 27 24 31	A V	120	N
Kirkby Stephen	57 63 60 53	C/D V	12	N
Kirkcubright	21 27 24 31	A V	6	N
Langholm	57 63 60 53	C/D V	25	N
Laxey (IoM)	58 64 61 54	C/D V	25	N
Lorton	57 63 60 53	C/D V	26	N
Lowther Valley	48 40 46 50	B V	8	N
Minnigaff	33 26 23 29	A V	6	N
Moffat	52 45 42 49	B V	6.5	N
New Galloway	33 26 23 29	A V	100	N
Orton	40 46 43 50	B V	31	N
Pinwherry	22 28 25 32	A V	56	N
Portpatrick	58 64 61 54	C/D V	6	N
Pooley Bridge	48 40 46 50	B V	13	N
Port St Mary (IoM)	58 64 61 54	C/D V	250	N
Ravenstonedale	57 63 60 53	C/D V	11	N
St Bees	58 64 61 54	C/D V	12	N
Sirranraer	57 63 60 53	C/D V	250	N
Thornhill	57 63 60 53	C/D V	500	N
Threlkeld	57 63 60 53	C/D V	11	N
Union Mills (IoM)	39 45 42 42	B V	12	N
Whitehaven	40 46 43 50	B V	2k	N
Workington	58 64 61 54	C/D V	10	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM	
BBC1: SCOTLAND					
Sandale	22		WH	500k	N
Sandale	67		WH	20k	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
BBC1: SCOTLAND (fed from Sandale) • ITV: BORDER (fed from Caldbeck)				
Balantrae	58 64 61 54	C/D V	6.6	N
Barskeoch Hill	55 62 59 65	C/D V	2k	N
Cambret Hill	44 51 41 47	B H	16	N
Creetown	58 64 61 54	C/D V	32	N
Selkirk	55 62 59 65	C/D H	50k	N
Bonchester Bridge	39 45 49 42	B V	6	N
Eyemouth	33 26 23 29	A V	2k	N
Galashiels	51 44 41 47	B V	100	N
Hawick	33 26 23 29	A V	50	N
Innerleithen	58 64 61 54	C/D V	100	N
Jedburgh	51 44 41 47	B V	160	N
Lauder	22 28 25 32	A V	11.2	N
Peebles	22 28 25 32	A V	100	N
Stow	33 26 23 29	A V	5.6	N
Yetholm	51 44 41 47	B V	6	N

Station	Channels B B I C B B T H C C C V 4 1 2	Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
BBC1: NORTH-EAST • ITV: BORDER				
Berwick-upon-Tweed	21 27 24 31	A V	38	N
(BBC from Chatton)				

FM RADIO STATIONS

Stations	Transmitter Site	Freq. MHz	Power max ERP (Watts)	Polarisation
Century Radio	Blisdaie	100.7	8.9kW	M
Century Radio	Burnhope	101.8	9.3kW	M
City FM	Allerton Park	96.7	8.2kW</	

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio 2	Chatton	90.1	5.6kW	M
Radio 2	Chesterfield	89.0	400W	V
Radio 2	Cornholme	89.7	20W	V
Radio 2	Darwen	89.5	10W	V
Radio 2	Douglas (10M)	88.4	11kW	M
Radio 2	Fenham	89.8	42W	V
Radio 2	Hasingden	89.9	83W	V
Radio 2	Hebden Bridge	88.4	25W	V
Radio 2	Holme Moss	89.3	250kW	M
Radio 2	Keighley	88.9	1kW	V
Radio 2	Kendal	89.0	100W	M
Radio 2	Luddenden	88.7	84W	V
Radio 2	Morecambe Bay	90.0	10kW	M
Radio 2	Oliver's Mount	89.9	250W	M
Radio 2	Pendle Forest	93.2	1kW	M
Radio 2	Pontop Pike	88.5	134kW	M
Radio 2	Saddlerworth	89.7	95W	V
Radio 2	Sandale	88.1	250kW	M
Radio 2	Sheffield (Crosspool)	89.9	320W	M
Radio 2	Stanton Moor	89.8	1.2kW	M
Radio 2	Toadnorton	88.9	100W	V
Radio 2	Walsden South	88.4	10W	V
Radio 2	Weardale	89.7	100W	M
Radio 2	Wensleydale	88.3	27W	H
Radio 2	Wharfedale	88.4	40W	M
Radio 2	Whitby	89.6	40W	M
Radio 2	Whitehaven	89.7	100W	V
Radio 2	Windermere	88.3	64W	M
Radio 2	Winter Hill	88.6	4kW	M
Radio 2	Woolmoor	92.2	5kW	V
Radio 2	Woolmoor	90.2	5kW	V
Radio 3	Barnoldswick	91.9	20W	V
Radio 3	Beecroft Hill	92.0	200W	V
Radio 3	Benwick-upon-Tweed	90.8	20W	V
Radio 3	Chatton	92.3	5.6kW	M
Radio 3	Chesterfield	91.2	400W	V
Radio 3	Cornholme	91.9	10W	V
Radio 3	Darwen	91.7	10W	V
Radio 3	Douglas (10M)	90.5	11kW	M
Radio 3	Fenham	92.0	42W	V
Radio 3	Hasingden	92.1	83W	V
Radio 3	Hebden Bridge	90.6	25W	V
Radio 3	Holme Moss	91.5	250kW	M
Radio 3	Keighley	91.1	1kW	V
Radio 3	Kendal	91.2	100W	M
Radio 3	Luddenden	90.9	84W	V
Radio 3	Morecambe Bay	92.2	10kW	M
Radio 3	Oliver's Mount	92.1	250W	M
Radio 3	Pendle Forest	92.6	1kW	M
Radio 3	Pontop Pike	90.7	134kW	M
Radio 3	Saddlerworth	91.9	95W	V
Radio 3	Sandale	90.3	250kW	M
Radio 3	Sheffield (Crosspool)	92.1	320W	M
Radio 3	Stanton Moor	92.0	1.2kW	M
Radio 3	Toadnorton	91.1	100W	V
Radio 3	Walsden South	90.6	10W	V
Radio 3	Weardale	91.9	100W	M
Radio 3	Wensleydale	90.5	27W	H
Radio 3	Wharfedale	90.6	40W	M
Radio 3	Whitby	91.8	40W	M
Radio 3	Whitehaven	91.9	100W	V
Radio 3	Windermere	90.5	64W	M
Radio 3	Winter Hill	90.8	4kW	M
Radio 4	Barnoldswick	94.1	20W	V
Radio 4	Beecroft Hill	94.2	200W	V
Radio 4	Benwick-upon-Tweed	93.0	20W	V
Radio 4	Chatton	94.5	5.6kW	M
Radio 4	Chesterfield	93.4	400W	V
Radio 4	Cornholme	94.1	10W	V
Radio 4	Darwen	93.9	10W	V
Radio 4	Douglas (10M)	92.8	11kW	M
Radio 4	Fenham	94.2	42W	V
Radio 4	Hasingden	94.3	83W	V
Radio 4	Hebden Bridge	92.8	25W	V
Radio 4	Holme Moss	93.7	250kW	M
Radio 4	Keighley	93.3	1kW	V
Radio 4	Kendal	93.4	100W	M
Radio 4	Luddenden	93.1	84W	V
Radio 4	Morecambe Bay	94.4	10kW	M
Radio 4	Oliver's Mount	94.3	250W	M
Radio 4	Pendle Forest	94.6	1kW	M
Radio 4	Pontop Pike	92.9	134kW	M
Radio 4	Saddlerworth	94.1	95W	V
Radio 4	Sandale	92.5	250kW	M
Radio 4	Sheffield (Crosspool)	94.3	320W	M
Radio 4	Stanton Moor	94.2	1.2kW	M
Radio 4	Toadnorton	93.3	100W	V
Radio 4	Walsden South	92.8	10W	V
Radio 4	Weardale	94.1	100W	M
Radio 4	Wensleydale	92.7	27W	H
Radio 4	Wharfedale	92.8	40W	M
Radio 4	Whitby	94.0	40W	M
Radio 4	Whitehaven	94.1	100W	V
Radio 4	Windermere	92.7	64W	M
Radio 4	Winter Hill	93.0	4kW	M
Radio 4	Woolmoor	94.4	5kW	V
Radio Aire FM	Morley	96.3	1kW	C
Radio Cleveland	West Moor	95.0	10kW	M
Radio Cleveland	Whitby	95.8	40W	H
Radio Cumbria	Kendal	95.2	100W	M
Radio Cumbria	Morecambe Bay	99.1	3.2kW	M
Radio Cumbria	Sandale	95.5	15kW	M
Radio Cumbria	Woolmoor	104.2	65W	M
Radio Humberside	High Hunsley	95.9	9.6kW	M
Radio Lancashire	Acklam Wold	104.5	2.1kW	M
Radio Lancashire	Beecroft Hill	103.9	1.8kW	M
Radio Lancashire	Hamedon Hill	95.5	1.6kW	M
Radio Leeds	Ardsley	102.7	500W	M
Radio Leeds	Holme Moss	103.9	100W	V
Radio Leeds	Holme Moss	92.4	5.6kW	M
Radio Leeds	Luddenden	95.3	83W	V
Radio Leeds	Wharfedale	95.3	40W	M
Radio Merseyside	Allerton Park	95.8	7.5kW	M
Radio Newcastle	Chatton	96.0	6kW	M
Radio Newcastle	Lancaster	104.4	42W	V
Radio Newcastle	Pontop Pike	95.4	10kW	M
Radio Scotland/Dumfries	Sandae	94.7	250kW	M
Radio Sheffield	Chesterfield	94.7	400W	V
Radio Sheffield	Sheffield (Crosspool)	88.6	160W	M
Radio Sheffield	Windermere	104.1	4.4kW	M
Radio Wave	Blackpool Tower	96.5	50W	M
Radio York	Fenham	104.3	500W	V
Radio York	Oliver's Mount	95.5	250W	M
Radio York	Winter Hill	103.7	2kW	V
Rock FM	Winter Hill	97.4	1.6kW	S
Sunrise FM	Idle (Bradford)	103.2	400W	M
TFM	Bilsdale	96.6	9kW	M
The Bay	Kendal	100.2	100W	M
The Bay	Ulverston	96.9	3.2kW	M
Viking FM	High Hunsley	96.9	10kW	M
Wear FM	Haining	103.4	80W	V
Yorkshire Coast Radio	Oliver's Mount	96.2	620W	M

SCOTLAND



TV STATIONS

Station	Channels				Aerial Group and Polarisation	Power (ERP) (Watts)	NICAM
	B	B	I	C			
Relay stations are indented	B	B	I	C			
	1	2	3	4			
BBC1: SCOTLAND * ITV: SCOTTISH							
Black Hill	40	46	43	50	BH	500k	N
Abington	57	63	60	53	C/DH	5.1	N
Acharacle	40	46	43	50	BV	10	
Biggar	22	28	25	32	AV	500	N
Bridge of Allan	33	35	23	29	AV	8	N
Broughton	21	27	24	31	AV	8	N
Callander	22	28	25	32	AV	100	N
Cathcart	57	63	60	53	C/DV	1.7	N
Clachan	40	46	43	50	BV	4	N
Cumbernauld Village	58	64	61	54	C/DV	8	N
Dianston	53	60	63	57	C/DV	2	N
Dollar	58	64	61	54	C/DV	10	N
Fintry	34	27	24	31	AV	26	N
Gigha Island	51	44	41	47	BV	60	N
Glasgow (West Central)	68	62	56	66	C/DV	32	N
Glespin	58	64	61	54	C/DV	7	N
Haddington	58	64	61	54	C/DV	20	N
Keilindie	34	52	30	48	WV	2	N
Kilninn	65	62	59	55	C/DV	500	N
Kilmacoll	21	27	24	31	AV	32	N
Kirkfieldbank	57	63	60	53	C/DV	5.8	N
Leadhills	58	64	61	54	C/DV	3	
Netheron Braes	22	28	25	32	AV	5	N
Plavenscraig	21	27	24	31	AV	16	N
South Knapdale	57	63	60	53	C/DV	1.45k	N
Strachur	33	35	23	29	AV	35	N
Strathblane	31	27	24	31	AV	6.4	N
Tarbert (Loch Fyne)	21	27	24	31	AV	2.6	N
Tillicoultry	57	63	60	53	C/DV	5.5	N
Toroway							
Arisaig	22	28	25	32	AV	20k	
Balteshulish	33	35	23	29	AV	8	
Bellanoch	39	45	42	49	AV	60	
Castlebay	21	27	24	31	AV	6	
Cow Hill (Fort William)	40	46	43	50	BV	65	
Dalmally	51	44	41	47	BV	50	
Dychlismore	22	28	25	32	AH	1	
Easdale	39	45	42	49	BV	7	
Flunary	40	46	43	50	BV	50	
Glengorm	58	64	61	54	C/DV	1.1k	
Kinlochleven	55	62	59	65	C/DV	16	
Kintrow	40	46	43	50	BV	20	
Mallaig	43	46	40	50	BV	18	
Oban	51	44	41	47	BV	12	
Orlich	58	64	61	54	C/DV	17	
Spean Bridge	21	27	24	31	AV	70	
Strontian	42	49	46	53	BV	14	
Taynuilt	40	46	43	50	BV	8	
Tayvallich	40	46	43	50	BV	8	
Twechar	22	28	25	32	AV	8.9	N
Uplawmoor	58	64	61	54	C/DV	32	N
Darvel							
Ardentenny	39	45	42	49	BV	70	
Ardradam	51	44	41	47	BV	25	
Arrochar	21	27	24	31	AV	6	
Blackwaterfoot	40	46	43	50	BV	35	
Bowmore	39	45	42	49	BV	59	
Bowmore	39	45	42	49	BV	22	
Campbelltown	57	63	60	53	C/DV	125	
Carradale	51	44	41	47	BV	29	
Clonessig	55	62	59	65	C/DV	74	
Dunure	40	46	43	50	BV	12.3	
Garschochhead	51	44	41	47	BV	15	
Girvan	55	62	59	65	C/DV	250	
High Keil	51	44	41	47	BV	20	
Holmhead	51	44	41	47	BV	12	
Kirkconnel	58	64	61	54	C/DV	250	
Kirkmichael	39	45	42	49	BV	19	
Kirkoswald	22	28	25	32	AV	32	
Largs	39	45	42	49	BH	11.8	
Lethanhill	57	63	60	53	C/DV	250	
Lochgoilhead	57	63	60	53	C/DV	6	
Lochwinnoch	57	63	60	53	C/DH	86	
Millburn Muir	39	45	42	49	BV	250	
Milport	58	64	61	54	C/DH	2.7	
Muirkirk	51	44	41	47	BV	85	
New Cumnock	40	46	43	50	BV	12	
Port Ellen	22	28	25	32	AV	90	
Portmahaven	33	35	23	29	AV	10	
Rosneath	58	64	61	54	C/DV	10k	
Rosneath	58	64	61	54	C/DH	50	
Rothesay	22	28	25	32	AV	2k	
Rothesay Town	55	62	59	65	C/DV	5.4	
Som	40	46	43	50	BV	7	
Tighnabruach	39	45	42	49	BV	100	
Troon	58	64	61	54	C/DV	20	
Wanlockhead	51	44	41	47	BV	2	
West Kilbride	51	44	41	47			

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio 1	Durms	99.02	1kW	M
Radio 1	Eitshal	99.4	2kW	V
Radio 1	Eyemouth	99.3	100W	V
Radio 1	Forfar	97.9	17kW	M
Radio 1 (M)	Fort William	98.9	1.5kW	V
Radio 1	Girvan	98.5	100W	V
Radio 1 (M)	Glengorm	99.1	5kW	M
Radio 1	Grantown	99.4	350W	H
Radio 1	Inverleithen	99.1	20W	M
Radio 1	Keelylang Hill	98.9	41kW	M
Radio 1	Kingussie	98.7	35W	H
Radio 1 (M)	Kinlochleven	99.3	10W	M
Radio 1	Kirkconnel	98.3	40W	M
Radio 1	Kirkton Mailer	98.6	964W	M
Radio 1	Knock More	97.8	500W	M
Radio 1	Knock More	94.8	500W	M
Radio 1	Lethanhill	97.9	200W	M
Radio 1 (M)	Mallaig	97.7	14W	H
Radio 1	Meldrum	98.3	150kW	M
Radio 1	Melvaig	98.7	50kW	M
Radio 1	Millburn Muir	97.9	50W	M
Radio 1	Ness of Lewis	97.9	200W	V
Radio 1 (M)	Oban	98.5	3.6kW	M
Radio 1	Peebles	98.0	20W	M
Radio 1	Penfiler	97.7	20W	M
Radio 1	Pitlochry	98.8	200W	H
Radio 1 (M)	Port Ellen	98.6	65W	V
Radio 1	Rosemarkie	99.2	20kW	M
Radio 1	Rosemount	99.2	32W	V
Radio 1	Rosneath	98.8	32W	V
Radio 1	Rothsay	98.1	570W	M
Radio 1	Rumster Forest	99.7	10kW	M
Radio 1	Sandale	97.7	250kW	M
Radio 1	Sknag	98.1	10kW	M
Radio 1	South Knapdale	98.9	1.1kW	H
Radio 1	Strachur	98.2	18W	M
Radio 1	Stranraer	99.3	31W	V
Radio 1	Tullich	99.7	42W	M
Radio 1	Ullapool	97.9	50W	V
Radio 1	West Kilbride	98.7	50W	V
Radio 2	Ardgour	88.7	50W	H
Radio 2	Ashkirk	89.1	50kW	M
Radio 2 (M)	Balachulish	88.1	15W	H
Radio 2	Black Hill	89.9	250kW	M
Radio 2 (M)	Bowmore	88.1	80W	V
Radio 2	Bressay	88.3	43kW	M
Radio 2	Campbeltown	88.4	400W	M
Radio 2	Cambret Hill	88.7	64W	H
Radio 2	Cietravai	89.3	2kW	V
Radio 2	Cneff	89.9	125W	V
Radio 2	Dalburgh	88.1	1kW	V
Radio 2	Darvel	89.5	10kW	M
Radio 2	Durms	89.4	2.1kW	M
Radio 2	Eitshal	89.8	2kW	V
Radio 2	Eyemouth	89.7	100W	V
Radio 2	Forfar	88.3	17kW	V
Radio 2 (M)	Fort William	89.3	1.5kW	H
Radio 2	Girvan	88.9	100W	V
Radio 2 (M)	Glengorm	89.5	5kW	M
Radio 2	Grantown	89.8	350W	H
Radio 2	Inverleithen	89.5	20W	M
Radio 2	Keelylang Hill	89.3	41kW	M
Radio 2	Kingussie	89.1	35W	H
Radio 2 (M)	Kinlochleven	89.7	10W	M
Radio 2	Kirkconnel	88.7	40W	M
Radio 2	Kirkton Mailer (Perth)	89.0	964W	M
Radio 2	Knock More	88.2	500W	M
Radio 2	Lethanhill	88.3	200W	M
Radio 2	Lochgilphhead	88.3	10W	H
Radio 2 (M)	Mallaig	88.1	14W	H
Radio 2	Meldrum	88.7	150kW	M
Radio 2	Melvaig	89.1	50kW	M
Radio 2	Millburn Muir	88.3	50W	M
Radio 2	Ness of Lewis	88.3	200W	V
Radio 2 (M)	Oban	88.9	3.6kW	M
Radio 2	Peebles	88.4	20W	M
Radio 2	Penfiler	88.1	20W	M
Radio 2	Pitlochry	89.2	200W	H
Radio 2 (M)	Port Ellen	89.0	65W	V
Radio 2	Rosemarkie	89.6	20kW	M
Radio 2	Rosemount	89.6	32W	V
Radio 2	Rosneath	89.2	32W	V
Radio 2	Rothsay	88.5	570W	M
Radio 2	Rumster Forest	90.1	10kW	M
Radio 2	Sandale	88.1	250kW	M
Radio 2	Sknag	88.5	10kW	M
Radio 2	South Knapdale	89.3	1.1kW	H
Radio 2	Strachur	88.6	18W	M
Radio 2	Stranraer	89.7	31W	V
Radio 2	Tullich	90.1	42W	M
Radio 2	Ullapool	88.3	50W	V
Radio 2	West Kilbride	89.1	50W	V
Radio 3	Ardgour	90.9	50W	H
Radio 3	Ashkirk	91.3	50kW	M
Radio 3 (M)	Balachulish	90.3	15W	H
Radio 3	Black Hill	92.1	250kW	M
Radio 3 (M)	Bowmore	90.3	80W	V
Radio 3	Bressay	90.5	43kW	M
Radio 3	Cambret Hill	90.9	64W	H
Radio 3	Campbeltown	90.6	400W	M
Radio 3	Cietravai	91.5	2kW	V
Radio 3	Cneff	91.5	125W	V
Radio 3	Dalburgh	90.3	1kW	V
Radio 3	Darvel	91.7	10kW	M
Radio 3	Durms	91.6	2.1kW	M
Radio 3	Eitshal	92.0	2kW	V
Radio 3	Eyemouth	91.9	100W	V
Radio 3	Forfar	90.5	17kW	V
Radio 3 (M)	Fort William	91.5	1.5kW	H
Radio 3	Girvan	91.1	100W	V
Radio 3 (M)	Glengorm	91.7	5kW	M
Radio 3	Grantown	92.0	350W	H
Radio 3	Inverleithen	91.7	20W	M
Radio 3	Keelylang Hill	91.5	41kW	M
Radio 3	Kingussie	91.3	35W	H
Radio 3 (M)	Kinlochleven	91.9	10W	M
Radio 3	Kirkconnel	90.9	40W	M
Radio 3	Kirkton Mailer (Perth)	91.2	964W	M
Radio 3	Knock More	90.4	500W	M
Radio 3	Lethanhill	90.5	200W	M
Radio 3	Lochgilphhead	90.5	10W	H
Radio 3 (M)	Mallaig	90.3	14W	H
Radio 3	Meldrum	90.9	150kW	M
Radio 3	Melvaig	91.3	50kW	M
Radio 3	Millburn Muir	90.5	50W	M
Radio 3	Ness of Lewis	90.5	200W	V
Radio 3 (M)	Oban	91.1	3.6kW	M
Radio 3	Peebles	90.6	20W	M
Radio 3	Penfiler	90.3	20W	M
Radio 3	Pitlochry	91.4	200W	H
Radio 3 (M)	Port Ellen	91.2	65W	V
Radio 3	Rosemarkie	91.2	20kW	M
Radio 3	Rosemount	91.8	32W	V
Radio 3	Rosneath	91.4	32W	V
Radio 3	Rothsay	90.7	570W	M
Radio 3	Rumster Forest	92.3	10kW	M
Radio 3	Sandale	90.3	250kW	M
Radio 3	Sknag	90.7	10kW	M
Radio 3	South Knapdale	91.5	1.1kW	H
Radio 3	Strachur	90.6	18W	M
Radio 3	Stranraer	91.9	31W	V
Radio 3	Tullich	92.3	42W	M
Radio 3	Ullapool	90.5	50W	V
Radio 3	West Kilbride	91.3	50W	V
Radio 4	Ardgour	93.1	50W	H
Radio 4	Ashkirk	103.9	50kW	M
Radio 4 (M)	Balachulish	94.7	15W	H
Radio 4	Black Hill	95.8	250kW	M
Radio 4 (M)	Bowmore	95.7	80W	V
Radio 4	Bressay	94.9	50W	M
Radio 4	Cambret Hill	95.3	64W	H
Radio 4	Campbeltown	95.2	400W	M

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio 4	Cietravai	95.9	2kW	M
Radio 4	Cneff	95.3	125W	M
Radio 4	Dalburgh	95.1	1kW	V
Radio 4	Darvel	104.3	10kW	M
Radio 4	Durms	95.9	2.1kW	M
Radio 4	Eitshal	95.1	2kW	V
Radio 4	Eyemouth	104.6	100W	V
Radio 4	Forfar	94.9	17kW	M
Radio 4 (M)	Fort William	95.9	1.5kW	V
Radio 4	Girvan	95.3	100W	H
Radio 4 (M)	Glengorm	96.1	5kW	M
Radio 4	Grantown	104.2	350W	H
Radio 4	Inverleithen	96.1	20W	V
Radio 4	Keelylang Hill	95.9	41kW	M
Radio 4	Kingussie	95.7	35W	H
Radio 4 (M)	Kinlochleven	95.6	10W	M
Radio 4	Kirkconnel	95.3	40W	M
Radio 4	Kirkton Mailer	104.5	964W	M
Radio 4	Lethanhill	94.9	200W	M
Radio 4 (M)	Mallaig	94.7	14W	H
Radio 4	Meldrum	95.3	150kW	M
Radio 4	Melvaig	95.7	50kW	M
Radio 4	Millburn Muir	104.1	50W	M
Radio 4	Ness of Lewis	96.1	200W	V
Radio 4 (M)	Oban	95.3	3.6kW	M
Radio 4	Peebles	95.0	20W	M
Radio 4	Penfiler	96.1	20W	M
Radio 4	Pitlochry	103.9	200W	H
Radio 4 (M)	Port Ellen	94.7	65W	M
Radio 4	Rosemarkie	103.6	20kW	M
Radio 4	Rosemount	95.5	32W	V
Radio 4	Rosneath	103.8	32W	M
Radio 4	Rothsay	95.1	570W	M
Radio 4	Rumster Forest	104.5	10kW	M
Radio 4	Sandale	92.5	250kW	M
Radio 4	Sknag	94.8	10kW	M
Radio 4	South Knapdale	95.6	1.1kW	H
Radio 4	Strachur	95.1	18W	M
Radio 4	Stranraer	104.6	31W	V
Radio 4	Tullich	104.5	42W	M
Radio 4	Ullapool	96.1	50W	V
Radio 4	West Kilbride	103.5	50W	V
Radio Borders	Berwick upon Tweed	97.5	10W	V
Radio Borders	Eyemouth	103.4	500W	V
Radio Borders	Peebles	103.1	35W	V
Radio Borders	Selkirk	96.8	5kW	V
Radio Borders	Black Hill	97.6	200W	V
Radio Forth RFM	Craigkelly, Edinburgh	97.3	9.8kW	M
Radio Forth RFM	Ardgour	104.9	50W	H
Radio Nan Gaidheal	Balachulish	103.7	15W	H
Radio Nan Gaidheal	Bowmore	103.6	80W	V
Radio Nan Gaidheal	Cietravai	104.2	2kW	V
Radio Nan Gaidheal	Dalburgh	92.5	1kW	V
Radio Nan Gaidheal	Eitshal	104.3	2kW	V
Radio Nan Gaidheal	Fort William	104.2	1.5kW	H
Radio Nan Gaidheal	Glengorm	103.5	5kW	M
Radio Nan Gaidheal	Kinlochleven	104.4	10W	M
Radio Nan Gaidheal	Lochgilphhead	97.9	10W	H
Radio Nan Gaidheal	Mallaig	104.3	14W	H
Radio Nan Gaidheal	Melvaig	103.9	50kW	M
Radio Nan Gaidheal	Ness of Lewis	104.9	200W	V
Radio Nan Gaidheal	Oban	104.6	3.6kW	M
Radio Nan Gaidheal	Penfiler	104.3	10W	M
Radio Nan Gaidheal	Port Ellen (M)	104.9	65W	V
Radio Nan Gaidheal	Rosemarkie	104.9	20kW	M
Radio Nan Gaidheal	Sknag	104.7	30kW	M
Radio Nan Gaidheal	South Knapdale (M)	104.8	1.1kW	H
Radio Nan Gaidheal	Strachur (M)	104.2	18W	M
Radio Nan Gaidheal	Ullapool	104.9	50W	V
Radio Scotland/Inverness	Ardgour	95.1	50W	H
Radio Scotland/Selkirk	Ashkirk	93.5	50kW	M
Radio Scotland/Inverness	Balachulish	92.5	15W	H
Radio Scotland	Black Hill	94.3	250kW	M
Radio Scotland/Inverness	Bowmore (M)	92.5	80W	V
Radio Scotland/Aberdeen	Bressay	92.7	43kW	M
Radio Scotland/Shetland	Cambret Hill	93.1	64W	H
Radio Scotland/Dumfries	Campbeltown	92.8	400W	M
Radio Scotland	Cietravai	93.7	2kW	V
Radio Scotland	Cneff	93.7	125W	V
Radio Scotland	Darvel	92.5	1kW	V
Radio Scotland/Inverness	Dalburgh	93.9	10kW	M
Radio Scotland/Aberdeen	Durms	93.8	2.1kW	M
Radio Scotland/Inverness	Eitshal	94.2	2kW	V
Radio Scotland/Selkirk	Eyemouth	94.1	100W	V
Radio Scotland	Forfar	92.7	17kW	M
Radio Scotland/Inverness	Fort William	93.7	1.5kW	H
Radio Scotland	Girvan	93.3	100W	V
Radio Scotland/Inverness	Glengorm (M)	93.9	5kW	M
Radio Scotland/Selkirk	Inverleithen	93.9	20W	M
Radio Scotland/Aberdeen	Keelylang Hill	93.7	41kW	M
Radio Scotland/Inverness	Kinlochleven	94.1	10W	M
Radio Scotland	Kirkconnel	93.1	40W	M
Radio Scotland	Kirkton Mailer (Perth)	93.4	964W	M
Radio Scotland/Inverness	Knock More	92.6	500W	M
Radio Scotland	Lethanhill	92.7	200W	M
Radio Scotland	Lochgilphhead	92.7	10W	H
Radio Scotland/Inverness	Mallaig	92.5	14W	H
Radio Scotland/Inverness	Meldrum	93.1	150kW	M
Radio Scotland/Inverness	Melvaig	93.5	50kW	M
Radio Scotland	Millburn Muir	92.7	50W	M
Radio Scotland/Inverness	Ness of Lewis	92.7	200W	V
Radio Scotland/Inverness	Oban	93.3	3.6kW	M
Radio Scotland/Inverness	Peebles	92.8	20W	M
Radio Scotland/Inverness	Penfiler	92.5	20W	M
Radio Scotland	Pitlochry	93.6	200W	H
Radio Scotland/Inverness	Port Ellen	93.4	65W	V
Radio Scotland/Inverness	Rosemarkie	94.0	20kW	M
Radio Scotland	Rosemount	94.0	32W	V
Radio Scotland	Rosneath	93.6	32W	M
Radio Scotland	Rothsay	92.9	570W	M
Radio Scotland/Inverness	Rumster Forest	94.5	10kW	M
Radio Scotland/Dumfries	Sandale	94.7	250kW	M
Radio Scotland/Inverness	Sknag	92.9	30kW	M
Radio Scotland	South Knapdale	93.7	1.1kW	H
Radio Scotland	Strachur	93.0	18W	M
Radio Scotland/Dumfries	Stranraer	94.1	31W	V
Radio Scotland/Aberdeen	Tullich	94.5	42W	M
Radio Scotland/Inverness	Ullapool	92.7	50W	V
Radio Scotland	West Kilbride	93.5	50W	V
Radio Tay	Perth	96.4	350W	M
Radio Tay	Angus	102.8	1kW	M
Radio Tay	Black Hill	100.3	20kW	M
Radio Tay	Craigkelly	101.1	10kW	M
SIBC	Bressay	96.2	50	

REPUBLIC OF IRELAND TV STATIONS

Station	Channels	Aerial Group and Polarisation	Power (ERP) (Watts)
	R N T W E K 1 2		

RTE: REPUBLIC OF IRELAND

Cairn Hill (Longford)	40 43	BH	800k
Airainn Mhor	39 42	BV	8k
Ballydavid (Co. Kerry)	22 25	AV	20
Ballymacarby	54 58	CH	80
Bandon	30 34	AH	8
Bealanbrack	39 42	BH	100
Birragford	40 43	BV	20
Cahir	21 24	AV	30
Clonmel	27 31	AH	400
Cork (Spur Hill)	29 33	AH	500
Cork City (Collins Barracks)	39 49	BV	165
Crosshaven	55 59	C/D V	250
Dingle	23 26	AV	100
Dromanasag	54 58	CH	16
Falmore	54 58	C/D V	10
Glenbeigh	39 42	BH	15
Glenarriff/Bantry	70 49	BH	250
Goirey	54 58	C/D H	10
Halfway/Crossberry	54 58	C/D H	100
Inishillogh	53 57	C/D H	20
Innishannon	40 43	BH	50
Kells	22 25	AH	32
Kinsale	30 34	AV	5
Knockmoyle	53 57	C/D V	2k
Limerick City	48 52	BH	2k
Malin	21 24	AH	20
Malin	22 25	AH	5k
Monasootagh	54 58	C/D H	25
Mountstage	22 25	AH	16
Mt. Eagle/Dun Quin	40 43	BV	20
Mullanny	55 59	CH	32
Passage West		TBA*	
Termon	54 58	CH	100
Westport	54 58	CH	40
Youghal	30 34	AH	2.5
Clermont Cam (Co. Louth)	52 56	C/D V	250k
Carlingford/Greenore	61 67	C/D V	60
Holywell Hill (NE Donegal)	23 26	AH	200
Ballyboley/Stranorlar	21 31	AV	50
Termon	54 58	CH	32
Three Rock Mountain (Dublin)	29 33	AH	25k
Greystones		TBA*	

*New stations, some details still to be announced.

FM RADIO STATIONS

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
2FM	Achill	91.5	2kW	V
2FM	Athlone	92.1	50W	V
2FM	Cahersveen	91.7	2kW	V
2FM	Castletbar	92.0	3kW	V
2FM	Castletownbere	90.5	1kW	V
2FM	Clermont Cam	97.0	40kW	V
2FM	Clifden	91.7	3kW	V
2FM	Clonmel	90.5	1kW	V
2FM	Crosshaven	90.4	3kW	V
2FM	Cork City	91.4	5kW	V
2FM	Dungarvan	90.7	3kW	V
2FM	Fanad	92.0	4kW	V
2FM	Greystones	91.7	1kW	M
2FM	Holywell Hill	91.4	2kW	M
2FM	Kippure	91.3	40kW	M
2FM	Knockmoyle	90.6	1kW	V
2FM	Limerick City	91.5	2.5kW	V
2FM	Maghera	91.0	160kW	V
2FM	Monaghan	91.1	3kW	V
2FM	Mount Leinster	91.8	100kW	V
2FM	Moville	90.5	3kW	V
2FM	Mullaghanish	92.2	160kW	V
2FM	Suir Valley	91.2	3kW	V
2FM	Three Rock Mountain	90.7	10kW	M
2FM	Truskmore	90.4	80kW	V
96 FM	Hollyhill, Cork City	96.4	2kW	V
Anna Livia FM	Three Rock Mountain	103.8	1kW	V
CKR FM	Killeshin Mountain	97.3	5kW	V
CKR FM	Redgap Mountain	97.6	2kW	V
Clare FM	Burren Hill Cree	95.5	500W	V
Clare FM	Maghera	96.4	5kW	V
Classic Hits 98 FM	Three Rock Mountain	98.1	4kW	M
County Sound North	Mount Hillary	103.7	2.5kW	V
County Sound West	Nowen Hill	103.3	8kW	V
East Coast Radio	Arklow Town	104.4	100W	V
East Coast Radio	Blessington	102.9	250W	V
East Coast Radio	Bray Head	94.9	6kW	V
East Coast Radio	Wicklow Head	102.9	4kW	V
FM104	Three Rock Mountain	104.4	10kW	C
Galway Bay FM	Abbey Knockmoyle Hill	96.8	5kW	V
Galway Bay FM	Balinsloe	97.4	1kW	V
Galway Bay FM	Galway City	95.8	100W	V
Highland Radio	Arranmore Island	95.2	50W	V
Highland Radio	Finn Valley Area	94.7	250W	V
Highland Radio	Scalp Mountain (Burrfoot)	103.3	5kW	V
Limerick 95	Woodcock Hill	95.0	6kW	V
MWR FM	Achill	97.1	1.3kW	V
MWR FM	Ballina	97.3	50W	V
MWR FM	Sraheens Kiltmach	96.1	5kW	V
MWR FM	Westport	95.4	50W	V
North West Radio	Laghney, Donegal	105.0	1kW	V
North West Radio	Truskmore	102.5	1kW	V
Northern Sound Radio (M)	Carrickmacross	97.5	20W	V
Northern Sound Radio	Corcaghan	96.3	5kW	V
Northern Sound Radio (M)	Lockin-Lea	103.4	40W	V
Northern Sound Radio	Skabh Glach	94.8	1.5kW	V
Radio 1	Achill	89.3	2kW	V
Radio 1	Athlone	89.9	50W	V
Radio 1	Cahersveen	89.5	2kW	V
Radio 1	Castletbar	89.8	3kW	V
Radio 1	Castletownbere	88.3	1kW	V
Radio 1	Clermont Cam	95.2	40kW	V
Radio 1	Clifden	89.5	3kW	V
Radio 1	Clonmel	88.3	1kW	V
Radio 1	Cork City	89.2	1kW	V
Radio 1	Crosshaven	88.2	3kW	V
Radio 1	Dungarvan	88.5	3kW	V
Radio 1	Fanad	89.8	4kW	V
Radio 1	Greystones	89.5	1kW	M
Radio 1	Holywell Hill	89.2	2kW	V
Radio 1	Kippure	89.1	40kW	M
Radio 1	Knockmoyle	88.4	1kW	V
Radio 1	Limerick City	89.3	2.5kW	V
Radio 1	Maghera	88.8	160kW	V
Radio 1	Monaghan	89.9	3kW	V
Radio 1	Mount Leinster	89.6	100kW	V
Radio 1	Moville	88.3	3kW	V
Radio 1	Mullaghanish	90.0	160kW	V
Radio 1	Suir Valley	89.0	3kW	V
Radio 1	Three Rock Mountain	88.5	10kW	M
Radio 1	Truskmore	88.2	80kW	V
Radio 3	Sieve Bloom Mountain	103.5	2.5kW	M
Radio Kerry	Cahersveen	96.2	3kW	V
Radio Kerry	Knockanure	97.6	1kW	V
Radio Kerry	Mullaghanish	97.0	15kW	V

Stations	Transmitter Site	Freq. MHz	Power max ERP	Polarisation
Radio Kilkenny	Corbally Wood, Pritown	96.0	500W	V
Radio Kilkenny	Johnswell, Mount Nugent	96.6	5kW	V
Radio LMFM	Castletown Mount	104.9	100W	V
Radio LMFM	Mount Oneil	95.8	10kW	M
Radio na Gaeltachta/FM3	Achill	93.7	2kW	V
Radio na Gaeltachta/FM3	Cahersveen	93.9	2kW	V
Radio na Gaeltachta/FM3	Castletbar	94.2	3kW	V
Radio na Gaeltachta/FM3	Castletownbere	92.7	1kW	V
Radio na Gaeltachta/FM3	Clermont Cam	102.7	40kW	V
Radio na Gaeltachta/FM3	Clifden	93.9	3kW	V
Radio na Gaeltachta/FM3	Clonmel	92.7	1kW	V
Radio na Gaeltachta/FM3	Cork City	93.6	5kW	V
Radio na Gaeltachta/FM3	Crosshaven	92.6	3kW	V
Radio na Gaeltachta/FM3	Derybeg	93.0	1kW	V
Radio na Gaeltachta/FM3	Dungarvan	92.9	3kW	V
Radio na Gaeltachta/FM3	Fanad	94.2	2kW	V
Radio na Gaeltachta/FM3	Greystones	93.9	1kW	V
Radio na Gaeltachta/FM3	Holywell Hill	93.6	2kW	M
Radio na Gaeltachta/FM3	Kinsale	93.4	10W	V
Radio na Gaeltachta/FM3	Kippure	93.5	40kW	M
Radio na Gaeltachta/FM3	Knockmoyle	92.8	1kW	V
Radio na Gaeltachta/FM3	Limerick City	101.1	2.5kW	V
Radio na Gaeltachta/FM3	Maghera	93.2	160kW	V
Radio na Gaeltachta/FM3	Monaghan	93.3	3kW	V
Radio na Gaeltachta/FM3	Mount Leinster	94.0	100kW	V
Radio na Gaeltachta/FM3	Moville	92.7	3kW	V
Radio na Gaeltachta/FM3	Mullaghanish	94.4	160kW	V
Radio na Gaeltachta/FM3	Suir Valley	93.4	3kW	V
Radio na Gaeltachta/FM3	Three Rock Mountain	92.9	10kW	M
Radio na Gaeltachta/FM3	Truskmore	92.6	80kW	V
Radio na Life	Three Rock Mountain	102.2	1kW	V
Shannonside 104 FM	Boile, Roscommon	95.7	20W	V
Shannonside 104 FM	Slabh Bawn	104.1	2kW	V
Shannonside 104 FM	TBA	94.8	-	-
Shannonside 104 FM	TBA	96.3	-	-
South East Radio	Mount Leinster	99.2	4kW	V
South East Radio	North Co. Wexford	96.2	30W	V
Tip FM	Tipperary (South East)	97.1	1.6kW	V
Tip FM	Tipperary (North)	103.9	1.6kW	V
Tipperary Mid-West Radio	Golden Co. Tipperary	104.8	5kW	V
WLR FM	Dungarvan	95.1	5kW	V
WLR FM	Waterford City	97.5	8kW	M

N Indicates those ITV and Ch4 stations broadcasting some programmes in NICAM Digital Stereo Sound. On some of these stations BBC1 and BBC2 are also broadcasting in NICAM.

NICAM is being introduced on a phased basis to all RTE transmissions in the Republic of Ireland. NICAM is available on the Three Rock, Kippure and Maghera transmitters for RTE1 only.

UHF TV CHANNELS

Bands IV and V (Carrier frequencies in MHz)			NICAM			
Ch	Vision	Sound	Ch	Vision	Sound	
21	471.25	477.25	477.802	47	679.25	685.25
22	479.25	485.25	485.802	48	687.25	693.25
23	487.25	493.25	493.802	49	695.25	701.25
24	495.25	501.25	501.802	50	703.25	709.25
25	503.25	509.25	509.802	51	711.25	717.25
26	511.25	517.25	517.802	52	719.25	725.25
27	519.25	525.25	525.802	53	727.25	733.25
28	527.25	533.25	533.802	54	735.25	741.25
29	535.25	541.25	541.802	55	743.25	749.25
30	543.25	549.25	549.802	56	751.25	757.25
31	551.25	557.25	557.802	57	759.25	765.25
32	559.25	565.25	565.802	58	767.25	773.25
33	567.25	573.25	573.802	59	775.25	781.25
34	575.25	581.25	581.802	60	783.25	789.25
35	583.25	589.25	589.802	61	791.25	797.25
36	591.25	597.25	597.802	62	799.25	805.25
37	599.25	605.25	605.802	63	807.25	813.25
38	607.25	613.25	613.802	64	815.25	821.25
39	615.25	621.25	621.802	65	823.25	829.25
40	623.25	629.25	629.802	66	831.25	837.25
41	631.25	637.25	637.802	67	839.25	845.25
42	639.25	645.25	645.802	68	847.25	853.25
43	647.25	653.25	653.802			
44	655.25	661.25	661.802			
45	663.25	669.25	669.802			
46	671.25	677.25	677.802			

UK BROADCASTING BANDS

Long Wave	148.5 to 283.5kHz (2020-1058m)	AM radio
Medium Wave	526.5 to 1606.5kHz (570-187m)	AM radio
Band II (VHF)	87.5 to 108MHz	FM radio
Band IV (UHF)	470 to 582MHz (Channels 21 to 34)	625-line TV
Band V (UHF)	614 to 854MHz (Channels 39 to 68)	625-line TV
Band VI (SHF)	11.7 to 12.5GHz (Channels 1 to 40)	Satellite TV

Band II (VHF)

Band II is gradually being extended to cover 87.5 to 108MHz. Regrettably the frequency band 105 to 108MHz will not be available until 1996.

The general plan for locating stations in England and the Channel Islands is as follows:

87.5MHz	Not allocated
87.6 to 88MHz	Short term 'Restricted services'
88 to 90.2MHz	Radio 2
90.2 to 92.4MHz	Radio 3
92.4 to 94.6MHz	Radio 4
94.6 to 96.1MHz	BBC Local Radio (and Radio 4 in places)
96.1 to 97.6MHz	Independent Local Radio
97.6 to 99.8MHz	Radio 1
99.8 to 102MHz	Independent National Radio Classic FM and Local Radio
102 to 103.5MHz	Independent Local Radio
103.5 to 105MHz	BBC Local Radio
105 to 108MHz	Not allocated

The BBC does not have local radio stations in Scotland, Wales or Northern Ireland, but the sub-bands 92.4 to 96.1 MHz and 103.5MHz to 105MHz usually carry the national regional services. Details as follows:

92.4 to 96.1MHz: Radio 4/Radio Scotland/ Radio Cymru/Radio Ulster. 103.5 to 105MHz: Radio Scotland/Radio Cymru.

Radio Data System

All BBC local and national radio, and Independent Radio transmitters are transmitting RDS signals with almost all stations. RDS is a radio tuning aid which enables suitably designed radios to identify VHF FM stations by detecting the inaudible digital signals inserted continuously into every broadcast. A suitably equipped radio could then display the station name e.g. "BBC R4", or automatically search for a particular station. In a car, the radio could automatically retune as the car travels from the service area of one transmitter to that of another.

The other main purpose of RDS is to detect traffic announcements automatically, so that even if you are listening to another station or to the cassette player, the receiver can be programmed so that traffic news on any nearby station will override it. The service is operating throughout England and Northern Ireland.

TV Stereo Sound

The transmitters marked 'N' in the tables on the previous pages should be broadcasting a digital stereo sound signal on selected programmes with the TV picture on BBC1, BBC2, ITV and Channel 4. The system being used is NICAM 728 which provides a stereo soundtrack of near Compact Disc quality from receivers marked "NICAM Digital Stereo".

For further information see Maplin Magazine issue 34 for a preview by the IBA.

Satellites

In Great Britain it is possible to receive transmissions from several satellites, which provide a variety of channels, including the BBC World Service as well as many continental services. Naturally, reception is very much dependent on location, dish size and orientation and type of LNB fitted. Additionally, a decoder may be required to view the channel. In general, for the south and east of England, then a 60cm dish is recommended for ASTRA reception. For all other parts of the UK a 80cm dish is recommended. The cable connecting the LNB to the receiver should be to BS5425. The signal has a very wide bandwidth from 950 to 2050MHz, so the cable should not have an attenuation greater than 25dB at this upper frequency.



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RS12750



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SATELLITE FINDER KIT

Union Brothers



A compact, battery powered meter to help align your satellite dish for best reception. The output from the satellite LNB is fed directly into the unit, via 6ft of RF cable provided, and by adjusting the gain and sensitivity of the unit, the best position for the dish can be found. The kit includes a compass to help in the initial positioning of the dish. The PVC case has a covered compartment for the battery holder, which takes 10 x 'AA' type batteries (not included).

Specification

Frequency range: 950 to 1550MHz
 Gain: 10dB + 4dB
 Sensitivity control: 12dB + 4dB (LNB gain = 55dB, C/N = 15dB)
 Power supply: +2V to +8V
 DC Supply current: 60mA
 Operating range (input): 62 to 80dB (LNB gain = 55 to 60dB)
 Impedance: 75Ω
 Connections: 'F' type female (input/output)
 Case size: 245 x 125 x 55mm

Order Code	Type	Price each
BZ68Y	Sat Finder Kit	£32.99

Type	Length (l)	Diameter (d)	d1	Apparent permeability
810	100mm ±1.5mm	8mm ±0.8mm	7mm ±0.3mm	9.2 to 9.5
101	140mm ±2mm	10mm ±0.4mm	9mm ±0.4mm	9.9 to 10.2

Order Code	Type	Price each
YG20W	Ferrite Rod 810	59p
YG22Y	Ferrite Rod 101	79p

TELESCOPIC AERIALS

Low Cost

Union Brothers

Two low cost telescopic aerials, one six-section and one seven-section. The six-section type is 482mm (19 ins) long (105mm retracted). 6mm in diameter at the base and has a threaded hole tapped to M2.5 in the bottom. The seven-section type is 670mm (26.25 ins) long (123mm retracted), 7mm in diameter at the base and has a threaded hole tapped to M3 up the centre.



Order Code	Type	Price each
JM10L	6-Section Aerial	£1.15
RK49D	7-Section Antenna	£1.20

Swivel Base

Union Brothers

Low-cost 6-section telescopic aerial with base which swivels and rotates. The aerial extends from 275mm to 980mm. Requires a 9.53mm dia. cut-out for mounting. Base section is 6mm dia.



Order Code	Type	Price each
YT20W	6 Sect Swivel Aerial	£2.30

High Quality 10 Section

Union Brothers

A high quality, heavily chromed, ten-section telescopic aerial (retracted length 166mm) extending to 1.31m (51.5 ins). Base section is 9.5mm diameter and a threaded hole is tapped to M4 up the centre.



Order Code	Type	Price each
LB10L	HQ 10-Section Aerial	£3.40

RADIO AERIALS

Ferrite Rod Aerial

Union Brothers



A 5in long x .375in diameter ferrite rod onto which a medium wave and long wave coil are wound. Coils may be moved on rod for best performance (then fixed with a suitable adhesive). Inductance of medium wave coil: 370μH; long wave coil: 4.1mH.

Typical coverage:
 Medium wave – 550 to 1550kHz (193m to 545m).
 Long wave – 150 to 280kHz (1070 to 2000m).

Order Code	Type	Price each
LB12N	MW/LW Aerial	£2.99

Ferrite Rods

Union Brothers



Round ferrite rods with a slightly flattened cross-section for medium/long wave radicos. Available in the following sizes which may be cut into shorter lengths with a hacksaw if required.

Fully Retractable Swivel Base

Union Brothers

A low cost eight-section telescopic aerial with a base that swivels and rotates. This aerial has the advantage that the mast-sections may be pushed down through the swivel base into the equipment in which the aerial is housed. Thus the aerial is fully retractable, leaving only 11mm of aerial tip exposed. The aerial is 1.016m long from the base and 1.04m long including the base. The base requires an 11.35mm diameter cut-out for mounting and 210mm of clearance inside the enclosure for when the aerial is fully retracted.

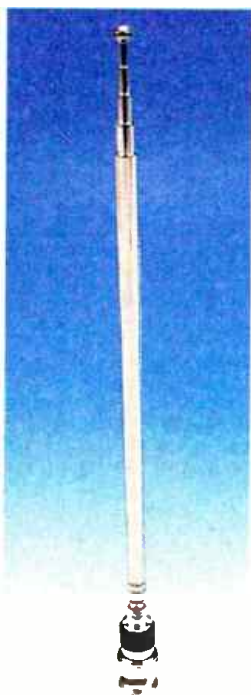


Order Code	Type	Price each
JM11M	Rtrctble Swivel Aerial	£2.75

144/430MHz Telescopic Aerial & BNC Plug

Union Brothers

A good quality, reasonably priced telescopic aerial, designed especially for use with hand-held transceivers operating at 144/430MHz. This 5-section aerial is 535mm long when extended and 187mm long when retracted. The aerial represents 1/4 wavelength at 144MHz when extended and 1/4 wavelength at 430MHz when retracted. The aerial has a pivoted base and is terminated in a BNC connector suitable for direct connection to most hand-held transceivers.



Order Code	Type	Price each
JM12N	144/430 BNC Aerial	£4.99

FLEXIBLE ANTENNAE 27MHz

Union Brothers



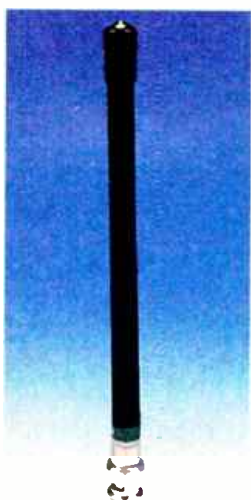
A flexible rubber antenna for the 27MHz band. Excellent SWR when fitted to handheld equipment and offering small size, unbreakable durability and gain approaching quarter wave. Overall length: 355mm. Terminated in a detachable PL259 UHF plug.

Order Code	Type	Price each
YG41U	27MHz Rubber Duck	£10.45

2m Band

Union Brothers

A flexible rubber antenna for the 2m band. Excellent SWR to hand-held equipment and offering small size, unbreakable, and gain approaching quarter wave. Overall length: 175mm. Terminated in a BNC plug.



Order Code	Type	Price each
YG15R	2m Rubber Duck	£7.49

VHF FM AERIALS

FM Aerials

Three types are available, one has spade terminals, one is terminated in a co-ax plug and one is terminated in an FM-type 2-pin plug with central peg. Impedance 300Ω balanced.



Order Code	Type	Price each
LB11M	FM Tape Aerial Spade	£1.19
FS24B	FM Tape Aerial Coax	£1.19
YT15R	FM Tape Aerial Plug	£1.19

Radio Rod

Antiference

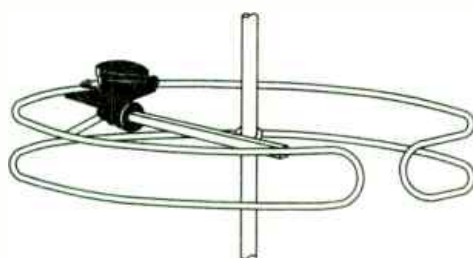
Dramatic developments are taking place in FM stereo broadcasting and pretty soon there will be some exciting new changes for the future 1990's. Apart from BBC's Radio One gaining its own independent FM wavelength, there are an estimated 200 or more independent local radio stations planned catering for all kinds of special interests, and a new independent National Radio station for general entertainment. To this end 'Radio Rod' is designed to be omni-directional and receive national and local transmissions from any direction in the range 88 – 108MHz. Ideal for use with midi systems, it is light and easy to install on the outside of the house or in the loft. Comes complete with 10m of coaxial cable, fittings and instructions. A coax plug or coupler will be needed to terminate this lead to the receiver or an extension lead (see also connectors section).



Order Code	Type	Price each
XP09K	A1 Radio Rod	£13.99

VHF FM Omnidirectional Aerial

Antiference



An ingenious solution to the problem of receiving VHF FM broadcasts from a number of different transmitters. The omnidirectional aerial, by virtue of its design, offers the listener the choice to tune to radio stations broadcasting in the VHF FM band from nearby transmitters located in the surrounding area.

Omnidirectional aerials are intended for use in good reception areas. This depends upon distance from the transmitter and the power of the transmission. In practice this generally means its performance makes it better suited for use in urban areas where radio stations are more plentiful as opposed to more remote rural areas.

Supplied with mast mounting clamp.
Overall Size 95mm x 515mm (dia.)

Order Code	Type	Price each
XM64U	A1 Allrounder FM1080	£13.99

Stereo FM Aerial Type FM3



A low-cost but high quality 3-element, stereo FM aerial, directional for long-distance reception. Can be installed either in a loft or mounted externally. Supplied with a generous 10m of coaxial cable and VHF plug and complete fitting kit. Comes with easy to fit assembly instructions.

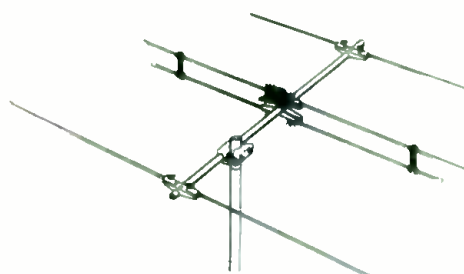
Order Code	Type	Price each
GK26D	C2 FM Aerial FM3	£19.99

Mushkillers

Antiference

New type of 108 Mushkillers, a range of high quality VHF/FM aerials introduced to cover the enlarged Band II frequency range of 88 to 108Mz. The aerials offer VSWR's as low as 1.50:1, have an even response to within 1dB over the band, display high directivity for stereo reception free from multipath distortion, and give up to 1 1/2 dB extra gain with patented 'Trumatch' dipole.

3-Element

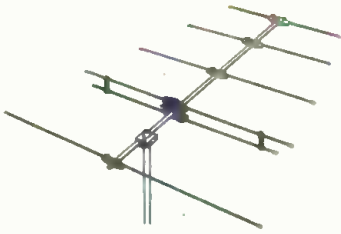


Suitable for good reception areas. It features the 'Trumatch' dipole, one director and one reflector. Supplied complete with Universal Clamp Type 1.

Forward Gain	4.5dB
Front/Back Ratio	15dB
Acceptance Angle	±32°
Overall Size	864mm long x 1.73m wide

Order Code	Type	Price each
XQ23A	C3 Mushkiller FM1083	£19.99

5-Element



Suitable for outer reception areas. Supplied with Universal Clamp Type 1.

Forward Gain 6.5dB
 Front/Back Ratio 16dB
 Acceptance Angle $\pm 28^\circ$
 Overall Size 2.05m long x 1.73m wide

Order Code	Type	Price each
XQ25C D5	Mushkiller FM1085	£29.99

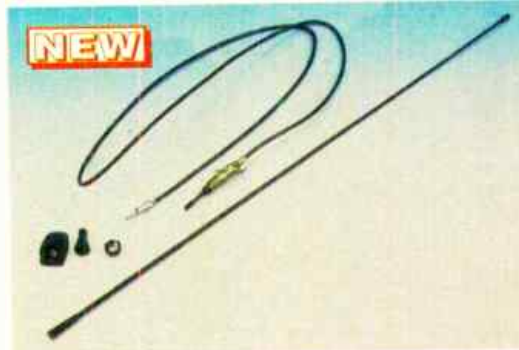
1-Piece Car Aerial



A single section, non-retractable AM/FM car aerial, that is finished in black glass-fibre. The mounting bracket is angled at 90° from the horizontal, but the aerial can be bent up to 30° in any direction after mounting. The bracket is only 15mm wide and 15mm deep so will fit in to very tight locations. The aerial is easy to fit, requiring a single 14mm mounting hole (if access can be made to the underside of the mounting surface), or an 18mm mounting hole (if access can only be made to the topside of the mounting surface). Length of element is 775mm and the cable is 1.63m long.

Order Code	Type	Price each
RZ56L	1-Piece Car Aerial	£12.99

Side Mounting Car Aerial



A single section, non-retractable car AM/FM aerial, finished in black glass-fibre. The mounting bracket is angled at about 42° from the horizontal, making this ideal for roof mounting to give a low profile. Easy to fit, only requires a 20 x 15mm (approx.) mounting hole.

Element length: 775mm
 Cable length: 1.6m

Order Code	Type	Price each
ZF00A	1 Piece S/Mt Aerial	£13.99

High Quality Wing Mounting Aerial

A fully retractable four-section telescopic aerial for wing mounting. Aerial retracts into plastic cylinder and can be pulled with a key (two supplied) which fits into hole in top of aerial. Fully extended length: 119cm. Underhang: 26cm. Aerial is supplied fitted with 112cm of lead with car radio plug fitted. A bar is also supplied which clamps the bottom of the metal cylinder so that the aerial is firmly secured.



Order Code	Type	Price each
YT13P	Car Aerial 5-Section	£3.55

Profile Plus Indoor FM Aerial

Maxview

A unique innovative design of indoor aerial that would pass any critical eye test for modern styling. This bi-directional aerial is suitable for all FM applications. It includes an integral low noise signal amplifier/booster, for weak signal areas. The aerial is coloured slate grey and is supplied with a flylead 2m long.



Frequency range: 88 to 108MHz
 Dimensions: 320mm x 220mm x 50mm
 Power supply: 2 x AA batteries (not supplied)

Order Code	Type	Price each
RT66W	Profile Plus Aerial	£21.99

CAR RADIO AERIALS

Windscreen Mounting Aerial

Union Brothers



A crystal clear self-adhesive polypropylene film tape that will not crack, yellow or dry out even in extreme heat or cold. The tape is connected to 1m of coax cable terminated in a car aerial plug. This type of aerial has many advantages over externally fitted aerials.

1. It is much longer, giving an improvement on AM reception and it has vertical and horizontal components giving an improvement on FM reception.
2. As it is internal it cannot be stolen or snapped off (in car washes for example).
3. Easy to install — no holes to drill in car body.
4. Fits any car.

A chrome blanking grommet is supplied to fill hole where wing-mounted aerial was previously fitted.

Order Code	Type	Price each
LH99H	Windscreen Aerial	£3.99



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FULLY AUTOMATIC CAR AERIAL

NEW

A good quality fully automatic car aerial that is designed to fit negative earth cars and is electrically operated and powered by the car battery. The aerial will only extend when the radio cassette is switched on and is retracted when the radio/cassette is off, so greatly reducing the risk of the aerial being damaged by vandals. Power and control connections to the aerial are made by three wires, green and red, which have bullet type connectors, and a black wire which has an eyelet connector. The red must be connected to the positive battery supply via a suitable fuse rated at 5A. Green must be connected to the power antenna lead output of the radio-cassette, or directly to the on/off switch of the radio-cassette. Black is connected to the car chassis or negative battery terminal. The antenna when fully extended is 0.81m in length, and is supplied with 1.3m of screened cable which is terminated in a standard car aerial plug. The assembly is 335mm in length with the aerial completely retracted.



SUPERB QUALITY!
£29.99
RJ98G

CAR PHONE AND COMMUNICATION AERIALS

Basic Type

Allgon

Quarter wave antenna made of stainless steel with threaded support for fitting to either of the bases. Frequency range is 825 to 960MHz. Length 50mm, colour black.



Order Code	Type	Price each
ZA47B	SS Phone Antenna	£3.99

Double Ring Type

Allgon

A broadband, quarter wave double ring antenna made of stainless steel with threaded support. Frequency range 800 to 1000MHz. Height 40mm, colour black.



Order Code	Type	Price each
ZA48C	Dbl Ring Phone Ant	£5.49

Cellular Phone Aerial

Allgon



A complete cellular phone aerial kit for mounting the aerial onto a non-moving window, comprising aerial, exterior base plate for accepting the clip-on aerial, and an interior base plate incorporating 50Ω coaxial cable with a 5mm miniature crimped connector on the free end.

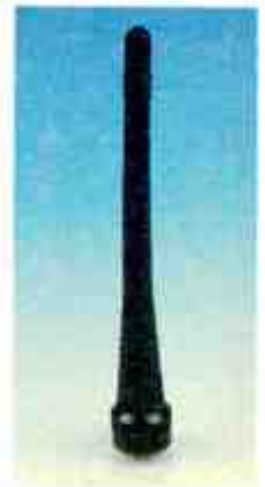
Order Code	Type	Price each
MJ00A	Cellular Phone Ae	£19.99

FOR CASHTEL
Phone 01702 552941

Phone Aerial

Allgon

A flexible moulded polyurethane 1/4-wave aerial for Motorola phones. Frequency range 825 to 960MHz. Overall length 93mm.



Order Code	Type	Price each
MJ01B	Phone Aerial	£12.99

Coiled Type

Allgon

A collinear antenna made of stainless steel with threaded support. Gain is +4dB relative to a quarter wave radiator. Frequency range 872 to 960MHz. Length 275mm.

Colour black.



Order Code	Type	Price each
ZA49D	Coiled Phone Antenna	£7.49

Enclosed Type

Allgon

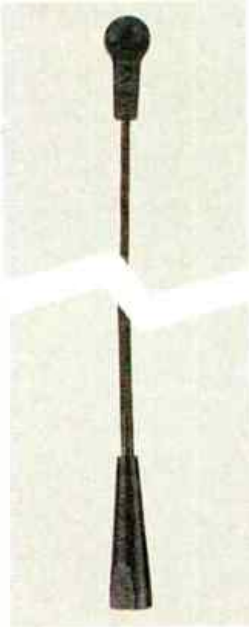
An encapsulated collinear antenna with threaded and sprung support and a gain of +4dB relative to a quarter wave radiator. Frequency range 872 to 960MHz. Length 240mm, colour black.



Order Code	Type	Price each
ZA50E	Encap Phone Antenna	£7.49

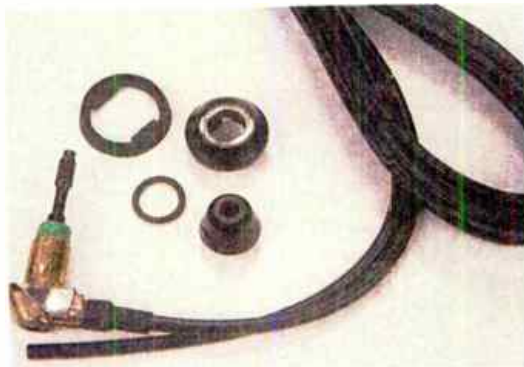
VHF/UHF Type Allgon

A black steel antenna especially for VHF and UHF frequencies. Supplied with cutting length chart to obtain correct frequency. Frequency band 68 to 225MHz



Order Code	Type	Price each
ZA46A A	VHF/UHF Antenna	£7.99

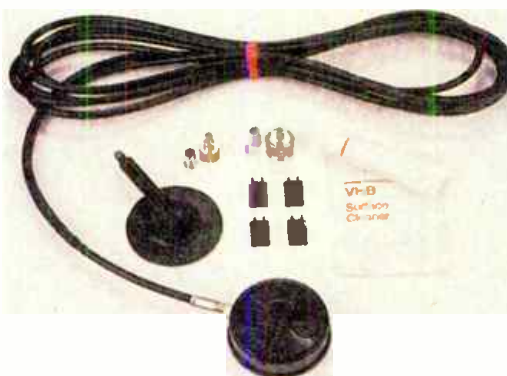
Bases Allgon



Suitable for 68 to 900MHz antennas, these bases have small dimensions and are absolutely waterproof. They are intended to be mounted from either the inside of the vehicle (14mm dia. hole) or from the outside (18mm dia. hole). Approx. 5 metres of 50Ω coax cable is fitted but does not include a connector on the free end. Each has a 40mm high external conical part topped by a 10mm long M6 threaded stud. The cable entry moulding below is 13mm deep. Available in two styles; oval type has a 35 x 25mm exterior skirt, the round type is 32mm in diameter overall. Only available in black.

Order Code	Type	Price each
ZA51F	Oval Base Black	£11.99
ZA52G	Round Base Black	£11.99

Glass Mounting Base Allgon



This ingenious antenna base can be mounted onto the glass of a rear window – without requiring any holes in the glass! The circular outer part is glued to the outside surface, and on the inside of the glass the base proper

IT'S A FACT!

TV AERIALS

TV broadcasters use a series of main transmitters spread around the country to radiate their programmes, the largest of which has a radiated output approaching 1,000,000 watts (1MW).

These main transmitters are located on the highest point available in a region and provide television pictures to over 99% of the UK population. They broadcast signals direct to rooftop aerials and to smaller relay transmitting stations, which in turn re-broadcast to areas unable to receive the main transmitter. Each transmitter broadcasts on a frequency selected to avoid interference with neighbouring transmitters.

External aerials should be correctly aligned to the transmitter, and mounted as high as

possible, either on the chimney breast or above the roof line. This usually improves the quality of reception as localised obstructions, such as trees or buildings are reduced to a minimum. This is particularly important for reception and decoding of teletext signals where ghosting, which may not be visible on a normal picture, can cause errors or missing characters on teletext screens. In general, an 18-element aerial is for weak signal areas, a 14-element is for normal signal areas, and a 10-element is for strong signal areas. Loft aerials are adequate in strong and normal signal areas, and set top aerials are usually used where external walls and lofts are inaccessible. Set top aerials normally receive all channels and can send down to the television from any receivable local transmitter that gives a satisfactory picture.

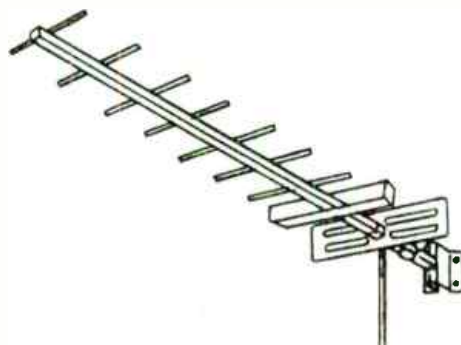
is similarly bonded, and is inductively coupled to the outside part. The interior portion includes 4 metres of coax cable attached via a mini-UHF connector, and a TNC crimp plug is provided for the other end (Tx/Rx connection). The outer base accepts our car antenna ZA50E. A re-fit kit is also available separately in the event that the outer base and aerial is lost, which includes extra glue and glass cleaner, etc.

Order Code	Type	Price each
ZA45Y	Glass Antenna Base	£25.99
ZA44X	Re-fit Kit	£9.99

UHF TV AERIALS

These aerials are often colour-coded as follows:
Group A = Red; B = Yellow; C/D = Green; W = Black; E = Brown.

DIY TV Aerial Maxview



A low-cost but high quality 10 element TV aerial for installation in the loft or outdoors. Includes complete fitting kit comprising universal bracket with adjustable support, and a generous 10 metres (33 feet) of coaxial cable terminated with a UHF plug. Suitable for all TV channels, and equally suitable for main or additional secondary TV sets. Supplied with easy to fit assembly instructions.

Gain:	6.0dB
Front/back ratio:	20dB
Acceptance angle:	29°

Order Code	Type	Price each
ZA55K A2	DIY TV Aerial	£14.99

10 Element TV Aerials Maxview



A range of high quality TV aerials for Band IV and V UHF reception. Available in three or four channel groups. Suitable for primary service areas and supplied with a mast clamp.

	Group A	Group B	Group C/D
Forward gain:	8.75dB	9.1dB	8.75dB
Front/back ratio:	18dB	20dB	22dB
Acceptance angle:	20°	24°	25°

Order Code	Type	Price each
GK16S A2	10 Element TV A	£6.99
GK17T A2	10 Element TV B	£6.99
GK18U A2	10 Element TV CD	£6.99

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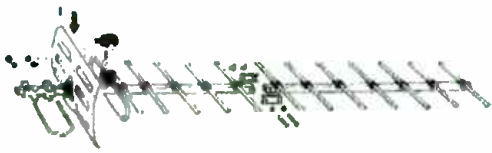
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14 Element TV Aerials

Maxview



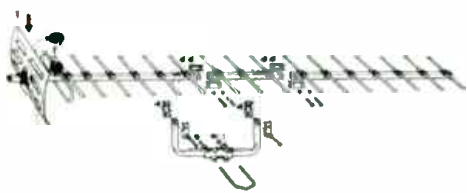
Suitable for medium range reception and supplied with mast clamp.

	Group A	Group B	Group C/D
Forward gain:	9.7dB	10.2dB	9.75dB
Front/back ratio:	21dB	22dB	23dB
Acceptance angle:	19°	21°	20°

Order Code	Type	Price each
GK19V	B2 14 Element TV A	£8.99
GK20W	B2 14 Element TV B	£8.99
GK21X	B2 14 Element TV CD	£8.99

18 Element TV Aerials

Maxview



Suitable for medium to long-range reception and supplied with mast clamp. Sometimes supplied in only two sections.

	Group A	Group B	Group C/D	Group W/B
Forward gain:	10.5dB	10.6dB	10.5dB	8.6dB
Front/back ratio:	23dB	23dB	24dB	18dB
Acceptance angle:	16°	15°	16.5°	21°

Order Code	Type	Price each
GK22Y	C2 18 Element TV A	£12.99
GK23A	C2 18 Element TV B	£12.99
GK24B	C2 18 Element TV CD	£12.99
GK25C	C2 18 Element TV W	£12.99

Trucolour

Antiference

A range of high quality aerials for use with Band IV and V UHF monochrome and colour TV sets. Each type is available in three channel or four channel groups.

10-Element

Suitable for use in the primary service area and supplied with a clamp to fix it to the mast.



	Group A	Group B	Group C/D	Group W/B
Forward Gain (±0.5dB)	7.75dB	8.25dB	8.5dB	6.0dB
Front/Back Ratio (±2dB)	31.0dB	28.3dB	29.2dB	15.0dB
Acceptance Angle (±3°)	±20°	±21°	±23°	±30°
Overall Size	1.1m	0.9m	0.82m	1.04m

Order Code	Type	Price each
XQ29G	A2 Trucolour TC10 Grp A	£14.99
XQ30H	A1 Trucolour TC10 Grp B	£14.99
XQ31J	A1 Trucolour TC10 Grp C/D	£14.99
MJ04E	A1 Trucolour TC10 Grp WB	£14.99

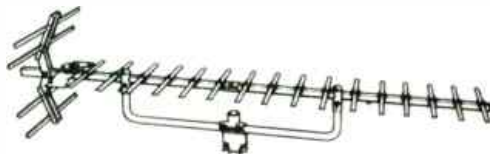
MAPLIN KEY CALL

Phone 01702 556751

18-Element

Antiference

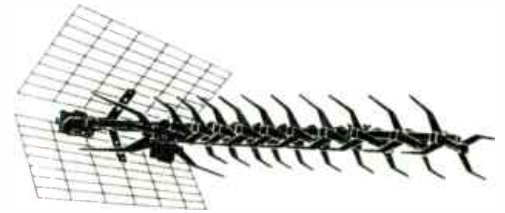
Suitable for medium to long range reception and supplied with a Universal Clamp Type 1 and U support arm.



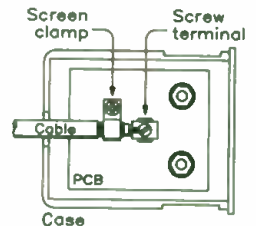
	Group A	Group B	Group C/D	Group E
Forward Gain (±0.5dB)	9.5dB	9.0dB	9.5dB	8.5dB
Front/Back Ratio (±2dB)	30.7dB	30.7dB	29.7dB	27.0dB
Acceptance Angle (±3°)	±16°	±16°	±17°	±15°
Overall Size	1.82m	1.54m	1.41m	1.4m

Order Code	Type	Price each
XQ35Q	B3 Trucolour TC18 Grp A	£22.99
XQ36P	B3 Trucolour TC18 Grp B	£22.99
XQ37S	B3 Trucolour TC18 Grp C/D	£22.99
XG24B	B3 Trucolour TC18 Grp E	£22.99

12 Element TV Aerial Kit



A complete kit of all parts necessary to install a high quality TV aerial ready for immediate use. The design is of the quad-X type, having 10 director bays — offering signal gain equivalent to that from at least twice the number of 'standard' dipole directors — preceding a 40cm wide quad-X dipole antenna backed by a grid plane reflector. All hardware is supplied in a flat pack and requires assembly.



The kit comprises:

1. Antenna parts: 2 section extruded aluminium main spar and jointing hardware; 2 halves of reflector grid plane; integral main antenna dipole with cable connection box; and 10 director bay elements. The elements are elegantly formed from pressed aluminium, and come ready mounted in insulating plastic supports, which require attaching to the main spar with the novel self-locking plastic press-studs provided. The complete assembly is 1.15 metres long but very lightweight, and fetchingly finished in gold with contrasting black plastic components.

2. Mounting hardware, comprising one 1 inch dia., right-angled aluminium mounting mast 780mm high with a 200mm long, lower stand-off section; mast fixing bracket including screws and wall plugs for mounting to a vertical wall, loft joist or similar surface; and a universal fitting antenna fixing clamp.

3. Cabling, including 10 metres of white coax. cable; one white coax. UHF plug; and cable fixing clips. The cable has an air filled insulator and solid centre conductor and is easily connected into the dipole connector box. To ensure a reliable connection, strip 20mm of outer sleeve and 10mm of inner insulator. Release brass clamp and remove centre screw. Wrap braid screen around remaining insulator and insert under clamp. Wrap centre conductor around screw and replace, tighten clamp (see diagram). At the plug end, it is suggested that the tip of the solid core be soldered at the end of the plug pin after assembly to ensure a good connection. Pictorial assembly instructions are provided on underside of packaging.

Specification

Forward gain:	10 to 15dB
Front/back ratio:	25 to 30dB
Acceptance angle:	16°

Order Code	Type	Price each
GK27E	D5 TV Aerial Kit	£34.99

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01702 553935

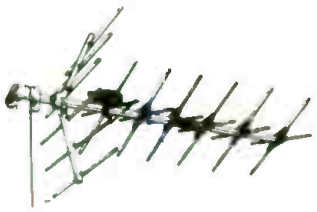
Extragain

Antiference

A range of high quality, high gain aerials for use with Band IV and V UHF monochrome and colour TV sets. Especially suitable for use with teletext receivers. They are ideal for problem areas, ghosting and long-range reception.

Features are the high forward gain Quad-X dipole and director chain; the high front to back ratio and improved directivity resulting from a massive six element full-wave reflector and the extra accurate matching given by a specially designed integral balun and resonator.

5-Bay Director Aerial

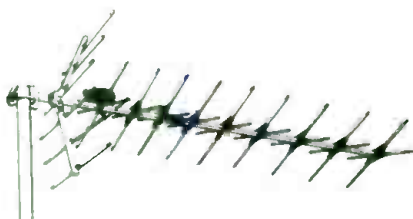


Suitable for local areas, this aerial has five powerful Quad-X director bays giving equivalent gain to that provided by a standard 10-element aerial. Available only as a wideband (W) giving coverage of all UHF channels. A very compact and economical aerial supplied complete with clamp.

Forward Gain 6.5dB
 Front/Back Ratio 26-27dB
 Acceptance Angle ±17-28°
 Overall Size 0.76m long approx.

Order Code	Type	Price each
XQ38R B3	Extragain XG5	£29.99

Aerial for Difficult Reception Areas

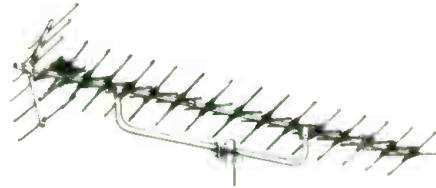


Suitable for fringe areas, this aerial has eight, nine or ten powerful Quad-X director bays giving near equivalent gain to that provided by 2 standard 18-element aerials of the same group. Supplied with a three-way clamp for tail mounting, the aerial is available in three channel groups and a wideband version is also available.

	Group A	Group B	Group C/D	Wideband
Forward Gain (dB)	9.75	11.25	12.0	8-25
Front/Back Ratio (dB)	22-33	22-25	20-29	26-29
Acceptance Angle (°)	±17-22	±13-16	±14-19	±15-27
Number of director bays	8	9	10	8

Order Code	Type	Price each
XQ39N C5	Extragain XG8 GroupA	£36.99
XQ40T C5	Extragain XG9 GroupB	£36.99
XQ41U C5	Extragain XG10GrpC/D	£36.99
XQ42V C5	Extragain XG8 Wdbnd	£36.99

Aerial for Extreme Fringe Areas



Suitable for outer fringe areas, this aerial has eighteen (14 for wideband type) powerful Quad-X director bays giving near equivalent gain to that provided by four standard 18-element aerials. Supplied with a U support arm and three-way clamp, the aerial is available in three channel groups and a wideband version is also available.

	Group A	Group B	Group C/D	Wideband
Forward Gain (dB)	11.5	12.5	13.75	9-75
Front/Back Ratio (dB)	23-28	20-22	20-25	27-31
Acceptance Angle (°)	±11-16	±10-12	±12-15	±13-23

Order Code	Type	Price each
XQ43W E8	ExtragainXG18 GroupA	£59.99
XQ44X E6	ExtragainXG18 GroupB	£59.99
XQ45Y E6	ExtragainXG18 GrpC/D	£59.99
XQ46A E5	Extragain XG14 Wdbnd	£59.99

High Performance Indoor Set-Top Aerial



A UHF set-top aerial available only in wideband version. This high quality aerial allows for easy adjustment to give horizontal or vertical polarisation, and is electrically isolated for safety. Assembly instructions on box.

Order Code	Type	Price each
XQ51F A1	Super-Set Top	£12.99

Indoor Set-Top Aerial

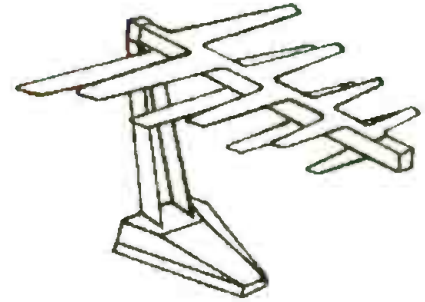


The "Toptenna" is a new set-top aerial that out-performs all the competition at this price. Styled to match modern portable TV sets, it is a precisely tuned yagi wideband antenna covering all the UHF channels (21-68) with minimum ghosting and maximum gain.

Order Code	Type	Price each
XY30H A1	Toptenna	£5.49

Multi-Element Hi-Tech TV Aerial

Antiference



A smart, lightweight UHF TV aerial for indoor use. The aerial features two parallel, staggered 7-element arrays of matt finished aluminium, connected to either side of a 75Ω coaxial feeder and mounted on a square section plastic support. The unusual 'log periodic' design offers up to 6dB of gain at 770MHz, and a minimum 4.5dB at 500MHz. Covers all UHF broadcast TV channels from 21 to 68. The aerial comes in three parts, a triangular base for a plug-in support, and the aerial itself which is normally mounted horizontally but can be inserted vertically for vertically polarised transmitters. Safety isolated to BS5373. Fitted with 1 metre of coaxial cable terminated with a UHF plug.

Order Code	Type	Price each
YM56L A1	Hi-Tech TV Aerial	£14.99

Omni-directional UHF/VHF Indoor Aerial with Signal Booster



An unusual indoor antenna which represents a breakthrough in high performance examples of this type. The self standing antenna consists of a horizontally polarised loop aerial contained in a 300mm diameter plastic disc shaped body, supported by a cantilever arm on a 180mm diameter base. The antenna receives both UHF TV and VHF FM signals through a full 360°. The base contains 5 metres of white coax. terminated with a coax. plug on an integral bobbin, which can be unwound to any length to reach the intermediate signal booster amplifier stage. Contained in a small unit measuring 93 x 77 x 60mm, this provides 26dB of gain and is powered from the mains supply with negligible consumption. It includes a power-on red LED indicator, and also powers the main antenna front-end which includes another red LED indicator and a multi-turn gain control to provide optimum picture and sound reception. For further fine tuning if necessary, an 80cm long, chromed telescopic aerial can be added to the top centre of the antenna disc and adjusted for angle and

FOR TOP QUALITY & VALUE!

Continued on next page.

CONTOUR INDOOR TV AERIAL

Maxview

A unique innovative design of indoor aerial that would pass any critical eye test for modern styling. This bi-directional aerial is suitable for all TV applications. This aerial comes in two forms - the basic Contour aerial for strong signal areas and an alternative version, the Contour Plus, which includes an integral low noise signal amplifier/booster, for weak signal areas. Both versions are coloured mid-grey and supplied with a flylead 2m long.

Specification

Frequency range: 470 to 860MHz
 Channels: 21 to 68
 Dimensions: 320mm x 220mm x 50mm

Gain:

Contour: 2dB (RT64U)
 Contour Plus: 12dB (RT65V)
 Power supply: 2 x AA batteries (not supplied)



SUPERB VALUE!
£21.99 RT65V
 Add Carriage (A1)

RT64U A1 Contour Aerial £10.99

Traveller Aerial



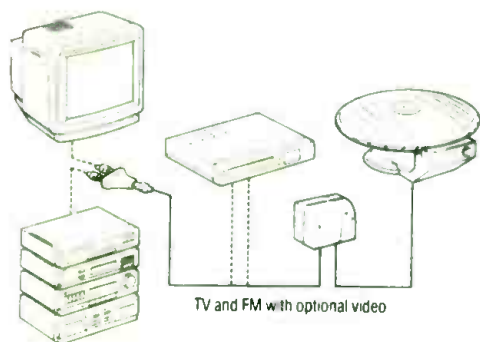
Space-saving wideband log-periodic aerial that will fix to any vertical, horizontal or sloping flat surface by means of three giant suction pads. These hold the aerial securely, but when removed do not leave the slightest trace of a mark. Ideal for use on caravans, boats and cars. The aerial features two parallel, staggered 7-element arrays of matt finished aluminium, connected to 4m of coaxial cable terminated in a co-ax plug. The unusual 'log periodic' design offers up to 7dB of gain at 760MHz and a minimum of 6dB at 470MHz. Covers all UHF broadcast TV channels from 21 to 68. The unique locking action of the mounting arm and bracket allows the mast to remain upright regardless of the orientation of the fixing surface. The aerial can be set to receive horizontally or vertically polarised stations. The unit is weatherproofed and isolated to BS5373 for safety.

Order Code	Type	Price each
XJ75S A1	Caravan Boat Aerial	£22.99

Continued from previous page.

length to provide the best possible FM/UHF reception. The booster unit can be free standing or mounted on a wall or other surface. A 1 metre long white flylead is provided to link the booster unit to an FM receiver, TV input socket or VCR. The booster can even drive both a TV/VCR and an FM receiver if an inline combiner/splitter (e.g. JM13P) and a second UHF flylead is used.

The complete kit of parts comprises:

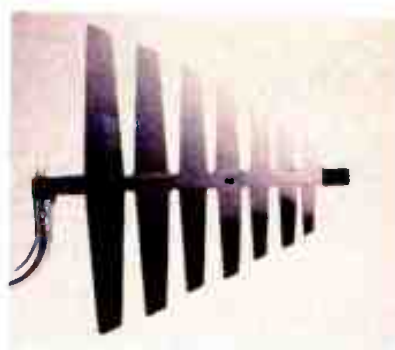


1. The 'Omnivision' antenna front-end with 5m of fitted white coax. cable and plug. Colour dark grey.
2. Integral inline booster amp and power supply, with input and output sockets, and 1.3m of fitted twin-core mains lead. A 3A fuse is included to replace standard 13A fuse in mains plug during fitting. A mains plug is not included and is additionally required. Wall mounting is provided for by the inclusion of screws and wall plugs.
3. Additional telescopic aerial.
4. 1 metre long white coax. flylead terminated in a UHF plug at each end.

Order Code	Type	Price each
GK15R C4	Indoor Omni Aerial	£39.99

Loft or Outdoor DIY Aerial

Antiference



Compact wideband log-periodic aerial designed to be easily fixed to windows frames, walls, balcony railings, or loft joists. The aerial features two parallel, staggered 7-element arrays of matt finished aluminium, connected to 1m of coaxial cable terminated in a co-ax line socket in a weatherproof sleeve. The unusual 'log periodic' design offers up to 7dB of gain at 760MHz and a minimum 6dB at 470MHz. Covers all UHF broadcast TV channels from 21 to 68. The aerial is supplied with an angled boom extension arm universal mounting bracket, and can be set up for horizontal or vertical channels. The unit is weatherproofed and isolated to BS5373 for safety.

Order Code	Type	Price each
XJ74R A1	Loft/Out DIY Aerial	£17.99

Touring Aerial



A low-cost, high quality 9-element TV aerial for touring. This kit comprises an easily assembled multielement aerial, an easily assembled mounting pole, two quick-release clamps and 5m of coaxial down lead. The clamps are provided with mounting plates that are designed to be secured to a surface, allowing the clamps and mounting pole to be assembled and removed as and when required. Aerial and mounting pole are 600mm long.

Gain: 6dB
 Channels: 21 to 68
 Frequency: 470 to 860 MHz
 Front to back ratio: 20dB
 Accetance angle: 20°

Order Code	Type	Price each
RT71N A1	Touring Aerial	£21.99

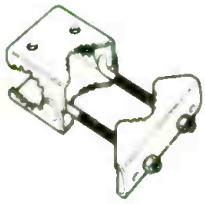
MAPLIN
KEY CALL
Phone 01702 556751

MOUNTING BRACKETS AND MASTS

Antiference

Bracket No. 1

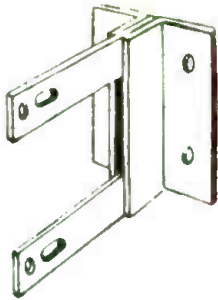
A universal clamp for masts up to 51mm (2in.) diameter. Kit includes: 1 bracket assembly, 2 nuts and 2 shakeproof washers.



Order Code	Type	Price each
BW42V	Univ. Clamp Type 1	£2.99

Bracket No. 3

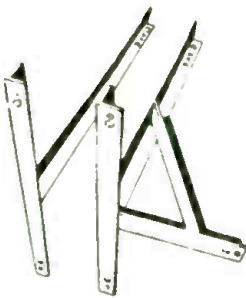
A wall-mounting bracket for 25.4 to 32mm diameter mast (1 to 1 1/4 in.) and providing a 102mm (4in.) stand-off. Kit includes: 1 bracket, 2 U bolts and 4 nuts.



Order Code	Type	Price each
XQ53H	A2 Mast Bracket Type 3	£4.99

Bracket No. 8

A heavy duty double wall-mounting bracket for masts from 37mm (1 1/2 in.) to 51mm (2in.) diameter and providing a 203mm (8in.) stand-off. Kit includes: 2 brackets, 2 U bolts and 4 nuts.



Order Code	Type	Price each
XQ54J	C6 Mast Bracket Type 8	£9.99

18in. Mast Bracket

NEW!

Larger version of XQ54J above. Used where there is a large overhang on the eaves of a house. Accepts masts of 1 1/2 to 2in diameter. Manufactured from galvanised steel, and supplied complete with 'v' bolts.

Order Code	Type	Price each
ZF17T	D6 18 Inch Mast Bracket	£12.99

Loft Bracket

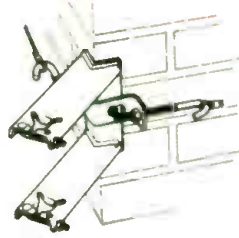
A stand-off arm with bracket for mounting aerials in lofts. Size 380 x 25mm diameter.



Order Code	Type	Price each
BW45Y	Loft Bracket	£3.49

Lashing Kit No. 4

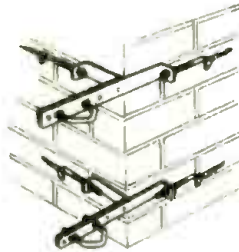
A single lashing with bracket to give 152mm (6in.) stand-off for masts up to 25.4mm (1in.) diameter.



Order Code	Type	Price each
XQ55K	A3 Lashing Kit Type 4	£6.99

Lashing Kit No. 7

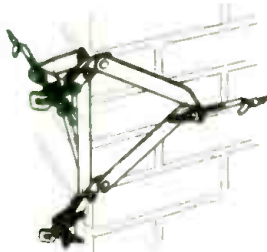
A heavy duty double lashing with brackets to give 140mm (5.5in.) stand-off for masts up to 51mm (2in.) dia. Kit includes: 2 brackets, 2 U bolts, 4 U bolt nuts, 4 J bolts, 4 J bolt nuts, 2 eyelets, 2 lengths of lashing cable and 6 cable support guides.



Order Code	Type	Price each
XQ57M	D6 Lashing Kit Type 7	£13.99

Lashing Kit No. 9

A single lashing with bracket to give 102mm (4in.) stand-off for 25.4 to 32mm diameter masts (1 to 1.25in.). Kit includes: 1 bracket, 2 U bolts, 4 U bolt nuts, 2 J bolts, 4 J bolt nuts, 1 eyelet, 1 length of lashing cable and 3 cable support guides.



Order Code	Type	Price each
XQ58N	A5 Lashing Kit Type 9	£8.99

Mast Type D

A 914.4 x 25.4mm (3ft x 1in.) cranked mast giving a 229mm (9in.) stand-off. Manufactured in tubular aluminium, wall thickness 1.2mm.



Order Code	Type	Price each
XQ60Q	A1 Mast D	£3.25

Mast Type M

A1524 x 25.4mm (5ft x 1in.) cranked mast giving a 229mm (9in.) stand-off. Manufactured in tubular aluminium, wall thickness 1.2mm.



Order Code	Type	Price each
XQ63T	D1 Mast M	£4.99

Mast Type E

A 1829 x 25.4mm (6ft x 1in.) straight mast. Manufactured in tubular aluminium, wall thickness 1.2mm.

Order Code	Type	Price each
XQ61R	G1 Mast E	£5.49

Mast Type G

A 3048 x 38mm (10ft x 1.5in.) straight mast. Manufactured in tubular aluminium, wall thickness 1.6mm.

Order Code	Type	Price each
XQ62S	H3 Mast G	£19.99

TV AND FM RADIO AERIAL AMPLIFIERS

Masthead Amplifier



A masthead amplifier for UHF in a fully weatherproof housing complete with brackets for either mast or surface mounting. The power to drive the amplifier is 12V DC, and is fed to the amplifier from the special power unit BW50E, which must be bought separately, shown below.

Bandwidth: 470 to 860MHz
 Typical Gain: 15dB
 Noise: 3dB

Order Code	Type	Price each
BW46A	Masthead UP1501	£12.99

Low Noise Masthead Amplifiers

Antiference

The UP2301 is a two stage, wideband UHF masthead amplifier, proven to be one of the most successful high gain UHF preamplifiers for fringe area reception. It covers all channels from 21 through to 68. It has a single input and output. The UP2501 is similar to the UP2301 but having a lower noise figure and a bandwidth limited to channels 21 to 34, useful where strong adjacent transmitters operating on other channels are a problem. It has a single input and output.

Continued on next page.

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2 ISSUES FREE

Continued from previous page.

The UP3501 is a three stage, ultra-wideband amplifier for both VHF and UHF antennas, and sets a new standard for FM/TV preamplifiers. It features both high gain and output, an even response, excellent matching and very low noise characteristics. It has separate VHF and UHF aerial inputs and one common output. The UP3302 combines an extra high gain amplifier and a VHF diplexer in one. It is especially useful in a situation where there are strong local VHF signals which don't need to be amplified, but where weak UHF ones do. The VHF component is effectively bypassed unchanged to the common output download.



All these units are housed in a tough, weatherproof plastic moulding featuring a reversible mounting bracket, which can be either surface mounted using a single screw, or tied to a mast using a black nylon tie-wrap (supplied). Cables are very easily connected to internal screw terminals and screen clamps. Each amplifier requires a 12V DC supply provided via the output download centre conductor.

Specifications

Model	VHF	UHF
UP2301		
Bandwidth:	—	470 to 860MHz
Gain:	—	23dB ±2dB max.
Noise:	—	3.5dB
Maximum output:	—	36dBmV
Current consumption:	—	20mA
UP2501		
Bandwidth:	—	470 to 585MHz
Gain:	—	24dB
Noise:	—	2.7dB
Maximum output:	—	35dBmV
Current consumption:	—	18mA
UP3501		
Bandwidth:	88 to 108MHz	470 to 860MHz
Gain:	11.5dB	24dB
Noise:	<4.8dB	<3dB
Maximum output:	37dBmV	36dBmV
Current consumption:	32mA	
UP3302		
Bandwidth:	40 to 230MHz	470 to 860MHz
Gain:	0dB	27dB±2dB
Noise:	—	2.5dB
Maximum output:	—	3mV
Current consumption:	18mA ±10%	

Order Code	Type	Price each
YZ89W	Low N Amp UP2301	£19.99
MJ03D	Low N Amp UP2501	£19.99
YZ90X	Low N Amp UP3501	£32.99
YZ91Y	Low N Amp UP3302	£24.99

Masthead Amp Power Unit

Antiference



A plug in power unit for use with our masthead amps UP1501. Supplied with instructions and screws for fixing. It has co-ax sockets for both sides of the aerial head for easy connection.

Specification

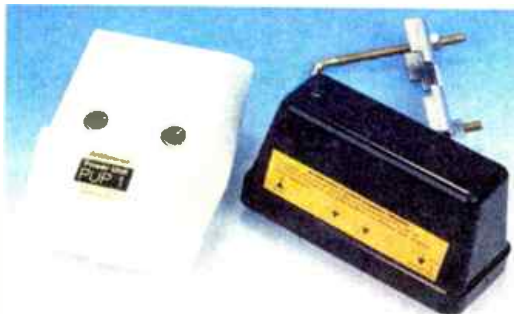
Mains input:	200-250VAC 50Hz
Line-power output:	+12VDC ±10% @ 40mA max
Insertion loss:	<1dB (40-1000MHz)
Cable connections:	Co-ax sockets

Order Code	Type	Price each
BW50E	Power Unit PUP1	£14.99

Masthead Amplifier and Power Unit Kit

Antiference

A mast or loft mounting amplifier from which up to 3 TV's may be run from one aerial. By connecting in different ways, your video recorder can be used with just one TV or connected so that the program from the recorder can be watched by all the TV's in the house. The kit includes a mains operated power unit and power is fed to the mast-head amplifier over one of the downloads. This download should not be connected through a splitter.



Specification of Amplifier

Frequency range:	470 to 860MHz
Gain to each output:	12dB±1dB
Isolation between outputs:	24dB
Noise figure:	<4dB
Max output:	84dBµV
VSWR:	Input 1.5:1 Output 1.2:1

Line-power requirement:	+12VDC ±10% @ 18mA via terminal 4
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Specification of Power Unit

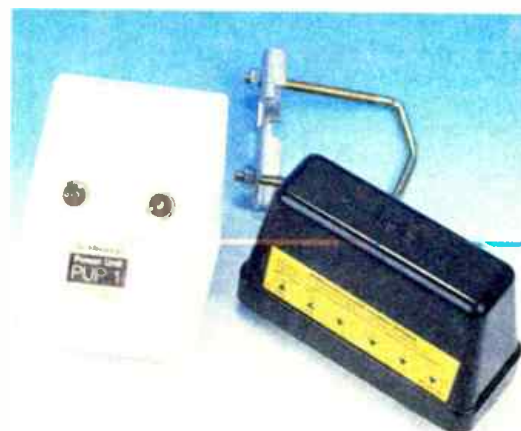
Mains input:	200-250VAC 50Hz
Line-power output:	+12VDC ±10% @ 40mA max
Insertion loss:	<1dB (40-1000MHz)
Cable connections:	Co-ax sockets

Order Code	Type	Price each
YN41U	3 Outlet Amp Kit	£36.99

VHF/UHF Masthead Distribution Amplifier

Antiference

A tough, fully weatherproof, masthead mounting distribution amplifier with separate FM and TV inputs and four outputs of equally good signal strength which, if these are not enough, give ample scope for further splitting to provide up to 9 points using suitable splitters. The amplifier is powered via one output coax download from the power supply provided in the kit. The wall mounted power supply runs directly from the 240V AC mains and is connected in series with output download No. 4 to power the masthead amplifier and pass on its returning signals. TV and FM antennæ are connected to the separate inputs, and both are available from any of the four outputs! Now you can have TV and FM in any room in the house from just one cable via one hole in a window frame or ceiling.



Specification Amplifier

	VHF	UHF
Bandwidth:	88-108MHz	470-860MHz
VWSR input:	2:1	1.7:1
VWSR output:	1.2:1	1.2:1
Gain to each o/p:	6dB±0.5dB	12dB±1dB
Isolation between o/p's:	>30dB	27dB
Noise:	4.8dB	4.5dB
Max. output:	84dBµV	84dBµV
Connections:	Internal screw terminals	
Power supply input:	240V AC @ 50Hz	
Output:	12V DC @ 34mA (amplifier consumption)	

Signal transfer loss on download No. 4:	1dB
Connections:	75Ω coax. sockets, twin core mains lead

Order Code	Type	Price each
YZ88V	A1 Amp OX4	£39.99

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Indoor Amplifier Antiference



An indoor amplifier suitable for UHF TV and FM. It is suitable for either colour or black and white TV. The amplifier will improve weak signals, but if the poor signal quality is due to interference the amplifier will probably make things worse. Very simple to install, the amplifier comes with complete instructions. It has very low power consumption, and is safe to leave on indefinitely.

Bandwidth:	87 – 860MHz
Nominal Gain:	16dB±1dB
Noise:	<2.5dB
Input/Output impedance:	75Ω

Supplied with approximately 1 metre of mains cable.

Order Code	Type	Price each
YX73Q	Indoor Amp XB1	£24.99

Amplifier for Second TV or Radio



An amplifier specially designed to overcome the losses in a splitter unit and extra cable when one aerial is used to drive two TV sets. Unit is in an easily fitted smart white box 120 x 90 x 51mm deep which simply plugs into mains. It has three co-axial sockets; one for the aerial, one for TV set 1 and one for TV set 2. For use with all UHF TV and FM radio channels.

	VHF	UHF
Bandwidth:	40 to 860MHz	
Typical Gain:	8.5dB	7.5dB
Max output:	32dBmV	
Channel Isolation:	17dB	23dB
Input/Output impedance:	75Ω	
Noise:	4dB	5dB

Supplied with instructions and 1m of mains cable.

Order Code	Type	Price each
YQ22Y	Xtra Set Amp	£24.99

High Gain Amplifier for Second TV or Radio

An aerial amplifier for use with TV or FM radio sets which may be used to give a high boost to one set or to boost the signal and overcome the losses when two TV sets or two radios or a TV and radio are operated from one aerial or one download. The amplifier is in a small white box 151 x 79 x 52mm high which may be screwed to a wall or left free-standing. The unit has an on/off switch and red 'on' indicator light, but may be left switched on continuously. The unit has three co-ax sockets. The aerial plugs into one and the TV or radio sets into the other two.

Bandwidth:	40 to 860MHz
Typical gain:	15dB
Max output:	95dBμV
Input/output impedance:	75Ω
Input voltage:	240V AC 3VA

Supplied with 1.8m of mains cable. Ensure that unit is connected to a plug fitted with a 3A fuse.



Order Code	Type	Price each
YP42V	2 Outlet TV/FM Amp	£17.99

Amplifier for Second or Third Radio or TV

Antiference



An amplifier with the ability to drive three sets from one aerial. For use with all UHF TV and FM radio channels. Fitted with approximately 1 metre of cable.

	VHF	UHF
Bandwidth:	40 – 860MHz	
Nominal Gain:	8dB	4.5dB
Max. output:	28dBmV	
Channel Isolation:	19dB	
Input/Output impedance:	75Ω	
Noise:	5.0dB	

Supplied with instructions.

Order Code	Type	Price each
BK75S	Xtra Set 3 Amp	£29.99

Amplifier for up to Four Radios and TV's

Antiference



An ultra-wideband FM/UHF distribution amplifier for small domestic systems. It has a single aerial input and four outputs i.e. five co-ax sockets on the front plate. The unit can operate up to 4 TV's and 4 FM receivers from one download though splitters will be required if more than 4 outputs overall are wanted. And a video recorder can be linked into the system so that its output is available to all the outlets as well.

	VHF	UHF
Bandwidth:	40 to 860MHz	
Gain:	11-11.5dB	8-10dB
Max output:	30dBmV	
Noise figure:	5.5dB	6.5dB
Channel isolation:	>19dB	
Input/Output impedance:	75Ω	

Supplied with instructions and 1m of mains cable.

Order Code	Type	Price each
YN42V	Xtra Set 4 Amp	£39.99



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Plug-in Signal Boosters

Maxview



A range of fixed gain, plug-in, signal amplifiers for use with TV and FM radios, when fed from a suitable aerial. The amplifiers can also be used to link a satellite decoder to a TV and/or a video recorder. These units are housed in an attractively styled box fitted with square pins at the rear for plugging directly into a 13A socket. The unit is supplied with one input socket and between one and four output sockets, depending on the model. If the amplifiers are to feed TVs and FM radios simultaneously, then the downloads from the two aerials will have to be connected to the input socket via a diplexer (e.g., FE27E). The outputs can then be fed directly to the equipment or, if in strong signal areas, split again using diplexers. In fact, by using suitable diplexers various combinations are possible, to suit individual requirements.

Specification (all units)

Maximum output: 30mV
 Noise: 3dB (typical)
 Bandwidth: 40MHz to 860MHz,
 Channels E2 to 69
 Power requirements: 220/240V AC < 5W

Specification (each unit)

Order Code	Model	No. of Outputs	Gain to each outlet
RT67W	PSB1C	1	15dB
RT68X	PSB2C	2	12dB
RT69Y	PSB3C	3	8dB
RT70A	PSB4C	4	8dB



Order Code	Type	Price each
RT67W	Sig Amp 1 O/P	£14.99
RT68X	Sig Amp 2 O/P	£16.99
RT69Y	Sig Amp 3 O/P	£18.99
RT70A	Sig Amp 4 O/P	£19.99

TV/FM Variable Signal Amplifiers

Maxview

A range of variable gain signal amplifiers for use with TV or FM radio sets fed from a suitable aerial. The amplifiers can also be used to link a satellite receiver to a TV and/or video recorder. These mains powered units are designed for continuous use and a red LED illuminates when the unit is switched on. The amplifiers can be wall mounted or free standing, a 1m flying lead is included to connect to an FM radio, TV or video recorder. Housed in a very attractive white plastic box, the gain is easily adjusted by a flush mounted control. The amplifiers have one input socket and either 1, 2, 3 or 4 output sockets. All the sockets are flush mounted in the box. If the amplifiers are to feed a TV and an FM radio simultaneously, then the two downloads will have to be connected to the input via a combiner (e.g. FE27E). Alternatively, a masthead combiner (e.g. BW51F) can be used to feed one download. By using a combiner on the input, then a TV aerial can be used with a satellite receiver or computer and the outputs can then feed a video recorder and TV's. In fact, by using a combiner and/or splitters various combinations are possible, to suit individual requirements.



Specifications

KC09K
 No. of outputs: 1
 Gain: 22dB typically
 Dimension: 92 x 77 x 63mm excl. lead



KC10L
 No. of outputs: 2
 Gain to each outlet: 10dB typically
 No. coaxial plugs supplied: 2
 Dimensions: 147 x 77 x 63mm excl. lead



KC11M
 No. of outputs: 3
 Gain to each outlet: 8dB typically

No. coaxial plugs supplied: 4
 Dimensions: 147 x 77 x 63mm excl. lead



KC12N
 No. of outputs: 4
 Gain to each outlet: 6dB typically
 No. coaxial plugs supplied: 6
 Dimensions: 147 x 77 x 63mm excl. lead

For all amplifiers

Bandwidth: 40MHz to 860MHz
 TV channels 2 to 69 FM 88MHz to 108MHz
 Gain control range: 20dB
 Noise figure: 3dB typically
 Power: 240V AC < 5 watts

Supplied with 1.25m of mains cable, 3A fuse, 1m flying lead with coaxial plugs and full instructions.

Order Code	Type	Price each
KC09K	Var Sig Amp 1 O/P	£19.99
KC10L	Var Sig Amp 2 O/P	£22.99
KC11M	Var Sig Amp 3 O/P	£24.99
KC12N	Var Sig Amp 4 O/P	£28.99

TV/FM Signal Booster Kit

Maxview



The SSB4/DIY kit is based on a 4 output amplifier. Easy to follow detailed instructions are included showing how to install a system for feeding up to three TVs.

Contents of kit

Variable signal booster 4 o/p:	1 (with 13A plug)
White coaxial cable:	25m
TV aerial extension lead:	5 at 2m
White splitter/combiner:	3
White coaxial connector:	3
White coaxial plug:	10
White surface outlet box:	4
Fixing screws for outlet box:	8
Coaxial cable clips:	50 x 6mm
Instructions:	1

Order Code	Type	Price each
RT72P	D6 TV/FM Booster Kit	£39.99

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Battery Powered TV/FM Variable Signal Amplifier

Maxview



A 12/24V DC powered version of the single output amplifier described above (KC09K). Ideal for use in caravans, caravanettes, boats or long distance lorries, the amplifier has only one output, but a splitter (e.g. FE27E) can be used if necessary. The amplifier has an on/off switch, and is supplied with approx. 1.5m of twin power lead, and a 1m flying lead fitted with coaxial plugs. Dimensions 92 x 85 x 63mm.

Order Code	Type	Price each
KC13P	12/24V DC Signal Amp	£19.99

UHF/VHF Distribution Amplifiers

Antiference



These multiple output amplifiers are designed to provide simply engineered, reliable UHF and VHF distribution systems from a range of plug-in units. Now you can operate more than one receiver from a single antenna using a multi-way splitter with no losses – in fact, these 'splitters' also amplify! The amplifiers will accept two aerial feeds and combine the signals for distribution, and provision is made for powering a masthead amplifier via the UHF aerial download. The XS06 is an ultra-wide band FM/UHF distribution amplifier for small domestic systems. It features high gain, exceptional output capability, separate FM/UHF aerial input sockets and six 'split' outputs. Provision is included for powering a mast-head amplifier via the UHF download.

XS06	FM	UHF
Bandwidth (MHz):	88-108	470-860
Gain to each output (dB):	11.5	11.0
Max. output (dBmV):	28	
Noise (dB):	5.0	
Isolation between outputs (dB):	27	
Isolation between input (dB):	>38	>43
Input/output impedance (Ω):	75	
Connections:	75Ω coax. sockets	
Power supply reqd:	240V AC mains 50Hz	
Power output for aerial pre-amps available:	+12V DC @ 6mA max. via centre conductor of UHF aerial input socket, screen is earth	

The XS6/32 is an ultra-wide band VHF/UHF version for larger scale domestic systems, flats, hotels, shops, showrooms and service departments. It is provided with separate UHF and VHF aerial inlets, and these two signals are combined within to share any one of the common outputs. In addition to the features of the XS06, the XS6/32 also has a high level output socket as well as the six 'split' outlets. This can be connected to an extra distribution panel, the XP6, providing a further six outlets. In this way a number of XP6 units can be cascaded in series providing a total of 32 outlets, or up to 63 outlets using two XS6/32 amplifiers – full details are provided with each XP6 unit.



XS6/32	VHF	UHF
Bandwidth:	40-230MHz	470-860MHz
Gain, 'normal' output:	5.5dB	5.5dB
High level output:	23.5dB	22dB
Max. output, 'normal':	22dBmV	22dBmV
Max. o/p, high level:	38.5dBmV	37.5dBmV
Noise:	<4.5dB	<5dB
Isolation between inputs:	>20dB	>25dB
Isolation between 'normal' outputs:	>30dB	
Between 'normal' & high level o/p:	35 - 45dB	
Input/output impedance:	75Ω	
Connections:	75Ω coax. sockets	
Power supply reqd:	240V AC mains	
Power output for aerial pre-amps available:	+12V DC @ 40mA max. via centre conductor of aerial input socket, screen is earth	

The XS9 is a wideband FM/UHF distribution amplifier as XS06, but with eight 'split' outlets and an additional high level output – and by using two XS9 amplifiers up to 67 outlets are possible. An LED indicates when line power is present on the UHF input.



XS9	FM	UHF
Bandwidth:	88-108MHz	470-860MHz
Gain to each 'Split' output:	4.5dB	4dB
High output:	22.5dB	22.5dB
Max. output:	21.5dBmV	21.5dBmV
'Split':	39dBmV	39dBmV
High level:	<5dB	<5dB
Noise figure:	<5dB	<5dB
Isolation between inputs:	>37dB	>41dB
Isolation between 'Split' output:	31dB	29dB
'Split' high:	33dB	35dB

Input/output imp:	75Ω
Connections:	75Ω coax. sockets
Power supply req:	240V AC Mains
Power output for aerial pre-amps:	+12V DC @ 40mA max. via centre conductor of aerial input socket, screen is earth

The distribution amplifiers are enclosed in attractive metal cases providing effective screening, minimising RF radiation and protecting the system from interference, and there is also no need to terminate unused outputs.

The XP6 is a passive, ultra-wide band plug-in 'tee' unit with six padded outputs and a low-loss through line. It has excellent performance characteristics at VHF and UHF, with a high level of isolation between its outputs so that there is no need to terminate unused ones.

XP6	
Circuit type:	Resistive
Bandwidth:	40-860MHz
Tap loss:	20dB
Through loss:	VHF 4.5dB UHF 5.5dB

Isolation between outputs:	>33dB
Nominal impedance:	75Ω
Connections:	75Ω coax. sockets

*NOTE: because of the distribution losses indicated above, the XP6 should not be used as an aerial splitter

Order Code	Type	Price each
YZ86T	Amp XS06	£49.99
YZ87U	Amp XS6/32	£64.99
KR20W	Amp XS9	£64.99
JU85G	Tee XP6	£14.99

Battery Powered Aerial Amplifier

Antiference



This amplifier is specially designed for use with portable UHF/TV receivers where an AC mains supply is not available. It is ideal for use in caravans, boats, etc., where, if desired, it can be operated from either an internal 9V (PP3) battery, or an external 12V DC supply. It should treble any incoming signal.

Bandwidth:	40 to 860MHz
Nominal Gain:	15dB
Max. output:	30.5dBmV
Supply Voltage:	9 to 12V DC
Current consumption:	5mA @ 9V
Input/output impedance:	75Ω

Order Code	Type	Price each
BK76H	TV Amp XB15	£18.99

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DIPLEXERS AND SPLITTERS

FM/UHF Diplexer

Antiference

A masthead or surface mounting diplexer for combining or separating FM and UHF signals from antenna downloads. To separate at receiver, use BW57M, YN54J or FE27E.



	FM	UHF
Bandwidth:	87-108MHz	470-860MHz
Insertion loss:	0.5dB	
Channel Isolation:	22dB	38dB

Order Code	Type	Price each
BW51F	Diplexer UF22	£9.99

Combiner/Splitter

A 'professional' non-resistive, low-loss unit for combining antenna downloads or dividing equally the signals on one download. Supplied in a weatherproof housing, a masthead amplifier can be powered through this unit. Suitable for mast or surface mounting. Looks identical to BW51F above.

Frequency range:	40 to 860MHz
Insertion loss:	4.0dB

Order Code	Type	Price each
BW52G	Splitter CS1000	£9.99

3-Way Low-Loss Splitter

Antiference

An inductive splitter for mast-head or loft mounting. Line-power bypass is provided on output 1 so that a mast-head amplifier can be powered via this unit. The unit can be used to combine or separate UHF TV and FM radio signals. An unused output should be terminated with a Min Res 75Ω. Looks identical to BW51F above.

	FM	UHF
Insertion loss	40-230MHz	470-860MHz
Output 1	3.5dB	3.5-4dB
Outputs 2 & 3	6.7dB	6.75-8dB
Isolation		
output 1 to 2 or 3	25dB	27dB
output 2 to 3	20dB	30dB
VSWR input	1.5:1	1.32:1
VSWR output	1.2:1	1.67:1

Order Code	Type	Price each
FE28F	Splitter CS3000	£9.99

UHF Aerial Combiners

Antiference

Ideal for use in areas where ITV stations overlap, the combiners allow two aerials in different groups to share one download. Two types are available and should be selected as below. Looks identical to BW51F above.

Aerial receiving stations in group	combined with	Aerial receiving stations in group	Use combiner
A		B	A/E
A		C/D	A/E
A		E	A/E
B		C/D	AB/CD

The unit is very easy to install on the aerial mast or a vertical surface and masthead amplifiers can be powered through the unit on either or both inputs. Supplied with full instructions.

Order Code	Type	Price each
YP57M	Aerial Combiner A/E	£13.99
YP58N	Aerial Combiner AB/CD	£13.99

Surface Mounting Inductive Splitter Unit

A non-resistive splitter that offers less loss than other models. It may also be used in reverse to combine two signals via the co-ax sockets onto one lead. White moulded housing and fixing screws supplied. No soldering required. Overall size: 59 x 51 x 27mm high.



Order Code	Type	Price each
YQ23A	Inductive Splitter	£2.99

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2 Way UHF TV Splitter

Union Brothers

Two good quality, metal shrouded screened UHF TV signal splitters. The splitters are electrically identical but offer different arrangements of plugs/sockets.



Type 1 has one input plug and two output sockets. Type 2 has one input socket and two output plugs. Both types have an insertion loss of 3.5dB and are suitable for use with frequencies up to 1GHz. Isolation between the outputs is 22dB.

Order Code	Type	Price each
JM13P	Type 1 TV Splitter	£1.99
JM14Q	Type 2 TV Splitter	£1.99

TV AND FM OUTLETS

Single Co-axial Outlet

Union Brothers

A surface mounting co-ax outlet in a moulded white housing. Co-ax cable enters from rear and is screw terminated. For use with FM or UHF signals. Overall size: 50 x 32 x 24mm.



Order Code	Type	Price each
HX87U	Surface Coax Outlet	99p

Single Flush Mounting Co-axial Outlet

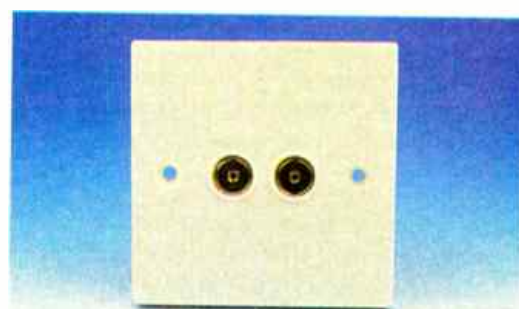
A flush mounting co-ax outlet with a white thermoset front plate. Fits standard conduit and surface boxes (see electrical accessories) to BS1363. Screws supplied. No soldering required. For use with FM or UHF signals. Front 85mm square. Depth (from rear of plastic moulding) 15mm.



Order Code	Type	Price each
BW55K	Flush Co-Ax Outlet	£1.56

Double Co-axial Outlet Flush

Union Brothers



As BW55K, but with two completely separate co-ax sockets and screw terminals at rear for two separate cables. Sockets are marked 'TV' and 'Radio' moulded into the white front plate. Overall size 86mm square. Depth from rear of plastic face 15mm.

Order Code	Type	Price each
BW56L	Flsh Dbl Co-Ax Outtt	£2.15

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TV/FM Diplexer Surface

A surface mounting integral diplexer which separates the UHF TV signals from the FM radio signals which have been combined on one download. Screw fixing for co-ax cable at rear, two co-ax sockets at the front, one marked TV and one marked FM. In a white moulded housing with fixing screws supplied. Overall size: 63 x 44 x 29mm.



Order Code	Type	Price each
BW57M	Surface TV/FM Outlet	£6.99

TV/FM Diplexer Plug-in

A plug-in diplexer which may be used to combine or separate UHF TV and FM radio signals. Unit has at one end two co-ax sockets, one marked TV and the other FM and a co-ax plug at the other end which connects to the combined signal. Insertion loss <math><1\text{dB}</math>. Overall size of plastic body: 37 x 40 x 16mm.



Order Code	Type	Price each
FE27E	Plug-in TV/FM Diplxr	£4.99

Flush Mounting TV/FM Diplexer Antiference



A flush mounting diplexer to separate UHF TV signals from FM radio signals which have been combined on one download. Screw fixing for co-ax cable at rear, two co-ax sockets on the front, one marked TV and one marked FM. Fits standard conduit and surface boxes (see Electrical Accessories) to BS1363. Screws supplied. Front 85mm square. Depth (from rear of plastic moulding): 10mm.

Order Code	Type	Price each
YN54J	Flush TV/FM Outlet	£6.99

ACCESSORIES

(Also see Co-ax Connectors in Connectors Section)

Aerial Switch Antiference

An in-line aerial switch in a white moulded housing. For switching a TV or FM receiver from one aerial to another. Or it can be used to switch one download from one receiver to another. Two co-ax sockets at rear for two separate co-axial downloads and one standard co-ax plug at the front.



Overall size: 58 x 40 x 15mm.

Order Code	Type	Price each
BW58N	Aerial Switch	£4.99

Balun 300/75Ω

A receiver transformer to enable 300Ω balanced feeder (XR31J) to be used when TV or FM receiver has 75Ω unbalanced aerial input. The balanced feeder terminates on screw terminals on the balun which may then be plugged into a standard co-ax socket. By using an in-line co-ax socket and a short piece of 300Ω feeder it is possible to use the balun in reverse. Size of body 38 x 22 x 20mm.



Order Code	Type	Price each
FD78K	300/75 Balun	£1.86

TV/Satellite Outlet Socket Antiference



A flush mounting dual outlet socket containing one conventional VHF coaxial socket, and one threaded F connector socket for a satellite feeder to connect to a receiver. Screw fixings for both coax cables are provided at the rear, and the TV socket is capacitively isolated. The sockets are marked on the front panel as 'SAT' and 'TV'. Fits standard conduit and surface boxes (see Electrical Accessories) to BS1363. Screws supplied. Front panel is 85mm square. Depth (from rear of front panel) 15mm.

Order Code	Type	Price each
MJ02C	SAT/TV Outlet	£10.99

Attenuators Antiference

For in-line connection. Standard coax socket at one end, standard coax plug at other end in bright aluminium alloy bodies and suitable for VHF and UHF. They have low VSWR and are clearly marked. Three types available. 3dB, 6dB, 12dB.



Length 45mm (approx)

Order Code	Type	Price each
RK47B	Attenuator 3dB	£3.29
BW59P	Attenuator 6dB	£3.29
BW60Q	Attenuator 12dB	£3.29

TVI Filter Antiference

A high quality filter designed to be inserted in the aerial leads of TV sets suffering from interference from CB transmissions. The filter is peaked to reject signals from transmitters operating on 27 to 28MHz while giving a very low insertion loss to UHF TV signals. The unit plugs directly onto the end of the existing TV aerial lead.



Order Code	Type	Price each
YL43W	TVI Filter	£5.49

TV Aerial Flylead



Co-axial cable with co-ax plugs connected at both ends. Available in 2m, 5m and 10m lengths.

Order Code	Type	Price each
RW36P	Flylead 2m	£1.39
JW39N	Flylead 5m	£2.25
JW40T	Flylead 10m	£2.99

Aerial Extension Cable

Coaxial extension lead manufactured from 75Ω coaxial cable and terminated at one end in a coaxial plug and at the other end in a coaxial socket. The terminations are protected with a plastic strain relieving sheath. Length 2m.

Order Code	Type	Price each
GW61R	Aerial Extn Cable	£1.35

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162 • PROJECTS & MODULES

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When it comes to electronic based kits, the Maplin range is unparalleled! Whether you are interested in computing, music, radio or 'just-for-fun' projects, there are kits of varying complexity, for the beginner through to expert. Look out for the superb Maplin 'Millennium' valve amplifier!

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CONSTRUCTORS GUIDE

A leaflet containing much practical information and advice on the more mechanical aspects of project building. The leaflet is normally included with every kit, and is an essential aid for the beginner. It covers component recognition, how to solder and then how to check for correct solder joints, handling semiconductors etc. The information provided could also be valuable to the more experienced project builder.

Order Code	Type	Price each
XH79L	Constructor Guide	30p NV

WATCH AS YOU BUILD VIDEO WITH RADIO RECEIVER KIT



A beginner's starter project which includes a step-by-step construction guide on a VHS video tape. The whole kit is supplied neatly packed into a standard VHS video cassette, together with an accompanying leaflet. By following the instructions on video you will be introduced to the basic techniques of project building, and by the end of the video a simple AM radio receiver circuit will have been constructed, ready to use. Some troubleshooting advice is given at the end. It is recommended that the absolute beginner also purchase a starter tool kit (see tools section) to ensure that they have the correct tools at the outset. Additional kits of parts are also available without the video tape, so that several students can work from one video tape. However, these extra kits cannot be used unless you have at least one video tape.

Order Code	Type	Price each
SK00A	Start Radio & Video	£17.99
SK04E	Start Radio No Video	£10.99

FUNTRONICS

A set of projects ideal for the absolute beginner, requiring no soldering and the minimum of tools to construct. A small screwdriver, pliers and wire cutters are normally all that is needed. The components and connecting wire are held in place by self-tapping screws which fit into holes in the plastic 'peg-board' supplied. A component guide-sheet is supplied with each kit and this is cut-out and stuck to the plastic board. The kits include all the parts necessary except the battery and tools.

Optional Items

The following items, not included in the kits, may also be required.

PP3 Battery	As Req.	(JY60Q)
PP3 Alkaline	As Req.	(FK67X)
Snip Cutter	1	(JH20W)
Pliers	1	(FV55K)
Screwdriver	1	(JG98G)

PROJECT CONSTRUCTION RATINGS

All the projects in this section have been rated for ease or difficulty of construction to help you to decide before you buy a kit, whether its construction will be within your capabilities. The projects are rated from 1 to 5, which may be interpreted as follows:

- 1** Projects rated 1 are simple to build and understand and are suitable for absolute beginners. They require only the minimum of tools such as soldering iron, cutters, pliers, wire-strippers and possibly a screwdriver. They do not require any test gear or setting-up.
- 2** Projects rated 2 are easy to build, but not suitable for absolute beginners. They require some test gear, usually a multimeter and may require setting-up or testing.
- 3** Projects rated 3 are average. They require some skill in their construction or more extensive setting-up.
- 4** Projects rated 4 are advanced. They require a fairly high level of skill in construction. They may require some specialised test gear or their setting-up may be quite complex.
- 5** Projects rated 5 are complex. They require a high level of skill or they may require specialised test gear or are complex in construction or require complex wiring. These projects are recommended for skilled constructors only.

PLEASE NOTE: Construction details are included in the kits.

There are 10 projects in the range:

1. Bulb & Fuse Tester

This is a very simple project indeed, it is intended to allow testing of bulbs, fuses, switches etc. If the device under test is good, then an LED lights up. See Maplin Magazine Issue 48.

2. Transistor Tester

As well as showing you how a transistor works, this handy kit allows you to test diodes or any small or medium NPN or PNP power transistors you may use in your own projects. See Maplin Magazine Issue 49.

3. Water Indicator

This little project is ideal for detecting water in the soil of house plants and will give a visible indication, an LED will light, when the soil is dry. See Maplin Magazine Issue 50.

4. Light-Dark Indicator

This project simply switches on an LED if it detects the absence of light. With a simple change to the circuit, this project will do the opposite, i.e. it will operate the LED indicator if the light level is above a certain amount. A useful purpose for a project of this type is a photographic darkroom indicator. See Maplin Magazine Issue 51.



5. The Flasher

This is an astable circuit that switches on and off two LEDs alternately. The LEDs flash every two or three seconds. Such a project will be of great use to model makers, for example. In its present form, the Flasher is ideal for flashing warning lights on a model level crossing. See Maplin Magazine Issue 52.

6. Electronic Siren

This little unit is ideal for use with model cars and similar applications. It provides a sound that varies in pitch; you can control this pitch, enabling a useful range of siren sounds to be produced. See Maplin Magazine Issue 53.

7. Pet Communicator

This project uses an astable multivibrator loaded by a small loudspeaker. At low-light levels the frequency is very low, but in daylight the frequency is very high and will probably not be heard by most humans – but will be heard by your pets. A simple modification will allow this project to operate as an alarm. See Maplin Magazine Issue 54.

8. Decision Maker

Simple multivibrator circuit that is started by holding two prods together. Two LEDs will flash very fast so that they appear to be on all the time. When the prods are disconnected, a simple 'memory' action holds on one of the LEDs which can be labelled 'yes/no', 'in/out', 'heads/tails' or whatever. See Maplin Magazine Issue 55.

9. Morse Code Communicator

An astable multivibrator circuit that operates at several hundred pulses per second and produces an audio tone and lights an LED when the 'key' is pressed. This project will help you to learn Morse Code and communicate with others using this special 'language', the circuit is not any form of radio transmitter. See Maplin Magazine Issue 56.

10. Music Maker

A simple electronic organ that plays 10 notes, enough to play a range of simple tunes. The unit is 'monophonic'; this means it can only play one note at a time. It uses a stylus type 'keyboard'; in other words, you hold a stylus (prod) and play notes by touching it on to the 'keys', which are actually just screw terminals. The circuit is an astable multivibrator that can oscillate at several different frequencies, so as to provide a reasonable range of notes. See Maplin Magazine issue 57.

Order Code	Type	Price each
LP82D	Continuity Tester	£2.99
LP86T	Transistor Tester	£2.99
LP90X	Water Level Indicatr	£2.99
LP93B	L/D Indicator	£3.99
LP96E	Flasher	£2.99
LP97F	Electronic Siren	£3.99
LT01B	Pet Communicator	£4.99
LT04E	Decision Maker	£2.99
LT07H	Morse Communicator	£4.99
LT09K	Music Maker	£3.99

HOT TIP

Fitting handles to the front of your project, not only enhances its appearance by giving it a professional look, but helps protect any components mounted on the front panel, should it be accidentally dropped onto its face.

AUDIO PROJECTS

LM386 AMPLIFIER 1

The LM386 is a general purpose power amplifier designed for use in low voltage applications and requires minimal external components to operate. It is ideal for use in applications where a low power amplifier is required, i.e. radio receivers, intercoms, etc. Output power into 8Ω is 325mW. For more details see 'Data File' in Maplin Magazine Issue 29.



Specification (typical)

Supply Voltage (V_s): 4V to 12V DC
 Quiescent Current: 4mA
 Output Power (P_{out}): 325mW
 Voltage Gain: 46dB
 Bandwidth: 300kHz
 THD: 0.2%
 Input Bias Current: 250nA

Note: As this board is intended as a 'building-block' project it is not eligible for our 'Get-you-working' service.

Kit and Special Parts

A complete kit of parts to build the basic LM386 amplifier is available (note: kit does not include R1, which has to be selected on test). The high quality fibre-glass PCB is also available separately. PCB dimensions: 29.2 x 29.2mm.

Order Code	Type	Price each
LM76H	LM386 Kit	£4.75
GD86T	LM386 PCB	£1.75

TDA2822 STEREO AUDIO AMPLIFIER 2



- ★ Easy to build
- ★ Low quiescent current
- ★ Low crossover distortion
- ★ Supply voltage down to 3V
- ★ Stereo headphone jack socket

The TDA2822 is a monolithic integrated circuit and with the rest of the components on the printed circuit board, it offers a small yet powerful stereo amplifier module. Because of its wide supply voltage range (3V to 15V) it is well suited to portable battery operated applications.

Specifications

Test conditions:
 PSU = 9V, Output load = 8Ω
 Input sensitivity: 26mV rms
 Input impedance: 47kΩ at 1kHz
 Quiescent current: 8mA
 Maximum current: 260mA
 Output power: 650mW rms per channel
 Power bandwidth: 40Hz to 150kHz (-3dB)

Distortion: 0.9% thd
 Output noise: 40μV

Kit and Special Parts

A complete kit of parts is available and pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 34. PCB dimensions: 72.4 x 44.5mm.

Order Code	Type	Price each
LP03D	TDA2822 Stro Pwr Amp	£7.99
GE21X	TDA2822 PCB	£2.49

TDA7052 1W POWER AMPLIFIER MODULE 1



- ★ Low Component Count
- ★ Low Power Consumption
- ★ Short Circuit Protected
- ★ No External Heatsink Required

An application circuit using the TDA7052 1W mono power amplifier IC, and ideal for use in low power applications such as portable battery powered equipment, because it requires very little in the way of external components to function. This is entirely a general purpose module and will find uses where simple but effective audio power amplification is needed. Typical uses for the module could include low power audio amplification for portable radios, cassette recorders/players, toys, games, intercoms, and related devices; the high gain capability of the circuit makes it ideal for use in intercoms and baby alarms, where the module may be used to amplify signals from a microphone direct with very little pre-amplification to a suitable level to drive a loudspeaker directly. Provision for a volume control can be made directly on the board.

Specification

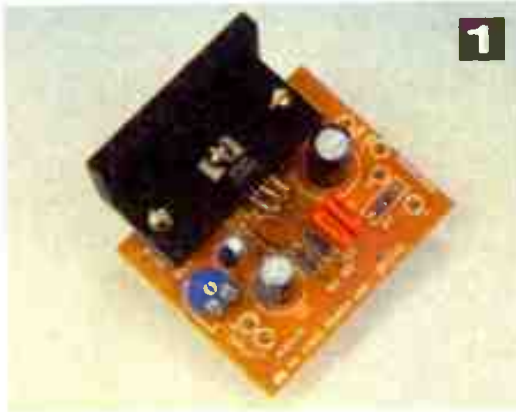
Power supply range: 3 to 15V DC
 Supply current: 4mA quiescent @ 6V
 340mA max. @ 6V for 1W into 8Ω
 Distortion: 0.7% THD @ 1kHz & 0.1W
 Output power: 1W rms max. @ 6V
 Voltage gain: 39dB
 Size: 32 x 32mm

Kit and Special Parts

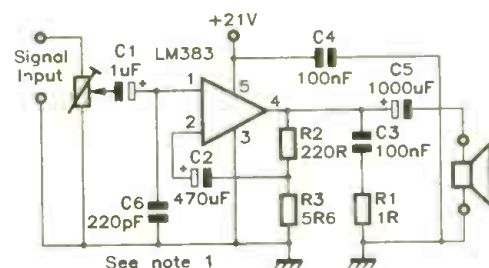
A complete kit of parts is available. The pcb is also available separately. Full construction details may be found in the Maplin Magazine Issue 37. PCB dimensions: 31.75 x 31.75mm.

Order Code	Type	Price each
LP16S	TDA7052 Kit	£4.99
GE41U	TDA7052 PCB	£1.99

8W POWER AMPLIFIER 1



A hi-fi 8W amplifier using the LM383. One of our most popular kits, this amp is offered at a very low price and is an ideal building-block module for use in many audio projects. For more details see the specification of the LM383 in the Semiconductor Section of this catalogue. Note 1: These common ground returns should be connected by two separate wires to the ground return on the power supply e.g. the negative wire (-V) shown in the PSU diagram.



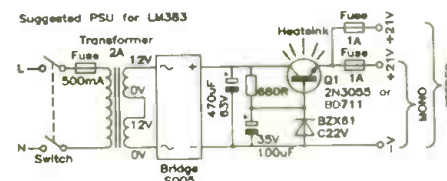
Parts List for 8W Amplifier

R1	Min Res 1Ω	(M1R)
R2	Min Res 220Ω	(M220R)
R3	Econ Res 5.6Ω	(B5R6)
RV1	Hor S-Min Preset 100k	(UH06G)
C1	PC Elect 1μF 100V	(FF01B)
C2	PC Elect 470μF 16V	(FF15R)
C3,4	Polyester 0.1μF	(WW41U)
C5	PC Elect 1000μF 16V	(FF17T)
C6	Ceramic 220pF	(WX60Q)
IC1	LM383	(WQ33L)
	8W Hi-Fi Heatsink	(HQ81C)

Parts List For Suggested Power Supply

Fuse 500mA Anti-surge (A/S)	(WR18U)
Fuse 1A (A/S)	(WR19V)
Fuse 1A Additional for Stereo	(WR19V)
Transformer 2A	(YK15R)
Bridge Rectifier SO05	(QL09K)
470μF 63V Electrolytic Capacitor	(FB74R)
100μF 35V Electrolytic Capacitor	(FB49D)
Resistor 680Ω	(M680R)
Zener Diode 22V BZX61C22V	(QF61R)
Power Transistor 2N3055 or BD711	(YH98G)
	(WH15R)

Mains switch as required (see switches section).
 Heatsink as required (see end of semiconductor section).



Kit and Special Parts

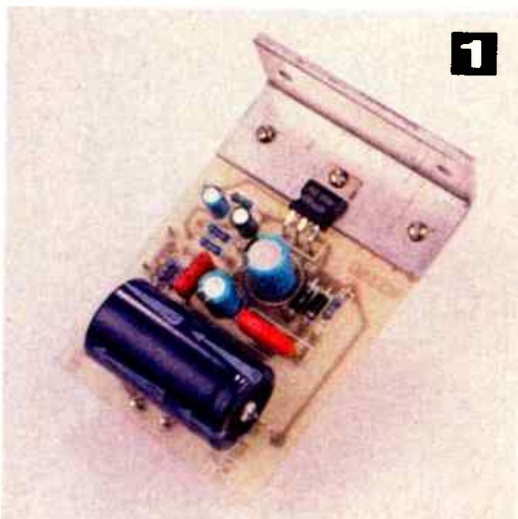
A complete kit of all the parts needed to build the 8W amplifier shown above (not including the PSU) is offered at a very competitive price. The pcb is also available separately.

Order Code	Type	Price each
LW36P	8W Amp Kit	£8.49
BY73Q	8W Amp PCB	£1.30

Maplin

means fast
 service and
LOW
 prices!

15W POWER AMPLIFIER MODULE



Features

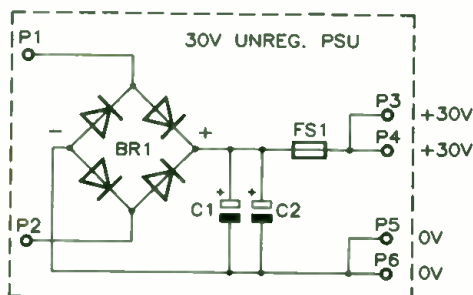
- ★ 15W RMS output power (into 4Ω load)
- ★ Short-circuit protected
- ★ Low distortion
- ★ Amplifier and power supply kits available
- ★ Low-cost

Applications

- ★ Superior replacement amplifier module for most music centres
- ★ Monitor amplifier
- ★ Bench amplifier

The original Hi-Fi 15W amplifier, using the TDA 2030 IC, has been around for 12 years and has been a consistently good seller. By a careful redesign of the original PCB layout, and a few judicious component changes, the performance has been considerably improved over the original. The total harmonic distortion has been reduced to less than 0.1%, with a very useful increase in output power. All this adds up to an extremely versatile, compact amplifier. The output is short-circuit proof, and the built-in thermal protection means that the IC is capable of surviving most fault conditions. The IC should be bolted directly to the heatsink bracket after smearing a small amount of heat transfer compound (not supplied in kit) onto the mating surfaces. The tab of the IC is connected internally to pin 3, and is at 0V potential; this pin must always be connected to the most negative part of the amplifier circuit. It may be desirable to isolate the tab from the heatsink by using an insulating bush and greaseless washer and leave pin 7 of the IC unconnected.

A suitable 30V DC unregulated power supply kit is also available (excluding transformer). One kit is required for each amplifier, but only one transformer is required, a toroidal type (YK86T), for either mono or stereo operation. For mono applications, the two secondaries are wired in parallel (red and blue wires to pin 1 of PSU, yellow and grey wires to pin 2 of PSU). For stereo each secondary winding feeds a separate PSU module (red to pin 1 of PSU 1, yellow to pin 2 of PSU 1; blue to pin 1 of PSU 2, grey to pin 2 of PSU 2).



Specification

(Using LT24B PSU module(s) and YK86T transformer)
 Maximum supply voltage: 40V DC
 Output short circuit protection: Continuous

Input sensitivity for maximum output	
4Ω speaker load:	244mV RMS (-10.03dB)
8Ω speaker load:	288mV RMS (-8.59dBu)
Total harmonic distortion	
mono into 4Ω:	0.05% (15W RMS)
mono into 8Ω:	0.05% (11W RMS)
stereo into 4Ω:	0.1% (15W RMS)
stereo into 8Ω:	0.1% (11W RMS)
Bandwidth	
4Ω:	20Hz to 100kHz
8Ω:	10Hz to 100kHz

Optional items

The following items, not included in the kits, may also be required.

15W Amplifier

Heatsink 4Y	1	(FL41U)
TO66(P)	1	(WR23A)
Heat Transfer Compound	1 Tube	(HQ00A)
Heavy Duty Speaker Cable	As req.	(XR60Q)

PSU

Neon Switch Red	1	(YR70M)
Fuse 1½in. 1A	1	(WR11M)
Toroidal Transformer		
120VA 24V	1	(YK86T)
Fuseholder	1	(FA39N)
Fuseholder Boot	1	(FT35Q)
Tie Wrap 102	1	(BF91Y)
Miniature Mains Cable	As req.	(XR01B)
Strain Relief Grommet 5R2	1	(LR48C)
Push-on Receptacles	1 Pkt	(HF10L)
Push-on Receptacle Covers	1 Pkt	(FE65V)
Tag 2BA Solder	1 Pkt	(BF27E)
Chassis Mounting Phono Skt	2	(YW06G)
Chassis Mount 2pin DIN Skt.	2	(HH31J)

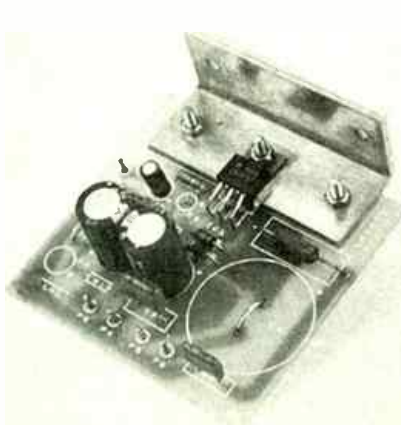
Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items) for the 15W amplifier and a separate kit is available for the 30V unregulated PSU. The PCBs and bracket are also available separately. Full construction details may be found in Maplin Magazine Issue 64.

Order

Code	Type	Price each
LT23A	15Watt Amplifier Kit	£8.49
GH32K	15Watt Amplifier PCB	£2.45
LT24B	30V Unreg PSU Kit	£7.49
GH33L	30V Unreg PSU PCB	£2.49
YQ36P	15W Amp Bracket	£1.25

20W POWER AMPLIFIER



This low distortion, high quality audio amplifier, based on the LM1875, is capable of delivering 25W into 4Ω to 8Ω loads and can be operated from split or single rail supplies. It also features short circuit and thermal protection. This amplifier is an ideal building-block module for use in many audio projects. For more details see 'Data File' in Maplin Magazine Issue 30.

Specification

Supply Voltage:	60V(±30V) Max
Supply Current:	70mA (typical), P _{out} 0W
Output Power (P _{out}):	25W, THD = 1%

Load Impedance:	4Ω to 8Ω
THD:	(f = 1kHz) 0.022%
P _{out} = 20W, 4Ω load	(f = 20kHz) 0.07%
Full Power Bandwidth:	DC to 250kHz (-3dB)
Open Loop Gain (DC):	90dB
Slew Rate:	8V/μs

Printed Circuit Board

A high quality fibre-glass PCB with printed legend is available for the basic LM1875 audio amplifier application. The board has provision for both single and split rail supply versions of the amplifier.

Note: As this board is intended as a 'building-block' project it is not eligible for our 'Get-you-working' service.

PCB dimensions: 73.7 x 68.6mm.

Order

Code	Type	Price each
GE13P	LM1875 PCB	£2.99

THE BEST OF SERVICE

MILLENNIUM 4-20 20W AUDIO VALVE POWER AMPLIFIER



Features

- ★ Class AB1 push-pull output
- ★ Non-hybrid traditional 4-valve design
- ★ Simplified construction using PCBs
- ★ Expandable modular concept
- ★ Mono or stereo options
- ★ No setting up required
- ★ Minimal test equipment needed
- ★ Matching preamp will be available

Applications

- ★ Domestic hi-fi/stereo music systems
- ★ Small-scale public address
- ★ Musical instrument amplification

An affordable, 20W valve amplifier guaranteed to turn any capable, domestic stereo system into something a bit special, emitting a wonderfully gutsy bass even at low volume, together with 'an extra something' in the mid and treble ranges.

Closely resembling Mullard's '520' design of the early sixties, the amplifier benefits hugely from the superior quality of modern components. Modern materials have produced transformer cores that are half the size of those of 20 years ago, yet with better specification. High-speed capacitors achieve a competent, even sparkly, HF performance, and high stability resistors help push the S/N ratio to nearly 90dB, making a nonsense of the myth that valve circuits are inherently noisy.

The construction concept is modular and there are only two basic kits: the PSU module, and the amplifier module. Each kit contains everything required to build the basic module, including a standardised aluminium chassis (8 x 6 x 2½in.), and a PCB to simplify construction. The chassis are joined to form either a traditional 'monobloc' (single amplifier and PSU), or a full stereo assembly (having 1 x PSU, 2 x amplifier

modules). The PSU is designed to power a stereo pair. Project rating is 4, but no special setting up is required and initial testing only needs an ordinary multimeter.

Specification of Power Supply Unit

Transformer (primary)			
Input voltage:	240V AC 50Hz		
Valve heater (secondary)			
Circuit type:	Earthed centre-tap balanced AC		
Heater output voltage:	6.3V AC 50Hz (3.15V - 0 - 3.15V)		
Heater output current:	7A maximum		
HT secondary o/p voltage:	350V AC maximum		
HT secondary o/p current:	250mA maximum		
HT DC output voltages, no load:	480V to 500V DC		
single amplifier powered:	430V to 440V DC (half load)		
two amplifiers powered:	370V to 400V DC (full load)		
HT ripple:	<6% of total DC at full load		
Power consumption,	HT	Heater	Total Mains current
single amplifier:	55W	22W	77W >320mA
two amplifiers:	96W	44W	140W <700mA
Cold switch-on mains in-rush current at full load:	>800mA		
Primary side protection:	1A 'quick-blow' fuse		
Main line DC HT protection:	250mA anti-surge fuse		
Unloaded or open-circuit HT reservoir discharge method:	Constant leakage resistor		
Unloaded HT reservoir discharge time:	1 minute approx., 500V to 0V		

Specification of Amplifier

Amplifier type:	Class AB1 'Ultra-Linear'
Line supply voltage (HT):	400V to 450V DC
HT current consumption:	125mA nominal (HT = 440V)
Heater current consumption:	3.5A
Max. output power:	20W r.m.s. (27W absolute maximum., HT = 440V)
Gain:	30dB
Input sensitivity	220mV for 20W Output
Input impedance:	1MΩ (500kΩ if volume control added)
Frequency response:	25Hz to 30kHz ±0.5dB at 20W -3dB at 75kHz at 20W <10Hz to <40kHz ±0.5dB at 1W
Signal-to-noise ratio:	89dB
Output noise (input grounded), hum:	<3mV peak
white Noise:	<2mV peak
Harmonic distortion:	0.05% (0.1% at 27W)
Output impedance:	<0.2Ω

Output Transformer Details

Primary anode-to-anode impedance (Ra/a):	6.6kΩ
Screen gnd taps:	4:3% from CT
Winding distribution:	Five sections of interleaved primary and secondary windings
Speaker load matching:	8:2 only
Low frequency cut-off:	25Hz at 20W throughput
Primary resonant frequency:	80kHz approx.
Valves:	1 x EF86, 1 x ECC83, 2 x EL34
Dimensions:	monobloc, 12 x 8 x 6 1/2 in. stereo, 18 x 8 x 6 1/2 in.

Optional Items

The following items are not included in the kit, but may also be required.

8.2Ω 25W wire-wound Resistor (dummy-load)	1	(P8R2)
470k single pot log	1	(FW27E)
470k dual pot log (alternative)	1	(FX14Q)
10M (alternative)	1	(M10M)
Gold chassis phono skt red	1	(JZ06G)
Gold chassis phono skt blk	1	(JZ05F)
Stick-on feet square	1 Pkt	(FD75S)
M3 x 10mm steel screw	1 Pkt	(JY22Y)
M3 steel nut	1 Pkt	(JD61R)
M3 shakeproof washer	1 Pkt	(BF44X)

Kits and Special Parts

A complete kit for each module, including the PCB and transformer, is available (but excluding optional items) to build one PSU and one mono amplifier. In addition, complete 'monobloc' and stereo assembly kits are also available as LT71N and LT72P. Full construction details may be found in Maplin Magazine Issues 73 and 74.

DIGITAL SINGLE 30V 3A DC POWER SUPPLY

Instek

A high quality DC power supply providing 0 to 30V DC at up to 3A maximum. The instrument includes an auto-ranging digital voltmeter (DVM) with front panel LCD readout, and which can also function as a digital ammeter, for monitoring voltage or current output as required according to the setting of the front panel VOLTS/AMPS selector switch. Voltage output is continuously variable over the whole range with one 'coarse' rotary control, accompanied by an additional 'fine' control which can vary output over >5% of the set value. Current limiting is provided by further 'coarse' and 'fine' rotary controls, and with these the power supply can be forced to leave 'constant voltage' mode and enter 'constant current' mode. Power consumption and dissipation is reduced by a multiple level power saving device which selects lower ratios of the main supply transformer secondary automatically if the output falls below the relevant threshold.



Specification

	CV Mode	CC Mode
Input:	240V AC ±10% 50/60Hz	
Output:	0 to 30V DC	0 to 3A DC
Load regulation:	0.01% +3mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	0.5mV rms	3mA rms
Dimensions:	128 x 145 x 285mm	
Weight:	4kg	

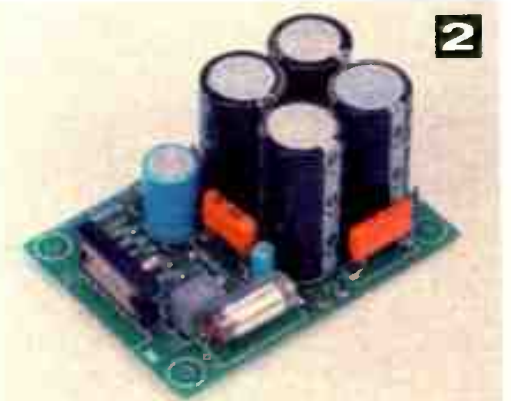


A matching self-powered valve preamplifier, the 'Newton', will be available in the early part of 1995, designed to go with the 'Millennium'. Full constructional details will be found in Issues 85 and 86 of 'Electronics'.

Order

Code	Type	Price each
LT44X	C6 Valve Amp PSU Kit	£59.99
GH59P	Valve Amp PSU PCB	£3.65
LT45Y	C6 Mono Valve Amp Kit	£79.99
GH60Q	Valve Amp Mono PCB	£3.99
LT71N	H12 Mono Valve Amp & PSU	£129.50
LT72P	H18 Stereo Valve Amp&PSU	£199.50

TDA1514A 50 WATT IC POWER AMPLIFIER



- ★ Star earthing
- ★ Small size (PCB, 57mm x 76mm)
- ★ Preselectable input sensitivity
- ★ Wide supply voltage range
- ★ Safe operating area (SOAR) protected
- ★ Short circuit protection
- ★ Thermal protection

The TDA1514A power amplifier is a high quality IC based power amplifier combining small size with high power output. The IC features protection against AC and DC short circuits when used with symmetrical supplies. The IC also includes an output mute circuit preventing 'clicks' and 'thumps' during switch on and switch off, thus eliminating the possibility of damage to

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delicate speakers. The amplifier is protected against thermal runaway and includes SOAR protection making the device almost indestructible. The IC has a wide supply range, the minimum requirements being $\pm 9V$ to a maximum of $\pm 30V$. To deliver an output power of 50 watts the module requires a $\pm 27.5V$ supply for an 8Ω load and a $\pm 23V$ for a 4Ω load. For full details see 'Data File' in Maplin Magazine Issue 40.

Specification

Supply voltage range:	$\pm 9V$ to $\pm 30V$ DC
Input sensitivity:	300mV to 2V (adjustable)
Output impedance:	0-1 Ω
Power output:	($V_s = \pm 27.5V$)
8 Ω	40W RMS
4 Ω	60W RMS
HD at -3dB of full output:	0.1%
Full power bandwidth (-3dB):	20Hz to 25kHz
Signal to noise ratio:	82dB
Peak output current:	6.4A
Quiescent current:	60mA
Supply ripple rejection:	(100Hz) 72dB
Slew rate:	10V/ μ S

Optional Items

The following optional items are not included in the kit but may also be required.

Heatsink 2E	1	(HQ70M)
Insulator TO218	1	(UL74R)

Kit and Special Parts

A complete kit of parts is available and the pcb is also available separately.

A ready assembled version is also available.

PCB dimensions: 57.2 x 76.2mm.

Order Code	Type	Price each
LP43W	TDA1514 Power Amp	£19.99
GE64U	TDA1514 Amp PCB	£5.39
AM04E	TDA1514 Amp Assm	£26.99

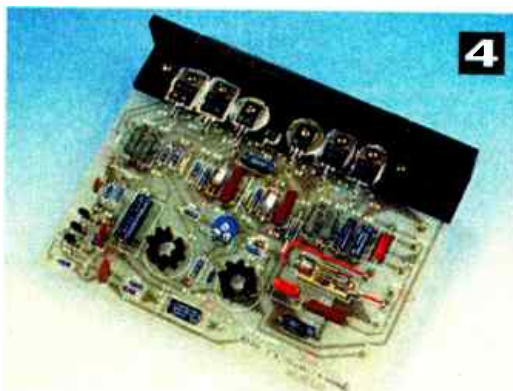
50W Hi-Fi POWER AMPLIFIER

Features

- ★ Very Low Distortion (<0.05% at 1kHz)
- ★ Unconditionally Stable
- ★ Damping Factor 80
- ★ Maximum Output 72W RMS at 1kHz (4 Ω load)
- ★ Noise < -100dB
- ★ Easy to Build

Applications

- ★ Hi-Fi Systems
- ★ Active Loudspeaker Systems
- ★ Sub-Woofer Amplifier
- ★ In-Car Amplifier



The Maplin 50W amplifier has been around for some time, and still sells extremely well – a tribute, no doubt, to the excellent design. The amplifier can readily form the basis of a high quality Hi-Fi system. Because of the low-cost of the kit, the amplifier can be used in an active loudspeaker system, or used to drive a sub-woofer. Such applications will require the amplifier(s) to be fed from suitable filter circuits. Another possible application is in-car amplification. Although if the amplifier(s) is to be used in a car, it would still have to be fed from a $\pm 30V$ power supply. A suitable switch-mode power supply, that 'converts' the 12 to 14V output from a car battery to a suitable $\pm 30V$ power supply, was discussed in 'Electronics' Issue 46, which is also available as a kit (LP39N).

Specification

(With power supplies shown and extra heatsink)
Power Output at 1kHz

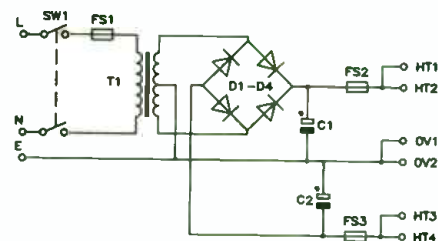
	4 Ω Load	8 Ω Load
One Channel:	72W RMS	50W RMS
Two Channel:	49W RMS	36W RMS
Input Sensitivity		
For Rated Output:	380mV	450mV
Frequency Response:	Flat from 20Hz to 28kHz	
Full Power Bandwidth	(pulse tested at hf): 3dB down at 95kHz	
Noise:	<-100dBu	
THD:	<0.05% at 1kHz	
Damping Factor:	80	
Input Impedance:	15k Ω	
Slew Rate:	14V/ μ s (at 10kHz)	

Power Supplies – Recommended Circuits

A dual DC power supply is required for this project, capable of supplying 30-0-30V @ 2A. The mono supply is capable of powering a single 50W amplifier for mono use, while the stereo supply is designed to power 2x50W amplifiers. All parts are available from Maplin, but no kit is available for either PSU, and a PCB is not necessary. In general, the best way to construct either supply is by building directly into a metal case of suitable dimensions, keeping all lead lengths down to a minimum, and ensuring adequate ventilation.

Although the stereo power supply is adequate for most users, a reduction in the ripple, and therefore an improvement in the noise figure, can be achieved by replacing C1 and C2 with 22000 μ F 56V high-grade can-type capacitors (FA20W).

Please note: The PSUs are NOT available as a kit.



Mono PSU Parts List

CAPACITORS

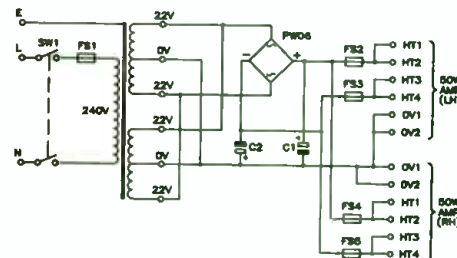
C1,C2 4700 μ F 63V Can Electrolytic 2 (FF27E)

SEMICONDUCTORS

D1,2,3,4 1N5402 4 (QL83E)

MISCELLANEOUS

T1	Transformer 28V 1.5A x 2	1	(WB17T)
SW1	Red Neon Switch	1	(YR70M)
FS1	Fuse 1 $\frac{1}{4}$ in 1A	2	(WR11M)
FS2,3	Fuse 20mm 2A	2	(WR05F)
	Fuseholder (FS1)	1	(FA39N)
	Fuseholder Boot	1	(FT35Q)
	Tie Wrap 102	1	(BF91Y)
	Fuseholder 20mm	2	(RX96E)
	Wire 3202 Black	1m	(XR32K)
	Wire 3202 Red	1m	(XR36P)
	Wire 3202 Green	1m	(XR35Q)
	Miniature Mains cable	2m	(XR01B)
	Strain Relief Grommet 5R2	1	(LR48C)
	Push-on Receptacles	4	(HF10L)
	Push-on Receptacle Covers	4	(FE65V)



Stereo PSU Parts List

CAPACITORS

C1,2 10000 μ F 63V Can Electrolytic 2 (FF32K)
or 22000 μ F 56V Can Electrolytic 2 (FA20W)

SEMICONDUCTORS

Rect 1 PW06 Bridge Rectifier 1 (WQ58N)

MISCELLANEOUS

T1	15/22V Power Transformer	1	(LW34M)
SW1	Red Neon Switch	1	(YR70M)
FS1	Fuse 1 $\frac{1}{4}$ in 1A	1	(WR11M)
FS2,3,4,5	Fuse 20mm 2A	4	(WR05F)
	Fuseholder	1	(FA39N)
	Fuseholder Boot	1	(FT35Q)
	Tie Wrap 102	1	(BF91Y)
	Fuseholder 20mm	4	(RX96E)
	Wire 3202 Black	2m	(XR32K)
	Wire 3202 Red	2m	(XR36P)
	Wire 3202 Green	2m	(XR35Q)
	Miniature Mains Cable	2m	(XR01B)
	Strain Relief Grommet 5R2	1	(LR48C)
	Push-on Receptacles	4	(HF10L)
	Push-on Receptacle Covers	4	(FE65V)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 67. Available assembled.

Order Code	Type	Price each
LW35Q	50W Amp Kit	£21.99
HQ68Y	50W Hi-Fi PCB	£4.99
AM05F	50W Amp Assm	£28.99



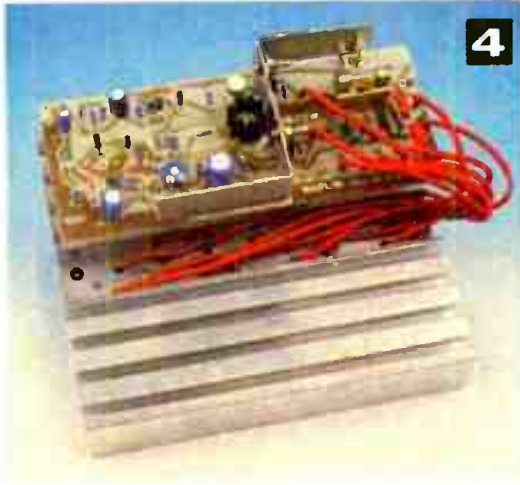
BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750



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150W POWER AMPLIFIER



A very high quality power amp capable of delivering 225W continuous RMS sine wave into a 4Ω load when used with the power supply shown. With two amps running on the power supply shown the output is reduced to 160W per channel. (Into 8Ω the amp delivers 146W (one only) or 112W with a stereo pair.) The transient peaks can easily exceed 300W so you should have a bank of speakers capable of handling at least 400W with one amp and 4Ω impedance, 300W each with two amps and 4Ω impedance, 300W with one amp and 8Ω impedance and 200W each with two amps and 8Ω impedance.

Specification

Output power with 4Ω load both channels simultaneously: 160W rms continuous sine wave per channel

Frequency response: 30Hz to 20kHz (-1dB)
15Hz to 37kHz (-3dB)

Total harmonic distortion at 160W: <0.1% at 1kHz

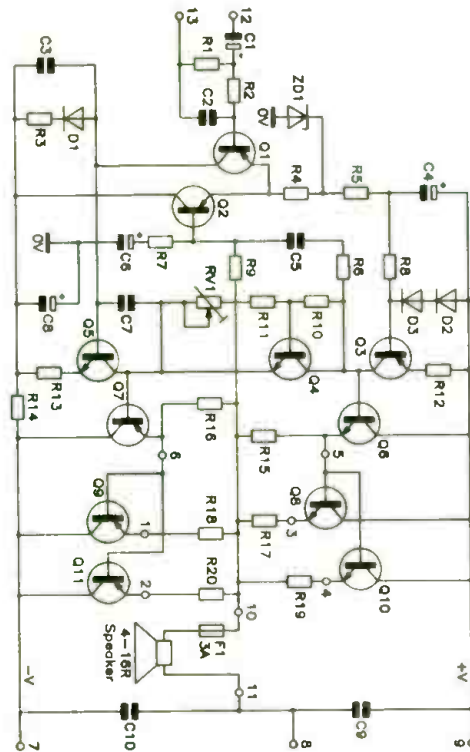
Damping Factor: 80

Sensitivity for 160W into 4Ω: 1V rms

Construction

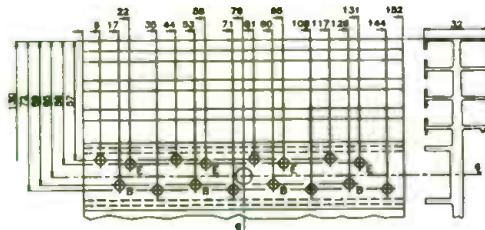
Fit the components to the pcb as shown. Note that the clip-on heatsinks are required for Q3, 4 and 5 and the Heatsink DR2 for Q6 and 7. Drilling instructions for the Heatsink 6W-1 are shown. Q6 to 11 must be mounted using mica washers and silicone grease. Ensure that all transistor mounting holes are deburred and rubbed down with a fine emery cloth as even the smallest metal filing may punch through the thin mica washer when the transistor is bolted down tightly, and this will damage several of the transistors. The pcb is fixed to the heatsink using three 19mm stand-offs. These slot neatly into the vanes of the heatsink. Connections to the collectors of Q8, 9, 10 and 11 are made by means of solder tags mounted under the nuts. Link the tags in pairs and take the two wires through the 8mm (5/16 in.) hole in the centre of the transistors. Keep the connections between the output transistors and the pcb as short as possible and use 32/02 wire. The output is protected against a short circuit by a 3A fuse fitted to the pcb. Bolt down the power supply components – the bridge rectifier is best bolted to the side of the transformer chassis. Keep all the parts close together and keep all wires as short as possible. If you have two power amps, run separate wires from the power supply to each amp individually. The 0V return from the loudspeaker(s) should be brought to the 0V link on the capacitors C6 and C7 and not taken to the pcb. The 0V to the pcb(s) should be taken from this point also. Before connecting the plus and minus supplies to the amp switch on the power supply and measure the voltage between FS2, 3 and 0V. It should be between +50V and +55V approx. And the voltage between FS4, 5 and 0V should be between -50V and -55V approx. (Measure on a DC voltage range.) If all is well switch off and connect the power supplies to the amp(s). Remove FS2 (FS3 for second amp) and connect a millimeter in its place. Turn VR1 to its

centre position. Switch on and if the current exceeds 250mA switch off again immediately. Check for short circuits, but if none can be found, the most likely cause is an earth loop. Before switching on again check that all the fuses are intact. Never switch on if any one or more of the fuses has blown. If all is well however, adjust VR1 until the current reads about 70mA. Allow the amp to warm up for about 15 minutes until the current stops increasing and then readjust for 75mA. Switch off, reconnect the fuse, switch the multimeter to a low DC volts range, switch on again and measure the voltage between the loudspeaker output and 0V. The voltage should not exceed plus or minus 0.2V Use a heavy wire for connection to the loudspeakers bearing in mind that the transient peaks to the speakers can exceed 8 Amps.



150W Power Amplifier Circuit

Please note that the Heatsink 6W-1 is sufficient for amplifier powers up to 150W only when used vertically in free air. If the unit is to be used in a confined space or inside a cabinet, additional heatsinking or a fan is required.



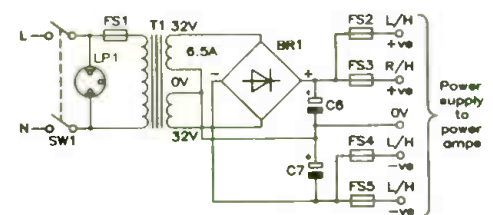
Heatsink Drilling

Parts List for One Amplifier

R1	Min Res 3k9
R2	Min Res 820Ω
R3	Min Res 220Ω
R4	Min Res 2k2
R5	Min Res 1k
R6	Min Res 220Ω
R7	Min Res 220Ω
R8	Min Res 1k
R9	Min Res 4k7
R10	Min Res 2k2
R11	Min Res 1k
R12	Min Res 68Ω
R13	Min Res 100Ω
R14	Min Res 33Ω
R15	Min Res 47Ω
R16	Min Res 47Ω
R17,18,19,20	W/W Min 0.27Ω

RV1	Hor S-Min Preset 1k
C1	PC Elect 4.7μF 63V
C2	Ceramic 3900pF
C3	Ceramic 1500pF
C4	PC Elect 220μF 16V
C5	Ceramic 39pF
C6	PC Elect 220μF 16V
C7	Ceramic 33pF
C8	PC Elect 47μF 63V
C9,10	Polyester 0.1μF
ZD1	BZX61C15V
D1,2,3	1N4002
Q1,2,3	ZTX541 (or 542)
Q4	2N1893
Q5	BF337
Q6	BD711
Q7	BD712
Q8	2N3055
Q9	MJ2955
Q10	2N3055
Q11	MJ2955
1	150W Amp Board
13	Veropins 2141
1	Chassis F/H 20mm
1	Fuse 20mm 3A
3	Stand-Off Long
2	Heatsink Clip-On
1	Heatsink 6W-1
12	Bolt 6BA x 1/2 in
12	Nut 6BA
2	Mounting Kits 'P' Plas
4	Mounting Kits TO3
4	Tag 6BA
1	Heatsink DR2

Also required: Silicone grease, Wire 32/02, Hook up wire etc.



PSU Circuit

Parts List for Power Supply

T1	Tr 32032/6 1/2 A
BR1	Bridge J02
C6,7	Can 10,000μF 63V
FS1-5	Fuse 20mm 3A (only 3 required for mono)
4	Chassis F/H 20mm (only 2 required for mono)
1	Safuseholder 20mm
1	Square Neon
1	Rocker Sw DP
2	Clip Can 50
9	Bolt 2BA x 1in.
2	Bolt 4BA x 1/2 in
9	Nut 2BA
1	Transformer Mounting Plate
2	Nut 4BA

Kit and Special Parts

A kit of all the parts to build a mono amp, offering a saving over buying all the parts separately. A pcb on which to build this amplifier is also available separately as is the heatsink which fits onto the pcb and separates the power from pre-amplifier stages.

Order Code	Type	Price each
LW32K	A1 150W Power Amp Kit	£29.99
BB20W	150W Amp Board	£4.29
BB18U	Heatsink DR2	£1.65

Fax your orders to:
01702 553935

100W PRO-AMP

Features

- ★ **Balanced line input**
- ★ **100W RMS power output**
- ★ **Standard 19in. 2U rack mounted case**
- ★ **Thermal protection**
- ★ **Loudspeaker protection**
- ★ **Switch-on mute**

Applications

- ★ **Instrument amplification**
- ★ **Stage foldback**
- ★ **Small venue P.A.**
- ★ **Studio monitor amplifier**

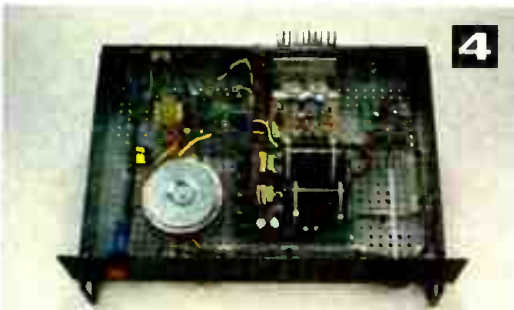
Based on Maplin audio projects, this high quality amplifier is not intended as a domestic amplifier, but for use on-stage, in a recording studio or other similar 'professional' applications. As such, the Pro-Amp is comparable, in terms of price, performance and features, to many commercial amplifiers. The Pro-Amp includes many features to make it as versatile and easy to use as possible, these include: A strong and attractive 19in. 2U rack mounted case for longevity and ease of integration with other professional equipment.

A low-noise, balanced line input is provided on both 1/4in. jack and 3-pin XLR sockets; the input stage is AC coupled and has an impedance of 100kΩ. Adjustment of input sensitivity is provided by a front panel level control.

To guard against switch-on and switch-off transients, power amplifier faults etc. that can damage expensive loudspeakers, an amplifier monitor is included. If a fault has occurred and has been cleared, the monitor circuit can be reset by means of a front panel switch.

Thermal protection is also provided to protect the amplifier from excessive temperature rise. LEDs are provided to indicate the status of the amplifier.

The loudspeaker output is available on both a 1/4in. jack and socket and a 3-pin XLR plug. The amplifier output is DC coupled and can drive loads down to 4Ω. To minimise susceptibility to mains bome interference, the 240V AC 50Hz mains supply is connected via a 3-pin filtered mains inlet. Rear panel fuseholders are provided for the mains input and amplifier supply fuses.



The kit of parts contains the five kits that comprise the amplifier, plus the additional parts required. The five kits are: 150W MOSFET amplifier, High Quality PSU, SSM2016 Preamplifier, Amplifier Monitor and Temperature Monitor. There are certain component changes and modifications to some of the modules, and these are fully explained in the instruction leaflet contained in the kit.

Specification

Input impedance:	100kΩ
Rated load impedance:	4 to 8Ω
Maximum power output,	
4Ω	105W RMS
8Ω	90W RMS
THD @ 75W (1kHz):	0.02%
Signal to noise ratio:	85dB
Input sensitivity	
for rated output, 4Ω	-13.6dBm/160mV RMS
8Ω	-11dBm/215mV RMS
Maximum input level:	+8dBm/1.9V RMS
Frequency response:	10Hz to 40kHz -1dB
Supply voltage:	240V AC 50Hz

Power consumption	
quiescent:	17W
at rated output:	194W (4Ω) 130W (8Ω)
Dimensions:	483 x 370 x 88mm

Optional Items

The following items not included in the kit may also be required.

Chassis Punch Set	If Req.	(YK27E)
Crimp Tool	If Req.	(FY31J)
XLR Line Plug 3-pin	As Req.	(BW89W)
XLR Line Socket 3-pin	As Req.	(BY91Y)
Mono Screened Jack Plug 1/4in.	As Req.	(HF87U)
Stereo Screened Jack Plug 1/4in.	As Req.	(HF89W)

Kit and Special Parts

A complete kit of parts is available. Full construction details may be found in Maplin Magazine Issue 56.

Order Code	Type	Price each
LT11M	H6 100W Pro-Amp	£159.99

150W MOSFET AMPLIFIER



- ★ **True 100W/150W rms power output**
- ★ **Drives 4 Ω or 8 Ω loud speakers**
- ★ **High reliability and performance**

The MOSFET amp has been revised from its debut in 1981 for guitar use in the Combo Amplifier!!! This best selling project is always in the Top Ten Kits list.

An incredible hi-fi amp that offers high reliability and performance like the best valve amps. It is suitable for use in audio applications where high power levels and excellent frequency response characteristics are required.

A power supply is not included with the kit.

Specification

Power supply	
Voltage:	±55V DC max (8Ω)
Current:	2.5A (8Ω), 5A (4Ω)
Output power rating	
at 1kHz continuous	100W rms into 8Ω load
sinewave:	150W rms into 4Ω load (max)
Frequency response:	20Hz to 40kHz
Slew rate:	20V/μs
Damping factor:	Fd = 200 (8Ω load)
Input impedance:	47kΩ
Input sensitivity:	860mV rms (2.43V pk-pk) for rated output

Optional Items

The following items, are not included in the kit, but may also be required.

Audio Toroidal 160V-	1	(YZ23A)
J04	1	(BH46A)
W01	1	(QL38R)
4k7 1W Carbon Film	2	(C4K7)
10,000μF 63V Can	2	(FF32K)
2,200μF 63V Can	2	(FF22Y)
100nF HV	2	(FA21X)
100nF 35V Tantalum	2	(WW54J)
μA78M12UC	1	(QL29G)
μA79M12UC	1	(WQ89W)
Fuse A/S 3-15A	3	(RA11M)

Fuse A/S 630mA	2	(RA08J)
Heatsink 6W-1	1	(FL77J)

Kit, Ready-Built Module and Special Parts

This project is available as a complete kit or as a ready-built module size 100 x 75 x 25mm. In addition the heatsink mounting bracket and the pcb (size 90 x 85mm) are available separately. Full construction details can be found in Maplin Magazine Issue 41.

Order Code	Type	Price each
LP56L	Mosfet Amp Kit	£20.99
AM03D	150W MOSFET Amp Assm	£28.99
GA28F	150W MOSFET PCB	£2.99
GA29G	MOSFET Amp Mtg Bkt	£1.29

BRIDGING MODULE MAKES 400W MOSFET AMP



- ★ **Increases output to 400W**
- ★ **Anti-thump at switch-on**
- ★ **Loudspeaker protection**
- ★ **Accommodates wide range of input voltages**

When used with two Maplin MOSFET Amps, this easy-to-add module will allow them to produce up to 400W RMS audio output!! By connecting the amplifiers to the input and to the speakers via this module many advantages are obtained in addition to the huge power gain. The module completely protects the loudspeakers and amplifiers through the on-board relay from short circuits, overloads, and high voltage offsets. In addition the module stops the audible thump at switch-on by connecting the speakers to the amps after a short delay. The massive power gain is achieved by making the input to one of the power amps out of phase with the input to the other amp and then bridging the speakers between the two amps. The very high output powers achieved will require that speaker connections are carefully chosen to ensure that the high currents can be handled. To achieve 400W a high power PSU will be needed i.e. 8 to 10 amps at 55-0-55V and it must be well regulated. The MOSFET amps, however, thanks to the special characteristics of MOSFET transistors will give long and reliable service without strain even at this extremely high output.

Kit and Special Parts

This project is available as a complete kit or as a ready-made module. The pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 2.

Order Code	Type	Price each
LK03D	MOSFET Bridging kit	£14.99
GA17T	MOS-Amp Bridge PCB	£3.65
YM28F	Bridging Amp Assmbld	£19.99

1kW HIGH POWER MOSFET AMPLIFIER

4

The High Power Mosfet Amplifier is intended for use in halls, auditoriums or wherever the situation demands large scale audio amplification. Loudspeaker loads down to a minimum of 3.5/4Ω can be driven by the amplifier at full power, before protection circuitry on the Monitor Module, comes into effect. Mosfet devices have the capacity to limit conduction with increasing junction temperatures. This means that running the amplifier at full power into loads of 1 to 2Ω, will cause the Mosfets to shut down all output signals, although heavy loads like this can be driven at reduced power levels. One function of the Monitor Module is preventing the amplifier from delivering power continuously into a short circuit. This situation can occur when loudspeaker connecting cables are shorted together, rendering them liable to overheat very quickly with disastrous results! The complete system is made up from four modules. A Driver module and Output module form the power amplifier and are mounted on the Mosfet heatsink assembly. A Monitor module and a Power Supply module are mounted separately and provide protection and power respectively.



Prototype Specifications:

Single Channel (mono) power output stage

Power supply: ±90VDC (180V) @ 7A

Rated Power Output into 4Ω load.

(1) Peak Power: 1.3 kW (1300 Watts) PEAK

(2) RMS Power: 775 Watts RMS

(3) Average Power: 650 Watts RMS

Full Power Bandwidth: 10Hz to 50kHz

Total Harmonic

Distortion: 0.2% @1kHz (90% full power)

Slewing rate: 24V/μs

Damping factor: 110 (4Ω load)

Input sensitivity: 775mV (0dB) into 30kΩ for rated output.

Kit and Special Parts

Kits are available for the Output Stage, the Driver Module, the Monitor Module, the Power Supply, and the Hardware. A pre-drilled case is available, and all the pcb's are available separately. Full construction details may be found in the Maplin Magazine Issues 26 and 29.

O/P PCB: 226.1 x 49.5mm.

Driver PCB: 177.8 x 49.5mm.

Monitor PCB: 94 x 76.2mm

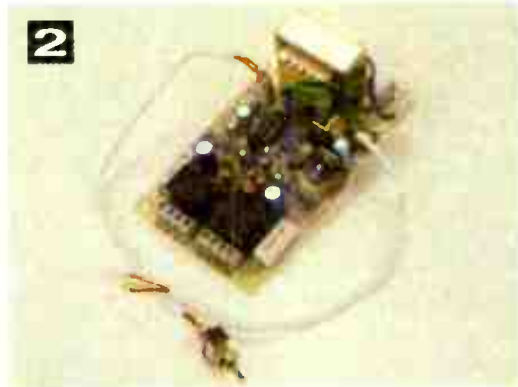
PSU PCB: 142.2 x 92.7mm.

Order Code	Type	Price each
LM51F C4	HP Mosfet O/P Kit	£99.99
LM50E	HP Mosfet Driver Kit	£14.99
LM52G	HP Mosfet Monitr Kit	£31.99
LM53H H19	HP Mosfet PSU Kit	£119.99
LM65V H15	1kW Mos/amp Hard Kit	£94.99
XM13P G17	19 Case	£69.99
GD81C	HP Mosfet O/P PCB	£4.85
GD80B	HP Mosfet Driver PCB	£5.99
GD82D	HP Mosfet Montr PCB	£3.49
GD79L	HP Mosfet PSU PCB	£4.75

AMPLIFIER MONITOR

- ★ Prevents switch-on/switch-off transients
- ★ Protects loudspeakers against amplifier and power supply faults
- ★ Self resetting or manual reset modes of operation
- ★ Suitable for mono or stereo amplifiers

2



This amplifier monitor provides loudspeaker protection against such 'nasties' as DC offsets. This can occur when amplifiers and their associated power supplies go faulty. Additionally, the monitor is intended to protect DC coupled loudspeakers – such as bass and mid-range units. At switch-on, the amplifier monitor provides a time delay during which the loudspeakers are 'disconnected' from the amplifier by means of relays. This allows the power supply to stabilise and the amplifier output capacitors, if fitted, to charge. At switch-off, the relays immediately 'drop-out'. Thus the amplifier monitor prevents those nasty 'bangs, pops and thuds' at switch-on and switch-off, which otherwise might damage your delicate and expensive loudspeakers. The amplifier monitor is suitable for use with amplifiers having symmetrical or asymmetrical power supplies up to ±50V or +100V. A facility for adding an external trigger circuit e.g., a temperature monitor (LP71N), is also included, giving complete protection for both amplifier and loudspeakers. If the amplifier monitor is to be for PA use, then it may be found that the monitor may drop out when a 'miked-up' drum kit is struck. To overcome this problem, two 10μF capacitors (C1 and C101) are replaced by 33μF capacitors of the same type.

Specification

Mains power supply: 240V AC 50Hz

Supply current: 34mA max

Monitor input voltage: ±50V max

Monitor trip voltage: ±3V min

Signal requirements to trip input frequency,

C1 and C101 = 10μF: <8Hz

C1 and C101 = 33μF: <2.5Hz

Pulse width at 4Vpk,

C1 and C101 = 10μF: >70ms

C1 and C101 = 33μF: >200ms

Output current

from -12V: 75mA max.

Optional Items

The following items, not included in the kit, may also be required.

M3 x 10mm Insulated Spacer 1Pkt (FS36P)

3-Way Minicom Plug 1 (BX96E)

3-Way Minicom Housing 1 (BX97F)

Min Mains Black As Req (XR01B)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 47.

PCB dimension: 130.8 x 75.6mm.

Order Code	Type	Price each
LP32K	Amplifier Monitor	£21.99
GE59P	Amp Monitor PCB	£4.29

12V PUBLIC ADDRESS SYSTEM

- ★ Two 8W RMS Amplifiers
- ★ Maximum of 10 x 8Ω Speakers can be Driven
- ★ Supplied from 12V Car Battery

A Public Address amplifier that operates from a 12 volt car battery, and producing up to 10 Watts per channel specifically to drive arrays of public address loudspeakers. Input for a single microphone is provided by a mono 1/4in. jack socket. Bandpass limiting of 300Hz to 3kHz neatly excludes very low and high frequency harmonics in speech areas which are unnecessary for PA use, leaving the bandpass area free of excessive distortion. Megaphone type speaker arrays that would be used have their own similar bandpass characteristics. Without recourse to power bridging designs or power inverter techniques the amplifier can produce 10 to 20W r.m.s. of power output, using the robust TDA2005 power amp IC, from a single 12V supply. The IC contains 2 such amplifiers each capable of driving loads down to 1.6Ω, or five 8Ω speakers. A combined total of 16 watts can be achieved from ten such speakers.



Specification

Supply voltage: 6V to 17V DC

Min. supply current: 100mA

Max. supply current: 2.25A

Rated power output: 8W rms. per ch. (16W pk)

Both channels running: 16W rms. total at 1kHz

Input sensitivity: 2mV continuously variable for rated output

Load impedance: 1.6Ω max. to 8Ω min.

Power response: 680Hz to 2kHz

Input: Single 1/4in. mono jack

Output: Twin 1/4in. jacks

Includes input sensitivity preset and volume control.

Optional Items

The following items, not included in the kit, may also be required.

Jack Plug 2 off (HF87U)

PA Front Panel (FP59P)

Battery Clip 2 off (HF26D)

Wire 3202 Red (XR36P)

Wire 3202 Black (XR32K)

Kit and Special Parts

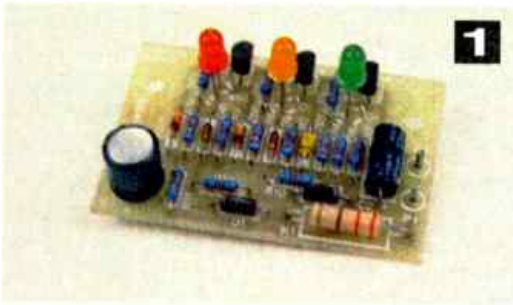
A complete kit of all parts for the 12V PA Amplifier excluding the front panel. The pcb (size 144 x 82mm), pre-drilled case, and printed adhesive front panel are also available separately. Full construction details may be found in the Maplin Magazine Issue 21.

PCB dimensions: 144.8 x 82.6mm.

Order Code	Type	Price each
LM17T C1	PA Kit	£29.99
GD31J	PA Board	£3.75
YP12N	Car PA Case Drilled	£11.99
FP59P	PA Front Panel	£3.65

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WATT WATCHER



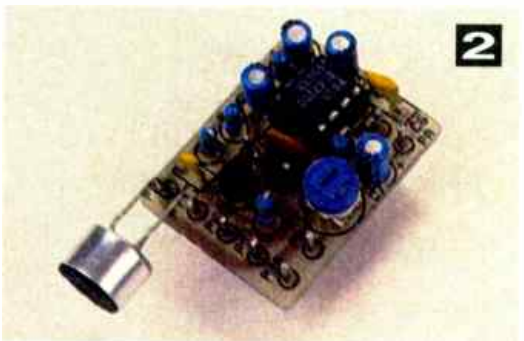
When running a speaker system it is useful to have an idea of the approximate level of power being used. In particular it is important that the loud speaker manufacturer's specification is not exceeded as this could result in severe damage to the speaker. The Watt Watcher is a simple circuit that may be fitted into a speaker cabinet to provide an indication of the relative power level. It uses three LED's: a green LED lights when the power is at a relatively low level indicating that the system is running; a second (orange) LED indicates an intermediate level of power and a third (red) indicates an overload condition. The level at which the orange and red LED's light is set by fitting resistors of selected value, depending on the required power range. The Watt Watcher derives its power from the speaker line and hence requires no external power supply.

Kit and Special Parts

A complete kit of parts including the pcb is available. The pcb is also available separately. Full construction details may be found in the Maplin Magazine Issue 27.

Order Code	Type	Price each
LM57M	Watt Watcher Kit	£5.75
GD91Y	Watt Watcher PCB	£3.65

SL6270 AGC MICROPHONE PREAMP



Features

- ★ Constant output signal
- ★ Fast attack
- ★ Lower power consumption
- ★ Single-ended or differential input

Applications

- ★ Audio AGC system
- ★ Transmitter overmodulation protection
- ★ Tape recorders

The SL6270 is a small 8-pin IC combining the functions of an audio amplifier and Voice Operated Gain Adjusting Device (VOGAD). It is designed to accept small signals from a microphone and to provide an essentially constant output signal from an input covering a range of 50dB. The dynamic range, attack and decay times are controlled by external components. The circuit can be used with either a dynamic or electret microphone. The device will operate over a wide range of power supply voltages between 4.9V to 10V and consumes only 9mA from a 9V battery. Typical applications might include: audio AGC systems, transmitter overmodulation protection, tape recorders and audio surveillance. Because the SL2670 may be used in many varied applications, some of the component values supplied in the basic kit will not be suitable, so alternative values must be

calculated to determine the new working parameters. Note: this is intended as a 'building block' project, and not eligible for our 'Get-You-Working' Service.

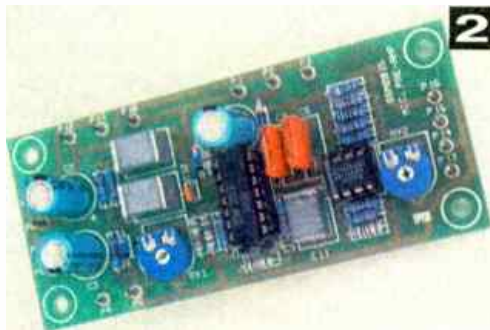
Kit and Special Parts

A complete kit of parts is available, including the PCB and instruction leaflet, but excluding PP3 battery and microphone. The PCB is available separately. Full construction details may be found in Maplin Magazine Issue 51.

PCB dimensions: 33 x 25.4mm

Order Code	Type	Price each
LP98G	SL6270 AGC Mic Amp	£8.99
GH00A	AGC Preamp PCB	£1.99

SSM2015 MICROPHONE PREAMPLIFIER



- ★ Low Noise
- ★ Low Distortion
- ★ Balanced Line Operation
- ★ High Slew Rate

The SSM2015 is a low noise preamplifier IC featuring low distortion and a wide bandwidth. Voltage gains between approximately 10 and 2000 can be set using different resistor values and the device is ideal as a microphone preamplifier. True differential inputs make the device particularly useful for interfacing balanced line transducers to equipment with single ended inputs. For full constructional details, see 'Data File' in Maplin Magazine Issue 39.

Specification

Supply Voltage:	±12 to ±17V DC
Supply Current:	20mA @ ±15V
Total Harmonic Distortion:	Less than 0.02% (1kHz)
Gain	
RV1 set to minimum:	21.0dB
RV1 set to maximum:	33.5dB
Maximum Input Voltage (for 9V RMS output, ±15V supply)	
RV1 set to minimum:	800mV RMS
RV1 set to maximum:	190mV RMS
PCB Dimensions:	43 x 99mm

Kit and Special Parts

A complete kit of parts is available. The pcb is also available separately.

Order Code	Type	Price each
LP42V	SSM2015 Kit	£14.99
GE63T	SSM2015 Preamp PCB	£2.25

SL561C LOW NOISE PREAMPLIFIER



Features

- ★ Gain up to 60dB
- ★ Low noise
- ★ Good bandwidth

NEW!

Applications

- ★ Video preamplifiers
- ★ Video buffers
- ★ Video distribution systems

The SL561C is a monolithic IC which can be used in a number of different low noise preamplifier roles. It contains nine very high performance transistors with associated biasing components, and the high gain, low noise design makes it suitable for use in audio and video systems at frequencies up to 6MHz. Noise performance is optimised for source impedances between 20Ω and 1kΩ, so the device can be used with a variety of transducers, including photo-conductive infrared detectors, magnetic tape heads and dynamic microphones.

In this application the device is configured as a video preamplifier, with a small amount of HF boost to sharpen the picture, and an output impedance of approximately 50Ω. As it stands the project is useful as a video preamplifier, video buffer or line driver, and as part of a video distribution system. This could be a single video signal such as from a satellite decoder, and split to several SL561C boards with outputs to individual monitors. Video amplification is the most critical role for this module, and with a little modification to some circuit details, by changing some components, the module will easily cater for AF applications.

Specification

Power supply voltage:	5V DC
Supply current:	40mA
Bandwidth:	24MHz (-3dB)
Input level:	1V (pk to pk)
Input impedance:	4k7 (no termination) 75Ω (terminated)
Output level:	2V (pk to pk)
Output load impedance:	75Ω

Optional items

The following items are not included in the kit, but may also be required.

Phono Chassis Socket	As Req.	(YW06G)
Phono Screen Plug	As Req.	(HH01B)
UHF SO259 Chassis Socket	As Req.	(BW84F)
UHF PL259 Plug	As Req.	(BW81C)
UHF PL259 Reducer Small	As Req.	(BW82D)
UHF PL259 Reducer Large	As Req.	(BW83E)
BNC Chassis Socket 75Ω	As Req.	(FE31J)
BNC Plug 75Ω	As Req.	(FE99H)
Peritel (SCART) PCB Straight Socket	As Req.	(JW34M)
Peritel PCB Right Angle Socket	As Req.	(FV89W)
Peritel Plug	As Req.	(FJ41U)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (but excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 76.

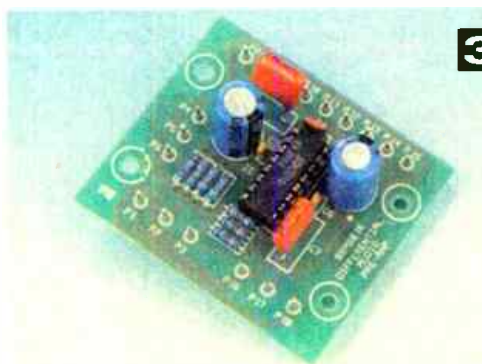
Order Code	Type	Price each
LT48C	SL561C HF Preamp	£6.99
GH61R	SL561C Preamp PCB	£1.99

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SSM2016 DIFFERENTIAL PREAMPLIFIER



3

Features

- ★ Wide supply voltage range
- ★ Low noise
- ★ High slew rate (10V/μs)
- ★ True differential inputs
- ★ Low distortion

Application

- ★ Balanced input stages

Based on the SSM2016 chip, the differential preamplifier project has many applications including microphone preamplifiers and balanced input stages. The IC operates as a true differential amplifier with feed-back. Operating voltages are between ±9V to ±36V, capable of typical sink currents up to 70mA. A very good noise figure is achieved at source impedances below 1kΩ. The device is capable of a relatively high drive level and is designed to be used with a number of outputs. The bandwidth of the device varies with the gain and is typically in excess of 1MHz at gains below 100. Slew rate is relatively independent of gain and is typically 10V/μs. The circuit may be used in many different applications requiring a balanced input preamplifier.

Note: this is intended as a 'building block' project only, and is not eligible for our 'Get-you-working' service.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details can be found in Maplin Magazine Issue 41.

PCB dimensions: 59.7 x 50.8mm.

Order Code	Type	Price each
LP44X	SSM2016 Kit	£14.99
GE74R	SSM2016 PCB	£4.49

Applications

- ★ Mixers
- ★ Tape recorders
- ★ Upgrading existing equipment

The SSM2017 IC, at the heart of this project, is a latest-generation audio preamplifier which is particularly suitable for use as a balanced microphone amplifier. It features an ultra-low noise level (around 2nV/√Hz), wide bandwidth and high slew rate. It requires a dual rail supply of between ±6V and ±22V, and is available in an 8-pin DIL package. Whilst aimed at balanced applications, it can also be used with unbalanced microphones, as well as phantom powered microphones e.g. electret microphones without an internal power supply.

Specification

THD:	<0.01dB (gain = 40dB)
Noise:	2nV/√Hz (typ.)
Bandwidth:	1MHz (gain = 40dB)
Slew Rate:	17V/μS (typ.)
Power Supply:	±6V to ±22V DC @ 14mA (max) per rail; 48V DC for phantom supply

Common-Mode Rejection

Ratio (CMRR):	92dB (typ.)
Gain Adjustment :	14dB (x5.5) to 60dB (x1000)

Optional Items

The following items, not included in the kit, may also be required.

Twin-core Screened Cable (e.g., XS23A or XR08J)	As Req.
Single-core Screened Cable (e.g., XR18U or XS14B)	As Req.
Wire 7/0.2 10m Black	1 (BL00A)
Wire 7/0.2 10m Red	1 (BL07H)
Wire 7/0.2 10m Green	1 (BL03D)

Kit and Special Parts

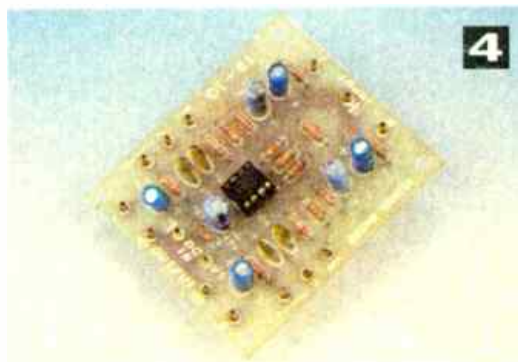
A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 69.

Order Code	Type	Price each
LT31J	SSM 2017 Pre-Amp	£12.99
GH52G	SSM 2017 PCB	£2.25

STEREO PRE-AMPLIFIER

— a Sound Master Kit

- ★ Low Level of Distortion
- ★ RIAA Frequency Response
- ★ Easy to Build



4

When using a magnetic pickup it is common practice to include a preamplifier between the pickup and the main amplifier to compensate for the recording characteristic and to provide the necessary sensitivity. The most common frequency response is that which slopes off below 1kHz and is boosted above 1kHz. This response is called the RIAA recording characteristic and is an adopted world-wide standard to provide compensation for the recording characteristic when playing a record. This small preamplifier provides the RIAA equalisation with high sensitivity. The pre-amplifier could also be used as a microphone pre-amplifier and when used as such exhibits a fairly flat response.

Specification

Input Impedance:	47kΩ approx.
Input Sensitivity:	200mV output for 5mV RMS input @ 1kHz
RIAA Pre-amp:	400mV output for 5mV RMS input @ 1kHz
Mic. Pre-amp:	230mV input for 9V RMS output @ 1kHz
Max. Input voltage:	115mV input for 9V RMS output @ 1kHz
RIAA Pre-amp:	0.005%
Mic Pre-amp:	Not less than 5kΩ
Total Harmonic Distortion:	30V at 3mA rising to 30mA max
Output Load Impedance:	
Power Supply:	

Kit

A complete kit of parts for this project is available. Full construction details may be found in the Maplin Magazine Issue 33.

Order Code	Type	Price each
LM68Y	Stereo Pre-Amp Kit	£4.99

SSM2120 DYNAMIC RANGE PROCESSOR

Features

- ★ Low distortion
- ★ Large VCA dynamic range
- ★ Wide supply voltage range
- ★ Low external parts count

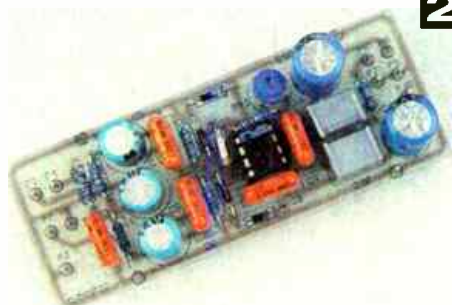
Applications

- ★ Noise reduction systems
- ★ AGC circuits
- ★ Voltage-controlled filters
- ★ Compressors, expanders, limiters

The SSM2120 is a versatile IC designed for the purpose of expanding, compressing or limiting signals in various analogue systems including audio. Detailed instructions are included with the kit showing how the SSM2120 can be used as a companding noise

Continued on next page.

SSM2017 MICROPHONE PREAMPLIFIER



2

Features

- ★ Low noise
- ★ Low distortion
- ★ Can be configured for use with either balanced or unbalanced microphones
- ★ Wide bandwidth
- ★ High slew rate
- ★ Phantom powering for capacitor-type microphones
- ★ High gain (over 70dB) obtainable



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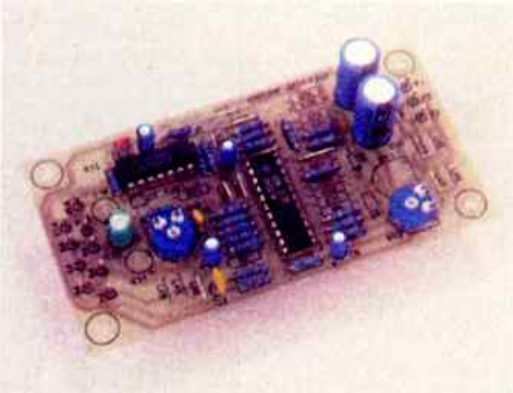
IT'S A FACT!

ROOT MEAN SQUARE

This refers to the value of a varying waveform, such as a sine wave, that dissipates the same power as it would under DC conditions. It is the square root of the mean values of the instantaneous values of the waveform. For a sine wave the root mean square (rms) is equal to the peak value divided by √2. However, for a square wave the maximum and rms values are equal.

Continued from previous page.

reduction system, a dynamic noise filter with downward expander, or a dynamic noise filter. Other possible applications include AGC circuits, voltage-controlled filters and stereo noise gates. Note that, because the module may be used in many different applications, some of the component values supplied in the kit have been assigned an arbitrary value. For this reason minor modifications may be necessary to adapt the circuit to individual purposes. The SSM2120 requires a split-rail supply and will operate over a wide range of voltages between $\pm 3V$ and $\pm 18V$. However, the device can operate from a single rail supply of between 6V and 36V. For optimum performance a regulated power supply should be used. All application circuits with the kit are optimised for use with a $\pm 15V$ power supply, or a single +30V rail.



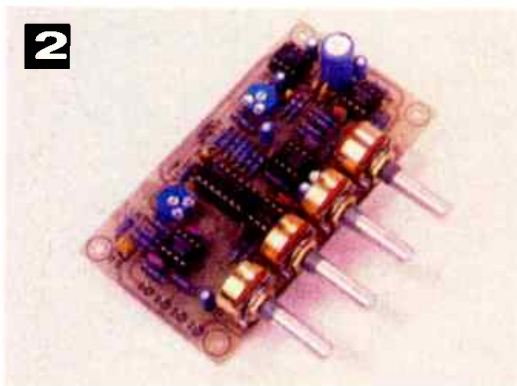
Note: The Maplin 'Get-You-Working' Service is not available for this project.

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 47. PCB dimensions: 104.1 x 53.3mm.

Order Code	Type	Price each
LP79L	SSM2120 DR Processor	£18.99
GE94C	SSM2120 DR Proc PCB	£3.49

MN3004 BUCKET-BRIGADE DELAY-LINE



Features

- ★ Variable delay of audio signal
- ★ Single +15V supply

Applications

- ★ Tremolo, vibrato and chorus effects
- ★ Variable or fixed delay of analogue signals
- ★ Telephone time compression
- ★ Delay line for voice communication systems

The MN3004 is a 512 stage, low noise, bucket-brigade delay-line. Very simply, sampled values of the analogue signal to be delayed are stored in the form of charges on a series of capacitors. Between each capacitor is a switch that transfers the charge from one capacitor to the next, upon command of a clock pulse. Analogue signals, in the audio band, can be delayed by 2.56ms to 25.6ms by adjusting the clock frequency.

The device is ideally suited for processing audio signals to produce an artificial delay in public address systems. The delayed signal has a limited bandwidth of 3.1kHz. In practice, this restricted bandwidth is hardly a problem since higher frequencies are also attenuated with natural echoes and reverberation. By varying the signal delay and the mixture of direct and delayed signals, a variety of interesting effects can be obtained.

The module requires a single well regulated +15V supply that is capable of delivering at least 40mA. Note: this is intended as a 'building block' project only, and is not eligible for our 'Get-You-Working' Service.

Specification

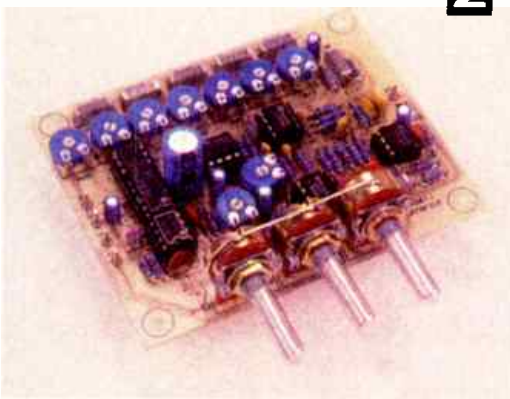
Supply voltage:	+15V DC
Supply current:	36mA
Input signal:	1Vrms typ.
Input impedance:	47k Ω
Delay time:	2ms to 24ms
Dry signal path frequency response:	4Hz to 15kHz
Delay signal path frequency response:	4Hz to 3.1kHz
Output signal level:	1Vrms
Output Impedance:	600 Ω

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 48. PCB dimensions: 104.1 x 55.9mm.

Order Code	Type	Price each
LP89W	MN3004 BBD Delay	£22.99
GE98G	MN3004 BB Delay PCB	£3.49

MN3011 BUCKET-BRIGADE DELAY-LINE



Features

- ★ 3328-stage audio signal delay with 6 output taps
- ★ Single +15V supply

Applications

- ★ Reverberation effect
- ★ Tremolo, vibrato and chorus effects

The MN3011 is a 3328 stage bucket-brigade delay-line with 6 tap outputs. Analogue signals, in the audio band, can be delayed by 1.98ms to 166.4ms by adjusting the clock frequency and making connection to the relevant output. Natural reverberation effects can also be produced by summing two or more of the six outputs. The six different and non-related delays are individually adjustable to give an optimum room simulation. Recirculation of the echoes is produced by feeding back part of the longest echo to the input. The module may be used in many different applications requiring a natural reverb effect, or even a single or multiple delay of up to 166ms e.g. reverberation effect in audio equipment; tremolo, vibrato and chorus effects; variable or fixed delay of analogue signals. Note: this is intended as a 'building block' project only, and is not eligible for our 'Get-You-Working' Service.

Specification

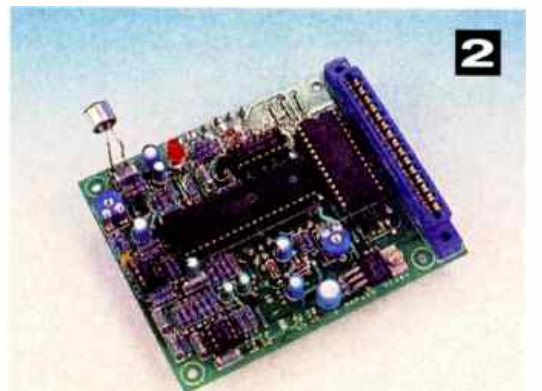
Supply voltage:	15V DC
Supply current:	40mA
Input signal level RV1 & RV2 fully clockwise:	1Vrms typ. 2.5Vrms max.
RV1 fully clockwise, RV2 fully anticlockwise:	1Vrms typ. 8Vrms max.
Input impedance:	47k Ω
Delay time:	1.7ms to 160ms
Dry signal path frequency response:	7Hz to 23kHz
Delay signal path frequency response:	8Hz to 3.3kHz
Output signal level:	1Vrms
Output impedance:	600 Ω

Kits and Special Parts

A complete kit is available and the PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 49. PCB dimensions: 95.3 x 76.2mm.

Order Code	Type	Price each
LP80B	MN3011 BBD Reverb	£49.99
GE96E	MN3011 BBD Revb PCB	£3.79

DIGITAL SPEECH RECORD AND PLAYBACK MODULE



This novel and versatile project can be used to store speech digitally, which can then be played back at the push of a button. The project is based around the UM5100 digital voice recorder and playback IC. Digital recording has the advantage over tape recording, in that there is no mechanical wear and tear. Applications include voice message pads, security systems and telecommunications. The on-board 32K SRAM memory will store between 5 and 20 seconds of speech (depending on sample rate). The module can be further expanded with an EPROM programmer module, which will allow non-volatile storage of speech in EPROM. An additional playback only module is available, which does not incorporate the record circuitry, and is intended for use with speech stored in EPROM.

Kit and Special Parts

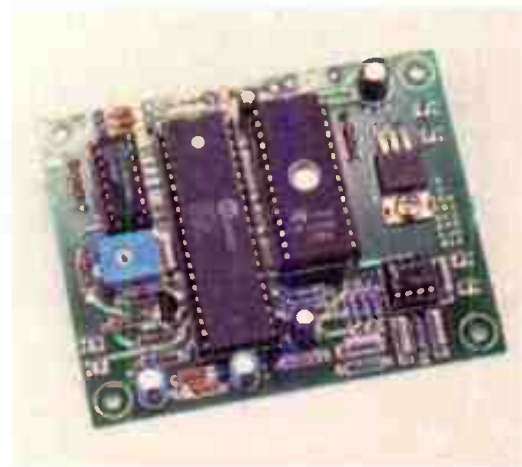
A complete kit is available and the pcb (size 108 x 86mm) is also available separately. Full construction details may be found in Maplin Magazine Issue 30. A ready assembled version is also available.

Order Code	Type	Price each
LM80B	Rec/Playbk Kit	£31.99
GD88V	Rec/Playback PCB	£11.25
AM18U	Rec/Playback Assm	£44.99

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DIGITAL SPEECH PLAYBACK-ONLY MODULE

2



This project allows messages, words and phrases stored in EPROM to be played back (EPROMs are programmed using the Digital Speech Record and Playback Module in conjunction with the EPROM Programmer, see above and below). The Playback-Only module will find applications in alarm systems and annunciator devices.

Optional Items

The following item, not included in the kit, may also be required.

Push switch 1 (FH59P)

Kit and Special Parts

A complete kit is available and the pcb (size 71 x 89mm) is also available separately. Full construction details may be found in Maplin Magazine Issue 31. A ready assembled version is also available.

Order Code	Type	Price each
LM85G	Dig Playback Kit	£16.99
GD87U	Digi Playback PCB	£9.35
AM19V	Playback Assm	£25.99

Optional Items

The following items, not included in the kit, may also be required.

2764 EPROM	1	(QQ09K)
27C64 EPROM	1	(UH43W)
27128 EPROM	1	(YH88V)
27C128 EPROM	1	(UH95D)
27256 EPROM	1	(QY75S)
27C256 EPROM	1	(UH44X)

Kit and Special Parts

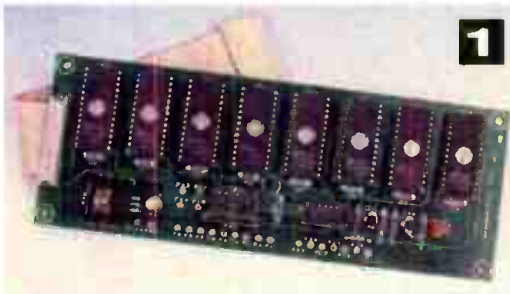
A complete kit is available (note: the 2 x 15 way edge connector is included) and the pcb (size 81 x 64mm) is also available separately. Full construction details may be found in Maplin Magazine Issue 31.

A ready assembled version is also available.

Order Code	Type	Price each
LM86T	Dig EPROM Kit	£17.99
GD89W	EPROM Extn board	£7.75
AM20W	Speech Board Assm	£26.99

DIGITAL SPEECH PLAYBACK EXPANSION

- ★ Just plugs into DIL socket of Playback Module
- ★ Wide range of applications
- ★ Up to eight EPROMs capacity
- ★ Binary or octal EPROM selection
- ★ Internal or external selection address latching
- ★ Status lines and READ indicator
- ★ Can be used with 8K, 16K or 32K EPROMs



This module has been developed to extend the versatility of the digital speech record and playback system still further. In many applications it may be required to playback more than one phrase, for instance in a domestic or commercial security and alarm system, with amateur radio for repeated calls signs and messages, or for any kind of annunciator device. The speech is held in EPROMs, previously recorded using the Speech Programmer Module. The Expansion Module itself merely plugs into the DIL EPROM IC socket of the Playback Module, with no further modifications required for the latter. The Expansion board incorporates its own on-board +5V regulator and so does not need to share the Playback Module's supply regulator, with the risk of overloading same. Up to eight EPROMs can be accommodated on the Expansion Module, but they are all required to be of the same type, i.e. all 8K, 16K or 32K capacities and not mixed. As it stands the supply regulator provided will cope with supplying power to all eight EPROMs if these are the low power CMOS 'C' versions, otherwise it is recommended that a larger external heatsink be used for the regulator.

The Playback Module treats the unit as the single device normally plugged into its EPROM socket, but accessed via a transition header. The 'address' is latched while the selected EPROM is being read by the Playback Module to prevent the message being interrupted and/or replaced by another and resulting in 'garbled' speech. Alternatively latching may be under external control and a complimentary pair of READ status lines are provided for use by external logic. A signal LED provides visible indication of a READ activity on the part of the Playback Module, this can be disabled if not required.

Optional Items

The following items, not included in the kit, may also be required.

27C64 EPROM	1-8 off	(UH43W)
27C128 EPROM	1-8 off	(UH95D)
27C256 EPROM	1-8 off	(UH44X)

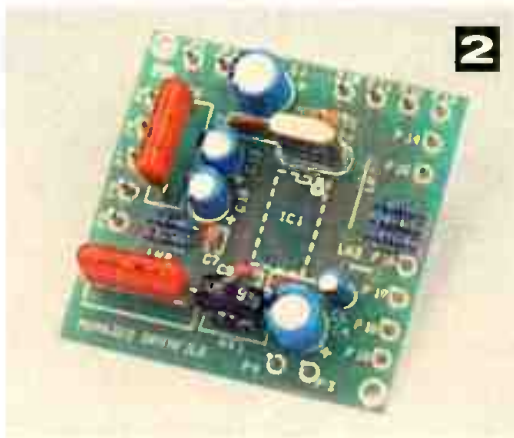
Kit and Special Parts

A complete kit including cable form is available. The pcb and cable form are also available separately. Full construction details may be found in the Maplin Magazine Issue 35.

PCB dimensions: 203 x 76mm.

Order Code	Type	Price each
LP05F	Spch ROM Exp Kit	£21.99
GE23A	ROM Exp PCB	£12.95
JP04E	Speech ROM Cable Frm	£3.95

MSM6322 SPEECH PITCH CONTROLLER



Features

- ★ Built-in microphone preamplifier
- ★ Built-in low-pass filters
- ★ Speech pitch alterable through 17 steps

Applications

- ★ Voice disguising
- ★ Children's toys
- ★ Stage shows

The SSM6322 is a real time audio pitch controller designed for speech. The IC (only available in surface mount) contains a fourth order low-pass input filter, an 8-bit A to D, and 9-bit D to A converters with a third order low-pass filter output, as well as a microphone preamplifier. Make your voice sound like 'Mickey Mouse' or 'Darth Vader'. The device uses a 4MHz clock, and there is decoupling for both analogue and digital supplies. Gain of the microphone preamp is set to 42dB, whilst the line preamp varies from 0 to 40dB. A supply of 5V, capable of delivering 10mA is needed. Sounds can be created by using the up/down modes and distorting the input signal, producing stunning audio effect.

Note: this is intended as a 'building block' project, and not eligible for our 'Get-you-working' service.

Kit and Special Parts

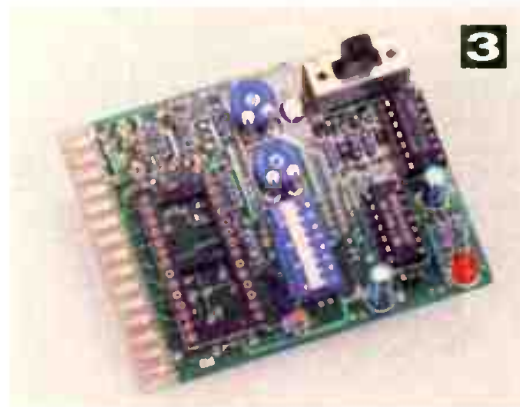
A complete kit is available and the pcb (size 51 x 51mm) is also available separately. Full construction details may be found in Maplin Magazine Issue 44. A ready assembled version is also available.

Order Code	Type	Price each
LP58N	MSM6322 Kit	£13.99
GE78K	MSM6322 PCB	£1.75
AM21X	MSM6322 Assm	£19.99

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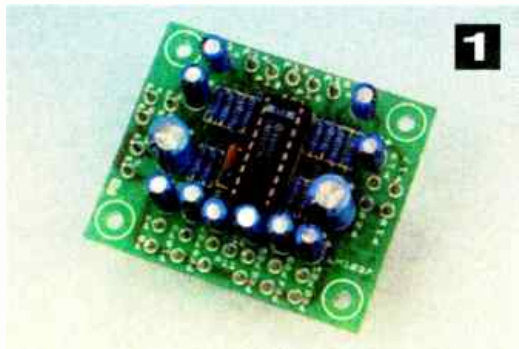
DIGITAL SPEECH EPROM PROGRAMMER

3



This project is an extension to the Digital Speech Record and Playback Module which can digitise speech and store it in RAM. The speech can then be replayed. The 32K static RAM supplied with the kit provided a record/play time of 20 seconds, but had the disadvantage of 'total amnesia' once the supply was removed. In applications such as annunciators or alarm systems, it is required that speech be stored permanently. It is the purpose of this project to store speech indefinitely in EPROM. The speech may then be replayed using the Digital Speech Playback-Only Module (see above). The EPROM programmer plugs into the Record and Playback module from which it obtains the necessary speech data.

LM1037 DUAL FOUR CHANNEL ANALOGUE SWITCH



1

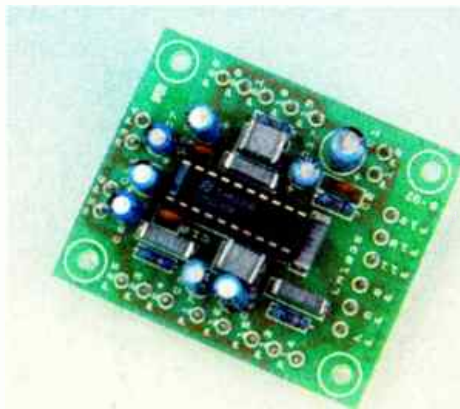
An application circuit for the LM1037 dual four channel analogue switch IC, incorporating an internal muting facility. The device is suitable for a wide range of switching applications including multiplexing and stereo source selection. Each channel is selected by one of four control inputs to which a DC voltage is applied. Each control pin selects a different input channel. It is possible to switch an increased number of channels by using two PCB's and connecting the mute inhibit pins together. Note: As this kit and board are intended to be a 'building block' project, they are not eligible for our 'Get-you-working' service.

Kit and Special Parts

A complete kit of parts is available. The high quality PCB is also available separately. Full construction details may be found in the 'Data File' in Maplin Magazine Issue 34. PCB dimensions: 58.4 x 48.3mm.

Order Code	Type	Price each
LP06G	LM1037 Kit	£8.99
GE19V	LM1037 PCB	£2.49

LM1035 DUAL DC OPERATED TONE/VOLUME/BALANCE CONTROL



1

An application circuit for the LM1035 stereo voltage controlled tone, volume and balance control IC, incorporating provision for loudness compensation. Control is achieved by applying a voltage to four separate control inputs. The control voltage may be either externally derived or taken from an internal stabilised reference voltage using a potential divider network.

Printed Circuit Board

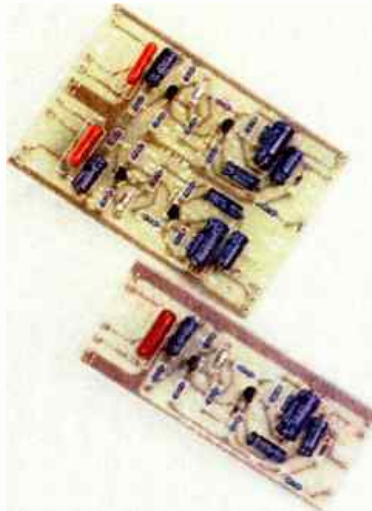
A PCB only is available for the LM1035 application circuit. Full construction details may be found in the 'Data File' in Maplin Magazine Issue 33. Note: As this board is intended to be a 'building block' project it is not eligible for our 'Get-you-working' service.

Order Code	Type	Price each
GE18U	LM1035 PCB	£2.65

GENERAL PURPOSE PRE-AMPLIFIER AND MIXER KITS AND MODULES

A range of very high fidelity pre-amp circuits for high quality audio applications. We recommend the use of our 'Low Noise Screened' cable (XR18U) for all interconnections. Most of the following circuits are fully documented in the Mixer Book XL47B.

General Purpose Input Module



2

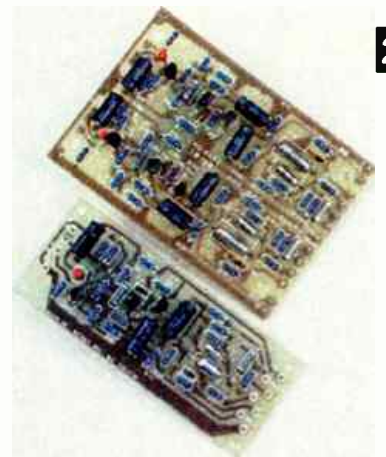
This input amp is suitable for use with any previously amplified signal or electronic musical instruments, electric guitar etc. and acts as a buffer and level matcher. It is not suitable for very low output microphones, where the Pick-Up/Mic input module should be used. Input signal levels above 275mV can be handled by adding a 220kΩ potentiometer (not supplied with kit or module) to the input which provides continuously variable attenuation down to nearly 0V. Available as mono or stereo in kit form or as ready built modules.

Specification

Input impedance	100kΩ (>60kΩ with pot)
Max input signal	275mV r.m.s. (777mV peak)
Max output signal (pre-clipping)	2.2V r.m.s. (6.2V peak)
I/P Signal for 450mV O/P	55mV r.m.s. (155mV peak)
Frequency response	20Hz - 200kHz (-3dB)
Distortion	0.025%
Noise	75µV (-80dB)
PSU	+30V DC @ 25mA, both versions
Dimensions of pcb:	Mono 100 x 40mm. Stereo 100 x 70mm.

Order Code	Type	Price each
LK81C	Gen Prp I/P mono Kit	£4.75
LK82D	Gen Purp I/P Str Kit	£8.49
YM15R	Gen Prp I/P mono Ass	£8.99
YM16S	Gen Purp I/P Str Ass	£13.99
LR15R	HQ Mixer PCB No.4	£2.65
LR34M	HQ Mixer PCB No.24	£4.75

Cartridge or High Impedance Microphone Module



2

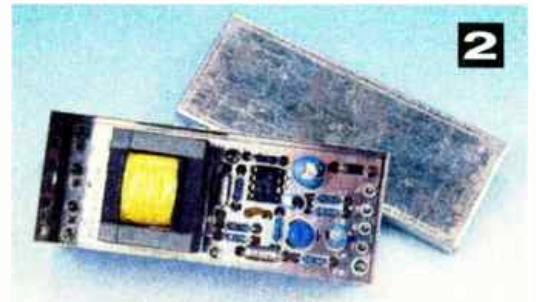
This module is available in either mono (single channel) or stereo (dual channel) versions; the circuit diagram shown in Issue 18 is for the left hand channel only of the stereo version, but the circuit is common to mono and stereo. This input amp is suitable for use with magnetic and high impedance ceramic cartridges, and high impedance microphones. Both versions available as a kit or as a ready built module. Negative feedback networks are provided on the board for either high impedance or electret microphone, magnetic pick-up or ceramic cartridge, any of which may be hard-wired with links or switch selected.

Specifications

	Mic	Magnetic PU	Ceramic PU
Input impedance	56kΩ	56kΩ	200kΩ
Input signal level	25mV	5.5mV	100mV
Max output before clipping	7.75V rms (22V Pk)		
Total harmonic distortion	Better than 0.2%		
Frequency response	Flat (-3dB @ 40kHz) to RIAA ±1dB		
Signal to noise ratio	Better than 90dB		
PSU Max, 30V DC @ 12mA (stereo) @ 6mA (mono)			
Dimensions of pcb:	Mono 100 x 40mm. Stereo 100 x 70mm.		

Order Code	Type	Price each
LK91Y	Hi-Z Mic Stereo Kit	£10.99
LK92A	Hi-Z Mic (Mono) Kit	£5.75
YM25C	Mic I/P Stereo Assem	£17.99
YM26D	Hi-Z Mic Mono Assem	£10.99
GD11M	Hi-Z Mic (Mono) PCB	£1.99
LR13P	HQ Mixer PCB No.2	£3.49

Low Impedance Microphone Module



2

This input amp is suitable for use with balanced and unbalanced low impedance microphones in the range 200Ω to 600Ω, where extremely high quality and low noise are the criteria. Signal gain is pre-settable to system requirements. The module is available in mono form only, and includes its own special screening case. Available as a kit or a ready built module.

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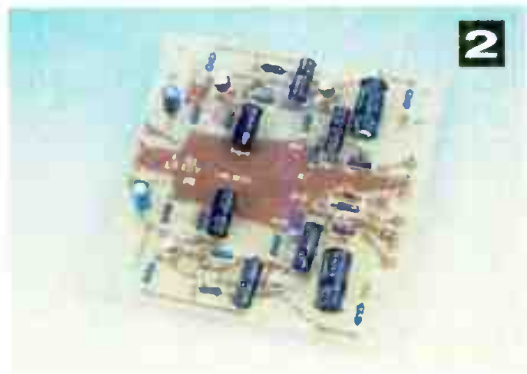
Specifications

Input Impedance	600Ω balanced (300 - 0 - 300Ω)
Typical Signal Levels	1.25V out for 1mV in
Maximum Output Level	2V r.m.s. (5.6V Pk)
Gain	30 to 50dB Variable
Signal to Noise ratio	80dB
Distortion	0.02% @ 1kHz
Frequency response	50Hz to 30kHz (-1dB)
Power supply, 9V @ 3mA	
Dimensions, 90 x 35 x 31mm.	

Order Code	Type	Price each
LK80B	Low Z Mic Preamp Kit	£17.99
YM14Q	Low Z Mic Preamp Assm	£22.99
GD34M	Lo-z Mic Preamp PCB	£2.99
FD20W	Lo-z Mic Preamp Case	£3.49

Mixer Amp Module

Any number of input circuits may be connected each via its own 22k resistor to the input of this circuit, which uses the 'virtual earth' mixing technique. Unit gain is approximately x3. Supply regulation is included on the board. The output can be fed to a power amplifier, tape recorder etc., or, if a master volume control is required, connect the output across a 10k log pot and connect the slider to the input of a line amp or filter module. The circuit diagram shown in Issue 18 is for one channel, but the mixer amp is available as a stereo pair only, either in kit form or as a ready built module. No 22kΩ input resistors are provided with kit or module.

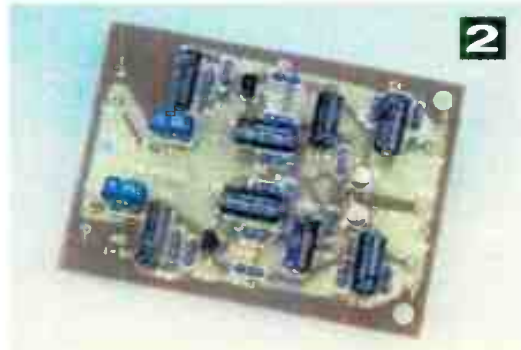


Specification

Frequency response	15Hz to 60kHz -3dB
Maximum input signal	5V peak to peak into 22kΩ
Maximum output signal	15V peak to peak (pre-clipping)
Distortion	0.02% @ 1kHz
Noise level	100µV
PSU 30V DC @ 14mA	

Order Code	Type	Price each
LK86T	Mixer Amp Kit	£7.49
YM20W	Mixer Amp Assembled	£12.99
LR22Y	HQ Mixer PCB No.7	£3.49

Line Amp Module



A high level buffer stage and output driver with a maximum gain of 20dB (=x10); a preset is included for any gain below this down to $-unity$. The output of a mixer amp or fader unit may be connected to this module, which then outputs to a power amplifier or tape recorder etc. The module has a specifically low output impedance ideal for driving into long signal

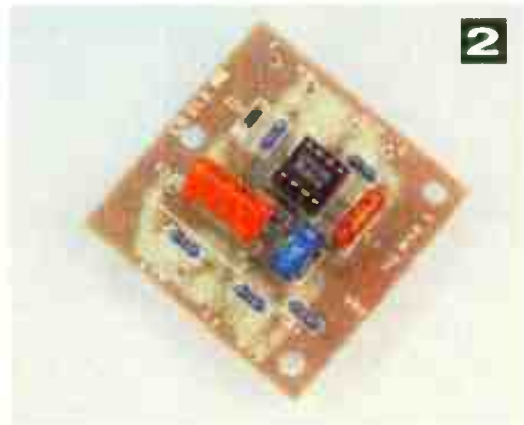
leads or multiple inputs. The circuit diagram shown in The Mixer Book is for one channel, but the module comprises two identical circuits for stereo. This circuit is not suitable for low level inputs from pick-up or microphone etc. Available in kit form or as a ready built module.

Specification

Frequency response	10Hz to 100kHz flat
Maximum output level	26V peak to peak (pre-clipping)
Minimum input signal level for full output	2.6V peak to peak
Maximum input level	Continuously variable
Gain	20dB or x10
Distortion	0.02% THD
PSU 30V DC @ 14mA.	
Dimensions of pcb: 85 x 60mm.	

Order Code	Type	Price each
LK87U	Line Amp Kit	£6.49
YM21X	Line Amp Assembled	£10.99
LR23A	HQ Mixer PCB No.8	£2.99

Peak Overload Detector Module



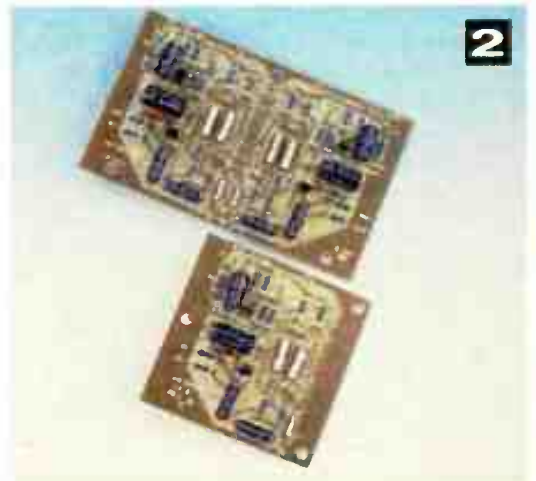
The peak detector is a simple comparator circuit with a variable triggering threshold, which can be set to light the LED indicator on input signals between 0.28 to 1.27 V peak. It has two mixer inputs for mono or stereo use, and serves as a signal overload indicator, giving warning of a signal level approaching the onset of clipping and distortion. Available as a kit or a ready built module, neither of which include the LED.

Specification

Input frequency range	1Hz to 10kHz (@ 450mV)
Min input level	6mV r.m.s.
Adjustable to	450mV r.m.s. @ 1kHz
PSU 30V DC @ 12mA; including LED.	
Dimensions of pcb: 50 x 50mm.	

Order Code	Type	Price each
LK85G	Peak Overload Kit	£3.75
YM19V	Peak Overload Assbld	£6.99
LR21X	HQ Mixer PCB No.6	£2.25

Tone Control Module



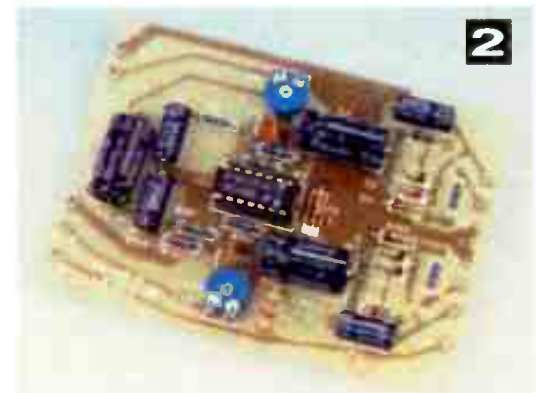
This circuit may be connected directly to the output of any of the input circuits shown here, and the volume control should then be connected across the output of this circuit. A maximum input signal of 450mV is recommended to extract the maximum signal to noise ratio, and this allows full boost to be applied without distorting the waveform, approaching 11.5V peak-to-peak before clipping occurs. Note that the output is AC coupled but has no earth leakage resistor, so if balance volume controls are not fitted here then a 'pull-down' resistor (4-7kΩ to 10kΩ) should be connected between output and 0V. Available in mono or stereo in kit form or as ready built modules. 470kΩ bass and 100kΩ linear tone control pots are not supplied with the kit or module.

Specification

Bass control	±18dB @ 20Hz
Treble control	±16dB @ 10kHz
Frequency response (Flat)	10Hz to 40kHz
Input signal level	450mV r.m.s.
Output signal level, controls set 'flat'	500mV r.m.s.
Max pre-clipping output	4V r.m.s.
Distortion (@ 1kHz)	0.05% THD
Noise level	150µV (-74dB)
PSU 30V DC @ 2.0mA stereo, 1mA mono.	
Dimensions of pcb: Mono 70 x 70mm. Stereo 105 x 70mm.	

Order Code	Type	Price each
LK83E	Tone Cntrl mono Kit	£4.75
LK84F	Tone Cntrl Stero Kit	£8.49
YM17T	Tone Cntrl mono Ass	£8.99
YM18U	Tone Cntrl Stero Ass	£13.99
LR16S	HQ Mixer PCB No.5	£2.25
LR35Q	HQ Mixer PCB No.25	£3.25

VU Meter and Headphone Monitor



A common pcb is used for one of two modules for either driving twin VU meter movements, or a pair of stereo headphones but not both simultaneously. If both VU and monitor are required, then one of each kit/module will be needed, both connected at the same signal source. Each channel input can be adjusted for

Continued on next page.



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Continued from previous page.

the required output level using 'on board' presets. Such a module would normally be used for monitoring pre-amp output signal lines in a mixer, hi-fi or disco etc. system, each line being selected by suitable switching. Alternatively it could be used as a low power, low cost stereo headphone driver for most audio applications. Note that component changes may be necessary if intending to use the monitor to drive headphones with an impedance much greater than 16Ω. The input sensitivity is continuously variable down to ∞unity. Note that the VU meters are not supplied with the VU meter kit/module, but can be selected to suit constructor's front panel style. The specifications quoted below are for the VU module when used with the dual VU meter YQ47B. Additional test gear may be required if it is desired that the output be a true representation of the decibel scale during setting up. Available in stereo only.

Specification

Basic frequency response	50Hz to 20kHz flat
Min input sensitivity, monitor	75mV
Min input sensitivity, VU driver	18mV for 0dB on scale
Max output level, monitor	10V peak to peak unloaded, 150mV into 8-16Ω

PSU Max +30V DC @ 40mA

Dimensions of pcb: 100 x 70mm.

Order Code	Type	Price each
LK88V	VU Meter Kit	£14.99
LK89W	Headphone Monitr Kit	£11.49
YM22Y	VU Circuit Assembled	£19.99
YM23A	Monitor Assembled	£15.99
LR25C	HQ Mixer PCB No.10	£3.99

Mixer Book

The circuits shown above are described in detail in the Mixer Book. It also includes details on how to connect the modules in several typical applications.

Order Code	Type	Price each
XL47B	The Mixer Book	£2.99 NV

MICROSONIC AUDIO BOOSTER



- ★ Audio AGC system
- ★ Fast attack
- ★ Battery state indicator
- ★ Minimal wiring

There are several commercially made hearing boosters currently available, but the majority are only simple headphone amplifiers. Because of this the volume control has to be constantly adjusted to suit the audio environment. The Microsonic Audio Booster has a distinct advantage in that it incorporates a Voice Operated Gain Adjustment Device (VOGAD). It is designed to accept small signals from a microphone and provide an essentially constant output signal from an input covering a range of 50dB. In real terms this means that once set to a comfortable listening level, the volume control seldom requires re-adjusting. The Microsonic requires a PP3 battery to operate. The voltage condition of the battery is continuously monitored and displayed by a red LED indicator.

Specification

Power supply voltage:	+4.5V to +9V DC
Power supply current:	100mA (+9V Supply, Max Volume)
Low battery indicator:	+6V Threshold
Microphone:	Electret
Preamp gain:	52dB
Output impedance:	16Ω (Minimum)
Output power:	200mW
Frequency bandwidth:	300Hz to 3kHz (-3dB)

Optional Items

The following items, not included in the kit, may also be required.

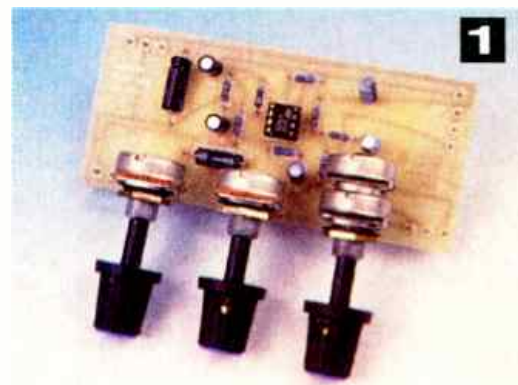
Alkaline Battery	1	(FK67X)
Mini Phones	1	(ZB91Y)

Kit and Special Parts

A complete kit of parts (including the PCB, front panel and instruction leaflet) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 55.

Order Code	Type	Price each
LP52G	Microsonic Pre-Amp	£17.99
GH12N	Microsonic PCB	£2.49
CP47B	Microsonic F/Panel	£1.20

PLAY ALONG MIXER



One way of improving one's skill on an electronic instrument is to play along to a record or tape. This is becoming an increasingly popular practice method and can be done with no special equipment. A hi-fi or record player provides the programme and a practice amp or combo is used to output the instrument. More realistic and better results can be achieved however if the two signals are mixed such that the total sound originates from the same audio system. The Play Along Mixer combines the output from the instrument with the record or tape programme, and outputs this to the stereo. Separate level controls for each source are provided, together with a panning control so that the instrument can be blended into the stereo image in a very realistic manner. Connection into the system is simple using standard 1/4 in. jack plugs for the stereo and a mono 3.5mm input for the instrument. Uses one 9V battery (PP6).

Kit and Special Parts

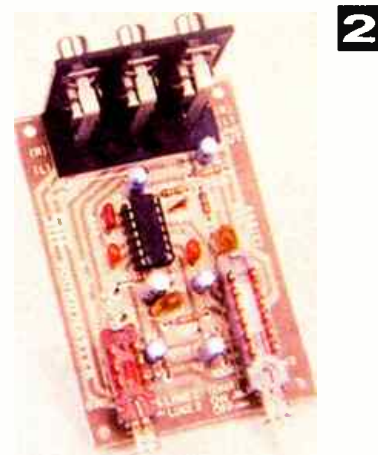
A complete kit of all parts, but not including battery. The pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 5.

PCB dimensions: 113 x 51mm.

Order Code	Type	Price each
LK93B	Play Along Mixer Kit	£19.99
GD10L	Play Along Mixer PCB	£2.65

STEREO DYNAMIC NOISE REDUCTION MODULE SM666

A Soundmaster Kit



The SM666 Dynamic Noise Reduction System is designed to reduce noise from cassette tape, long play records and weak FM radio reception. The heart of the system is the LM1894 Dynamic Noise Reduction (DNR) IC, which employs voltage controlled active filters offering attenuation of unwanted noise over a range of 10dB. The system does not encode recordings or require source material to be encoded (as with Dolby like systems), and is a 'playback only' processor operating with any music source including Dolby B encoded tapes.

The module operates from a single 9 to 12V DC

FOR TOP QUALITY & VALUE!

Power Supply Module



A dual output, continuously voltage variable power supply regulator module capable of supplying up to 300mA each output simultaneously, or 500mA one single output only. Presets are provided on the board for setting any output voltage from 1.5V to 30V DC. Short-circuit protection is built into the regulator IC's. The module uses a toroidal transformer to maintain a low level hum field. With an 80dB-ripple rejection the module is suitable for use with all of the above pre-amplifier/mixer modules. It can also find applications as a general purpose PSU for other uses, and the presets may be replaced with potentiometers to form a basic, voltage variable bench power supply. Dimensions of pcb: 169 x 91mm.

Order Code	Type	Price each
LK90X	B1 Mixer PSU Kit	£22.49
YM24B	A1 Mixer PSU Assembled	£27.99
GD25C	Mixer PSU PCB	£3.65

supply at 25mA average. It is provided with two pairs of line input phono sockets which can be selected via a push-button switch as 'Line 1' or 'Line 2'. Output is via a stereo pair of phono sockets, and the DNR function can be bypassed or switched out of operation by a second push-button switch. In this mode the selected input is connected directly to the output.

Specification

Supply voltage range:	9 to 12V DC
Average supply current:	20mA max.
Max. allowable input signal:	3.5V r.m.s. @ 1kHz
Min. input signal for flat frequency response:	300mV
Input impedance:	20kΩ
Noise reduction:	-10dB @ 20kHz -5dB @ 5kHz -4dB @ 1kHz

Total harmonic distortion, 300mV input for full bandwidth of 20kHz: <0.04%

The module can be used as part of a music or hi-fi system and can reduce surface noise from records and noisy tape recordings not made with a Dolby like noise reduction process. As it stands the module offers noise reduction with a performance comparable to Dolby B.

A review of this kit can be found in the Maplin Magazine issue 40. It also describes simple modifications that can be performed on the basic kit to improve the performance of the system.

Kit

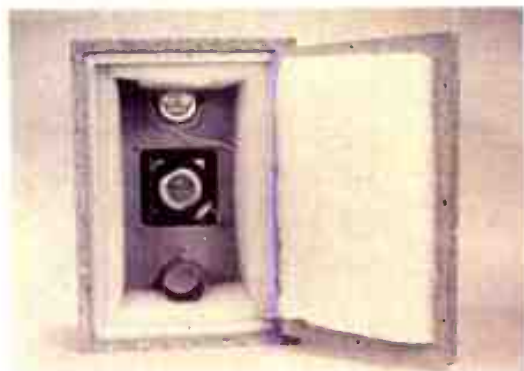
The DNR module is only available as a complete kit. No individual parts such as the PCB and the IC are available separately.

A ready assembled version is also available.

Order Code	Type	Price each
LP21X	DNR Filter	£12.99
AM06G	DNR Filter Assm	£18.99

HI-FI LOUDSPEAKER PROJECTS

3



By choosing any one of these three designs you will benefit from the superb reproduction quality of driver units chosen from our range of loud speakers from a well known French manufacturer. In purchasing any of these kits you will need to supply and assemble the majority of the chip-board cabinet as only the front baffle and tuning duct is supplied with the kit. Full details on how to do this are supplied with the kit. Three versions are available.

Specification

23-litre Enclosure

23-litre tuned bass reflex with ferro-fluid, horn loaded dome-tweeter.	
Cross-over:	2.7kHz (modified)
Power rating:	50W peak, 25W r.m.s.
Maximum signal:	40V peak, 14.2V r.m.s.
Frequency response:	(+4dB @ 60Hz)
Impedance:	8Ω
Approx. dimensions of cabinet:	42cm high x 32.8cm wide x 22.8cm deep

20-litre Enclosure

20-litre bass, high frequency ferro-fluid wide dispersion dome tweeter and passive river.	
Cross-over:	2.5kHz (modified)
Power rating:	60W peak, 25W r.m.s.
Frequency response:	40Hz to 15kHz
Impedance:	8Ω
Approx. dimensions of cabinet:	53cm high x 26cm wide x 21cm deep

16-litre Enclosure

16-litre bass, horn loaded ferro-fluid dome tweeter.	
Cross-over:	not used
Power rating:	40W peak, 30W r.m.s.
Frequency response:	40Hz to 18kHz
Impedance:	8Ω
Approx. dimensions of cabinet:	44cm high x 21cm wide x 25cm deep

All the cabinets are made from panels of high density chipboard, either 19mm or 15mm thick. Prepared lengths of 15mm or 25mm square softwood will also be required. Only the baffle panels are included in the kits. Full details of the cutting list will be found in the construction details.

Optional Items

The following items are not included in any of the kits but may be required for assembling the projects.	
Impact Adhesive	(FL43W)
Rubber Sealer	(YJ91Y)
Lever Terminal 2-way	(BW72P)
Hi-Fi Loudspeaker Cable	(XR72P)

Special Parts

A kit for each enclosure is available, comprising baffle panel, tuning duct, crossover module where required, duct as required, and all driver units. Additional woodwork to complete the enclosures is not included. Full construction details may be found in the Maplin Projects Book 22 (23 litre version), Maplin Magazine Issue 27 (20 litre version) and 28 (16 litre version).

Order Code	Type	Price each
LM21X	F9 23 Litre Cabinet Kit	£41.99
LM54J	E8 3way 20litre Cab Kit	£57.99
LM59P	C6 2W16L Kit	£34.99

HIGH POWER LOUDSPEAKER CABINET



A very high quality, superb sounding, high power loudspeaker system (2 way 70 litre). The most common size of loudspeaker that is practical for use in disco's, stage and PA applications is the 12 inch model. On its own, the high frequency response is

limited to approximately 5 to 6kHz on single cone versions and although this may be suitable for bass and lead guitar work the response is too low for most music applications. To extend the high frequency performance to 20kHz or more it becomes necessary to add an HF driver unit to the system and mount the speakers together in a cabinet. At the low frequency end, performance is very much determined by both the design of the 12 inch speaker and the cabinet into which it is mounted. This design for a 2 way 70 litre cabinet offers the choice of using a number of different 12 inch loudspeakers. To tailor the overall response to suit the application and speakers used, the dimensions of the tuned port are altered.

Optional Items

The following items are not included in the kit but may also be required.

Large Rubber Foot	4 off	(FP02C)
Castors (pair)	2 off	(FX96E)
Recess Handle (side)	2 off	(LH08J)
Spkr 12in 50W GP 8R	1 off	(XG47B)
Spkr 12in 50W GP 16R	1 off	(XG48C)
Spkr 12in 100W GP 8R	1 off	(XG49D)
Spkr 12in 100W TC 8R	1 off	(XG50E)
Spkr 12in 100W TC 16R	1 off	(XG51F)
150W 12in Bass Spkr	1 off	(XJ49D)

Also required

HD Chipboard
38mm Chipboard Screws
Resin 'W' Adhesive
Contact Adhesive
Staple Gun

Kit and Special Parts

A complete kit of parts, excluding optional items. HD chipboard and additional woodwork materials are NOT included. The pre-cut front baffle is also available separately. Full construction details may be found in Maplin Magazine Issue 33.

Order Code	Type	Price each
LM81C	E19 2W70L Cabinet Kit	£99.99
XM09K	C5 Baffle 2W70L	£7.99

4 WAY SPEAKER SWITCH



- ★ Din Sockets
- ★ Stereo Interlocked Switches
- ★ Fuse Protection on both Channels
- ★ High Quality Metal Case & Fibre Glass PCB

This four way speaker switch can be used with domestic hi-fi's with output power not exceeding 45W. The unit can be used to compare between differing sets of speakers, or to direct the output of your hi-fi to another room in the house.

Optional Items

The following items are not included in the kit, but may also be required.

Fuse 20mm 2A	As req	(WR05F)
DIN L/S Plug	As req	(HH24B)
Slidrs 2-pin DIN Plug	As req	(FM42V)
Slim DIN L/S Plug	As req	(FP13P)
Dinpak M	As req	(RW25C)
Dinpak P	As req	(RW27E)
Dinpak 262	As req	(RW44X)
Dinpak 273	As req	(RW45Y)
Dinpak 275	As req	(RW47B)
Zip Wire	As req	(XR39N)

Continued on next page.

Continued from previous page.

HD Loudspeaker cable As req (XR60Q)
Hi-Fi Loudspeaker cable As req (XR72P)

Kit and Special Parts

A complete kit of parts, excluding optional items is available. The following items are also available separately, a pre-drilled and printed case, and a high quality fibre-glass PCB. Full construction details may be found in Maplin Magazine Issue 30. PCB dimensions: 203.2 x 50.8mm.

Order Code	Type	Price each
LM77J	C1 4W Spkr Switch Kit	£33.99
YT63T	A1 4W Spkr Switch Box	£22.99
GD92A	4W Speaker PCB	£4.25

VELLEMAN AUDIO PROJECTS

K4020 300W STEREO/600W MONO MOSFET AMPLIFIER



Features

- ★ High power
- ★ Low distortion
- ★ Highly efficient
- ★ Comprehensive protection circuitry

Applications

- ★ Hi-fi systems
- ★ Disco applications
- ★ Laboratories
- ★ Studio monitoring

Two 300W mono MOSFET amplifier modules (Velleman Kit K4010) can be combined into a superb 300W stereo version, or a bridged 600W mono amplifier. A very special circuit design ensures the output stage always produces a Class A configuration, without loss of unnecessary power. The amplifier requires no adjustment and features speaker switch-on delay and protection, as well as thermal and short-circuit protection. The kit includes transformer, housing and all necessary heatsinks. An optional LED power meter K4021 is available separately.

Specification

Power output per channel	
Music power:	300W into 4Ω, 200W into 8Ω (600W bridged operation)
rms power:	150W into 4Ω, 100W into 8Ω (300W bridged operation)
Power output bridged	
Music power:	600W
rms power:	300W into 8Ω
Harmonic distortion:	0.008% @ 1W 1kHz, 0.04% @ 90W 1kHz
Damping factor:	>300
Input impedance:	47kΩ
Input sensitivity:	1V rms
Frequency response:	3Hz to 120kHz (-3dB)
Power bandwidth:	5Hz to 50kHz (-1dB)
Signal-to-noise ratio:	112dB (A-weighted at full power)
Protection:	Thermal, DC and short circuit
Speaker switch-on delay:	2 seconds
Speaker DC protection	
trip voltage:	±1V
Thermal protection	
trip temperature:	90°C
Efficiency:	>70%
Power consumption:	440W maximum
Dimensions:	427 x 95 x 382mm (including connectors and feet)

Additional Component Parts List for Kit

Zip Wire	30cm	(XR39N)
Solder Tag M3	1	(LR64U)
Spade Terminal	4	(HF10L)
Spade Terminal Cover	4	(FE65V)
Fuse 20mm 5A	1	(RA12N)
Heatshrink Sleeving CP32	5cm	(BF88V)
Wire 32/0.2 Green/Yellow	5cm	(XR38R)
Double Bubble Epoxy Glue	1	(FL45Y)

Optional Items

The following items, not included in the kit, may also be required.

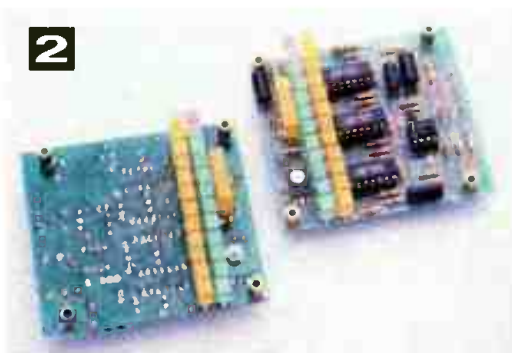
Nylon Mains Plug 13A	1	(RW67X)
Fuse 5A	1	(HQ33L)
IEC Mains Lead	1	(BW99H)
Insulating Boot for Fuseholder	1	(FT35Q)
Insulating Cover for Mains Connector	1	(JK66W)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 71.

Order Code	Type	Price each
VF17T	H29 Velleman Kit K4020	£299.99

K4021 POWER METER FOR 300W/600W MOSFET AMPLIFIERS



Features

- ★ 12-LED display
- ★ LED scale illumination
- ★ Wide range of power indication

Applications

- ★ 300W/600W MOSFET amplifier
- ★ Power monitoring for your own amplifier
- ★ In-car audio
- ★ Disco equipment

These power meters are designed to give a visual representation of the output power from amplifiers built around the 300W MOSFET amplifier modules (Velleman Kit K4010). A visual indication of the instantaneous power output of your amplifier is useful in that you can 'see' if you are about to exceed the loudspeakers, maximum input power level, or by running the amplifier into clipping, which can easily damage the tweeters.

Two boards, one board for each channel, are mounted vertically to provide a professional visual display of power output for each channel. If the amplifiers are bridged, the meters are mounted horizontally and connected in series. Each board uses 12 LEDs to indicate the power out, and 16 LEDs for scale illumination. The scales can be 0.001W to 100W/8Ω or 0.002W to 200W/4Ω (mounted vertically) or 0.001W to 400W/8Ω (mounted horizontally, divided over 24 LEDs) for bridged mono. The boards require ±40V DC that is supplied by the amplifier.

Specification

Number of LEDs (power indication):	12
Number of LEDs (scale illumination):	16
Power supply (from amplifier module):	±40V DC at 60mA (maximum)
PCB size:	72 x 78mm

Scale (8Ω load, 300W):	0.001W, 0.005W, 0.01W, 0.05W, 0.1W, 0.5W, 1W, 5W, 10W, 50W, 75W, 100W
Scale (4Ω load, 300W):	0.002W, 0.01W, 0.02W, 0.1W, 0.2W, 1W, 2W, 10W, 20W, 100W, 150W, 200W
Scale (8Ω load, 600W bridge mode):	0.001W, 0.002W, 0.005W, 0.01W, 0.02W, 0.05W, 0.1W, 0.2W, 0.5W, 1W, 2W, 5W, 10W, 15W, 20W, 40W, 60W, 80W, 100W, 150W, 200W, 250W, 300W, 400W

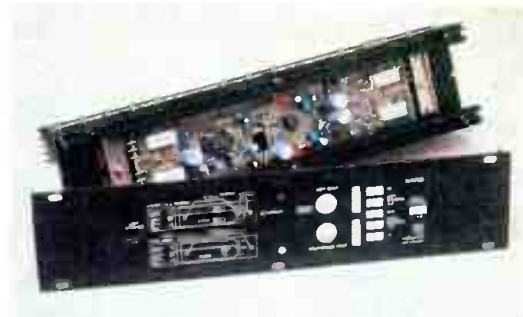
Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 72.

Order Code	Type	Price each
VF18U	Velleman Kit K4021	£32.99

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K4005 400W MONO/STEREO AMPLIFIER



Universal, solid and compact stereo amplifier for use as a built-in module or free-standing in an enclosure. This powerful amplifier, having a total music power of 400W, can be arranged as a stereo amplifier with 2 x 100W rms (4Ω) or 2 x 75W rms (8Ω) outputs, or as a mono amplifier with an output of 200W rms. The amplifier is protected against overload, short circuit, incorrect polarity and thermal overload. Includes heatsink.

Specification

Output power:	400W music power 2 x 100W rms into 4Ω or 2 x 75W rms into 8Ω
Mono-bridged power:	200W rms into 8Ω
Harmonic distortion:	0.003% at 1kHz
Signal to noise ratio:	96dB
Input impedance:	22kΩ
Input sensitivity:	150mV, 500mV, or 950mV switchable
Damping factor:	>2000 at 100Hz
Power supply:	±28V DC
Power supply	
- 2 x 4Ω:	±30V to 35V DC 5A max
- mono bridge:	±30V to 35V DC 5A max
- 2 x 8Ω:	±40V to 45V DC 2.5A max
Dimensions:	350 x 85 x 62mm

Order Code	Type	Price each
VF40T	H10 Velleman Kit K4005	£59.99

K4000 STEREO VALVE AMPLIFIER



- 95W in class A/B1
- 2 x 200W music power
- 10 valves on view
- Chrome covers for power supply and amplifiers
- 4Ω and 8Ω loudspeaker terminations

SUPERB QUALITY!
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Most of us cannot afford a ready-built high power valve amplifier, but this kit changes all that, so that anyone can enjoy the superb valve sound. To many people, the sound of valves can not be surpassed either by bipolar transistors or FETs. In developing this amplifier, special attention was paid to the housing. Indeed, it was decided to not hide the expensive valves, so that your eyes can have something to enjoy. Four EL34s are used in each channel to generate the high power output. Very high quality toroidal core ultra-linear output transformers are employed to provide outstanding sound quality.

Kit and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issues 51/52.

Specification

Output power:	2 x 200W music power 2 x 95W rms in class AB 2 x 15W in class A	S/N ratio:	102dB (A-weighted) at 95W
Output impedance:	4Ω or 8Ω	Channel separation:	67dB at 95W
Power bandwidth:	10Hz to 60kHz (-3dB at max. output)	Input impedance:	100kΩ
Frequency band:	4Hz to 100kHz (-3dB ref. 1W)	Input sensitivity:	0dB (0.775mV rms) for 95W
Harmonic distortion:	0.08% (1kHz/1W) 0.63% (1kHz/max. output power)	Damping factor:	25
		Overall feedback:	18dB
		Weight:	20kg
		Dimensions:	425 x 130 x 350mm

K4010 300W MONO MOSFET AMPLIFIER



Features

- ★ High power
- ★ Low distortion
- ★ Highly efficient
- ★ Comprehensive protection circuitry

Applications

- ★ Hi-Fi systems
- ★ Disco applications
- ★ Laboratories
- ★ Studio monitoring

Some audio applications demand high power levels, such as disco equipment, public address systems, laboratory experiments, and very large living rooms! This amplifier, an 'efficient' Class A design, will provide 300W music power into 4Ω. The amplifier gets around the inefficiency problem by a clever design which incorporates the use of a 'dynamic' (sometimes known as sliding) biasing technique. As a result, it has an efficiency of more than 70%, which is more in keeping with its Class B and AB cousins, but without the problem of crossover distortion.

This amplifier is the mono version of K4020 but without the casing.

Ideally suited for use in disco sound installations, PAs and active speaker systems. Two of these amplifiers, can be combined, both physically and electrically, into a 300W per channel stereo amplifier, or a 600W mono bridge amplifier (Velleman Kit K4020 VF17T).

Specification

Music power:	300W into 4Ω, 200W into 8Ω
rms power:	150W into 4Ω, 100W into 8Ω
Harmonic distortion:	0.008% at 1W 1kHz, 0.04% at 90W 1kHz
Damping factor:	>300
Input impedance:	47kΩ
Input sensitivity:	1V rms
Frequency response:	3Hz to 120kHz (-3dB)
Power bandwidth:	5Hz to 50kHz (-1dB)
Signal-to-noise ratio:	112dB (A-weighted at full power)
Protection:	Thermal, DC and short circuit
Speaker switch-on delay:	2 seconds
Speaker DC protection trip voltage:	>±1V
Thermal protection trip temperature:	90°C
Efficiency:	>70%
Power consumption:	220W maximum
Dimensions:	350 x 140 x 90mm (without transformer)

Optional Items

The following items, not included in the kit, may also be required.

Nylon Mains Plug 13A	1	(RW67X)
Fuse 5A	1	(HQ33L)
Insulating Boot for Fuseholder	1	(FT35Q)
Heatshrink Sleeving	As Req	
Heat Transfer Compound	1 Syringe	(FL79L)
Double Pole Mains Switch	As Req	
Panel Mounting Fuseholder	As Req	
AA Battery Box	1	(YR59P)
AA Zinc Carbon	1	(FK55K)
3-Core 6A Mains Cable	As Req	(XR03D)

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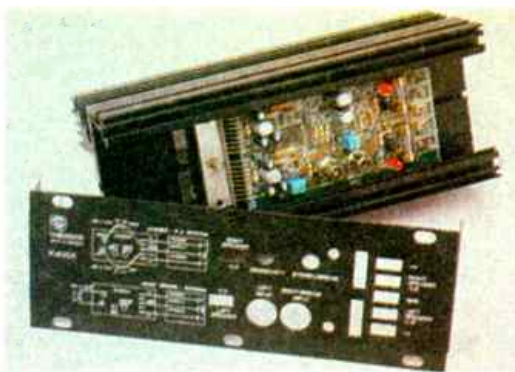
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Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 70.

Order Code	Type	Price each
VF19V	F11 Velleman Kit K4010	£134.99

K4004 200W MONO/STEREO AMPLIFIER



Universal, solid and compact stereo amplifier for use as a built-in module or free-standing in an enclosure. This powerful amplifier, having a total music power of 200W, can be arranged as a stereo amplifier with 2 x 50W rms (4Ω) or 2 x 40W rms (8Ω) outputs, or as a mono amplifier with an output of 100W rms. The amplifier is protected against overload, short circuit, incorrect polarity and thermal overload. Includes heatsink.

Specification	
Output power:	200W music power 2 x 50W rms into 4Ω or 2 x 40W rms into 8Ω
Mono-bridged power:	100W rms into 8Ω
Harmonic distortion:	0.01% at 1kHz
Signal to noise ratio:	102dB (A-weighted)
Stereo channel separation:	85dB
Input impedance:	22kΩ
Input sensitivity:	300mV, 550mV, or 1V switchable
Damping factor:	>1000 at 100Hz
Power supply:	±28V DC
Power consumption	
- 2 x 4Ω:	4A max.
- mono bridge:	4A max.
- 2 x 8Ω:	2.5A max.
Dimensions:	210 x 84 x 64mm

Order Code	Type	Price each
VF39N	G6 Velleman Kit K4004	£48.49

GOLD-LINE AMPLIFIERS AND POWER SUPPLIES

AMP200 400W MONO/STEREO

NEW!



A compact, high quality universal amplifier, that can be configured as a 100W/channel stereo amplifier or a 200W mono amplifier. The amplifier has three possible input sensitivities, overload and short-circuit protection, thermal protection, protection against wrong

connection to the power supply, and speaker 'pop' protection. The heatsink is an integral part of the casing and results in a compact well engineered amplifier, that can be used in a high quality in-car system or a domestic hi-fi system. The amplifier has extremely low distortion and a very high damping factor. Power supply module SPS200 is designed for use with the amplifiers for in-car systems.

Specification

Output power	
stereo:	100W/channel into 4Ω 75W/channel into 8Ω
mono:	200W into 8Ω
Total music power:	400W
THD	0.003% at 1kHz
S/N ratio:	96dB A-weighted
Stereo channel separation:	76dB
Damping factor:	>2000 at 100Hz
Input sensitivity:	150mV, 500mV or 950mV
Supply voltage	
for 8Ω:	±(40 to 45)V DC at 2.5A
for 4Ω or mono:	±(30 to 35)V DC at 5A
Dimensions:	350 x 62 x 85mm

Order Code	Type	Price each
VF45Y	C4 Velleman Kit AMP200	£109.99

AMP100 200W MONO/STEREO

A compact, high quality universal amplifier, that can be configured as a 50W/channel stereo amplifier or a 100W mono amplifier. The amplifier has three possible input sensitivities, overload and short-circuit protection, thermal protection, protection against wrong connection to the power supply, and speaker 'pop' protection. The heatsink is an integral part of the casing and results in a compact well engineered amplifier, that can be used in a high quality in-car system or a domestic hi-fi system. The amplifier has extremely low distortion and a very high damping factor.

Specification

Output power	
stereo:	50W/channel into 4Ω 40W/channel into 8Ω
mono:	100W into 8Ω
Total music power:	200W
THD	0.01% at 1kHz
S/N ratio:	102dB A-weighted
Stereo channel separation:	85dB
Damping factor:	>1000 at 100Hz
Input sensitivity:	300mV, 550mV or 1V
Supply voltage	
for 8Ω:	±28V DC at 2.5A
for 4Ω or mono:	±28V DC at 5A
Dimensions:	210 x 64 x 85mm

Order Code	Type	Price each
VF46A	B3 Velleman Kit AMP100	£79.99

SPS200 CAR POWER SUPPLY MODULE



Designed for use with the AMP200 amplifier module (VF45Y) for in-car systems. One main advantage of a separate supply module is that thick connecting cables to the battery can be kept very short, reducing power loss to a minimum. The amplifier module can be mounted as close as possible to the loudspeaker, so maintaining the excellent damping, for superb bass reproduction. To avoid interference the 0V rail is separate from the car chassis. See 'Cables' section for suitable connecting cables and 'Entertainment and Leisure' for connectors.

Specification

Input voltage:	10V to 15V DC at 30A max.
Output voltage:	±35V
Maximum output power:	300W
Efficiency:	90% max
Dimensions:	210 x 84 x 50mm

Order Code	Type	Price each
VF47B	A1 Velleman Kit SPS200	£84.99

APS208 225VA POWER SUPPLY

A matching mains power supply specifically for use with the AMP200 amplifier module when working into an 8Ω load.

Specification

Output power:	225VA
Output voltage:	±45V DC
Output fuse:	2 x 7.5A
Mains fuse:	2A slow
Dimensions:	265 x 120 x 80mm

Order Code	Type	Price each
VF52G	D7 Velleman Kit APS208	£89.99

APS204 300VA POWER SUPPLY

A matching mains power supply specifically for use with the AMP200 amplifier module when working into a 4Ω load or when the amplifier module is working in a mono bridge mode.

Specification

Output power:	300VA
Output voltage:	±35V DC
Output fuse:	2 x 7.5A
Mains fuse:	3A slow

Order Code	Type	Price each
VF51F	E8 Velleman Kit APS204	£99.99

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APS100 225VA POWER SUPPLY

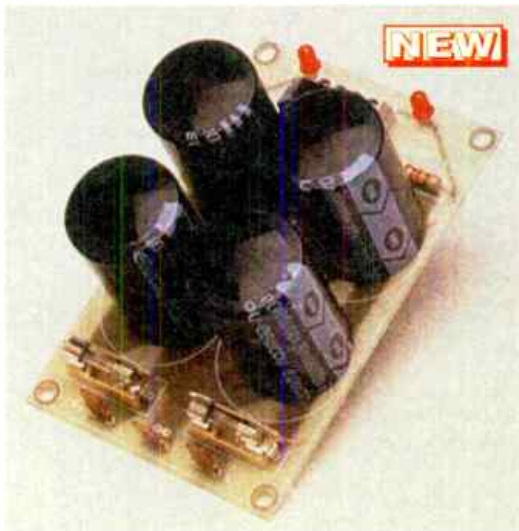
A matching mains power supply specifically for use with the AMP100 amplifier module when working into a 4Ω or 8Ω load, or when the amplifier module is working in a mono bridge mode.

Specification

Output power:	225VA
Output voltage:	±28V DC
Output fuse:	2 x 7.5A
Mains fuse:	2A slow
Dimensions:	265 x 120 x 80mm

Order Code	Type	Price each
VF50E D7	Velleman Kit APS100	£89.99

APS200 POWER SUPPLY MODULE



A ready-made power supply board for use with the Goldline amplifier modules AMP200 and AMP100 for those who require a customised installation. Requires a suitable mains transformer.

Specification	AC Input Volts	Transformer Rating VA	Stock Code
AMP100			
8Ω load:	2 x 20V	160	DH71N
4Ω load and bridged:	2 x 20V	225	DH71N
AMP200			
8Ω load:	2 x 30V	225	DH72P
4Ω load and bridged:	2 x 25V	300	DH74R

Order Code	Type	Price each
VF49D	Velleman Kit APS200	£29.99

K4003 30W STEREO AMPLIFIER



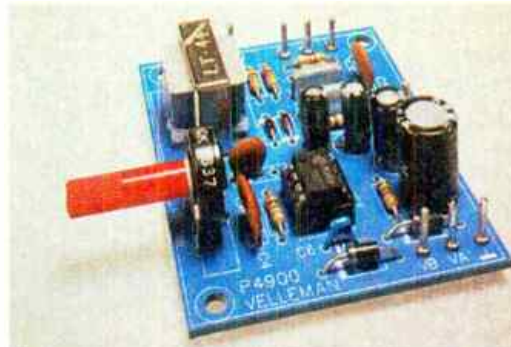
A small stereo amplifier based round the TDA1521 IC providing 15W rms/channel into 4Ω. The IC is thermally and short-circuit protected and includes suppression during switch on/off. Requires a suitable AC power rail.

Specification

Output power rms into 4Ω:	15W/channel
into 8Ω:	10W/channel
Peak music power:	30W/channel into 4Ω
THD at 1W (1kHz):	0.07%
Channel separation:	70dB
S/N:	98dB A-weighted
Input sensitivity:	300mV/150kΩ
Supply voltage:	2 x 12V AC at 2A (stock code YK15R)

Order Code	Type	Price each
VF53H	Velleman Kit K4003	£19.99

K4900 TELEPHONE AMPLIFIER



This telephone amplifier can be used either as an independent amplifier with loudspeaker, for instance to follow a telephone conversation, or one can connect its output to a tape recorder or a mixing panel. This module can be built into the Velleman modular mixing panel.

PROHIBITED from direct or indirect connection to public telecommunication systems. Action may be taken against anyone so connecting this apparatus.

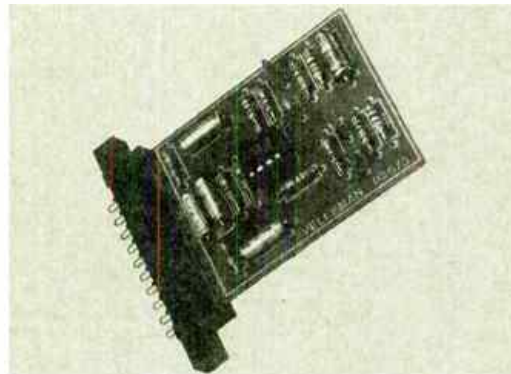
★ ★ ★

Input:	Isolation transformer coupling.
Output:	Loudspeaker 0.5W/8Ω.
Line:	0dB (0.775V rms).
Power supply:	12V DC max. 150mA.

For building it into the mixing panel, it is possible to connect the module to 15V as well.

Order Code	Type	Price each
VE26D	Velleman Kit K4900	£9.99

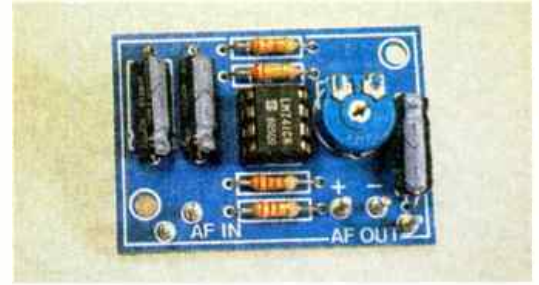
K2573 STEREO RIAA CORRECTION AMPLIFIER



RIAA stereo low noise preamplifier for moving magnet pick-ups. Power supply: 10 to 30V DC, regulated. Amplification (1kHz): 35dB. Input signal: 5 to 10mV.

Order Code	Type	Price each
VE23A	Velleman Kit K2573	£7.99

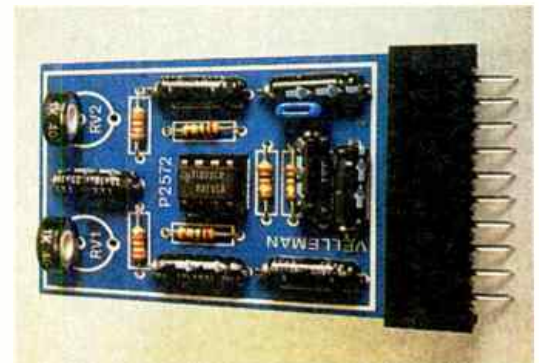
K1803 UNIVERSAL MONO PREAMPLIFIER



Ideally suited as: microphone amplifier – signal matching of tuner or tape outputs, etc. Gain: typ. 40dB. Adjustable output level. Frequency range: 20Hz to 20kHz (±3dB). Max. input signal: 40mV. Power supply: 10 to 30V DC, regulated.

Order Code	Type	Price each
VE21X	Velleman Kit K1803	£5.49

K2572 UNIVERSAL STEREO PREAMPLIFIER



Universal stereo low noise pre-amplifier. Frequency range: 40Hz to 30kHz (±3dB). Adjustable gain, typ. 40dB.

Order Code	Type	Price each
VE22Y	Velleman Kit K2572	£7.99

K2637 SUPER MINI MONO 2.5W AUDIO AMPLIFIER



Small board complete with both pre- and power amplifier. No adjustment required. Short circuit protected. Power supply: 4.5 to 15V DC. Input sensitivity: power amplifier 150mV (12V). Pre-amplifier: 20mV (12V). Max. output power: 2.5W (4Ω, 12V). Dimensions: 42 x 32 x 27mm.

Order Code	Type	Price each
VE12N	Velleman Kit K2637	£7.99

K4100 DIGITAL CONTROLLED PREAMPLIFIER

- ★ Inputs for phono, CD, tuner, and two cassette decks
- ★ Graphic equaliser loop
- ★ LED display of all settings
- ★ Full digital control of all functions
- ★ Switched mains output
- ★ Operational IR remote control

A superb digital preamplifier designed to complement the K4000 Valve Amplifier and the K4020, K4005, K4010 and K4004 high powered MOSFET amplifiers, but equally suited to any high quality amplifier. Digital control eliminates the need for conventional potentiometers, all functions being selected and operated by front panel mounted push-buttons. The K4101 I/R transmitter, which is available separately, is used to remotely control the functions. The preamplifier offers a phono input which is suitable for moving magnet or high output moving coil cartridges. Other inputs include CD and tuner, plus two tape monitor loops and a graphic equaliser loop. A switched mains output allows the rest of the installation to be switched on and off, and the power-up default setting can be programmed to individual requirements.



Specification

Input sensitivity/impedance	
Phono:	5.5mV/50kΩ
CD:	500mV/32kΩ
Tuner:	360mV/22kΩ
Tape 1 & 2:	360mV/22kΩ
Rated output voltage	
Line:	1V
Tape:	360mV
Equaliser:	180mV
S/N ratio	
Phono:	75dB (A-weighted, rated output)
Tape/CD/Tuner:	100dB (A-weighted, rated output)
THD:	0.01%
Frequency response(-3dB):	8Hz to 150kHz
Channel separation:	90dB
Crosstalk:	-98dB
RIAA deviation:	±0.5dB (20Hz to 20kHz)
Headphone output:	280mW into 32Ω
Power consumption:	6W maximum
Mains output:	5A switched
Dimensions:	420 x 50 x 350mm
Weight:	5kg

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The optional infra-red remote control is also available separately. Full construction details may be found in Maplin Magazine Issue 52.

Order Code	Type	Price each
VE46A	H15 Velleman Kit K4100	£199.99

VELLEMAN EQUALISER SYSTEM

3



A high quality equaliser system comprising the following kits:

K4300: Spectrum analyser display.
K4301: Pink noise generator.
K4302: 10 band graphic equaliser (two required for stereo).

K4303: Power supply and switching module (the switching module mounts onto the front panel).

Equaliser

Number of bands:	10
Centre frequencies:	32,64,125,250,500, 1k,2k,4k,8k,16kHz
Bandwidth:	5Hz to 100kHz (-3dB)
Amplification (controls in flat position):	0dB
Control range:	±10dB
Total harmonic distortion:	<0.02% (1kHz/0dB)
Signal-to-noise ratio (controls in flat position):	>110dB (A-weighted to 0.775mV)

Stereo separation:	>95dB (1kHz/0dB)
Max. output voltage:	2.5V rms
Input impedance:	4.7kΩ
Output impedance:	1kΩ

Pink Noise

Pseudo random digital noise	
Clock frequency:	Adjustable from 30 to 100kHz
Pink noise filter:	-3dB/octave (20Hz to 20kHz)
Output voltage:	150mV rms
Output impedance:	1kΩ

Spectrum Analyser

Number of bands:	10
Centre frequencies:	32,64,125,500, 1k,2k,4k,8k,16kHz
Power bandwidth:	20Hz to 20kHz (±2dB)
Range:	20dB
Resolution:	2dB/LED
Sensitivity: line input:	adjustable from 1V to 2V rms
microphone input:	adjustable from 1mV to 20mV rms
Input impedance: line input:	100kΩ
microphone input:	10kΩ

FRONT PANEL FOR GRAPHIC EQUALISER SYSTEM

A pre-formed front panel and accompanying panel foil for the modular graphic equaliser system.

Optional Items

The following item, not included in the system kits, may also be required, to complete the system.

19in. Rack Mounting Case	1	(XJ24B)
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Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details and a list of additional parts for interconnection of modules will be found in the Maplin Magazine Issue 74.

Order Code	Type	Price each
VE41U	A1 Velleman Kit F4302	£26.99

K4101 PREAMPLIFIER INFRA-RED CONTROL TRANSMITTER

- ★ 15 channels
- ★ Remote control of preamplifier and tuner
- ★ 21 keys
- ★ 'Click-touch' keypad
- ★ Robust aluminium case

2

This 15-channel infra-red transmitter is designed to remotely control the digitally controlled preamplifier K4100 (VE46A) and the tuner K4500 (VF20W). In the case of the tuner, a special safety key has been provided which allows you to preserve the memory content for stations to avoid unwanted overwriting. The keypad features a superb 'click-touch' design which has a characteristic responsive feel, unlike other membrane designs which offer no tactile feedback whatsoever. Additionally, 'click-touch' offers a high degree of protection against moisture ingress. A red LED, visible from the keypad, shows that the unit is functioning when a key is pressed and gives some idea as to the condition of the battery. The transmitter is housed in an attractive and robust aluminium case.



Specification

Range:	30m maximum
Tx carrier frequency:	38kHz
Identification codes:	6
Independent channels:	15
Power supply voltage:	9V (PP3 battery)
Current consumption	
standby:	0.1µA
transmit:	10mA average
Dimensions:	175 x 50 x 23mm

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 59.

Order Code	Type	Price each
VE47B	Velleman Kit K4101	£39.99

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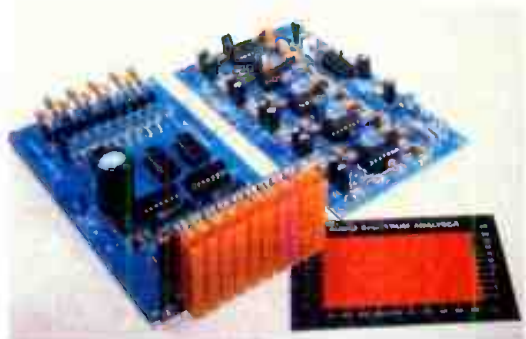
K4300 AUDIO SPECTRUM ANALYSER 3

Features

- ★ 10 frequency bands monitored on 10 linear bargraphs; centre frequencies 32Hz, 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz
- ★ 10 LED bargraph for each band; 2dB for each LED, giving 20dB range
- ★ Microphone input
- ★ Single +12V DC power requirement
- ★ High input impedance (100kΩ) - will not load audio system
- ★ Can be used in its own right, or as part of a system

Applications

- ★ Setting up speaker systems
- ★ Checking adjustment of graphic equaliser
- ★ Assuring a flat frequency response



A spectrum analyser is an invaluable tool for monitoring the composition of audio signals particularly in a sound system that utilises a graphic equaliser. In such a system, control across the spectrum is produced by 'boost' and 'cut' over multiple frequency ranges instead of the standard 'bass' and 'treble' controls. The spectrum analyser then visually displays the results of the graphic equaliser's settings on a group of LEDs arranged in a bank of 10 bands.

The spectrum analyser monitors pink noise from the output of an audio system enabling any corrective adjustment of the graphic equaliser controls to be displayed as a 'flat' response.

This kit can be used on its own or in conjunction with a pink noise generator (kit K4301, order as VE43W), a 10 band graphic equaliser (kit K4302, order as VE44X).

Specification

Supply current:	0.75A (DC)
Power supply:	2 x 9V AC, or 12 to 15V DC
Range:	20dB (10 LEDs, 2dB per LED)
10 Bands:	32Hz, 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz
Line input level:	Adjustable, 100mV to 2V rms
Line input impedance:	100kΩ
Microphone preamplifier gain:	40dB
Microphone input impedance:	10kΩ

Optional Parts

The following items, not included in the kit, may also be required.

Insulated Spacer M3 x 20mm	2 Pkts	(FS38R)
Insulated Spacer M3 x 10mm	1 Pkt	(FS36P)
Screw M3 x 12mm	1 Pkt	(BF52G)
Steel Nut M3	1 Pkt	(JD61R)
Rotary Switch SW4B	1	(FF75S)
Phono Socket	4	(YW06G)
Open Chassis Socket 6.3mm	1	(HF91Y)
Wire 7/0.2 10m Black	1	(BL00A)
Wire 7/0.2 10m Red	1	(BL07H)
Single Core Lapped Screen	1	(XR12N)
Ribbon Cable 20-Way	As Req	(XR07H)
Case as per user requirements		

Kit and Special Parts

A complete kit of parts (including the PCBs) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 70.

Order Code	Type	Price each
VE42V	A1 Velleman Kit K4300	£72.99

K4302 MONO GRAPHIC EQUALISER MODULE 2



Features

- ★ Compact size
- ★ Low distortion
- ★ Low cost
- ★ 10dB of cut or boost across 10 frequency ranges
- ★ 5V to 12V DC single-rail power requirement

Applications

- ★ Modular equaliser systems
- ★ Disco and PA equipment
- ★ Updating hi-fi equipment
- ★ In-car applications
- ★ Home recording and electronic music

A graphic equaliser allows you to bring out the best sound from your audio system - room acoustics or speaker coloration problems are brought under control by allowing the audio response to be tailored to personal preference.

The Graphic Equaliser kit allows ten narrow, but overlapping frequency bands across the audio range to be cut or boosted. These bands are arranged around centre frequencies of 32Hz, 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz, which are adjustable by moving the sliding potentiometers from the centre flat position, to cut or boost at a specific frequency, or group of frequencies. Note that two kits will be required for stereo.

Specification

Frequency bands:	32Hz, 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz
Cut/boost:	±10dB per band
Frequency response:	5Hz to 100kHz (-3dB)
Signal to noise ratio:	110dB (IHF A-weighted, 0dB output, flat)
Distortion:	0.02% (1kHz, all controls in 'flat' position)
Power supply:	5 to 12V DC at 10mA (regulated)
Overall dimensions:	145 x 77 x 35mm (excluding slider shafts)

Optional Items

The following items, not included in the kit, may also be required.

Slider Knobs	10 or 20	(VX18U)
Screened Cable	As Req	(XR15R)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 71.

Order Code	Type	Price each
VE44X	Velleman Kit K4302	£34.99

PINK NOISE GENERATOR 2



Features

- ★ AC or DC supply
- ★ Low cost
- ★ Easily adaptable to produce white noise
- ★ Flexibly designed and small PCB
- ★ Pseudo-random noise generation utilising digital techniques

Applications

- ★ Calibration of graphic equaliser in conjunction with a spectrum analyser
- ★ Noise generators
- ★ Electronic music

A pink noise generator is a device that produces noise of constant amplitude across the whole audio band. Many pink noise generators utilise a zener diode or reverse-biased transistor, working at a deliberately low current, as a noise source which leads to unpredictable results. By utilising a pseudo-random bit pattern generator, a much more reliable result is obtained.

The Pink Noise Generator Module is intended for use with a graphic equaliser, in conjunction with the Spectrum Analyser (Kit K4300 VE42V). This system, typically used in a domestic environment, allows compensation for speaker frequency response, the effect of room size on frequency response, soft furnishings, hard walls, and other sources of absorption and reflection.

Specification

Clock frequency adjustment:	30kHz to 100kHz
Output level:	150mV rms (clock running at 40kHz)
Output impedance:	1kΩ
Pink noise filter:	-3dB/octave (20Hz to 20kHz)
Power supply requirement:	9 to 12V AC, or 12 to 15V DC at 5mA
PCB dimensions:	43 x 72mm

Optional Items

The following items, not included in the kit, may also be required.

Screw-Gap Phono Plug White	2	(HQ59P)
Screened Cable	As Req	(XR15R)

Kit and Special Parts

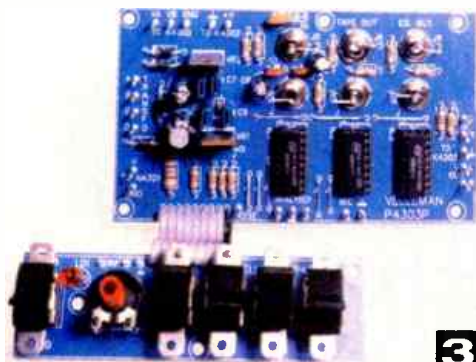
A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 72.

Order Code	Type	Price each
VE43W	Velleman Kit K4301	£9.99

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K4303 POWER SUPPLY AND SWITCHING UNIT



3

- ★ *Input from line or noise generator*
- ★ *Tape output from lines or equaliser*
- ★ *Spectrum analyser input from line or microphone*
- ★ *Line output from line input or equaliser*

This Power Supply and Switching Unit module has been designed for use with the Modular Graphic Equaliser System, which is made up from the following modules.

Audio Spectrum Analyser	K4300 (VE42V)
10-Band Graphic Equaliser	K4302 (VE44X)
Pink Noise Generator	K4301 (VE43W)
Front Panel	F4302 (VE41U)

This kit performs three functions. These are:

1. To provide a regulated power supply for the above modules.
2. To provide all the necessary switching functions.
3. Includes a front panel mounted line input sensitivity control.

Kit and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 73.

Order Code	Type	Price each
VE45Y	Velleman Kit K4303	£30.99

K2620 GIANT VU METER

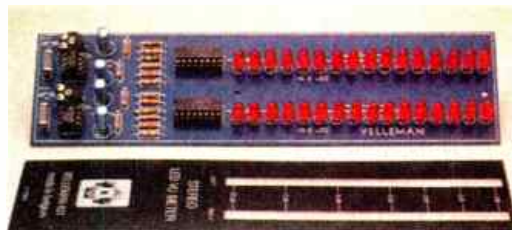


This kit drives 12 mains lamps mounted in a row to provide a giant VU light column. Interfaces to most audio equipment (isolated, adjustable input).

Input sensitivity:	100mV to 3V
12 triac outputs:	24 to 240V AC, max. 2A each (uncooled)
Power supply:	9V AC/0.5A

Order Code	Type	Price each
VE57M	Velleman Kit K2620	£29.99

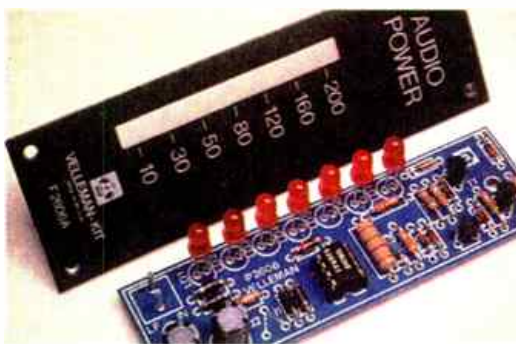
K1798 STEREO LED VU METER



Stereo 2 x 16 LED VU meter (spot indication) with adjustable input. Power supply 12V DC. Two front panels included for vertical or horizontal mounting. Input sensitivity 100mV to 10V.

Order Code	Type	Price each
VE28F	Velleman Kit K1798	£26.99

K2606 7-LED AUDIO POWER METER



Features

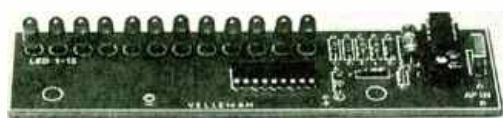
- ★ *7-LED scale*
- ★ *Measures peak audio power levels up to 200W*
- ★ *Directly driven from the loudspeaker output - no other power required*
- ★ *Metal front plate and four plastic scales included for easy panel mounting*
- ★ *Can be built into either amplifier or speaker enclosure*
- ★ *Suitable for use with 4Ω and 8Ω speakers*

Applications

- ★ *In-car audio*
- ★ *Disco systems*
- ★ *Speaker and amplifier designs*

If you've ever wondered how much power your amplifier is kicking out, then the 7-LED Audio Power Meter will help you find out. This project has seven LEDs that illuminate, in bargraph fashion, indicating the peak power output levels. Two power ranges can

K610 LED VU METER



VU meter with 12 LED scale and adjustable input. Power supply: 12V DC. Light bar display. 2 front panels included for horizontal and vertical mounting. Input sensitivity 100mV to 10V.

Order Code	Type	Price each
VE29G	Velleman Kit K610	£13.99

be selected via a link on the PCB, since the power level will depend on the impedance of the speaker used. Two front-panel scales are provided for each sensitivity; one for use with 4Ω speakers (100W and 250W, 'low' and 'high' sensitivity settings respectively), and another for use with 8Ω speakers (50W and 125W respectively). The device is directly connected to the loudspeakers or amplifier output, and does not require its own power supply, since it derives its power from the amplifier's audio output.

Optional Items

The following items, not included in the kit, may also be required.

Double Bubble Sachet	1	(FL45Y)
Toggle Switch 10A SPST	1	(JK25C)
Flexible Rubber Sealant	1 Syringe	(YJ91Y)
Wire 7/0.2 10m Red	1 Pkt	(BL07H)
Case as per user requirements		

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 69.

Order Code	Type	Price each
VE27E	Velleman Kit K2606	£16.99

K4700 LOUDSPEAKER PROTECTION



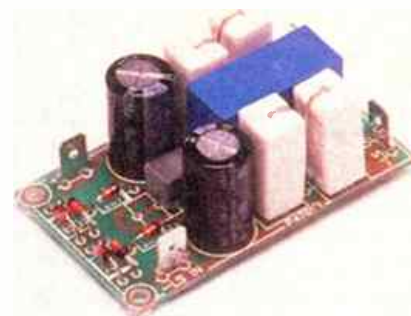
This dual-channel protection unit prevents power-on thumps from damaging your stereo speaker system and offers protection from DC components present on the output of any connected amplifier.

Switch-on delay:	±6 sec.
DC protection:	+1V/-1V
Max. input voltage:	200V pk to pk (71V rms)
Max. switching current:	10A

LEDs for 'switch-on-delay' and 'Error'.

Order Code	Type	Price each
VE24B	Velleman Kit K4700	£15.99

K4701 LOUDSPEAKER DC PROTECTION UNIT



Specification

Maximum input voltage:	90V DC
Maximum contact current:	10A
Minimum safety voltage:	10V DC
PCB	40mm x 67mm

This project has been designed to protect Hi-Fi loudspeakers from damage due to faults occurring within the output stage of a power amplifier. A fault of this nature nearly always causes a large DC current to

flow, and it is *this* current which 'burns' the loudspeaker. This module will 'disconnect' the speakers as soon as a DC voltage is detected.

The module can be mounted in the loudspeaker cabinet, and is also suitable for protecting car stereo systems (one module per channel). *Note that this project must not be used in conjunction with traditional valve amplifiers; they do not require this type of protection, and the use of this module could cause extensive damage to the amplifier. This module is also unsuitable for amplifiers with less than 10V_{pk} present at the output.*

Kit and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 82.

Order Code	Type	Price each
VF44X	DC Speaker Protector	£9.49

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THE MODULAR MIXING SYSTEM



Features

- ★ High quality
- ★ Modular design for easy servicing
- ★ Wide variety of input options
- ★ Up to 6 or 12 stereo channels available (depending on version)
- ★ DC-controlled electronic stereo faders for reliability
- ★ LED VU input level meters for each input
- ★ Low noise and distortion
- ★ Comprehensive equalisation and monitoring facilities
- ★ Effects loop (12-Channel version only)

Applications

- ★ Radio stations
- ★ Discos
- ★ Domestic recording studios

These two pre-cut front panels are used in the construction of the 6-channel and 12-channel mixers which use many of the Velleman audio kits. In addition, each panel is supplied with an appropriate plastic, self-adhesive, front-panel foil with the legends in white on a black background. The panels are 3mm thick aluminium plate, with all necessary holes and slots. The legend foil comes with windows for the VU meters and peak indicators, and with all the necessary cut-outs for switches and potentiometers.

15 METRE MAINS CABLE EXTENSION REEL

JoJo

Manufactured with safety in mind, this extension reel is suitable for use with power tools, lighting, various household appliances and gardening equipment such as strimmers, lawn mowers etc. The maximum load is 1200 watts. The reel is fitted with a convenient carry handle and an additional handle is provided for easy winding of the cable. Fitted with two childproof sockets, the extension reel conforms to BS6500, BS61363/A and BS5733. Colour black and red. Not for use in wet conditions.

GREAT VALUE!

£14.99

KR23A

[A2]

Specification

Cable length: 15m (50 feet approx.)

Capacity: 3A (720 watts) fully wound
5A (1200 watts) fully unwound

Weight: 1.5kg

The 6-Channel Mixer is made up of the following modules:

1. 3 Dual Input Modules K2661
2. 3 Dual Stereo Faders K2662
3. 3 Dual Stereo VU Meters K2668
4. 1 Master and Headphone Module K2664
5. 1 Mixer PSU and toroidal transformer K2667

The 12-Channel Mixer is made up of the following modules:

1. 6 x Dual Input Module K2661
2. 6 x Dual Tone Controls K2663
3. 6 x Dual Stereo Fader K2662
4. 6 x Dual Stereo VU Meter K2668
5. 1 x Monitor and Effects Module K2665
6. 1 x Mixer PSU/Transformer K2667
7. 1 x Precision VU Meter K2666
8. 1 x Master and Headphone Module K2664

Specifications

Input impedances

Phono:	47kΩ/180pF
Stereo line:	47kΩ
Mono line:	100kΩ balanced/47kΩ unbalanced
Microphone:	10kΩ balanced/5k6Ω unbalanced
Effect return:	47kΩ

Input Sensitivities

Phono:	5mV to 80mV rms
Stereo line:	100mV to 2.75V rms
Mono line:	50mV to 1.5V rms
Microphone:	1mV to 30mV rms
Effect return:	775mV rms

S/N ratio (A-weighted)

Phono:	80dB
Stereo line:	83dB
Mono line:	81dB
Microphone:	80dB

Frequency response

Phono:	RIAA curve ±1dB
Stereo line:	20Hz to 100kHz (-3dB)
Mono line:	20Hz to 100kHz (-3dB)
Microphone:	20Hz to 15kHz (-3dB)

Tone control

Per channel

Bass:	50Hz ± 12dB
Middle:	1kHz ± 15dB
Treble:	15kHz ± 12dB

Master

Bass:	50Hz ± 15dB
Treble:	15kHz ± 15dB

Monitor

Centre frequency:	100Hz to 10kHz
Q factor:	0.4 to 2.5
Attenuation:	0 to 30dB

Output levels

Master:	0.775/1.5/2.5V rms
Monitor:	0.775/1.5/2.5V rms
Effect:	0.775V rms
Tape recorder:	0.775V rms
Headphones:	0.1W (4Ω) 0.2W (8Ω) 0.4W (16Ω) 1.25W (32Ω) 0.5W (100Ω) 0.1W (400Ω)

Overload limit:

7dB

Overload indication:

3dB

Total harmonic distortion:

0.05%

Crosstalk (1kHz):

45dB

Fader range:

90dB

Output impedance:

1kΩ

Autostart open collector output:

24V DC at 50mA (max.)

Dimensions

FS 5-channel panel: 267 x 482mm

FL 12-channel panel: 482 x 800mm

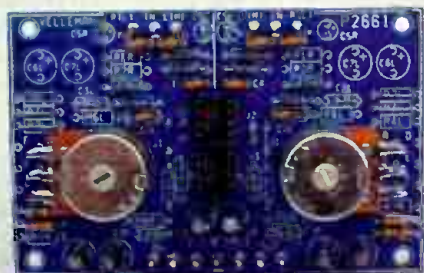
Kits and Special Parts

A complete kit of front panel parts is available. A set of control knobs for each mixer is available separately. Full construction details may be found in Maplin Magazine Issue 66.

Order Code	Type	Price each
VE39% B3	Velleman Frnt Pnl FS	£40.99
VE40T E8	Velleman Frnt Pnl FL	£81.99
VX00A	Velleman KN/MIXS	£9.99
VX01B A	Velleman KN/MIXL	£57.99

K2661 DUAL INPUT AMPLIFIER MODULE

2



Features

- ★ Highly flexible
- ★ Low or high impedance mic/line inputs
- ★ Balanced/unbalanced mic/line inputs
- ★ Mono or stereo configurations
- ★ Can be configured as RIAA-equalised phono preamp

Applications

- ★ Modular mixers
- ★ Updating existing systems
- ★ Hi-Fi equipment

The Dual Input Amplifier Module is a versatile building block - each half of the module can be configured in one of four different ways; stereo line (unbalanced), stereo phono (unbalanced), mono microphone (balanced or unbalanced). The unbalanced microphone and line inputs can be set for high or low impedance. The module can be used in a wide variety of applications ranging from a phono preamplifier, to general input modules for a mixer, or a balanced-line microphone input for a PA amplifier.

Specification

Number of independent channels:	Up to 4
Gain adjustment range:	25dB
Signal to noise ratio:	80dB
THD:	<0.05%
Frequency response:	20Hz to 20kHz (±0.5dB)
Deviation from RIAA equalisation curve:	Less than 1dB
Power supply:	±5V to ±15V DC, 100mA per rail

Optional Items

The following items, not included in the kit, may also be required.

Single Core Screened Cable	As req	(XR15R)
Twin Core overlapped Screen	As req	(XR08J)

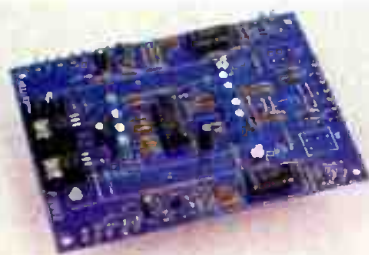
Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 63.

Order Code	Type	Price each
VE30H	Velleman Kit K2661	£17.99

K2662 DUAL FADER MODULE

2



Features

- ★ Two independent stereo channels, or 2 mono pairs
- ★ Electronic attenuators - no more potentiometer crackles!
- ★ Pre-fade listening (PFL) for each stereo pair

- ★ Fader-controlled start/stop facility for turntables, tape machines or CD players
- ★ On-board voltage regulators
- ★ LED peak detector
- ★ Long fader life

Applications

- ★ Mixing systems (particularly those of radio stations and disco consoles)
- ★ Upgrading existing equipment
- ★ DC control of volume

This module uses electronic control for fading of two stereo channels. Crackles produced by the sliding potentiometers have been eliminated completely through the use of high quality electronic volume control circuitry (DC control). The adjustment range exceeds 100dB, and noise produced by the fader is kept below -95dB. Both channels are equipped with a PFL (pre-fade listen) switch, a peak detector (+3dB), and an automatic starting control circuit for record players (pulse or continuous output).

Specification

Number of channels:	2 stereo (4 in all)
Distortion:	0.05% (max.)
Signal-to-noise ratio:	>90dB
Fader start/stop rating:	24V at 50mA
Attenuation (slider at min.):	90dB
Peak LED indication:	3dB
PCB dimensions:	138 x 98mm
Power Supply:	±15V regulated

Optional Items

The following items, not included in the kit, may also be required.

Screened Cable	As req	(XR15R)
Heat Transfer Compound	1 syringe	(HQ00A)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 61.

Order Code	Type	Price each
VE31J	Velleman Kit K2662	£29.99

K2663 DUAL STEREO TONE CONTROL MODULE



Features

- ★ Two stereo channels or four mono channels
- ★ Three-band tone control
- ★ Balance (stereo)/panorama (mono) control
- ★ Monitor output with level control (mono)
- ★ Effects output with level control (mono)

Applications

- ★ Tone control for amplifiers
- ★ Pre-recorded equalisation for tape machines
- ★ Suitable for use in modular mixing system

This kit contains two identical stereo tone control circuits on the same PCB with provision for independent control of balance or panning, bass middle and treble, monitor and effects levels. This board can be used with the Monitor and Effects Module (K2665) to provide 'effects send', 'effects return', a 'notch filter' and a mono monitor output for stage and live concerts.

Specification

Number of channels:	2 stereo (4 in all)
Number of tone controls:	3 per channel
Tone control turnover frequencies:	50Hz, 1kHz, 15kHz
Boost and cut range:	±12dB
Mono outputs:	Effects Send and Monitor
Distortion:	0.02% (max)
S/N ratio:	>92dB
Current consumption (quiescent):	10.5mA (±5V) 13.7mA (±15V)
Current consumption (full output into 10k load):	11mA (±5V) 16.7mA (±15V)

Optional Items

The following items, not included in the kit, may also be required.

Screened Cable	As req	(XR15R)
TL074C Quad Low-noise Op-Amp	1	(RQ69A)
1k 0.6W Metal Film Resistor	8	(M1K)
Strip board 1039	1	(JP46A)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 60.

Order Code	Type	Price each
VE32K	Velleman Kit K2663	£35.99

K2664 MASTER AND HEADPHONE OUTPUT MODULE

2



Features

- ★ Headphone amplifier with selector and volume control
- ★ Three fixed output levels 0.775V, 1.55V, and 2.5V rms
- ★ Tape recorder output
- ★ 2 x 5 LED VU meter
- ★ Bass and treble controls

Applications

- ★ Mixers
- ★ Preamplifiers

The Master and Headphone module is designed to be at the heart of a mixing system. It features a stereo input summing amplifier that provides three stereo outputs, a 4-way selectable input for monitoring via a pair of headphones, and an input for two, five bar LED VU meters.

There are three sets of stereo outputs:

1. Tape recorder
2. Headphones
3. Main master output

The master output features a dual ganged volume control, dual ganged treble and bass tone controls, as well as a balance adjustment. The tape recorder output is exactly the same as the master output, except that the volume control, mono/stereo switch, tone and balance controls have no effect on it. The stereo headphone output can be used to monitor the pre-fade listen (PFL), effects send or monitor buses (if used), or the outputs. A 4-way rotary switch provides the selection. Also included are 2 x 5-bar LED VU meters for visual monitoring.

Specification

Distortion:	0.05%
S/N ratio:	>90dB
Bass control:	15dB boost and cut, centred at 40Hz
Treble control:	15dB boost and cut, centred at 8.5kHz
Output levels	
Master:	775mV rms; 1.5V rms; 2.5V rms
Monitor:	775mV rms; 1.5V rms; 2.5V rms
Effect:	775mV rms
Tape recorder:	775mV rms
Headphone output:	45mW (400Ω load); 545mW (32Ω load); 1.3W (8Ω load)
VU meters:	green (-12dB, -6dB, -3dB); orange (0dB); red (+3dB)
Current consumption standby:	70mA
Current consumption loaded:	500mA
Power supply:	±17.5V to 30V

Optional Items

The following items, not included in the kit, may also be required.

Screened cable	As req	(XR15R)
Heat transfer compound	1 syringe	(HQ00A)

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 64.

Order Code	Type	Price each
VE33L	Velleman Kit K2664	£42.99

K2665 MONITOR AND EFFECTS MODULE



Features

- ★ Effects send and return loop circuits
- ★ Monitor channel with an adjustable notch filter frequency

Applications

- ★ Monitoring audio signals within a mixing deck
- ★ Interface between external effects equipment and the audio signal
- ★ Reduction of annoying sounds using a notch filter
- ★ Used with guitar amplifiers
- ★ Used in public address systems

A mono monitor mixing amplifier that incorporates a variable notch filter and separate 'Effects Send and Return' amplifiers. The Monitor amplifier, apart from a simple volume control, provides control over two parameters. The first is the Q-factor of the active filter, which is adjustable between 0.4 and 2.5. This corresponds to a -3dB bandwidth, variable between 840Hz and 1.7kHz. Secondly, the centre frequency is variable across a significant part of the audio band from 100Hz to 10kHz.

The 'Effects Send' has its own attenuation control for the level of signal sent to the effects equipment. Similarly, the returning 'treated' signal level is controlled by the 'Effects Return' amplifier attenuator.

Specification

Number of channels:	1 (2 required for stereo)
Notch filter centre frequency:	100Hz to 10kHz
Notch filter bandwidth adjustment:	840Hz to 1.7kHz
Notch filter depth:	0 to 30dB
Current consumption (quiescent):	9.1mA (±5V); 11.9mA (±15V)
Max. current consumption (both monitor and effects outputs into 1k load):	*0.4mA (±5V); 13mA (±15V)

Optional Items

The following items, not included in the kit, may also be required.

3k9 5% Metal Film	2	(M3K9)
4.7μF Minelect 63V	2	(RA53H)
Screened Cable	As req	(XR15R)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 62.

Order Code	Type	Price each
VE34M	Velleman Kit K2665	£20.99

K2666 PRECISION STEREO VU METER



Features

- ★ -26dB to +6dB scale
- ★ 30 LEDs per scale
- ★ Three colour scale
- ★ LEDs illuminated in dot mode
- ★ 150mV or 775mV input sensitivity

Applications

- ★ Amplifiers
- ★ Record level metering
- ★ Mixers
- ★ Tape recording

This VU-meter combines a high precision meter and large scale readout into a compact size, and is intended to be used as a building block in the Velleman Professional Modular Mixer and in other stereo audio applications. The 2 x 30-LED display is 105mm in length, providing a very large viewing area which is made easier by the use of three LED colours. Green LEDs are used for the range from -26dB up to -1.5dB, yellow for -0.75dB to +0.75dB (around 0dB level) and red for +1.5dB and over. The scale is dB linear over the range -6dB to +6dB, each LED corresponding to 0.75dB (16 are used over this range).

To keep power consumption to a minimum, the LED chains are lit one at a time in 'dot mode', rather than as a solid (true) illuminated bar.

Supplied with two calibrated plastic scales, horizontal and vertical, with white lettering on a matt black background.

Specification

Scale graduation:	-26dB to +6dB in 30 steps dB linear from -6dB to +6dB
Input impedance:	56k
Input sensitivity:	150mV or 775mV for 0dB, selectable
Maximum error:	0.5dB at 1kHz
Power requirement:	12V to 15V DC at 50mA, regulated

Kits and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 59.

Order Code	Type	Price each
VE35Q	Velleman Kit K2666	£45.99

K2668 DUAL STEREO VU METER MODULE



Features

- ★ Five LED displays
- ★ Stereo module
- ★ Four, 5-LED bargraph driver circuits

Applications

- ★ 6 and 12-channel mixers
- ★ Monitor microphone circuit levels
- ★ Monitor amplifier outputs

This simple module, which is used in both the 6-channel and 12-channel mixers, monitors the input level of each channel. It consists of four identical 5-LED bargraph driver circuits, each based around half a U2066B IC. The components associated with the two ICs determine the attack and decay times, and the bandwidth. Each of the four bargraph displays is made from three green, one orange and one red LED; the LEDs operate at approximately the following levels: red +3dB, orange 0dB, and green at -3dB, -8dB and -13dB.

Specification

Indication:	-13dB, -8dB, -3dB, 0dB, +3dB
Sensitivity:	0dB = 0.775V rms
Supply voltage:	14V to 18V DC
Current consumption:	62mA

Kits and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 66.

Order Code	Type	Price each
VE38R	Velleman Kit K2668	£16.49

K2667 UNREGULATED POWER SUPPLY MODULE



Features

- ★ Works with both 6 and 12-channel mixing systems
- ★ Dual power supply rails for op-amp circuits
- ★ Fuse protected outputs
- ★ Versatile - up to 2A per rail
- ★ Transformers available

This unregulated general purpose split-rail PSU module, is not supplied with a transformer. When used with a suitable transformer, available separately, it is able to power either the 6 or 12 Channel Modular Mixing System. The selected transformer must have a secondary winding rated at 2A and a maximum voltage output of 18V. The 6-channel mixer will require a 30VA 2 x 18V (YK12N) transformer should be used, and for use with the 12-channel mixer, the more powerful 80VA 2 x 18V (YK17T) transformer.

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Optional Items

The following items, not included in the kit, may also be required.

Toroidal transformer 30VA 18V	1	(YK12N)
or		
Toroidal transformer 80VA 18V	1	(YK17T)
Fuse 20mm 2A A/S (WR20W)	2	
Heat-shrink tubing	As req	
Mains cable	As req	
Double-pole mains switch	1	
Mains fuse holder	1	
Mains fuse	1	
Fuseholder insulating boot	1	
Strain-relief cable grommet	1	

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 65.

Order Code	Type	Price each
VE36P	Velleman Kit K2667	£10.99

K4400 ELECTRONIC RECORD/PLAYBACK MODULE



A redesign of one of our best selling kits, this module offers the electronics and audio enthusiast the possibility of recording a few lines of speech and repeating it over and over again - without the need for any mechanical parts. Short messages can be repeated, as required, to acknowledge welcoming visitors or greeting customers. Also can be used in conjunction with intruder alarms, in toys or at parties. The module drives a standard 8Ω speaker, and retains the message when the power is removed. It is possible to connect multiple modules together in cascade to increase the recording time.

Specification

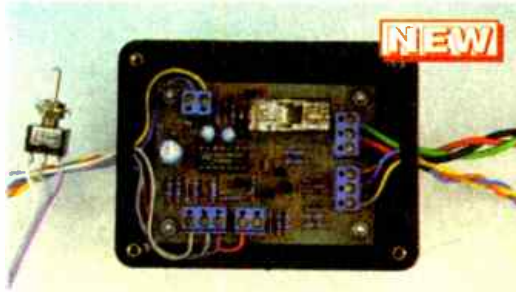
Recording time:	12 to 20s max.	
Power requirements:	9V to 12V AC	6V DC
Current drain		
standby:	7mA	15µA max
record:	40mA	26mA
playback:	75mA max	50mA max
Dimensions:	125 x 70 x 25mm	

Order Code	Type	Price each
VF43W	Velleman Kit K4400	£29.99

FOR CASHTEL
Phone 01702 552941

CAR PROJECTS

AUTO REAR WINDOW WIPER CONTROLLER 3



Features

- ★ Single shot and intermittent modes
- ★ Extends wiper blade life
- ★ Reduces the risk of scratches
- ★ Lessens wiper motor and gearbox wear
- ★ Enhanced operation
- ★ Multi-mode operation
- ★ Auto wipes when reversing

Most cars that have a rear wiper usually have the operating switch for it located in some awkward, almost unreachable position, whereas the conventional front screen wiper controls are close at hand. Consequently it is not easy to operate the rear wiper while you have to concentrate on your driving, so that should the window dry out, for example, and it is not a convenient moment to switch the wiper off, there is a risk of scratching the glass.

The Auto Rear Wiper Controller adds flexibility to the existing simple 'on or off' rear window wiper on the car, making its operation semi-automatic and relieving the driver of the task. When travelling in rain, for example, the rear window is mainly dry most of the time and only requires occasional wiping to clear spray, which can be done in intermittent mode.

There are three essential modes of operation. In Single Shot Mode, the rear wiper will give a single sweep and then stop. In Intermittent Mode, the rear wiper will sweep and then wait for a preset time period; this cycle will repeat indefinitely until switched off. The time delay period can be preset according to the value chosen for the timing resistor. In the kit, two alternative values are supplied for 7 and 15 seconds, but other values can be substituted for delay times from 1 second to 1 minute.

In Auto Wipe on Reverse Mode, the rear wiper is forced into Intermittent Mode whenever reverse gear is selected, regardless of the unit's toggle switch position. In all cases, the rear wiper will only function while the front windscreen wipers are also switched on, so that all wipers can easily be switched off with just one control. The original rear wiper switch can still be used as normal, and any mode is overridden by the Auto Wipe on Reverse Mode while the windscreen wipers are active.

Optional Items

The following items are not included in the kit, but may also be required.

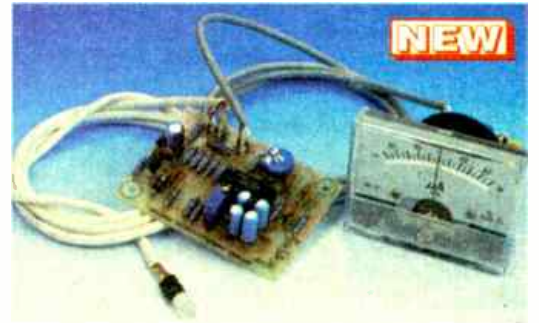
ABS Box MB2	1	(LH21X)
Pozi Screw M3 16mm	1 Pkt	(JC70M)
Steel Nut M3	1 Pkt	(JD61R)
Isoshake M3	1 Pkt	(BF44X)
Spacer M3 1/4 in.	1 Pkt	(FG33L)
Seal Grommet 16mm	1 Pkt	(JX77J)
Wire 6A Black	As Req	(XR32K)
Wire 6A Blue	As Req	(XR33L)
Wire 6A Red	As Req	(XR36P)
Wire 3A Black 10m	1 Pkt	(FA26D)
Wire 3A Blue 10m	1 Pkt	(FA27E)
Wire 3A Green 10m	1 Pkt	(FA29G)
Wire 3A Orange 10m	1 Pkt	(FA31J)
Wire 3A Red 10m	1 Pkt	(FA33L)
Wire 3A White 10m	1 Pkt	(FA35Q)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 74.

Order Code	Type	Price each
LT46A	Auto Rear Windw Wipe	£9.95
GH66W	Auto Rear Wiper PCB	£2.75

CAR BATTERY CHARGE/DISCHARGE/IDLE MONITOR 2



Features

- ★ Simple to build
- ★ Tri-colour visual indication
- ★ Optional centre zero meter
- ★ Easy to install

Applications

- ★ Avoiding a flat car battery
- ★ Detecting alternator faults
- ★ Balanced line driver

Be forewarned of a drained car battery, and so avoid failure to start the engine on a cold and frosty morning, with this easy to build and install project that will indicate the charge/discharge state of the battery. The dashboard of the average family car typically has no more than an ignition warning light, which only illuminates when the alternator is not producing any output. The alternator primarily replaces the energy lost from the battery during starting, and supplies the ancillaries; ignition, lights, radio, etc. Its current output is chosen by the manufacturer to meet these needs, but can be exceeded by the addition of new accessories, or be depleted with wear or as the result of a fault such as a slipping fan belt.

This project gives a visual indication of whether the car battery is being drained or charged on a single tri-colour LED. Discharging is shown as red, while charging is green. A quiescent state, when the battery is neither charged or discharged is shown as yellow. An optional centre-zero meter movement can even be fitted if required. Installing the module is very simple, since there are only three wires to connect.

Specification

Operating voltage:	+12V to +25V DC
Current consumption:	15mA (max)
Visual indicators:	Tri-colour LED
	Optional centre zero meter

Optional Items

The following items, not included in the kit, may also be required.

Min Res 15k	1	(M15K)
Horizontal Enclosed Preset 22k	2	(UH04E)
Diode 1N4148	2	(QL80B)
Strip Board Type 1039	1	(JP46A)
Insulated Spacer M3 x 10mm	1 Pkt	(FS36P)
Pozi Screw M3 6mm	1 Pkt	(BF36P)
Self-Tapping Screw No.6 x 3/8 in.	1 Pkt	(LR67X)
Single-Ended PCB Pin 1mm	1 Pkt	(FL24B)
Panel Meter 100-0-100µA 2in.	1	(RW98G)
Box with Base Type 2	1	(YN36P)
Min Single Core Lapped Screen	As Req	(XR15R)
Burglar Cable 4-wire	As Req	(XR89W)
In-Line Car Type Fuse Holder	1	(RX51F)

Fuse 100mA 1 1/2in.	1	(WR08J)
LED Clip Convex 5mm	1	(UK14Q)
PVC Sealing Grommet 16mm	1	(JX77J)
Heat Shrink Sleeving 1.6mm	1	(BF86T)

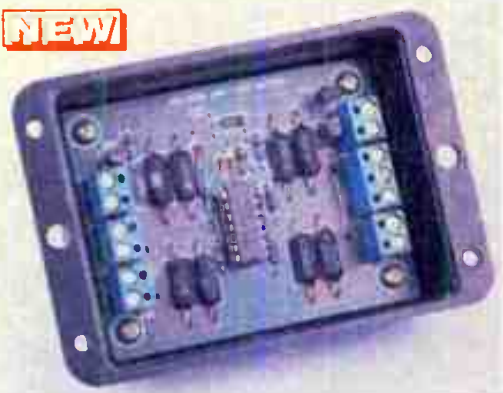
Kit and Special Parts

A complete kit of parts, including the PCB, is available (but excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 78.

Order Code	Type	Price each
LT56L	Batt. Charge Monitor	£7.99
GH74R	Batt Charge Mon PCB	£2.49

CAR LAMP MONITOR 2

NEW!



Features

- ★ Easy to build
- ★ Easy to install
- ★ Single or multiple indicators
- ★ Can be interfaced to logic
- ★ Self powered

It is surprising how few people take the trouble to check, on a regular basis, that their car's lights are fully functional. This can be a hazard to the driver of the vehicle itself and other road users. In today's tougher-than-ever driving conditions it is important that a car's lights are operating as they should. Faulty lights can and do contribute to accidents. What is needed is a method of indicating to the driver that a lamp has failed or has become intermittent at the time of the fault developing.

The Car Lamp Monitor, will provide an indication of lamp failure and is based around a custom designed IC. The Car Lamp Monitor has been designed to be as flexible as possible, so as to cater for the inevitable differences in electrical wiring between makes and models of cars. However, two basic assumptions have been made: firstly, the car's electrical supply is negative earth; secondly, the car's lights are switched in the positive supply line to the lamp (i.e. one side of the lamp is connected to chassis). The vast majority of cars will satisfy both of these requirements.

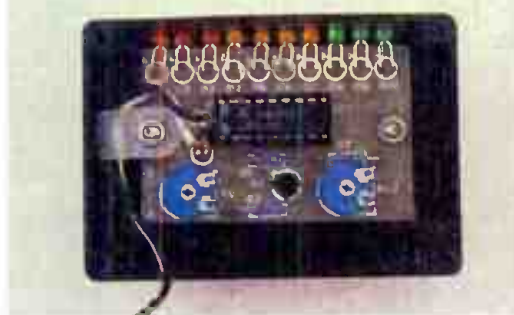
A single Car Lamp Monitor module can be used to monitor up to four groups of lamps; a group can comprise a single lamp or a number of lamps connected in parallel. The monitor works by detecting the current drawn by working lamps, if a lamp fails the current drawn will drop (to zero for one lamp). Fault indication can be in the form of a buzzer, an LED, a filament lamp or by interfacing the Car Lamp Monitor to more complex electronics, such refinements as digitised spoken warnings could be provided. To cover all of a car's lamps will require several modules to be built. The module may also be used to confirm operation of lights on a caravan or trailer.

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 80.

Order Code	Type	Price each
LT63T	Car Lamp Monitor Kit	£9.99
GH85G	Car Lamp Mon PCB	£2.99

CAR BATTERY MONITOR 2



Any number of things from a faulty alternator to left-on headlights can result in a flat car battery - and the first thing you are likely to know about it is when you turn the key one morning and the car won't start! This useful little unit is designed to warn you in advance by displaying the battery's state of charge with a row of ten LED's. The Monitor costs very little to build, and since it consumes a miserly 20mA, can be left permanently connected to the battery. The Car Battery Monitor will even reveal a slipping fan-belt problem, which prevents the battery charging properly, yet leaves the dashboard battery warning light off, as well as indicate how the battery is handling the strenuous work of starting the car (it takes 20 minutes of running to put back what a five-second start takes out).

Kit and Special Parts

A complete kit is available, and the pcb is also available separately. Full construction details may be found in the Maplin Magazine Issue 37. PCB dimensions: 55 x 35mm.

Order Code	Type	Price each
LK42V	Car Batt Monitor	£9.49
GA19V	Batt Mon PCB	£1.65

INTELLIGENT SPLIT CHARGE UNIT NEW!



Features

- ★ Charges auxiliary battery
- ★ Powers refrigerator
- ★ Alternator or Ignition switch controlled
- ★ Status Indicators
- ★ Easy-to-build
- ★ Easy-to-install
- ★ Can replace existing unit

Applications

- ★ Cars
- ★ Vans
- ★ Motor-homes
- ★ Trainers
- ★ Caravans

A split-charge unit is employed in a car or other similar vehicle to charge an auxiliary (second) battery. An auxiliary battery is often used to power 12V electrical accessories in a caravan or trailer. The use of such a battery ensures that the towing vehicle's main battery is not discharged. The auxiliary battery can be located in the towing vehicles' boot or in the caravan itself.

Modern caravans are often equipped with a multi-supply refrigerator which can be operated from 230V AC mains, 12V DC or liquified petroleum gas (LPG). The dual split charge unit is able to simultaneously charge an auxiliary battery and supply power to a 12V DC operated refrigerator.

Specification

Supply voltage range:	+10V to +16V DC
Maximum auxiliary battery output current:	10A
Maximum refrigerator output current:	10A
Supply current control input:	100mA maximum
monitor circuit supply:	50mA maximum

Optional Items

The following items, not included in the kit, may also be required.

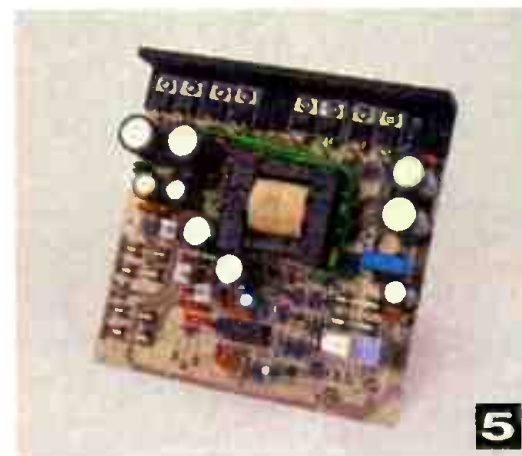
M3 x 15mm Spacer	1 Pkt	(FS37R)
30A Wire Red	As Req.	(XR59P)
30A Wire Black	As Req.	(XR57M)
10A Wire Red	As Req.	(XR36P)
10A Black Wire	As Req.	(XR32K)
4-way Low Current Cable	As Req.	(XR89W)
6-way Low Current Cable	As Req.	(XS54J)
8-way Low Current Cable	As Req.	(CW70M)
4.3mm Solder Tag	1 Pkt	(JH71N)
Aluminium Box	1	(XB69A)
Grommet	1	(JX65V)
M4 x 10mm Bolt	1 Pkt	(JY14Q)
M4 Nut	1 Pkt	(JD80Q)
M4 Shakeproof Washer	1 Pkt	(BF43W)
5mm Red LED	2	(WL27E)
5mm Green LED	2	(WL28F)
5mm LED Clip	4	(UK14Q)
Fuse 20mm T100mA	1	(WR00A)
In-line Fuseholder	1	(RC71N)
20A Blade Fuse	1	(KU23A)
10A Blade Fuse	1	(KU21X)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 82.

Order Code	Type	Price each
LT60Q	Intelligent Split Charge	£18.99
GH82D	Split Charge PCB	£4.29

SWITCHING PSU FOR IN-CAR AUDIO SYSTEM 5



- ★ For powering high quality power amplifiers
- ★ Polarity protected
- ★ Thermal protection
- ★ Remote switch on control

The increasing demand for a better quality in-car hi-fi system has led to several major advances in the field, to the point where superior equipment has been made on the test bench. The attention has turned towards

Continued on next page.

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high quality power supplies, producing low ripple and improved efficiency. This car audio switching power supply unit is able to fulfil the requirements of today's hi-fi buff. No longer are you limited to power amplifiers operating from the only available 12V source. Primarily designed to power the 50W power amplifier kit LW35Q (see elsewhere in this section), this project can also be used to increase the supply for high power 'booster' type amplifiers as well as other amplifiers requiring a supply voltage of $\pm 30V$. The power supply is able to operate under varied temperature conditions, with high temperature shut-down provided if the unit gets too hot. When the temperature drops to 20°C the unit automatically switches itself back on. Additional protection is supplied by fuses to the $\pm 30V$ output and a fused input. This project requires a degree of expertise and patience to build, and is not recommended for absolute beginners. Construction details must be carefully followed.

Specification

Supply voltage:	11V to 15V DC (13.8V Nominal)
Current:	10.7A ($V_s = 11.3V$)
Output power:	120W continuous
Outputs	
Main:	$\pm 30V$
Auxiliary:	$\pm 12V$
Continuous output current at	
$\pm 30V$:	2 + 2A
$\pm 12V$:	50mA + 50mA
Efficiency:	>90%
Shut-down temp:	80°C
Shut-down hysteresis:	20°C
Standby input:	Active low
Remote switch-on input:	Active high
Thermal shut-down output:	Active low
Input noise ($P_o = 120W$):	140mV
Output Noise ($P_o = 120W$)	
Main:	60mV
Auxiliary:	40mV
Switching frequency:	25kHz
Converter mode:	Push-pull

Optional Items

The following items, not included in the kit, may also be required.

Car Fuse Holder	1	(RX51F)
15A 1 1/4 in AS Fuse	1	(UK13P)
HC Wire Black	As Req	(XR57M)
HC Wire Red	As Req	(XR59P)
32/0.2 Wire Red	As Req	(XR36P)
32/0.2 Wire Black	As Req	(XR32K)
32/0.2 Wire Blue	As Req	(XR33L)
Zip Wire	As Req	(XR39N)
50W Power Amp	2	(LW35Q)
2E Heat Sink	2	(HQ70M)

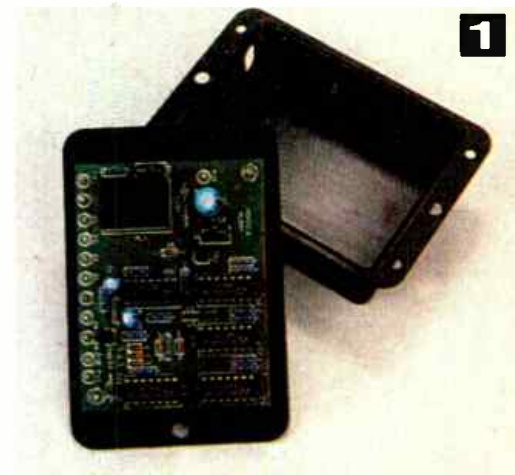
Kit and Special Parts

A complete kit is available, and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 46. PCB dimensions: 150 x 150mm.

Order

Code	Type	Price each
LP39N	B2 Car Audio SMPS	£49.99
GE61R	Switching PSU PCB	£6.49

VEHICLE INTRUDER ALARM



- ★ **Entry/exit delay**
- ★ **Entry/exit sounder**
- ★ **Two trigger inputs**
- ★ **Compact design**
- ★ **Pulsed car horn with time out**

There are many alarms available on the market, but none can offer complete protection against theft. Though no alarm will foil the professional thief, it will act as a deterrent to the small time thief or joyrider. This circuit, like most alarms, is triggered off by the door contacts for the courtesy light and will only work when fitted to a 12V negative earth car. The switch to the alarm is fitted on the inside of the car as opposed to the outside, thus ensuring that the switch is not tampered with. The idea is, when leaving the car the alarm switch is turned to the on position and the arm button is pressed. It is now safe to open the doors and get out of the car. After arming the system a timer circuit allows approximately 30 seconds to leave the car and shut the doors. The timing and sequence of events can be modified using the information in the leaflet supplied. If a door is then opened, the horn will sound after 15 seconds. The 15 second delay is sufficient time for the occupant to turn off the alarm, but not enough time for the thief to tamper with the system. The horn will pulse for 30 seconds at a rate of 1 pulse per second, before re-arming itself. If the door is left open the alarm will pulse for 30 seconds, stop for 15 seconds and will continue this cycle until reset.

The alarm is capable of driving car horns of up to 10A (120W).

Optional Items

The following items, not part of the kit, may also be required.

Min Key Switch	1	(FE44X)
Wire 3202 Black	1	(XR32K)
Wire 3202 Red	1	(XR36P)
16/0.2 Wire 10M Green	1	(FA29G)
16/0.2 Wire 10M Orange	1	(FA31J)
16/0.2 Wire 10M White	1	(FA35Q)
16/0.2 Wire 10M Yellow	1	(FA36P)
LED Clip Convex 5mm	1	(UK14Q)
Piezo Electronic Siren	1	(YP11M)
Stereo 3.5mm Ch Jk Skt	1	(FK03D)
Alarm Sticker	1	(JR91Y)
Self-Tap No. 8 x 1/2 in	1 Pkt	(BF69A)
Isobolt M4 12mm	1 Pkt	(BF49D)
Isonut M4	1 Pkt	(BF57M)
Spring Washer M4	1 Pkt	(JD95D)

Kit and Special Parts

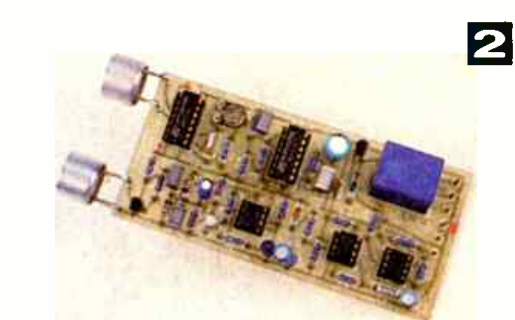
A complete kit is available, and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 46.

A ready assembled version is also available.

Order

Code	Type	Price each
LP65V	Vehicle Alarm	£12.99
GE79L	Vehicle Alarm PCB	£3.29
AM08J	Vehicle Alarm Assm	£16.99

ULTRASONIC CAR ALARM



This burglar alarm design is basically the same as the ultrasonic movement detector type that is often used to protect homes and other buildings. By detecting movement inside the car using the Doppler shift principle, any method of entry will trigger the alarm. The operating range is approximately 1m extending $\pm 45^\circ$ from the sensors, which is suitable for the driver and front passenger seat area of most cars.

The circuit incorporates an Exit Delay Timer which prevents the unit from being activated until several seconds after it has been switched on, giving the user an opportunity to leave the car without triggering the alarm. This is an important feature as it enables the on/off switch to be positioned inside the car, rather than having to rely on a concealed switch somewhere on the outside of the car. A short duration Entry Delay is also included so that the user can enter the car and deactivate the alarm before it sounds. Once activated the alarm operates the car horn which is pulsed at approximately 1Hz creating an 'urgent' sound. This will last for approximately 10 minutes and then the unit will reset automatically.

Kit and Special Parts

A complete kit of parts for this project and the pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 4. A ready assembled version is also available.

Order

Code	Type	Price each
GB93B	U/Sonic Car Alarm PCB	£4.75
LK75S	U/Sonic Car Alarm Kit	£19.99
AM09K	U/Sonic Alarm Assm	£29.99

COMPUGUARD



- ★ **Fully programmable**
- ★ **Low power consumption**
- ★ **Optional battery backup**
- ★ **Suitable for all negative earth vehicles**
- ★ **Microprocessor controlled**
- ★ **Controls central locking & electric windows and sunroof**

In Britain a car is stolen every 30 seconds! Compuguard is a microprocessor controlled programmable semi-intelligent vehicle alarm that aims to make a thief's time as difficult as possible by constantly monitoring and modifying its outlook on the security of the vehicle! Constructional details may be found in the Maplin Magazine Issues 40 and 41. Compuguard comes in three kits:

**MAPLIN
KEY CALL**
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Compuguard Main Unit

This houses a microcontroller, optional battery backup, shock and voltage drop sensors, control relays and service keyswitch. The unit is impregnable to water and is to be mounted in the engine compartment.

Optional Items

The following optional items are not included in the kit but may also be required.

Re-Chargeable Type AA Battery	6	YG00A
9V Battery Holder	1	HQ01B
PP3 Battery Clip	1	HF28F
Motor-Start Press	1	FH91Y
Additional Quick Snap Connectors	As Req.	JR88V
12V Siren	See Article	
Power Connection Wire Black	As Req.	XR32K
Power Connection Wire Red	As Req.	XR36P
Self Tapper No8 x 1/2 in.	1 pkt.	BF69A
Spirawrap 1/8 in.	As Req.	BL57M

Kit and Special Parts

A complete kit of parts is available. The high quality fibre-glass PCB, an aluminium mounting bracket for attaching the Compuguard main unit to the car body, and a TMS77C82 microcontroller pre-programmed with the Compuguard car alarm software are also available separately. The leaflet supplied with the kit contains the complete installation details (which are not shown in the magazines). This leaflet is also available separately.

PCB dimensions: 104 x 127mm.

Order Code	Type	Price each
LP22Y B1	Compuguard Main Unit	£69.99
GE46A	Compuguard Main PCB	£11.99
JR77J	Compuguard Bracket	£4.25
UL63T	TMS77C82 MS01	£19.99
XK53H	Cmpgud Main Leaflet	40p NV

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01702 553935**

Compuguard Infra-Red Receiver and Control Unit



This houses the infra-red receiver/decoder and control switches to select the activated sensors. The unit is to be mounted inside the passenger compartment.

Optional Items

The following optional items are not included in the kit but may also be required.

Multi-Core 15-way	As Req.	XR28F
Multi-Core 4-way Screened	As Req.	XR25C
Potting Box Miniature	1	LH56L
Potting Compound 50g	1	FT17T
Quickstick Pads	1	HB22Y

Kit and Special Parts

A complete kit of parts is available and the pcb and self-adhesive panel are also available separately.

PCB dimensions: 88.9 x 69.2mm.

Order Code	Type	Price each
LP23A	Compuguard IR Rec Sw	£23.99
GE56L	Compuguard I/R Rx 3d	£5.99
JR73Q	Compuguard IR Panel	£3.99

Compuguard Infra-Red Transmitter

This is a small hand-held transmitter that can easily be attached to a key-ring. A recessed tactile switch is provided which selects active, inactive, or 'panic' conditions.

Optional Items

The following optional items are not included in the kit but may also be required.

12V Lighter Battery 23A	1	JG91Y
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Kit and Special Parts

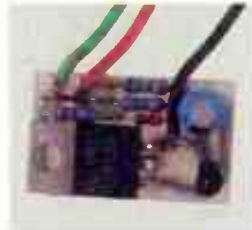
A complete kit of parts is available. The high quality fibre-glass PCB, self-adhesive panel and a key-ring box for housing the infra-red transmitter unit are also available separately.

PCB dimensions: 55.5 x 31mm.

Order Code	Type	Price each
LP24B	Compuguard IR Tx	£9.99
GE57M	Compuguard I/R Tx Bd	£2.25
JR92A	Remote Case Panel	36p
JR90X	Keyring Remote Case	£1.35
XK35Q	Cmpgud Rx/Tx Leaflet	60p NV

CAR COURTESY LIGHT EXTENDER

- ★ Requires no external power supply
- ★ Optional ignition override
- ★ No setting up required
- ★ Low component count



This project keeps the interior light on after the car door is closed, allowing time to find keys, ignition switch or even your way out of the garage! The board has three fly leads, two are fitted across the existing door switch whilst the other is connected to the ignition switch which turns off the unit when activated. The small PCB allows the unit to be concealed within the car. The mounting box supplied allows connection to the dashboard.

Optional Items

The following items, not included in the kit, may also be required.

Hook-up wire 16/0.2 Black	1(FA26D)
Hook-up wire 16/0.2 Red	1(FA33L)

Kit and Special Parts

A complete kit of parts is available, and the pcb is also available separately. Full construction details can be found in Maplin Magazine Issue 44.

Order Code	Type	Price each
LP66W	Courtesy Light Extr	£3.49
GE81C	Courtesy Light PCB	99p

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CAR INTERIOR LIGHT CONTROLLER



Features

- ★ Easy to build
- ★ Simple to fit
- ★ Low power consumption

NEW!

This project is a very useful addition to many older, and base model cars, many of which do not have the courtesy light feature of the higher models. The project will allow the courtesy light to remain illuminated for approximately 30 seconds after the vehicle door has been closed. It also adds an extra feature that in the event of a door being left open, the courtesy light will be automatically extinguished after approximately 10 minutes. Please note that some vehicles with electronic engine management systems will require reprogramming by a main dealer after disconnecting the battery.

Specification

Minimum supply voltage:	9V
Maximum supply voltage:	15.5V
Quiescent current:	2.5mA @ 12V
Operating current:	30mA @ 12V

Optional Items

The following items, not included in kit, may also be required.

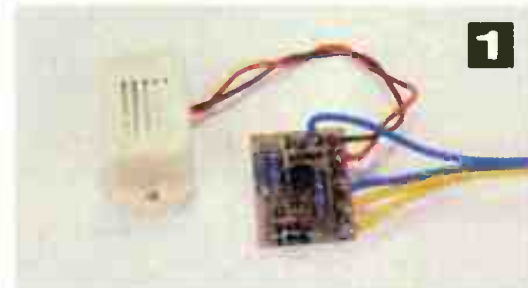
16.0mm Seal Grommet	1Pkt	(JX77J)
10mm M3 Insulated Spacer	1Pkt	(FS36P)
Box 2BA	1	(BZ28F)
Plug-in Fuse Holder	1	(RX51F)
1.25in. 100mA Fuse	1	(WR08J)
Black Connection Wire (32/0-2)	As Req.	(XR32K)
White Connection Wire (32/0-2)	As Req.	(XR37S)
Red Connection Wire (32/0-2)	As Req.	(XR36P)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 82.

Order Code	Type	Price each
LT65V	Car Int Light Cntrlr	£9.99
GH89W	Light Controller PCB	£2.99

CAR LIGHTS-ON WARNING INDICATOR



- ★ Low cost and small size
- ★ Easily fitted to most negative earth cars
- ★ Buzzer sounds when lights left on

If your car is not fitted with some kind of 'lights-on warning', the chances are that you will leave your lights switched on. Murphy's law dictates that when you do so, your absence from the car will be of

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sufficient duration to ensure that the battery will be well and truly flat! This small and simple Lights-On Warning Indicator will emit a clearly audible buzzing sound when the car lights are left on, the ignition switch is turned-off and the driver's door opened. In his manner the buzzer will only sound when the driver is genuinely about to leave the car. The circuit of the Indicator is very simple, just one transistor, some resistors, diodes and a buzzer.

Optional Items

The following items, not included in the kit, may also be required.

16/0-2 Wire	As Req. (FA26D-FA36P)
Snap lock Cable Connector	As Req. (JR88V)
Terminal Block 5A	As Req. (HF01B)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 50.

Order Code	Type	Price each
LP77J	Lights On Reminder	£4.99
GE88V	Lights On PCB	£1.39

L9801 HIGH-SIDE DRIVER



- ★ 25A peak current capability
- ★ Low on-resistance
- ★ TTL & CMOS compatible input
- ★ Thermal & overcurrent protection
- ★ Diagnostic output

The L9801 high-side driver IC is capable of switching both resistive and inductive loads of up to 6A, with a peak current capability of 25A. In use, one side of the load is connected directly to 0V and the other to the positive supply via the L9801; hence the name 'high-side' driver. Typically, automotive applications demand high-side switching – most loads use the vehicle chassis as the 0V connection, this saves on wiring and helps to prevent electrochemical corrosion. The L9801 is particularly suited to driving filament lamps as it limits inrush current; since the initial high current surge at switch-on is a major factor in filament failure, the device effectively increases lamp life. Other possible applications include: computer interfacing, remote switching and relay replacement. A useful feature of the device is a diagnostic output, which indicates an open circuit load, short-circuit output, thermal shutdown and input over-voltage. This may be used to inform the control system of a fault. Detected by software diagnostics routine or implemented by hardware, warning indicator LED, etc. For continuous currents up to 2A heatsinking is generally unnecessary, above this level a heatsink should be used. The tab of the device is at 0V potential and it is likely that in most instances an insulating mounting kit will be unnecessary, however, heat transfer compound should be used.

Note: this is intended as a 'building block' project only and some component values supplied may have to be changed for a particular application. This project is not covered by our 'Get-You-Working' Service.

Optional Items

The following items, not included in the kit, may also be required.

Slotted Heatsink	(FL58D), or
Powerfin Plastic	(FG55K), or
Powerfin TO3	(FG51F)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 54.

PCB dimensions: 24.1 x 38.1mm.

Order Code	Type	Price each
LT02C	L9801 HS Driver	£8.49
GH11M	L9801 HS Driver PCB	£1.75

CAR DIGITAL TACHO



In these days of ever-higher motoring costs the unit described here will help the driver to change gear at the most advantageous point to save fuel and extend engine life. Anyone using a car to tow a trailer or caravan will also benefit by being able to make the best use of the torque available from the engine. Conventional tachometers give a display of engine speed on a millimeter, usually with a scale of about 270° arc. Pulses produced by the action of the contact breakers are integrated and fed to the meter to give an analogue display of engine revolutions. The disadvantages are that an average reading is displayed, which can easily lag behind rapid speed changes, and the meters tend to be somewhat fragile. This tachometer overcomes both of these disadvantages by counting pulses and displaying engine revolutions over a very short time, the digital display being continuously updated. Two digits display the number of revolutions x 100. The unit is designed for negative earth cars. The unit can only be used on cars with contact breakers. Construction is very straight-forward, using two printed circuit boards which fit directly in the case without the need for mounting bolts, so the project can be tackled by any but the most inexperienced constructor.

Kit and Special Parts

A kit is available but does not include the case. The pcbs are also available separately. Full construction details may be found in Maplin Magazine Issue 37. Main PCB: 52 x 83mm. Display PCB: 52 x 23mm.

Order Code	Type	Price each
LK79L	Car Digitl Tacho Kit	£28.99
GA26D	Dig Tacho Main PCB	£2.20
GA27E	Dig Tacho Dsply PCB	£1.20

REMOTE POWER SWITCH

A useful project intended for use in cars, but finding many other applications where remote switching of up to 10A is required. The project is both easy to build and easy to use. Connection to the Remote Power Switch is via on-board screw



terminals. An LED is provided to indicate operation. A protection diode suppresses relay coil back emf voltage thus preventing possible damage to driver circuits. Applications include switching of fog/driving lights, alarms, horns, sirens and high power car amplifiers. The high quality, long life relay requires 45mA of drive current to operate.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 34. PCB dimensions: 36.8 x 45.7mm.

Order Code	Type	Price each
LP07H	Power Switch K t	£5.25
GE25C	Power Switch PCB	£1.99

VELLEMAN CAR PROJECTS K2543 IGNITION AMPLIFIER



Features

- ★ Easy to fit, only four wires
- ★ Transistor assisted ignition method
- ★ Significantly reduces contact breaker wear
- ★ Original connections can be easily restored at any time
- ★ Improved coil performance returns easier starting and cleaner combustion

Applications

- ★ For any petrol burning motor vehicle
- ★ Suitable for engines of 2 to 8 cylinders

There are two main types of electronic ignition currently available, the first being that which completely replaces the 'electromechanical' ignition (contact breaker points, condenser, etc.) and the type that can be fitted as an 'up-grade', producing what is commonly called 'transistor assisted ignition'. The latter type still makes use of the 'conventional' mechanical timing switch (the contact breaker points). However, it does provide a faster switching speed and more energy to the spark, so places less wear on the points because the arcing factor is removed, and so keeps the engine in tune for longer periods. Fixing this electronic ignition system will lead to improved starting and smoother running, particularly at very high and very low rpm. Other benefits include lower fuel consumption, less pollution and lower servicing costs.

Specification

Switching speed:	1µs
Firing interval:	2m-s minimum
Coil switching current:	4A nominal
Supply voltage:	12V to 14V DC
Polarity:	Negative earth only
Supply current drain:	320mA approx.

Optional Items

The following items, not included in the kit, may also be required.

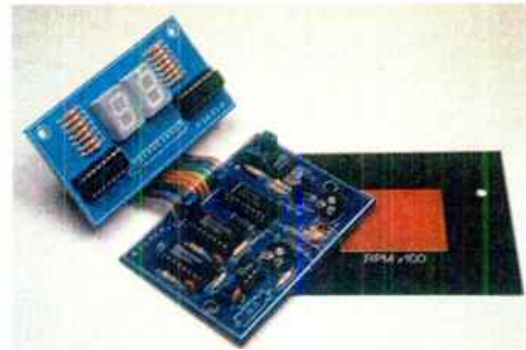
Box DCM5002	1	(LH70M)
Flexible Rubber Sealant	1	(YJ91Y)
Wire 3202 Red	2m	(XR36P)
Wire 3202 Black	2m	(XR32K)
Wire 3202 Blue	2m	(XR33L)
Wire 3202 Green	2m	(XR35Q)
Lucar Style Push-On Receptacle	1 Pkt	(HF10L)
Lucar Style Push-On Blade	1 Pkt	(HF11M)
Push-On Blade Covers	1 Pkt	(FE66W)
Push-On Receptacle Covers	1 Pkt	(FE65V)
Screw M3 x 40mm	1 Pkt	(JF28F)
Tie Wraps 385	5	(FE00A)
Heat Transfer Compound	1	(FL79L)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 68.

Order Code	Type	Price each
VE00A	Velleman Kit K2543	£11.99

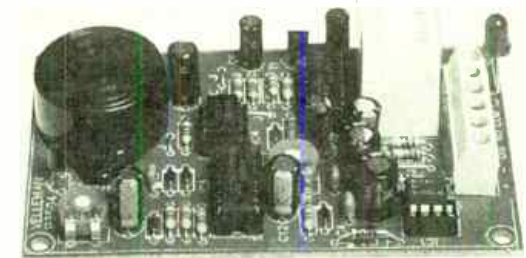
K2625 DIGITAL TACHOMETER



For cars or motor-cycles running on petrol or gas. Can act as a general purpose rev. counter. Range: 100 to 9900 RPM on a 2 digit display. Easy to calibrate. Requires 10 to 15V DC at 200mA. Front panel 70 x 90mm.

Order Code	Type	Price each
VE01B	Velleman Kit K2625	£25.99

K3504 CAR ALARM



This alarm detects instantaneous voltage drops of the battery caused, for example, by the courtesy light or boot light being switched on. To show you that the alarm is working properly, the kit has the following two control indicators: Flashing LED to indicate that the adjustable exit delay time has expired and that the alarm is armed; Pre-alarm (built-in buzzer) to remind you that the alarm is armed, so that you don't forget to

switch it off. The alarm can be switched on and off very easily, either automatically through the ignition lock or remotely controlled by our infra-red code lock K6704 and K6705 for example.

Order Code	Type	Price each
VE02C	Velleman Kit K3504	£15.99

K2599 INTERMITTENT WIPER CONTROLLER



2

Features

- ★ **Timer intervals 5, 10 & 15 seconds**
- ★ **Relay output: 2 x 5A single pole change over contacts**
- ★ **LED indicator**

This project is ideal for updating the windscreen wiper control installed in older cars. An intermittent setting, featuring three different time intervals of 5, 10 and 15 seconds is provided for matching to weather conditions. The advantages of intermittent wiping are that it extends the working life of the wiper blades and reduces the mechanical wear of the wiper motor and gearbox.

Specification

Power supply:	12V to 15V DC
Supply current	
output off:	25mA
output on:	100mA
Interval lengths:	5, 10, and 15 seconds
PCB dimensions:	82 x 52 x 40mm

Optional Items

The following items, not included in the kit, may also be required.

Ribbon Cable 10 way	As Req	(XR06G)
---------------------	--------	---------

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 75.

Order Code	Type	Price each
VE03D	Velleman Kit K2599	£12.99

AM972S/973 METAL PIN SWITCHES



These switches have normally closed contacts and may be used to switch on lights when opening car doors, boot or bonnet. They are ideal to activate the alarm K3504. Available in two lengths AM972S (short) and AM973 (long, with adjustable mountings).

Order Code	Type	Price each
VF30H	Velleman Mod AM972S	99p
VF31J	Velleman Mod AM973	£1.29

AM956 SHOCK DETECTOR

A ready-made electronic shock detector that can be installed anywhere in the car. The unit provides protection if an attempt is made to force entry, to tow or jack the car etc. The detector has adjustable sensitivity, LED indication, is easy to install, and makes a valuable addition to suitable existing car alarms.



Order Code	Type	Price each
VF28F	Velleman Mod AM956	£9.99

K2644 FROST INDICATOR



Features

- ★ **Adjustable indication threshold**
- ★ **Ideal beginners' project**
- ★ **Low cost**
- ★ **9V battery or 12V vehicle electrical system**

Applications

- ★ **Provides warning of dangerous driving conditions**
- ★ **Helps you to prevent water pipes from freezing and bursting**
- ★ **Temperature warning for cold stores**
- ★ **Greenhouse frost alert**
- ★ **General remote temperature sensing**

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Preset temperature threshold indication is important where fluctuating or wrong temperatures can cause problems. This can occur in the freezer, cold stores, greenhouses or on icy roads etc. The project comprises a sensor and a main PCB which will give visual indication when the temperature is between +3°C and -3°C. A flashing LED indicates when the temperature is nearing freezing point and below this point the LED is on continuously. A rugged temperature sensor with mounting stud is included.

Specifications

Supply voltage:	9V to 15V DC
Supply current:	25mA
Sensor:	NTC thermistor
Completed PCB dimensions (without LED):	56 x 20 x 40mm

Optional Items

The following items, not included in the kit, may also be required.

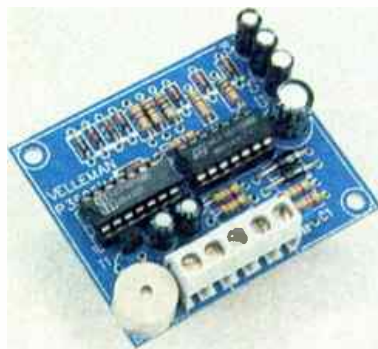
2k2 Min Res	1	(M2K2)
PCB Pin 214	1 Pkt	(FL21X)
M3 Isoshake Washer	1 Pkt	(BF44X)
Double Bubble Sachet	1	(FL45Y)
In-Line 1 1/4 in. Fuseholder	1	(RX51F)
100mA 1 1/4 in. Fuse	1	(WR08J)
Twin-Core Bell wire	As Req	(XR39N)
Box	As Req	

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 60.

Order Code	Type	Price each
VE04E	Velleman Kit K2644	£7.99

K3505 HEAD LIGHT INDICATOR



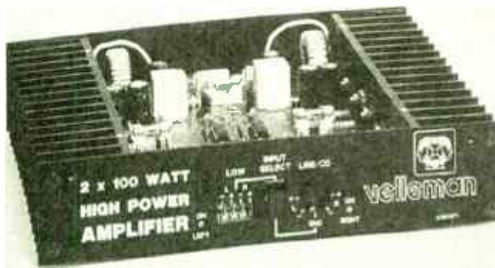
This clever module will be invaluable to car owners whose vehicles' lighting switch allows the headlights to remain 'lit' even if the ignition switch is off. This will result in the battery being reduced to a discharged state, so that it will be impossible to start the car. The module is designed to give a repeated audible alarm tone to remind you that the main lights are on when the ignition is switched off, so helping to prevent a flat battery. It can also be configured to give a continuous alarm tone to remind you to switch your lights on (this is a requirement in certain countries outside of the UK). PCB size: 57 x 48mm.

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 65.

Order Code	Type	Price each
VF24B	Velleman Kit K3505	£8.99

K3503 100W STEREO CAR AMPLIFIER



Features

- ★ Switchable line/CD and speaker level inputs
- ★ Wide frequency response (10Hz to 100kHz)
- ★ Twin switching power supply
- ★ 12V or 24V operation
- ★ Remote power off/on control
- ★ Push-pull BTL outputs

This affordable high power amplifier for cars employs a modern switching PWM power supply to boost the nominal 12V (or 24V for trucks) supply voltage to approximately 33V, enabling the amplifier to deliver higher power levels. Such switched mode power supplies (SMPS) using DC to DC converters help to deliver rock solid bass with a performance that is immune to supply line noise and battery fluctuation. Using FET switching transistors, the K3503 maintains tightly controlled regulation which results in stable, ripple-free supply voltages. Bipolar transistors are used in the audio output stages as they offer increased output efficiency. The speakers are directly coupled to the outputs to give a clean, powerful bass response. The amplifier will accept low level i.e. speaker outputs from a radio cassette, and line level inputs. Kit K3506 can be used to prevent audible thumps at switch-on.

Specification

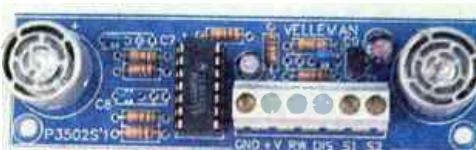
Output power:	2 x 100W peak (2 x 50W rms) into 4Ω 2 x 70W peak (2 x 35W rms) into 8Ω
Frequency response:	15Hz to 20kHz (-3dB) LOW input 10Hz to 100kHz (-3dB) LINE/CD input
THD at 1kHz:	0.15%
S/N ratio:	>100dB (A-weighted)
Channel separation:	55dB
Input sensitivity	
LINE/CD:	0.5V rms minimum
LOW:	1V rms minimum
Input impedance	
LINE/CD:	47kΩ
LOW:	135Ω
Power supply:	10V to 16V (14.3V nominal) at 20A 20V to 30V (28V nominal) at 10A
Quiescent current:	650mA
Dimensions:	250 x 190 x 50mm

Kits and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 55. Kit K3506, which can be used to prevent audible thumps at switch-on, is also available.

Order Code	Type	Price each
VE05F	C4 Velleman Kit K3503	£99.99
VF23A	Velleman Kit K3506	£10.99

K3502 PARKING RADAR



Features

- ★ Audible warning of obstacles
- ★ Easy to install
- ★ Adjustable range

This Sonic Car Parking Radar System is designed to assist you or your partners parking skills by using ultrasonics to measure a distance. A sensor is mounted at the back of the car and gives an indication of the distance between your car, and the car parked behind you, or other obstacles (only at the same height as the sensor). When the preset minimum distance is crossed, an audible signal is generated.

Specification

Measuring range:	5cm to 1.5m
Transmission frequency:	40kHz
Power supply:	10V to 15V DC 16mA max.

Optional Items

The following items, not included in the kit, may also be required.

Plastic Box D-003	1	(ZB01B)
Plastic Box MB8	If Req	(KC90X)
M3 Insulated Spacers	1 Pkt	(FS38R)
6-Core Cable	As Req	(XS54J)
Zip Wire	If Req	(XR39N)
Wire Gauze	As Req	
Silicon Rubber Sealant	As Req	
In-line Fuse Holder	1	(RX51F)
100mA 1 1/4 in. Fuse	1	(WR08J)

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 62.

Order Code	Type	Price each
VE08J	Velleman Kit K3502	£31.99

K3500 MULTI-FUNCTION CAR INTERIOR ILLUMINATOR



After getting in your car and closing the door, this circuit makes the interior light stay on for an adjustable time.

Switch off delay adjustable between 0 and 60 seconds. Simple connection to most cars. Current consumption: 13mA min.

Order Code	Type	Price each
VE06G	Velleman Kit K3500	£10.99

K3508 IN-CAR POWER SUPPLY



This power supply unit allows the use of a conventional amplifier or amplifying module in a car, and is exclusively suited for music loads. Ideally suited for this purpose is the VF40T amplifier. The advantage of a separate power supply is twofold: Firstly it can be placed adjacent to the battery to keep the thick connecting wires very short, and reduce power loss to a minimum. Secondly, the amplifier can be placed

THE BEST OF SERVICE

close to the loudspeakers, (e.g., in the car boot) thus maintaining optimal damping for an excellent reproduction of bass frequencies. Remote control switching of the power supply is provided. To avoid interference the 0V output is separated from the car's mass (chassis). Supplied with a casing.

Specification

Input voltage:	10V to 15V DC
Current consumption:	30A max.
Output voltage:	±35V symmetrically (unstabilised)
Output power:	300W max.
Efficiency:	90% max.
Dimensions:	210 x 84 x 50mm

Order			<small>3198</small>
Code	Type	Price each	
VF38R	H Velleman Kit K3508	£66.99	

COMPUTER PROJECTS

RS232/TTL CONVERTER



- ★ Operates from single +5V power supply
- ★ Meets all RS232C specifications
- ★ Normal or inverse logic
- ★ Two drivers and two receivers
- ★ Onboard voltage quadrupler
- ★ ±30V input level protection
- ★ ±9V output swing with +5V supply
- ★ Low power consumption

Not all home microcomputers or peripheral devices have serial data signals at RS232C logic levels. A method of converting +5V TTL signals to RS232C levels (and vice versa) is needed and the converter module does just this. The heart of the unit is the MAX232 IC which is a dual RS232 receiver/transmitter that meets all EIA RS232C specifications while only using a +5V power supply. This significantly simplifies the system design by removing the need for power supply voltages of other than +5V. The MAX232 has two onboard charge pump voltage converters which generate +10V and -10V power supplies from the single +5V power input. Output voltage swing is typically ±9V with the nominal 5kΩ input resistance of an RS232 receiver. Maximum data rate is 19,200 baud. An onboard DIP switch allows use of normal or inverse logic for transmitted/received data.

Optional Items

The following items, not included in the kit, may also be required.

Threaded spacer M3	1 Pkt	(FG38R)
Isobolt M3 x 6mm	1 Pkt	(BF51F)
Isoshake M3	1 Pkt	(BF44X)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 31.

A ready assembled version is also available.

Order			<small>3200</small>
Code	Type	Price each	
LM75S	RS232/TTL Conv2 Kit	£10.99	
GD93B	RS232/TTL Conv 2 PCB	£3.25	
AM10L	RS232/TTL Conv Assm	£15.99	

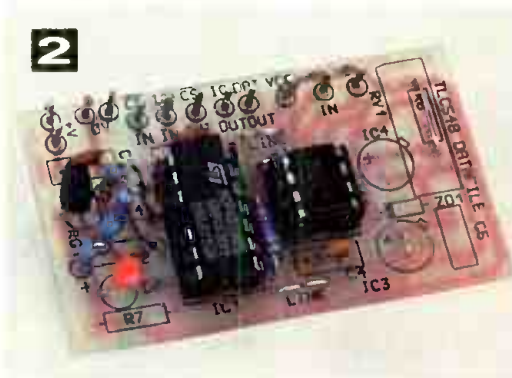
ULTRA-VIOLET INSECT KILLER

Use this ultra-violet insect trap to help you control the number of flying insects around your home, office or workplace. Simply plug the fly trap into an existing 13A socket outlet, suspend it approximately 1.8m above floor level, making sure that it is out of the reach of children and turn on the power. It's that easy. For optimum performance suspend the trap above entrances or windows where insects may be intercepted. The ultra-violet light, which is effective for approximately 2 metres around the trap, attracts light sensitive insects towards the high voltage grid of the trap and electrocutes them.

Supplied with small dusting brush and mains cord approximately 1.5m long.



TLC548 8-BIT ANALOGUE-TO-DIGITAL CONVERTER



Features

- ★ Cost effective with high performance
- ★ Low power consumption
- ★ Conversion time 17µs (max)
- ★ Differential reference input voltages

Applications

- ★ Interface sensors to the PC Weather Station
- ★ 8-bit resolution Analogue-to-Digital converter
- ★ Serial interface with tri-state data output

The TLC548I is a very powerful IC, suitable for a multitude of tasks, and is based on an 8-bit, successive approximation sample-and-hold, Analogue-to-Digital (A-to-D) converter, which makes 8-bit A-D conversion easy, cost effective and usable. The device is capable of up to 45,500 conversions per second, and needs only one external control signal. The specially designed PCB can be tailored for any task within the IC's specification, but the module was developed mainly for use with the PC Weather Station project.

The IC is a complete data acquisition system on a single chip, designed for serial interfacing with a microprocessor or computer via a tri-state, TTL compatible data output port and an analogue input port. It includes versatile control logic and on-chip sample-and-hold that can operate automatically or under microprocessor control. Voltage requirements for the IC are between +3V and +6V DC with, typically, a low power consumption of 6mW.

The differential high impedance reference inputs provide circuit isolation from logic and supply noise. The analogue input can be any voltage within the range of 0 to 5V DC; the corresponding digital output is a value between 0 and 255, proportional to the input voltage. The kit instructions include details of applications for a light sensor, temperature sensors and potentiometer position sensor. Details for an external clock oscillator circuit, which is required if the module is not used with the PC Weather Station project, is also given. In addition, modules can be cascaded using a 'master/slave' system (the 'master' board has the clock and power supply connected). Up to eight modules can be used in this way, but you will need suitable multi-way inputs, such as the 24-Line I/O Expansion kit (Order Code LP12N). An ABS box type MB1 (Order Code LH20W) can be used to house up to three TLC548I boards.

Optional Items

300mA Unregulated AC Adaptor	1	(XX09K)
ABS Box MB1	1	(LH20W)

Kit and Special Parts

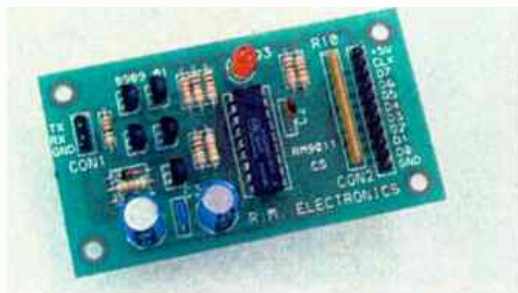
A complete kit of parts, including the PCB, is available (but excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 75.

The Maplin 'Get-You-Working' Service is not available for this project.

Order			<small>5313</small>
Code	Type	Price each	
LT51F	TLC548 A/D Conv Kit	£8.99	
GH68Y	TLC548I A-To-D PCB	£2.49	

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8-BIT I/O MODULE WITH RS232 INTERFACE



A ready-built module which provides any RS232-equipped computer with an 8-bit parallel I/O port. This will allow your computer to drive external apparatus and will open up exciting possibilities in computerised control and automation. (For relatively high current devices such as relays and motors an external driver transistor is required because the outputs can normally only source a maximum of 10mA.) Each bit can be configurable as an output, or a digital (CMOS or TTL compatible) input (this could be, for example, a servo pulse from an optocoupler). All I/O lines are provided with internal pull-up resistors so that a minimum of external components are required. Apart from the 8 I/O ports, there is a strobe output (CLK) which can be used as an interrupt or to trigger flip-flops, etc. A red LED is fitted which flashes whenever serial information is received from the computer. Controlling the module from the host computer is achieved using commands made up of standard ASCII characters which may be embedded in a program. Example programs written in BASIC are provided. Connection to the computer is by three wires: transmit (TX), receive (RX) and ground (there is no handshaking). A +5V regulated supply line is also required and this could also be taken from the computer. The RS232 interface on the module may operate at either 600 or 1200 baud, and the format may be 7-bit or 8-bit (odd or even parity).

Specification

Interface requirements: RS232 or compatible
 I/O port configuration: As 8 inputs, 8 outputs or any combination of the two
 Supply requirements: +5V at 100mA (max)
 Other features: Byte or bit read/write commands
 Auto baud rate selection
 Auto format/parity selection
 TTL or CMOS compatibility
 LED indication of valid command reception

Full instructions for connection/use and sample BASIC programs can be found in Maplin Magazine Issue 49.

Order Code	Type	Price each
LP85G	8 Bit I/O + RS232	£19.99

PARALLEL INTERFACE RELAY CARD



- ★ Robotics
- ★ Slide/tape recorder control
- ★ High power relay control
- ★ Programmable low voltage switching

This simple unit will allow up to eight independent relays to be controlled from any computer having a

'Centronics' parallel printer port. The device behaves as a printer, thus avoiding the necessity for special interfacing electronics or low-level software drivers. The relays are controlled simply by 'printing' an ASCII character, chosen to represent the required relay to be switched. The unit has on-board regulators but requires an external power supply. A 12V 800mA unregulated PSU (YM85G) is an ideal power source.

Specification

Power supply: 15V DC regulated or 12V DC 800mA unregulated
 Maximum current: 500mA (all relays 'on')
 Relay contact ratings: 3A DC/AC resistive, 1.5A inductive, 24V DC
 Computer interface: Parallel printer port ('Centronics')

Optional Items

The following items, not included in the kit, may also be required.

AC Adaptor Unreq. 800mA	1	(YM85G)
IBM PC Printer Cable	If Req.	(JC11M)
Male-to-Male Printer Cable	If Req.	(JC14Q)
Male-to-Female Printer Cable	If Req.	(JC15R)

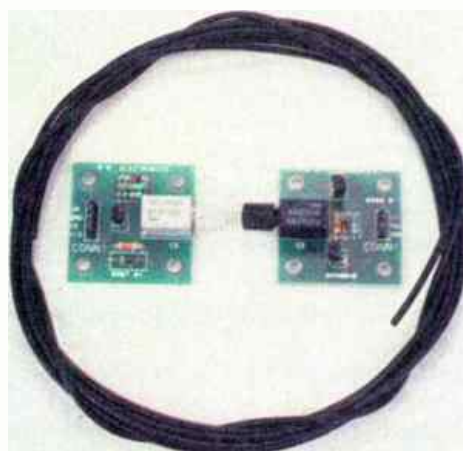
Kit and Special Parts

A complete kit of parts (including the PCB, Front Panel and instruction leaflet) is available (excluding optional items). The PCB and Front Panel are also available separately. Full construction details may be found in Maplin Magazine Issue 57. PCB dimensions: 160 x 109.2mm.

Order Code	Type	Price each
LT08J	A1 Centronics Rly Card	£34.99
GH16S	Centronics Relay PCB	£4.75
KP46A	F/P Cent Relay Card	£2.99

FIBRE OPTIC DATA LINK MODULES

Single Channel



A pair of ready-built transmitter and receiver modules supplied with 3m of optical fibre. They have been designed for serial data transmission with rates of up to 20K baud, and will work with both CMOS and TTL logic levels. The transmitter is also RS232 compatible. Power supply requirements depend on the logic family being used (5V for TTL; 12V for CMOS). The transmitter and receiver employ purpose-made opto-couplers operating in the visible red part of the spectrum which mate with each end of the optical fibre. These modules allow experimentation with optical data transmission which is particularly useful in electrically noisy areas. Full construction details may be found in Maplin Magazine Issue 47.

Order Code	Type	Price each
LP81C	1Ch Data Link	£22.99

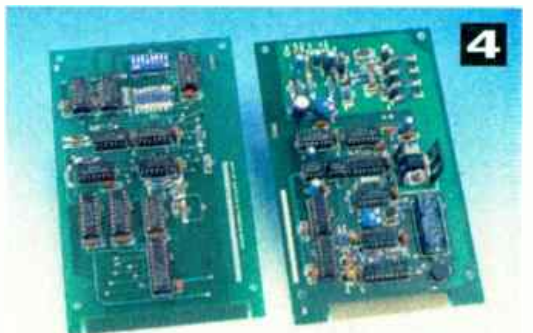
10 Channel



A pair of ready-built transmitter and receiver modules comprising a 10 channel transmitter, matching receiver and 3m of optical fibre cable to connect them. The system offers the same benefits as the single channel link, but features 10 independent channels for parallel operation. It offers multiple channel operation by multiplexing the input channels and transmitting the information in serial format along the optical fibre. At the receiver they are demultiplexed and latched to the outputs. Because of this, the data transmission rate is slightly lower than with the single channel system. Power supply requirements are 5V DC regulated and 0V ground. The inputs of the transmitter feature pull-up resistors and are compatible with CMOS and TTL logic pulses. They can also be used with switches and keyboards. The 10 data outputs are open-collector to enable interfacing to different logic technologies. There is also an active-low clock output derived from the multiplexing process with a pulse width of approx. 1mS. This can be used as an interrupt request or latch for use with microprocessor systems. Full construction details may be found in Maplin Magazine Issue 48.

Order Code	Type	Price each
LP84F	10Ch Data Link	£36.99

VIDEO DIGITISER



- ★ 312 x 255 'bit' Resolution
- ★ 8-bit Luminance Resolution
- ★ Controller Board enables Home Micro to run in BASIC

Save television pictures on disk or tape in digital form with this video digitiser project. If using a monochrome TV camera, your computer could have the power of sight, which opens up all sorts of possibilities in such areas as image recognition, movement detection etc., even extending to sophisticated security monitoring. The basic digitiser requires the host computer to run in machine code, since the latter will have to operate conditionally on the TV line and frame sync pulses. Alternatively a Controller Board is also available containing all logic to perform this function, making it possible for the host computer to run a BASIC program.

The Digitiser Board converts a video picture from a video camera or a V.C.R. (still frame image) into digital words which are used to represent the luminance, or brightness, of the X and Y co-ordinates within the picture. A complete scan of these co-ordinates are then sent to the host computer for display on a graphics screen, or organised into a file for storage onto disk or tape. The final resolution will depend on the graphics capability of the computer up to the limits of the Digitiser, which has a maximum vertical resolution of 312 lines (although twice this number should be available if the interlace frame is

also stored), by 255 sample points on one line. The picture therefore comprises a screen of rectangular blocks, each of which can have a luminance resolution of 255 levels. I/O connections required are one 8-bit output and one 8-bit input port minimum, allowing for up to 5-bits of luminance information. The Digitiser Controller Board is an optional addition to the Video Digitiser which greatly simplifies programming if you cannot easily write machine code, because the controller relieves the micro from having to detect line and frame sync pulses by software. Instead this is performed by the Controller logic, requiring only a 'start' signal from the host micro to begin loading one complete picture into its own memory, which is transferred piece-meal to the host. This enables BASIC programs to be used by the host, since the controller takes care of the detection of the TV sync pulses.

Kit and Special Parts

Complete kits are available and the pcbs are also available separately. Full construction details may be found in the Best of Maplin Projects Book 5.

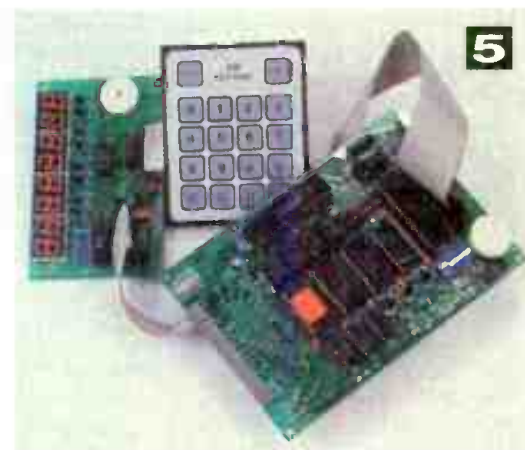
Order Code	Type	Price each
LK95D A2	Digitiser Kit	£52.99
LK96E	Digitiser Cntrlr Kit	£33.49
GD02C	Digitiser PCB	£14.99
GD03D	Digitiser Cntrlr PCB	£13.99

Z80A DEVELOPMENT SYSTEM

Z80A CPU Module

- ★ Accepts up to 8K of on-board memory
- ★ Has facilities for keyboard and displays
- ★ 4 decoded I/O select lines
- ★ Battery back-up available for CMOS RAMs

The Z80 microprocessor has been with us for many years and is still proving successful, with many new computer developments giving evidence of this fact. Practical applications of the CPU require a module with memory, input/output, clocks and facilities for further expansion.



The Maplin CPU Module can accept up to 8K of memory which is decoded in 2K (2048 bytes) blocks. The first block contains the operating system in ROM or EPROM and the second, third and fourth blocks can be either RAM or ROM. Static or CMOS 2K RAMs may be fitted (totalling 6K) and battery back-up is available, via switches, for CMOS data retention, if required. Both Z80 or Z80A processors can be fitted, and the system clock has facilities for different size crystals to suit, e.g.. 1MHz crystal for Z80 or 2.4576MHz crystal for Z80A.

A keyboard/display decoding IC can be fitted allowing for small key or large (64-key) type keyboards (or sensors) for data input. This IC can also drive seven segment LED displays. This interface can scan up to 64 keys – expandable to 128 with suitable decoding – and sensors or strobed keys may be used. Two key lockout and 'N' key rollover can be programmed, and keyboard entries generate an interrupt (NMI) to the

Z80. Either four or eight (programmable) 7 segment displays can be added with blanking facilities, and all connections are made via a 26-pin IDC socket. Four decoded I/O select lines are available and all data and address lines are buffered before being brought out to an expansion edge connector. All of the Z80 control lines are available, most of which are buffered, including a system CLOCK output, RESET output, SYSTEM RESET input and a switched NMI input. The NMI can be taken from either the KBd/ display interface or directly from the expansion connector.

Optional Items

The following items, not included in the kit, may also be required.

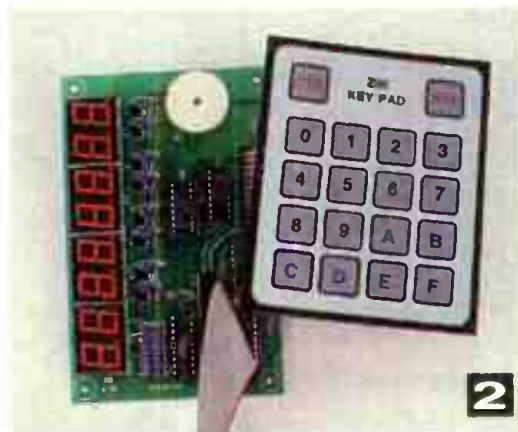
26-Way IDC Header Plug	1	(FJ15R)
2 x 28-way PC Edge Conn	1	(FG23A0)
2-4576MHz Crystal	1	(FY81C)
8279 Kbd/Display I/Face	1	(YH51F)
2716 2K EPROM	1	(QQ07H)
6116 2K CMOS EPROM	3	(UF33L)
or 2716 2K CMOS EPROM	3	(QQ07H)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine issue 58. PCB dimensions: 152 x 119mm.

Order Code	Type	Price each
LK67X	Z80 CPU Module Kit	£37.99
GB86T	Z80 CPU Module PCB	£16.99

Z80A Keypad



Features

- ★ Type in your own hex code easily
- ★ Splashproof membrane keypad
- ★ Large double-digit displays
- ★ Key-press bleep
- ★ Simple construction
- ★ Monitor EPROM available for Z80A CPU Module

Applications

- ★ Software development
- ★ Control applications
- ★ Education

When used with the Z80A CPU module (LK67X), this keypad with its splashproof membrane keys and key-press bleep forms a complete Development System. The Development System can be housed in an ABS console case for convenience. The keypad consists of a 16-key HEX matrix and, to obtain additional functions, a further key (CTRL) is provided. This, used together with any other key, allows up to 16 control functions, with some of these being used in the system monitor. The keypad includes an 8 digit 7-segment display with the first four, from left to right, forming 'address field', the next two 'status field' and the last 'data field'.

Membrane keys tend to have no 'feel', so a piezo sounder and an oscillator circuit produce an audible bleep whenever a key is pressed. To differentiate between normal and control key functions a warbling tone is produced if the control key is pressed in

conjunction with another key. A power up bleep is also produced when first switched on, and if the reset button is pressed a bleep will also be produced. The optional monitor EPROM is plugged into the Z80A module PCB and provides the ability to access any memory location to examine and/or modify data; step backwards or forwards through memory to examine, edit or enter program data; run a program from a given start location. A HALT instruction at the end of a program will result in a pause, and if a RESET from the keypad is entered, the module will return to the monitor allowing examination of memory addresses.

Optional Items

The following items, not included in the kit, may also be required.

EPROM 2716/M12 (Monitor)	1	(UH87U)
ABS Console M6007	1	(LH67X)
Filter Red	1	(FR34M)
Keypad Cableform	1	(FP63T)
Double Bubble Sachet	1	(FL45Y)
Steel Screw M3 x 25mm	1Pkt	(JY26D)
Threaded Spacer M3	1Pkt	(FG38R)
Isoshake M3	1Pkt	(BF44X)
Steel Nut M3	1Pkt	(JD61R)
Spacer M3 x 1/4 in.	1Pkt	(FG33L)
Steel Washer	1Pkt	(JD76H)
Steel Screw M3 x 20mm	1Pkt	(JY25C)

Kits and Special Parts

A complete kit of parts (including the PCB, hex keypad and instruction leaflet) is available (excluding optional items). The PCB, EPROM, cableform and hex keypad are also available separately. Full construction details may be found in Maplin Magazine Issue 58.

Order Code	Type	Price each
LT15R	Z80 Keypad	£26.99
ZF52G	Hex Keypad	£8.99
GH21X	Z80 Keypad PCB	£7.49
FP63T	Keypad Cableform	£3.99
UH87U	EPROM 2716/M12	£6.99

TMS77C82 ADAPTOR



A 40-to-28 pin adaptor to allow the 77C82 series of microcontrollers to be programmed with most standard PROM programmers.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 40.

Order Code	Type	Price each
LP36P	TMS77C82 Adaptor	£21.49
GE47B	Top Intrcnct PCB	£3.25
GE48C	Bot Intrcnct PCB	£2.99

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RUGBY CLOCK RECEIVER



3

- ★ Normal and inverted outputs
- ★ 12V operation
- ★ Selectable filter response
- ★ Visual and audible indication of signal

The Rugby Clock Receiver is a simple fixed frequency (60kHz) receiver intended for the reception of the MSF standard time service, transmitted from Rugby in central England. The Rugby MSF transmission includes time and date information, transmitted using both 'fast' and 'slow' codes, based on the Binary Coded Decimal (BCD) system. The receiver provides a normal and inverted digital output, corresponding to the transmitted information, together with an audible and a visual indication.

To make use of the digital outputs, it is necessary to use some form of decoder; this may be either a dedicated decoder or a computer running the appropriate software. A program written for the IBM-PC and compatibles in GW-BASIC is listed in the Maplin Magazine Issue 47, along with full construction and alignment details.

The receiver is built on two PCBs. PCB 1 is used for the PLL and digital part of the circuit, and RF amplifier circuitry is on PCB 2. For screening purposes, PCB 1 is housed in a small metal box, which is located in a position remote from PCB 2.

The receiver requires a +12V to +16V power supply that is capable of supplying at least 50mA. A suitable supply is XX09K. It is recommended that a power supply with a relatively smooth output is used, as this will improve reliability of operation.

Optional Items

The following items, not included in the kit, may also be required.

24-line PIO Card	1	(LP12N)
37-way D-type Socket	1	(FV72P)

Kit and Special Parts

A complete kit of parts (including the PCBs and instruction leaflet) is available (excluding optional items). The PCBs are also available separately. Full construction details may be found in Maplin Magazine Issue 47.

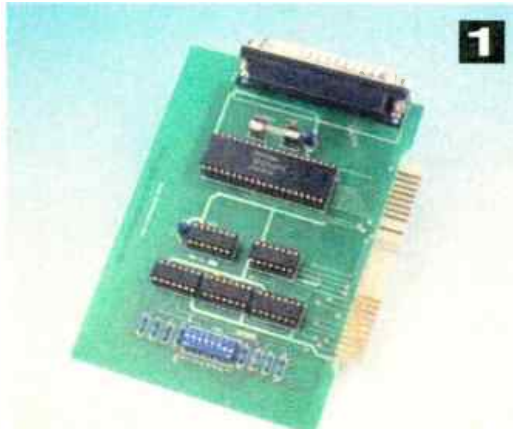
Order Code	Type	Price each
LP70M	60kHz Rugby Rx	£22.99
GE91Y	Rugby Rx PCB No. 1	£2.49
GE92A	Rugby Rx PCB No. 2	£2.49

PROGRAMMABLE PC I/O CARD

- ★ For use with IBM PC, PC-XT, PC-AT and compatible clones
- ★ 24 input lines
- ★ Fully programmable from BASIC
- ★ Base address selectable
- ★ Uses industry standard 8255 PPI IC

A 24-line digital I/O (Input/Output) card for use on many IBM PCs and clones. The card is based around the industry standard 8255 PPI (Programmable Peripheral Interface) IC. A 37-pin D-type connector is integral to the card and protrudes from the expansion board. The 8255 PPI IC provides the necessary control, latching, buffering and handshaking of data to and from the card. A number of TTL chips provide access to the 8255 from the host computer. Both

CMOS and TTL logic can be read, but only TTL +5V can be written. Extensions to the card can enable the device to write to CMOS levels. This card is not able to handle large current devices directly, however, circuits supporting the card are shown in the magazine. A GW BASIC program is supplied in the article for testing the card, producing a square wave at all the ports. Full operating procedures using GW BASIC commands are also shown in the leaflet.



1

Optional Items

The following items, not included in the kit, may also be required.

D-Connector Jack Post	1 Pr	(FP31J)
8255 Data Book	1	(XK97F)

Kit and Special Parts

A complete kit is available and the pcb is also available separately, as well as the 8255 Data Book. Full construction details may be found in Maplin Magazine Issue 43.

A ready assembled version is also available. PCB dimensions: 286 x 40mm.

Applications Information

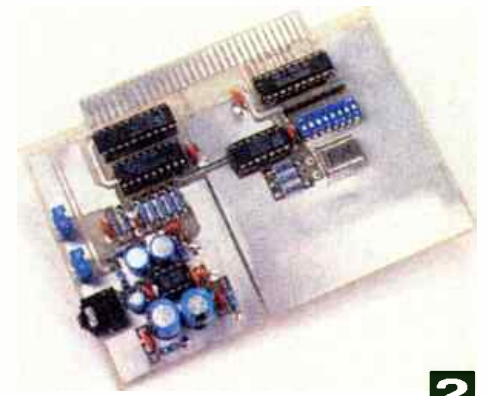
Further applications information on using the Programmable PC I/O Card may be found in the following issues of Electronics – The Maplin Magazine:

Using Temperature Modules – Issue 71 (XA71N): Gives details of how to measure temperature. Requires Temperature Module Expansion Converter Kit (LM36P) and Temperature Module (FE33L) – article includes BASIC program listing.
IBM PC Centronics Input Port – Issue 77 (XA77J): Gives details of how to receive data from another computer's centronics parallel printer port – useful when transferring data from an old computer system where disc or file formats, etc., are incompatible – article includes BASIC program listing.
Rugby Clock Receiver – Issue 47 (XA47A): Gives details of how to receive and decode Rugby MSF Clock data. Requires Rugby Clock Receiver Kit (LP70M) – article includes BASIC program listing.
Practical Robotics – Issues 42 (XA42V), 43 (XA43W), 44 1991 (XA44X), 59 (XA59P): Gives details of how to build and control robots from a computer – Issue 59 gives specific information relating to the Programmable PC I/O Card which can be directly applied to the articles in Issues 42 to 44 – articles include BASIC program listings.

Order Code	Type	Price each
LP12N	IBM Expansion Kit	£22.99
GE31J	IBM Expansion PCB	£12.99
XK97F	8255 Leaflet	80p NV
AM11M	Expansion Card Assm	£31.99

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PC SOUND GENERATOR



2

Features

- ★ Plugs into PC expansion slot
- ★ Alterable base address
- ★ Six frequency generators
- ★ Two noise generators
- ★ Two six channel mixers
- ★ Envelope shapers and amplitude control
- ★ Simple construction

Applications

- ★ Sound effects
- ★ Computer music

If IBM PCs (or their clones) lack anything, it must be decent sound, invariably supplied with a squeaky little speaker with only one voice! This stereo sound PC card is based around the Philips SAA1099 stereo sound IC. Each stereo channel possesses 3 tone generators each with a range of 31Hz to 7.81kHz and a noise generator, and each tone generator can be programmed over 8 octaves (each of which consists of 256 tones). The amplitude of each tone generator is programmable to 16 levels. In addition there are two (one for each channel) envelope generators; these can modulate the tone with sawtooth and triangular waveforms, in single or continuous mode, providing various effects like attack, decay, delay, sirens, alarms, and bomb drops – not to mention music. A TDA 2822 audio amp IC provides about 0.6W per channel into 8Ω speakers with a 5V supply. A 3.5mm stereo audio output socket is provided, which can be used with 'Walkman' – style headphones or extension speakers. Two individual volume controls are provided to correct the sound balance to compensate for the location of your speakers relative to your ears. A PC computer uses 32 addresses in the 0300H to 031FH range for additional cards, and the PC Sound Generator card can be used anywhere in this range. Knowing where your existing card(s) is located, you can place your PC Sound Generator at a different address. The kit includes instructions for setting up the address logic and programming the card. Once installed in a PC, it may be possible that the audio IC will pick up noise from other computer components and busses. To overcome a noise problem, an optional metal screen is available which can be fitted over the amplifier stage area on the top side of the PCB to exclude interference from surrounding circuitry.

Optional Items

The following items, not included in the kit, may also be required.

Lo-Z Mic Preamp Case	1	(FD20W)
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Kit and Special Parts

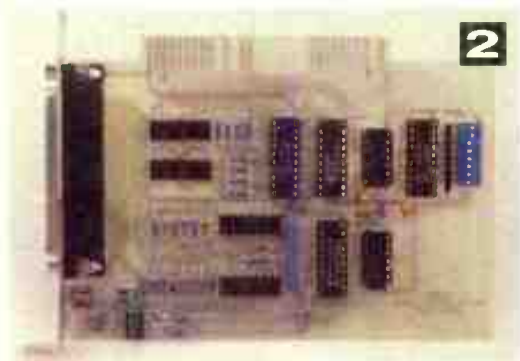
A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 58.

PCB dimensions: 126 x 92.4mm

Order Code	Type	Price each
LT10L	P.C Sound Generator	£32.99
GH19V	PC Snd Generator PCB	£11.99

PC OPTO-ISOLATOR CARD FOR THE IBM PC AND COMPATIBLES

2



Features

- ★ For use with IBM PC, PC-XT, PC-AT and compatible clones
- ★ 100% galvanic isolation
- ★ Eight 'double buffered', opto-isolated inputs with strobe
- ★ Eight opto-isolated transistor switch outputs
- ★ High isolation voltage
- ★ Fused 5V output to power external circuits
- ★ Selectable base address

Applications

- ★ Isolated data links
- ★ Connection of switches, tachos, pulse devices and detectors
- ★ Robotics
- ★ Process control
- ★ Timer control
- ★ Home automation
- ★ Control of lamps, motors, solenoids

This project is a versatile interface card for use with the IBM PC, PC-XT, PC-AT and compatible clones, featuring electrical isolation of both inputs and outputs using the opto-coupling technique. There are separate, 8-bit parallel input and output connections on the card, with an additional strobe input being provided for the 8-bit parallel input. This strobe can be disabled if required, improving the flexibility of the card.

The card slots into any one of the vacant expansion slots provided on the host PC, and the power, control, address and data signals are obtained from the computer's expansion bus. The opto-isolated inputs and outputs are brought out to a rear panel mounted, 37-way, female D-range connector, together with a fuse-protected +5V supply, allowing easy connection with the outside world.

The card uses discrete logic, as opposed to a fully programmable input/output IC, and therefore has the advantage that it does not need to be configured or initialised before use. Data can simply be written and read to, and from, the appropriate address. A further advantage is that a simple self-diagnostic function could be included in the software to check the presence of the card at the correct input/output map location, and whether the card is functioning correctly.

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB and 37 Way D-Type bracket are available separately. Full construction details may be found in Maplin Magazine Issue 66.

Order Code	Type	Price each
LT17T	PC Opto-Iso I/O Card	£29.99
GH23A	Opto-Isolate I/O PCB	£7.99
CR45Y	PC Bracket 37 Way D	£2.25

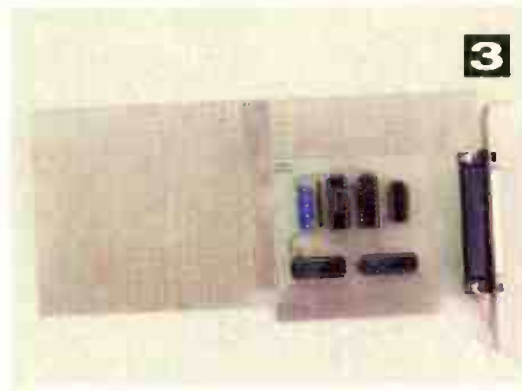
PC PROTOTYPING CARD

Features

- ★ For use with IBM PC, PC-XT, PC-AT and compatible clones
- ★ Matrix of DIL IC spaced solder pads and power rails
- ★ Buffered address and data lines
- ★ On-board address decoder
- ★ Selectable base address

Applications

- ★ Prototype development of PC I/O cards
- ★ Constructing custom 'one-off' adaptor cards



This versatile project is an interface card for use with the IBM PC, PC-XT, PC-AT and compatible clones, specifically designed to allow the home constructor and experimenter to develop a custom-built expansion card for his or her PC, to perform a specific hardware interfacing task which is not catered for by any normally available cards. It will be particularly useful in the field of electronics where some special interface is needed, and equivalent industrial I/O cards are expensive. The card plugs into any one of the vacant expansion slots provided on the host PC's motherboard, and the power, control, address and data signals are made available from the computer's expansion bus. External connections can be brought out to a rear panel mounted, 37-way, female D-range connector. This connector is optional however, and other, more specific connectors can be used instead if the application demands.

Flexibility is also increased from the software point of view, by the provision of the MEMR and MEMW lines, allowing configuration of the card as memory (therefore addressed in the memory map), or alternatively the IOR and IOW lines are available, allowing the card to be configured as an I/O device of some sort, as are all the IRQ lines.

The remainder of open space over the rest of the component side of the card has matrices of plated through holes organised to a 0.1in. grid. Those above the buffering circuitry have pads interconnected in favour of transistor circuits and resistor networks, while those occupying the front half are essentially configured for DIL ICs. Five bus bars are provided down the centre of the card carrying 0V, +5V, -5V, +12V and -12V supply rails.

If the 37-way, rear panel connector is used, then all the connections (which are open-ended, i.e. not connected to anything) are brought to separate pads, contained in the rectangular legend marked 'SK1', with pin identification.

Optional Items

The following items, not included in the kit, may also be required.

RA Socket 37-Way D-Range	1	(JB38R)
PC Bracket 37-Way D-Type	1	(CR45Y)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 67.

Order Code	Type	Price each
LT14Q	PC Proto Card	£31.99
GH39N	PC Prototyping Card	£23.99

PC RELAY CARD FOR THE IBM PC AND COMPATIBLES

2



Features

- ★ For use with IBM PC, PC-XT, PC-AT and compatible clones
- ★ Eight relay changeover contacts
- ★ Switches up to 24V DC/50V AC @ 2A resistive/1A inductive
- ★ Fused 5V output to power external circuits
- ★ Base address selectable
- ★ Multiple cards can be used
- ★ Fully programmable from BASIC

Applications

- ★ Robotics
- ★ Process control
- ★ Time control
- ★ Home automation
- ★ Controlling lamps, motors, solenoids

This project is a versatile relay card for use with the IBM PC, PC-XT, PC-AT and compatible clones. Each relay, of which there are eight on the card, has one set of change-over contacts. The relay contacts are able to switch 'moderate' loads, such as low voltage lamps, motors and solenoids.

The card slots into any one of the vacant expansion slots provided on the host computer. Power, control, address and data signals are obtained from the computer's expansion bus. The relays' contacts are brought out, together with a fuse-protected +5V supply, on a 37-way female D-type connector. The D-type connector protrudes through the expansion card slot facilitating easy connection with the outside world.

The card is based around discrete logic, as opposed to a fully programmable input/output IC, this has the advantage that the card does not need to be configured or initialised before use. Data can simply be written to the appropriate address to set or reset the relevant relays. To simplify programming, it is possible to 'read back' from the card which relay outputs are set or reset, this avoids having to set or reset software flags to keep track of the current relay states. A further advantage is that a self-diagnostic routine could be written into the software to check the presence of the card at the correct input/output map location and whether the card is functioning correctly. Details are given in the kit on how to access the PC Relay Card using GW-BASIC.

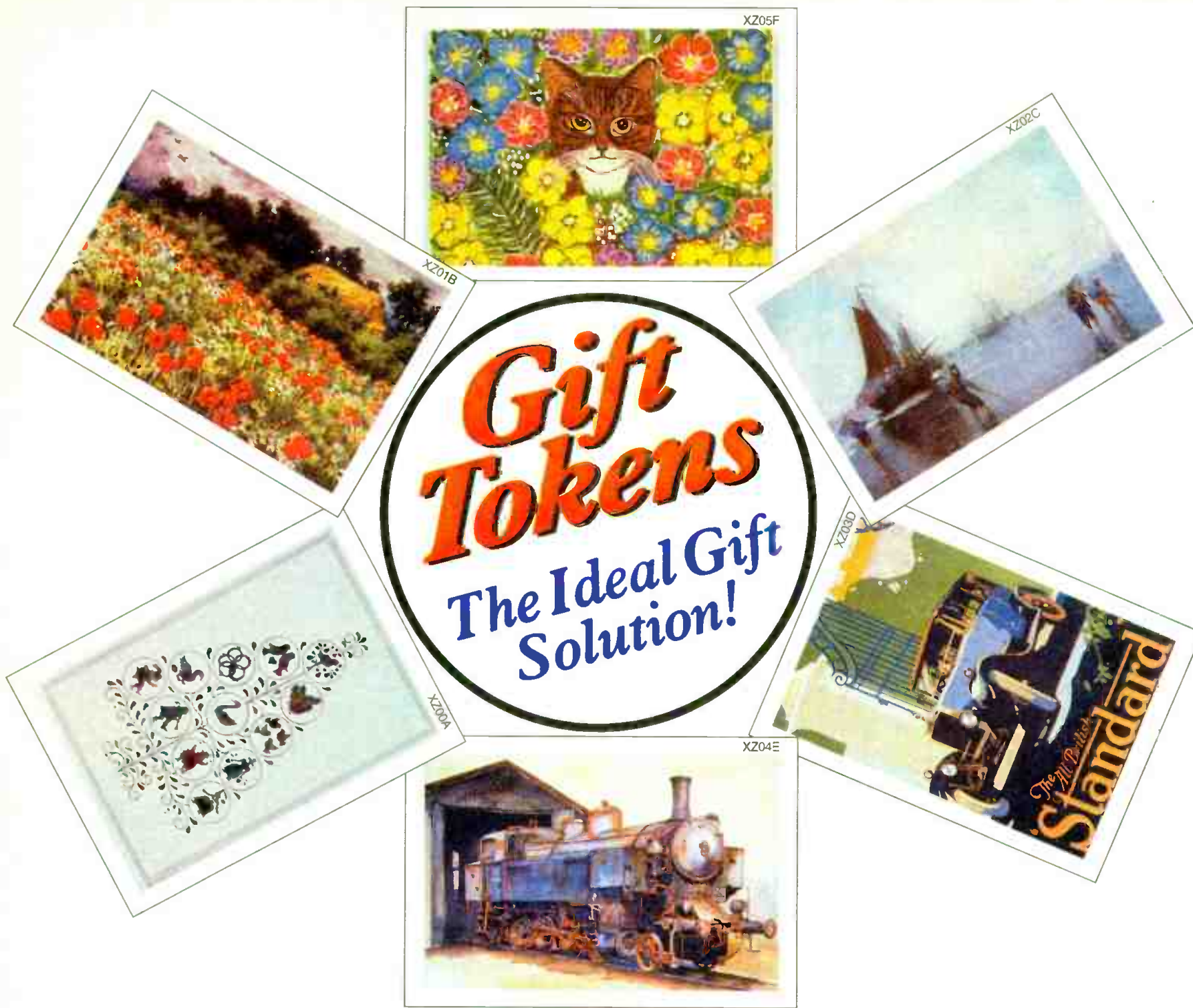
Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 65.

Order Code	Type	Price each
LT16S	PC Relay O/P Card	£25.99
GH22Y	PC Relay O/P PCB	£8.49

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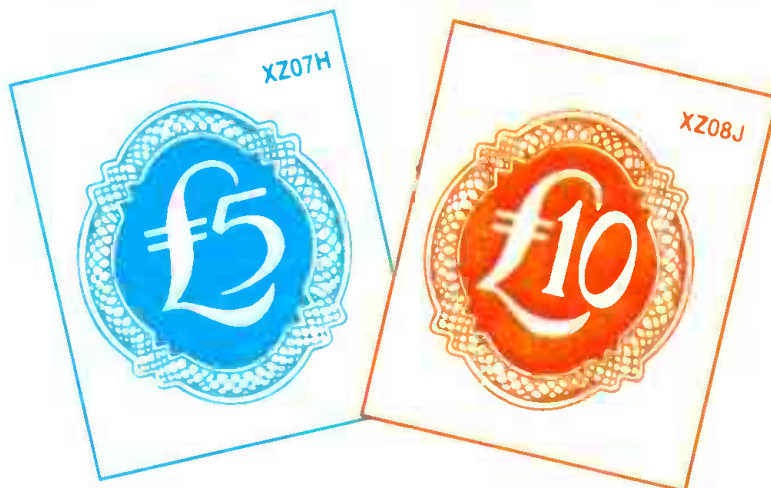
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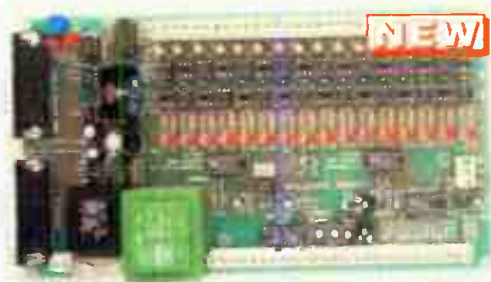
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VELLEMAN COMPUTER PROJECTS

K8000 COMPUTER INTERFACE BOARD



An interface card for control applications and functions that connects directly to the printer port. If necessary, a printer can be connected directly to this card. All connections to the computer are optically isolated and the card is controlled using Turbo Pascal programming language. Test and example programs are provided on a disk.

The card has 16 optically isolated connections, which can be configured as either inputs or outputs. In addition, there are nine analogue outputs, one of which is high precision, and four outputs. Up to four cards can be connected together to increase capacity (one master, four slaves), the card can be used with a wide range of associated cards such as K2633, K2634 etc. The module is mains powered.

Specification

Digital outputs I01 to I016	
Optocoupler O/C output:	50mA 30V DC max
Minimum conversion time:	80µs to set 16 outputs
Digital inputs I01 to I016	
Optocoupler input:	5V/5mA min, 20V/40mA max.
Minimum conversion time:	80µs to read 16 inputs
Analogue outputs 8 outputs DAC1 to DAC8	
Resolution:	64 steps
Minimum conversion time:	600µs (1 output), 2ms (8 outputs)
Output current:	6mA max
Output voltage @ 2mA:	0.1V min, 11.5V max (adjustable)
Resolution per step:	165mV
Precision output DA1	
Resolution:	256 steps
Conversion time to set output:	600µs
Maximum output current:	2mA
Output voltage:	0V min, 4.5V max (adjustable at 0.5mA)
Resolution per step:	17.5mV (0 to 4.5V)
Deviation:	26mV max
Analogue inputs - 4 inputs AD1 to AD4	
Resolution:	256 steps
Conversion time:	1ms (1 input) to 1.6ms (4 inputs)
Input voltage:	0V min, 5V max
Input impedance:	50MΩ
Resolution:	19.5mV
Deviation:	30mV max
Communication protocol:	I ² C bus
PCB dimensions:	237 x 133mm

Note: Conversion speed is dependent on the host computer.

Order Code	Type	Price each
VF54J	Velleman Kit K8000	£84.99

K5201 LIGHT COMPUTER



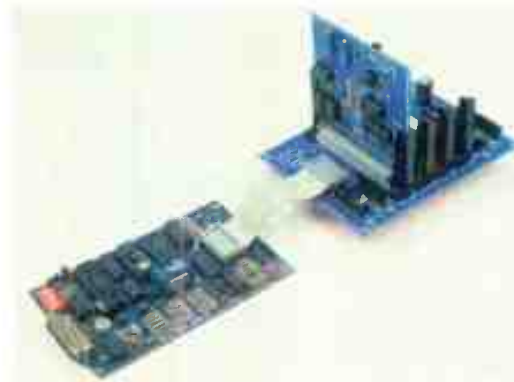
With 16 different programs and seven outputs, this light computer provides a unique visual experience, and is ideal for party lights, discotheques, advertising displays, signalling etc. Each output has its own LED, allowing easy visual checking of the programmes. Controls and the LED displays can be easily mounted on a front panel display. It is possible to make more spectacular displays by using an unlimited number of circuits, and a programme is included that allows two light computers to be cascaded.

Specification

Outputs:	7 via triacs rated at 1.5A max (300W at 220V)
Board power requirements:	7.5V to 9V AC at 250mA
Supply voltage for lamps:	24V to 240V AC
Programs:	16 stored in ROM
Speed:	adjustable between 1Hz and 15Hz
PCB dimensions:	134 x 79mm

Order Code	Type	Price each
VF56L	Velleman Kit K5201	£26.99

K2612 INTELLIGENT MOTHERBOARD AND K2631 EXTENSION KIT SERIAL PORT INPUT/OUTPUT SYSTEM



Features

- ★ Non-volatile memory
- ★ 4-slot expansion board
- ★ Interfaces with any computer via RS232 or 20mA current loop port
- ★ Report on alarm
- ★ Real-time clock/calender

Applications

- ★ Process control
- ★ Multiple interfacing
- ★ Data logging

This serial port input/output extension system is based on an intelligent motherboard which connects to a host computer's serial (RS232) port, or a 20mA current loop, which are normally found on industrial computers. The motherboard has a basic microcontroller and one expansion slot to which can be added an extension card providing four expansion slots. However, up to four expansion cards can be cascaded together so providing a total of 16 expansion slots.

The processor has a clock and a calendar, so that it is possible to execute tasks at particular moments without disturbing the host computer. Additionally, on all inputs an alarmed condition can be used, in which the motherboard automatically sends a message to the computer when an alarm situation arises. All the outputs can be pre-programmed to avoid dangerous situations that might arise after a power failure such as a motor suddenly starting-up.

For each extension board a 9V AC mains transformer will be required, as the extension board has on-board rectification and regulation for the interface PCBs.

Optional Items

The following items, not included in the kit, may also be required.

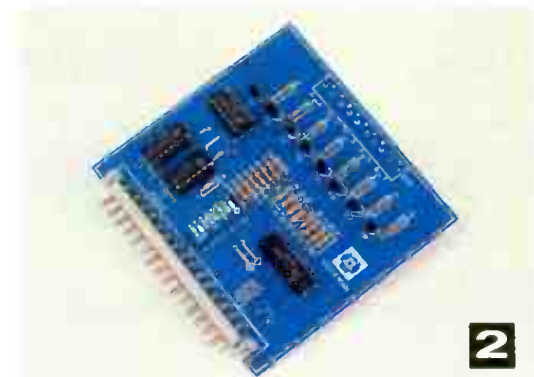
6264 100nS	1	(UF34M)
62256/43256	1	(UF40T)
R/A D-Range 25W Plug	1	(FG68Y)
Min Tr 9V	1	(WB11M)

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 59.

Order Code	Type	Price each
VE91Y	A1 Velleman Kit K2612	£89.99
VF32K	Velleman Kit K2631	£19.99

K2609 OPEN-COLLECTOR OUTPUT CARD



Features

- ★ 8 open-collector outputs
- ★ 25V 50mA switching capability
- ★ Several cards can be used
- ★ Programmable from BASIC
- ★ Add-on relay card available

Applications

- ★ Automatic test equipment (ATE)
- ★ Machine control and robotics
- ★ General-purpose control

Used in conjunction with the Intelligent Motherboard (K2612), this kit provides up to eight computer controlled switched outputs. These outputs, coupled with relays or triacs, allow the switching of different devices such as lamps, motors, alarm devices etc.

Specification

Outputs:	8 Open-Collector outputs
Sink current:	50mA
Sink voltage:	25V

Optional Items

The following items, not included in the kit, may also be required.

PCB Terminal 2-Way	5	(JY92A)
SPST Octal DIL Switch	1	(XX27E)

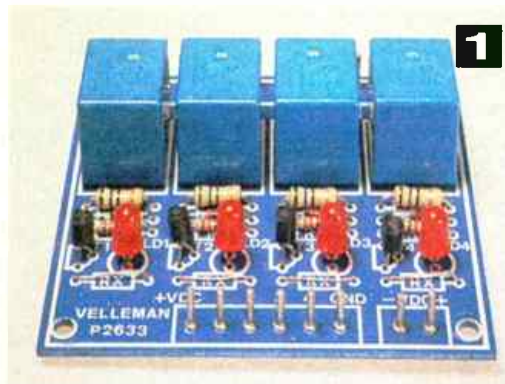
Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 60.

Order Code	Type	Price each
VE92A	Velleman Kit K2609	£20.99

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K2633 FOUR CHANNEL RELAY CARD



Features

- ★ Fully isolated change-over contacts
- ★ LED 'ON' indicators
- ★ Remote Installation

Applications

- ★ Model train control
- ★ Flashing signs
- ★ Motor and solenoid control
- ★ Security applications, door locks, etc.

This module is intended for use with the Open-Collector Card (VE92A) and serves to increase the versatility of the RS232 Serial Port Extension System. The module enables the RS232 Extension System to switch heavier loads with isolated supplies than would otherwise be possible with the transistor switches on the plug-in Open-Collector card.

Specification

Single-pole change-over relays:	6V operational
Number of relays per card:	4
Relay current consumption 'on-time':	1mA
Relay card power supply:	9 to 15V DC
Relay contacts ratings:	5A at 28V DC, 2A at 60V DC

CAUTION. Do not exceed the DC rating.

Optional Items

The following items, not included in the kit, may also be required.

Min Res 560Ω	4	(M560R)
Min Res 910Ω	4	(M910R)
Min Res 1k	4	(M1K)
1N4001	As Req	(QL73Q)
For Single Card:		
AC Adaptor 9V 300mA	1	(XX09K)
Or For Two Cards:		
AC Adaptor 9V 800mA	1	(YM85G)
Ribbon Cable 10-Way	As Req	(XR06G)
PC Terminal Blocks 3-Way	4	(JY94C)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 62.

Order Code	Type	Price each
VF00A	Velleman Kit K2633	£13.99

K2634 FOUR CHANNEL TRIAC CARD



To switch AC-voltages by means of an electronic control, one mostly uses relays because of their simplicity. When the switching happens too frequently or too fast, the life time of the contact points will be considerably shortened. This can be completely solved by replacing the relays with triacs. Using opto-couplers, the entire interface network remains isolated from the voltage that has to be switched.

Order Code	Type	Price each
VE97F	Velleman Kit K2634	£12.99

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K2611 EIGHT CHANNEL OPTO-COUPLER INPUT CARD



Features

- ★ Up to 8 electrically isolated inputs
- ★ Several cards can be combined
- ★ Programmable from BASIC
- ★ Signals have high immunity to interference
- ★ No additional power supply required

Applications

- ★ Detection of switch states and voltage levels
- ★ External parallel bit data input
- ★ Machine control and general control purposes

The Opto-Coupler Input Card is intended for use with the Intelligent Motherboard for the RS232 Serial Port Extension System, as described in Issue 59 of 'Electronics'. The card is initially designed to allow the intelligent motherboard to receive information on the state of switches (ON or OFF). This would be useful for such applications as alarm systems, registration of machines (position and end-of-travel sensors) etc. The inputs are electrically isolated from the board and the rest of the extension system circuit by the use of opto-coupler devices.

However, mains voltage SHOULD NOT be applied to the board. The correct maximum voltage input should be 35V.

Optional Items

The following item, not included in the kit, may also be required.

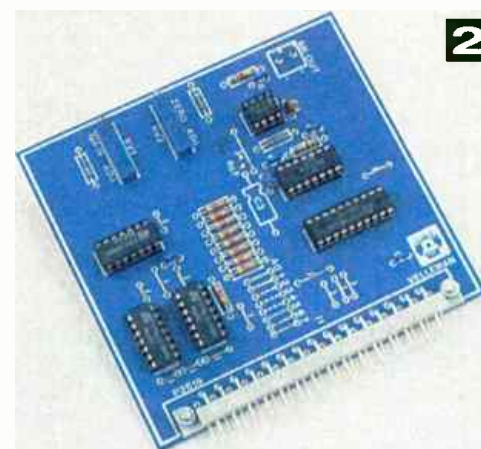
Optoisolator	4	(WL35Q)
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Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 63.

Order Code	Type	Price each
VE94C	Velleman Kit K2611	£23.99

K2618 DIGITAL-TO-ANALOGUE CONVERTER CARD



Features

- ★ Full 8-bit resolution
- ★ Output range 0V to 1V DC in 255, 4mV steps
- ★ Non-linearity of ±0.5V LSB
- ★ Programmable from BASIC

Applications

- ★ Analogue control of motor speed, attenuators, frequency generators, etc.
- ★ Automated varying voltage generation
- ★ General-purpose analogue signal generation

The Digital-to-Analogue Converter Card is intended for use with the Intelligent Motherboard for the RS232 Serial Port Extension System, as described in Issue 59 of 'Electronics - The Maplin Magazine', and is an addition to the other plug-in cards in this range. The D-to-A (Digital-to-Analogue) Converter transforms a binary number, presented to it via the system data bus from the Intelligent Motherboard, into an analogue voltage output. The 8-bit binary input offers up to 255 possible steps, each step producing an analogue DC output of 4mV. With a binary input of 0000 0000 (decimal 0 or hex 00), the minimum output from the D-to-A converter is 0V, but with an input of 1111 1111 (decimal 255, hex FF) an output of 1.02V is obtained.

This output from the D-to-A Converter Card could then be used to control analogue equipment, such as the volume of an automated mixing desk or the control of lighting, and even motors and actuators, etc.

Optional Items

The following items, not included in the kit, may also be required.

Axial Electrolytic 2μ2F 100V	1	(FB15R)
Min Res 10k	2	(M10K)
Min Res 1k	1	(M1K)
Monores 100nF	3	(RA49D)
PC Elect 100μF 25V	1	(FF11M)
CA3140E	1	(QH29G)
TIP122	1	(WQ73Q)
1N4002	2	(QL74R)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 64.

Order Code	Type	Price each
VE95D	Velleman Kit K2618	£29.99

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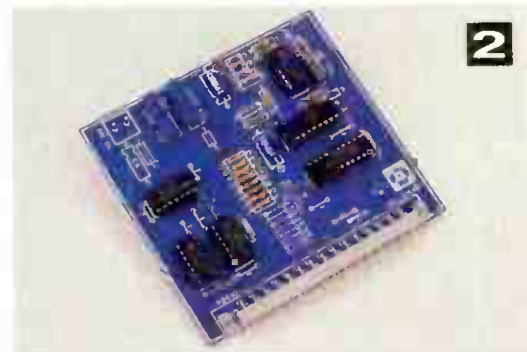
K2610 ANALOGUE TO DIGITAL CONVERTER CARD

Features

- ★ Input voltage range 0V to 5.1V
- ★ 0.02V resolution

Applications

- ★ Variable voltage input
- ★ Analogue information gathering
- ★ Digital conversion
- ★ Computer-based measurement/monitoring



This kit enables the Intelligent Motherboard to receive information from devices that can output a DC voltage of up to 5.1V with a resolution of 20mV. Information from various sensors, such as light dependent resistors (light sensors), potentiometers (position sensors), thermistors (temperature sensors), and pressure sensors, can be sampled.

Specification

Input sensitivity:	5.1V (full-scale)
Conversion type:	8-bit successive approximation
Number of steps:	256
Step resolution:	20mV
Linearity error:	±1 LSB
Power supply:	5V (from Intelligent Motherboard)
Dimensions:	106 x 106 x 15mm

Optional Items

The following item, not included in the kit, may also be required.

ZN448E ADC	1	(UF43W)
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Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 61.

Order Code	Type	Price each
VE93B	Velleman Kit K2610	£31.99

K2635 8 TO 1 CHANNEL ANALOGUE MULTIPLEXER CARD

Features

- ★ Selects 1 of 8 inputs with one single instruction
- ★ Attenuation of each separate input if required
- ★ Amplification of each input
- ★ On board 8-bit address decoding

Applications

- ★ Instrumentation
- ★ Automated signal switching

This Multiplexer has been designed to overcome the limitations of the A-to-D Converter Card, that is if more inputs are required, then extra A-to-D cards would be needed. To get around this problem, several inputs can be multiplexed, that is, the one A-to-D card is 'shared' amongst several peripheral devices. The 8 to 1 Channel Analogue Multiplexer can accept eight inputs, each of which can be individually attenuated, and provide an output that can be amplified by a maximum of x5.



Optional Items

The following item, not included in the kit, may also be required.

SPST Octal DIL Switch	1	(XX27E)
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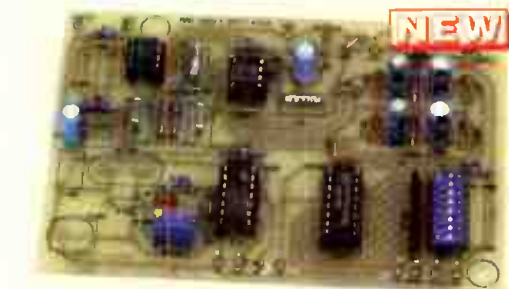
Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 65.

Order Code	Type	Price each
VE98G	Velleman Kit K2635	£23.99

DEVELOPMENT PROJECTS

MAX293/297 ELLIPTIC FILTER



Applications

- ★ Voice and data signal filtering

Features

- ★ 8th-order elliptic filters
- ★ Internal or external clock
- ★ Operates with a single +5V supply or dual ±5V supplies
- ★ External op amp for clock noise filtering

Specification

Supply voltage:	+5V DC
Quiescent current:	11mA
Operating current:	10.3mA
Onboard oscillator range	
minimum frequency:	8kHz
maximum frequency:	1.2MHz

The MAX293 or 297 Integrated Circuits (ICs) have been developed for a number of audio or data applications that require easy to use low-pass filters. Both ICs contain 8th-order (eight-pole) (24dB), lowpass, elliptic, switched-capacitor filters, with an uncommitted op amp and internal oscillator. This circuitry is contained in an 8-pin DIL package. The MAX293 is easily set up from 0.1 to 25kHz and the MAX297 from 0.1 to 50kHz.

The ICs have a 1.5 transition ratio providing sharp rolloff and -80dB of stopband rejection. The filters have fixed responses, so that selecting the clock frequency controls the filters corner frequency. The clock frequency being generated from either internal or external oscillators. A choice is given whether the MAX293 or MAX297 ICs are used in the Data File, and are therefore included in the Optional Parts List. The main differences are in the frequency range of each IC, plus clock frequencies.

The MAX293 operates with a 100:1 clock to corner frequency ratio and a 25kHz maximum corner frequency, and the MAX297 with a 50:1 clock to corner frequency and a 50kHz maximum corner frequency. The corner frequency is defined as the point where the filter output attenuation falls just below the passband ripple and is shown in Figure 6. The passband ripple for the MAX293 is typically 0.15dB, and for the MAX297 the passband ripple is typically 0.23dB.

Optional Items

The following items, not included in the kit, may also be required.

MAX293	1	(AY41U)
MAX297	1	(AY42V)
8-way DIL Slimline Switch	1	(QY70M)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 80.

Order Code	Type	Price each
LT59P	MAX293/7 Filter Kit	£11.99
GH81C	MAX293/7 Filter PCB	£3.99

FIBRE-OPTIC AUDIO LINK

- ★ Separate Transmitter and Receiver Modules

- ★ Ideal for Speech or Music Signal Sources
- ★ Bandwidth to 20kHz
- ★ Sends Along Fibre Optic Light Guide up to 20m in Length



This Fibre Optic Audio Link is an interesting alternative to the usual pair of wires to carry signals in the AF band from one place to another. It employs special purpose sender and receiver opto-couplers. These devices mate properly to the fibre, and enable it to do some useful work. The Fibre Optic Audio Link uses it to convey a 110kHz PLL carrier signal which can handle audio signals up to 20kHz with clarity and precision, for a distance of up to 20 metres! An ideal experimental and educational project, you can simulate telecommunications practice by building a long fibre optic system using intermediate Fibre Optic Link projects as repeaters.

From the practical point of view, your imagination is the limit. Useful examples range from maintaining a high quality audio signal path in close proximity to electrically noisy machinery, signal wiring in damp environments, and electrical isolation between sender and receiver.

Specifications

Frequency Response:	50Hz to 20kHz (-6dB) Flat from 150Hz to 3kHz
Max I/P and O/P levels:	0dB (775mV r.m.s.) @ 1kHz
Minimum Input level:	-28dB (30mV r.m.s.) for rated o/p
Noise level:	10mV
Signal to Noise Ratio:	35dB
Total Harmonic Distortion:	1% @ 1kHz
Phase Locked Loop carrier Frequency:	95 to 120kHz (110kHz nominal)

Continued on next page.

Continued from previous page.

Power Supply

Transmitter: 4.8V to 6V DC
@ 30mA to 50mA
Recommended: +5V DC @ 38mA
Receiver: 4.8V to 12V DC
@ 5mA to 12mA
Recommended: +9V DC @ 8mA

All specifications apply to the prototypes and may vary between different modules. Use the recommended power supply voltages shown for optimum performance.

Optional Items

The following items, not included in the kits, may also be required.

6 Volt Battery Box		(HF29G)
Fibre Optic Light Guide		(XR56L)
AA Batteries	4 off	(FK59P)
PP3 Battery		(FK62S)
PP3 Battery Clip	2 off	(HF28F)

Kits and Special Parts

Complete kits are available, the pcbs are also available separately. Full construction details may be found in the Best of Maplin Projects Book 5.
Tx PCB: 72 x 36mm
Rx PCB: 136 x 36mm.

Order

Code	Type	Price each
LM12N	Fib/Optic Tx Kit	£9.49
LM11M	Fib/Optic Rx Kit	£12.99
GD29G	Fib/Optic Tx PCB	£2.99
GD28F	Fib/Optic Rx PCB	£3.99

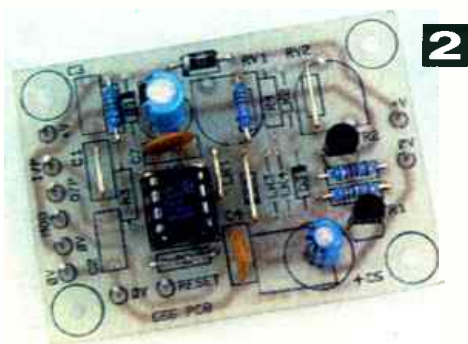
MULTI-PURPOSE 555 TIMER CARD

Features

- ★ Up to 11 configurations
- ★ Monostable or astable operation
- ★ Single PCB construction
- ★ Uses the popular 555 IC (NE555 supplied)

Applications

- ★ Timer circuits
- ★ Pulse width modulation
- ★ Square-wave generation
- ★ Reset pulse generation and watchdog circuits for microprocessors
- ★ Experimentation and circuit development
- ★ Education



2

The 555 timer IC has been around since the early 1970s, and can be found in many circuits. Configurable as a monostable or an astable multivibrator, it can be used in many applications - for example, precision timing, pulse generation, sequential timing, time delay generation, pulse width modulation, pulse position modulation, missing pulse detection and oscillators. 'Real world' uses for the 555 therefore include logic pulsers, DC-DC converters, alarm systems, servo controllers and remote control systems. This general-purpose 'building block' project allows such circuits to be built up around this versatile 8-pin IC. The PCB is designed to incorporate all of these possible variations, by simply fitting components or wire links where required for a particular configuration.

Kit and Special Parts

A complete kit of parts (including the PCB) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 69.

Order

Code	Type	Price each
LT34M	555 Proto Card	£5.99
GH54J	555 Proto PCB	£2.25

TUNGSTEN LAMP SURGE CONTROLLER

4

It is an often overlooked fact that the resistance of the filament of a tungsten lamp, or any other incandescent lamp for that matter, is very much lower when cold, compared to that at its normal operating temperature. This causes a high current to flow upon the instant the lamp is switched on. The thermal shock experienced by the filament during this time can be severe enough to break it prematurely.

Consequently any lamp will have a long life if only switched on for long periods of use, and the quickest way to 'blow' it is by repeated switching. This can become a problem with stage lighting, etc., where lamps may need to be switched often. The Tungsten Lamp Surge Controller provides anti-surge switch-on for high powered lamps up to 700W (or any other resistive load), using voltage phase control.

Construction Details

Note that no kit or pcb exists for this project. The Lamp Controller is not recommended for inexperienced constructors. Full details of construction and operating theory can be found in the Maplin Magazine Issue 21. See end of this section.

12V FLUORESCENT TUBE DRIVER MODULE

2



For 12 volt fluorescent lamps used in caravans, boats, for camping etc, this driver module is of a higher quality than the usual 'starter' circuit normally supplied with such lamps. Although intended to drive one 12 volt 8W fluorescent tube, it will operate two such tubes with negligible reduction in light output. Final light output strength can be chosen during construction, and is adjustable to a degree. Nominally consumes about 12 watts of power, and can be run for up to fifteen hours continuous use from the average car battery. Details of a suitable fluorescent tube can be found in the Opto Electrical section of this Catalogue.

Kit and Special Parts

A complete kit is available. Full construction details may be found in the Best of Maplin Projects Book 6. PCB dimensions: 56 x 33mm.

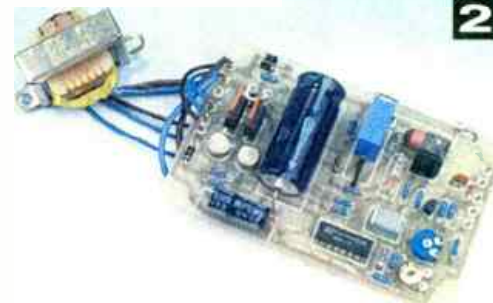
Order

Code	Type	Price each
LK35Q	Fluor Tube Drvr Kit	£11.99
GB52G	Tube Driver PCB	£1.99

THE BEST OF SERVICE

XENON FLASH TUBE DRIVER

A driver module using the Xenon flash tube described in the Opto-electrical section of this catalogue. The trigger transformer is energised by the capacitive



2

discharge method, while power for the tube is derived from a variable frequency inverter developing EHT up to 1kV. Applications are varied, including slave flash for photography, warning beacon, strobe and special lighting effects. Trigger source may be either from an on-board clock for strobe, or external switching. A neon indicator lights when the module is ready for the next flash.

Kit and Special Parts

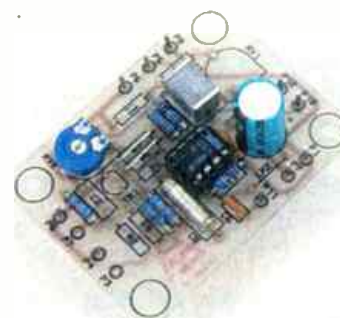
A complete kit is available and the pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 6. PCB dimensions: 106 x 68mm.

Order

Code	Type	Price each
LK46A	A1 Xenon Tube Drive Kit	£16.99
GB61R	Xenon Tube Dr PCB	£2.75

LM331 VOLTAGE-TO- FREQUENCY/ FREQUENCY-TO- VOLTAGE CONVERTER

2



Features

- ★ Lower power consumption
- ★ Good linearity
- ★ Excellent temperature stability

Applications

- ★ Remote control
- ★ Remote sensing

The LM331 is a simple voltage-to-frequency converter suitable for use in analogue-to-digital conversion, precision voltage-to-frequency conversion and many other applications. When the IC is used as a voltage-to-frequency converter, it produces a pulse train which is linearly proportional to the applied input voltage. Although the precision timer circuit has low bias currents, the response time is sufficiently fast for 100kHz voltage-to-frequency conversion. The open collector output of the device is capable of driving loads of between 5V (i.e. TTL level) and 40V, depending on the supply voltage, and is fully protected against short circuits to V_{cc} . In the frequency-to-voltage

converter mode, a frequency of between 1Hz to 10kHz is applied to the input, and the output voltage is directly related to the current flowing through a load resistor, nominally 100kΩ. This value can be altered, if necessary to provide different output level swings. Because of the high impedance nature of the output, it will normally be necessary to provide additional buffering – unless the circuit is driving a very high impedance load. The kit includes all the components to make either versions, and it is important to ensure the correct components/pins are inserted for the chosen version.

Note: this is intended as a 'building block' project and not eligible for our 'Get-You-Working' service.

Specification

Voltage-to-frequency

Power supply voltage: 5V to 40V
 Power supply current: 8mA (at 12V)
 Output frequency range: 50Hz to 10kHz (at 12V)
 Input voltage range: 0-0.5V to 10V

Frequency-to-voltage

Power supply voltage: 5V to 40V
 Power supply current: 6mA (at 12V)
 Output voltage range: 0-0.5V to 5V (at 12V)
 Input frequency range: 50Hz to 10kHz (at 12V)
 Input level: As supply voltage

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available to make either version. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 57.
 PCB dimensions: 45 x 60mm.

Order Code	Type	Price each
LT12N	LM331 V/F Converter	£10.99
GH20W	LM331 V/F Conv PCB	£2.29

Amplifier, Non-Inverting Summing Amplifier, Differential Amplifier, A basic integrator, The differentiator, Sine Wave Wien-bridge Oscillator Basic Schmitt Trigger, Square Wave Schmitt Trigger Oscillator. There is the option to add bandwidth limiting to the inverting and non-inverting amplifiers.

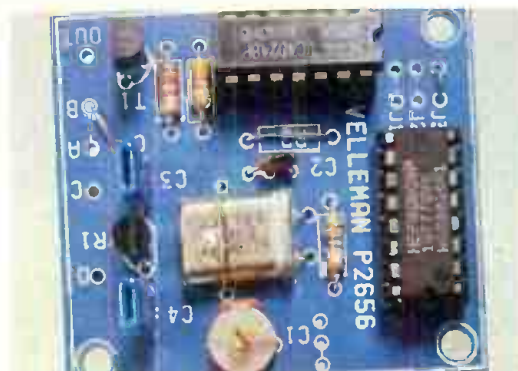
Kit and Special Parts

A complete kit of parts (including the PCB) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 68.

Order Code	Type	Price each
LT33L	Op Amp Proto Card	£7.99
GH51F	741 Op Amp Proto PCB	£2.75

VELLEMAN DEVELOPMENT PROJECTS

K2656 UNIVERSAL CRYSTAL TIME BASE

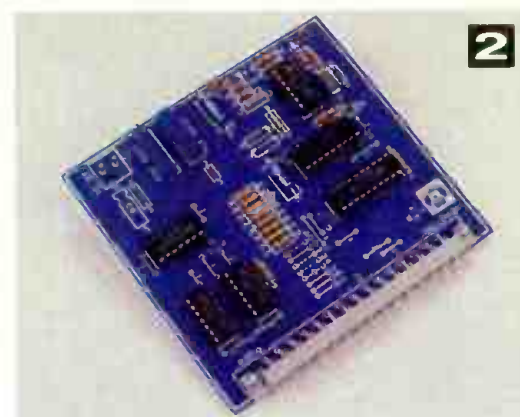


In many clocks and circuits with built-in clock another time base has to be provided during power failure, otherwise the clock would stop.

Output frequency: 50,100 or 400Hz
 Crystal: 3.276800MHz
 Can be adapted for 1Hz output signal.
 Supply voltage: 5 to 25V
 Supply current: 2 to 5mA depending on the configuration

Order Code	Type	Price each
VE80B	Velleman Kit K2656	£8.99

LARGE 7-SEGMENT NUMERIC DISPLAY MODULES



Features

- ★ 12 red LEDs per segment
- ★ Single 22 to 26V DC supply
- ★ On board drivers and current conversion
- ★ 400mA maximum current
- ★ Brightness independent of supply
- ★ Very high input sensitivity

Applications

- ★ Can be connected in parallel with original 7-segment display
- ★ For both static and multiplexed operations
- ★ Available in common cathode or anode versions

These modules can connect to existing 7-segment display drivers, and provide a very large display output (7 1/2 in. high). Applications include clocks in large work areas, factory production run-counters, athletics timer and lap counters, school classroom calculators, etc.

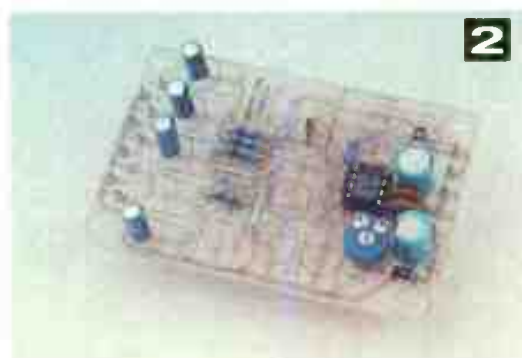
The modules need to be connected to a suitable power supply and driver circuitry. There are two different versions available; common anode and common cathode types.

Kit and Special Parts

A complete kit of parts for a common anode version (K2567) and common cathode version (K2568), which includes the PCB, are available. Full construction details and setting up procedures may be found in Maplin Magazine Issue 74.

Order Code	Type	Price each
VF01B	Velleman Kit K2568	£29.99
VE63T	Velleman Kit K2567	£29.99

MULTI-PURPOSE 741 OP-AMP CARD



Features

- ★ Up to 16 op amp configurations
- ★ All the basic op amp functions plus sine and square wave generators
- ★ Single PCB construction
- ★ Uses the popular 741 IC

Applications

- ★ Any AC or DC analogue processing
- ★ Control signal processing
- ★ Audio applications
- ★ Signal generation
- ★ Adding, summing, integration, etc.

This general-purpose building block project allows for a number of different op-amp configurations, and uses the industry standard 741 device. The accompanying PCB is designed to incorporate all these possible variations, by simply fitting components or wire links where required for a particular configuration. The various configurations which can be achieved with this module are: Buffer, Half Supply Generator, Non-Inverting DC Coupled Amplifier, Non-Inverting AC Coupled Amplifier, Inverting DC Coupled Amplifier, Inverting AC Coupled Amplifier, Inverting Summing

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CALCULATOR/CLOCK

A pocket, folding travel alarm clock and calculator that displays the time of day in twelve cities around the world, on a large format LCD. The clock has four modes: 12/24 hour time, date, alarm time, and calculator. In the time mode the clock shows hours, minutes and seconds. In the date mode the calendar shows month, date and day of week. In the alarm mode hours and minutes are shown by an on/off indicator. The alarm duration is 20 seconds. The calculator is a useful basic 8-digit device. Setting up the various functions is quite straightforward. Supplied with 1.5V battery and instructions.



SUPERB QUALITY!
£13.99
 RT22Y

The circuit could be used to drive more powerful light bulbs for greater effect; handy for christmas tree lights or the large nativity scenes that adorn your local church at christmas time. For greater realism arrays of lights should really be driven from several 'flickering candle' PCBs. Up to 250W of lighting can be driven when used in conjunction with the Mains Opto Switching kit (LP55K).

Supply Voltage: 9V DC
 Peak Operating Current: 166mA
 Logic Supply Current: 1.6mA
 Size of PCB: 49 x 43mm

Optional Items

The following items, not included in the kit, may also be required.

Power Socket 2.5mm	1	(JK10L)
Unregulated AC/DC Adaptor 300mA	1	(XX09K)
Battery Box 3 x AA	2	(YR61R)
PP3 Clip	1	(HF28F)
Duracell PP3 Battery	1	(JY49D)
Duracell AA Cell	6	(JY48C)
Epoxy Resin Sachet	1	(FL45Y)

Kit and Special Parts

A complete kit of parts, excluding optional items, is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 72.

Order Code	Type	Price each
LT40T	Twnking Xmas Candle	£7.49
GH47B	Xmas Candle PCB	£1.99

K2574 UNIVERSAL 4-DIGIT UP/DOWN COUNTER WITH COMPARATOR



Compared to the classic TTL counters, this CMOS version has a lot of advantages: lower supply current consumption and many selectable options that makes it universally applicable. By means of BCD switches, it is possible to set a number which is continuously compared with the contents of the counter. If both are equal, the 'compare' output is activated. The counter can increment or decrement (count up or down). Another facility is to freeze the displayed value at any time, while the internal counting continues.

Power supply: 5V DC, stabilised (150mA)

'Carry' output for cascading of several units
 Output signals: 5V, max. 50mA
 Max. count frequency: 2MHz

Order Code	Type	Price each
VE81C	Velleman Kit K2574	£44.99

EDUCATIONAL & NOVELTY PROJECTS

CHRISTMAS LANTERN AND FLICKERING CANDLE



Features

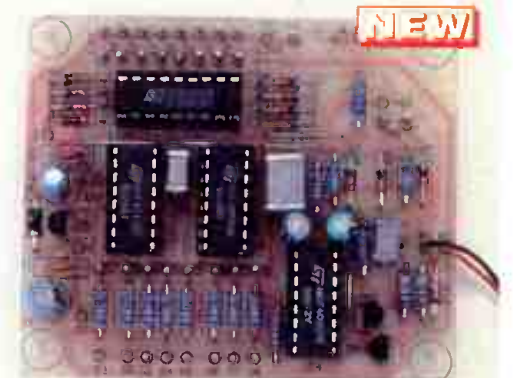
- ★ Realistic flicker effect
- ★ Easy to build
- ★ Low cost

Applications

- ★ Amateur theatrics
- ★ Home video productions
- ★ Nativity scenes
- ★ Carol singing
- ★ Christmas tree light(s) with a difference!

A christmas project with a difference! Using modern technology, this lantern has several advantages over the traditional wax candle. Not only doesn't it melt away, but you won't bum yourself or set anything alight because a tiny LES bulb replaces the flame. Neither, of course, will it be extinguished by the slightest breeze! Details are provided with the kit for building a lantern housing for the 'candle', using stiff, painted card. Such materials can safely be used as there is no risk of fire from this particular candle!

PRIORITY QUIZ BUZZER



Features

- ★ Easy to build
- ★ Low cost
- ★ Caters for eight contestants
- ★ Versatile and expandable
- ★ Can drive relays, buzzers, lamps or opto-isolated triacs

Applications

- ★ Family fun nights
- ★ Pub quiz nights
- ★ Charity trivia competitions
- ★ Team games
- ★ Reaction testing

Fed up with the incessant arguments over who was the first to answer a question during a quiz? Then this project is for you. Up to eight players can use the Priority Quiz Buzzer, expandable to 16 or 24 contestants if chained to a second or third PCB. Each contestant is equipped with a push-button and accompanying lamp. This is switched on at the moment that the button is pressed, while a buzzer attracts the attention of the quizmaster. The circuit uses high-speed latches to record the closure of any one of the eight switches, at which point a self resetting monostable will lock-out all other buttons. The speed of the system makes it virtually impossible for two buttons to be simultaneously pressed and recorded. The identifying lamp is lit for the duration of the time-out period. Up to eight lamps are driven by

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open-collector buffers, each able to switch up to 500mA. For higher currents relays can be used (protection diodes are provided).

An on-board 5V regulator is included for the circuit logic; the optimum supply for the module is 12V DC to suit most 12V lamps, relays and buzzers.

Optional Items

The following items, not included in the kit, may also be required.

MES Batten Holder	8	(RX86T)
MES Lampholder	8	(JX87U)
LES Lampholder	8	(UJ72P)
Domed LES Lampholder Blue	8	(RX76H)
Domed LES Lampholder Yellow	8	(RX80B)
Fluted LES Lampholder Red	8	(RX69A)
LES Lamp Cover Amber	8	(YY00A)
LES Lamp Cover Yellow	8	(YY06G)
Lilliput LES Lamp 12V	8	(BU14Q)
Tubular LES Lamp 12V	8	(WL75S)
Tubular MES Lamp 12V 100mA	8	(BU20W)
Tubular MES Lamp 12V 183mA	8	(BU21X)
2-pin DIN Plug	8	(HH24B)
2-pin DIN Socket	8	(HH31J)
4-pin DIN Plug	8	(HH26D)
4-pin DIN Socket	8	(HH33L)
Chassis Phono Socket	8	(YW06G)
Phono Plug Black	8	(HQ54J)
Phono Socket 8-way	8	(JK17T)
ABS box MB3 (for PCB)	1	(LH22Y)
Small Narrow Box (for switch)	8	(FT31J)
Push Switch	9	(FH59P)
Large Red Push Switch	9	(FH91Y)
Silver Push Switch	9	(FG45Y)
Black Square Push Switch	9	(FF96E)
Twin Zip Wire	As Req	(XR39N)
Phone Cable 4-way	As Req	(XR66W)
AC Adaptor Unregulated 300mA	1	(XX09K)
Insulated Spacer M3 x 10mm	1 Pkt	(FS36P)

Kit and Special Parts

A complete kit of parts, excluding optional items, is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 72.

Order Code	Type	Price each
LT41U	Priority Quiz Buzzer	£11.99
GH49D	Quiz Buzzer PCB	£3.75

LIVE WIRE GAME



Features

- ★ 'Lives' indicator
- ★ Low voltage operation
- ★ Easy to build

Applications

- ★ Fund-raising events
- ★ Family fun
- ★ Reducing stress
- ★ Improving hand/eye co-ordination

The traditional 'live-wire' game often suffers from a few shortcomings. Firstly, there is often no clear indication when the loop has just made momentary contact. Secondly, because the contact between loop and wire usually carries the bell current directly, if there is any appreciable contact resistance the bell may not sound

properly. Thirdly, differing abilities can mean that it is difficult to provide an interesting game for a wide range of contestants.

This project will stop the controversy over whether the 'live' wire was actually touched or not. The design includes a monostable that will positively sound the buzzer for a short period, and a 'lives' counter that permits the contestant a set number of attempts to reach the end before they are all consumed. Once all 'lives' have been lost, an indicator illuminates and a buzzer sounds continuously. The design allows the number of lives to be set (with links during construction) between one and five, and the output can drive LEDs or filament lamps.

The finished unit can be powered from any supply between 9 and 16V DC, and a car battery for outdoor events is ideal. Maximum current consumption at 12V is only 50mA. Alternatively internal batteries may be added.

Optional Items

The following items, which are not included in the kit, may also be required.

Battery Box 8 x AA	1	(RK44X)
PP3 Clip	1	(HF28F)
Alkaline AA Cell	8	(FK64U)
Power Plug 2.5mm	1	(HH62S)
Unregulated AC Adapter 300mA	1	(XX09K)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB and labels are also available separately. Full construction details may be found in Maplin Magazine Issue 78.

Order Code	Type	Price each
LT57M	Live Wire Game Kit	£24.99
GH75S	Live Wire Game PCB	£2.99
KP65V	Live Wire Top Panel	£1.99
KP66W	Live Wire R/Panel	£1.29

MODEL TRAIN CHUFFER



Features

- ★ Realistic chuff and hiss of steam
- ★ Chuffer automatically changes with speed
- ★ Hiss of escaping steam when train stationary
- ★ Adjustable chuff rate
- ★ Adjustable tonal quality

One effect that is normally missing from a model steam train set so making it less realistic, is the sound of a chuffing engine. The Chuffer project produces a realistic 'chuff' whilst the train is in motion, and also produces a hissing sound which emulates escaping steam whilst the train is at a standstill.

An external amplifier and a power supply of up to +36V DC (absolute maximum) are required for use with the Chuffer. Adjustment of the 'chuff' rate can be made to match the train speed. Once in operation the changes in track voltage will be picked up and the Chuffer rate will alter automatically and lend realism to the model steam train set up.

Specification

Supply Voltage DC:	+15.5 to 36V DC
Supply Current	
quiescent:	15.3mA
operating:	17.1mA
Output Signal Level (nominal):	1V rms
Track Control Voltage Range:	16V maximum

Optional Items

The following items, not included in the kit, may also be required.

Multi-purpose ABS Box Type MB3	1	(LH22Y)
Chassis Phono Socket	1	(YW06G)
2.5mm Power Socket	1	(JK10L)
Red Terminal Posts Small	2	(FD72P)
M3 x 10mm Insulated Plastic Spacer	2	(FS36P)
2A Hookup Wire Black	10m	(BL00A)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 79.

Order Code	Type	Price each
LT39N	Train Chuffer Kit	£9.99
GH80B	Train Chuffer PCB	£2.99

PARTYLITE

The idea of a three channel sound-to-light modulator is obviously not a new one, there being a multitude of units of this type already available, ranging from professional products to the types available at supermarkets for domestic use. Nevertheless, the Partylite is a worthy addition to the range because of its simplicity. It is fully automatic -- no knobs to re-adjust every time the level or tonal content of your music alters. The Partylite also has its own built in microphone eliminating the need for an audio connecting lead, making a completely free-standing unit and also avoiding the possibility of damage to your hi-fi or power amp. The Partylite employs zero voltage triggering of the thyristors. Consequently no interference is generated to produce those annoying clicks through the speakers, so common with cheaper sound-to-light units. It will work effectively on all three levels or in a disco environment. This is achieved by having independent automatic level control circuits for treble, middle and bass frequencies. Please note that a case, lamp fittings and lamps are not supplied. Also caution should be exercised as 240V Mains is present on the pcb.

Kit and Special Parts

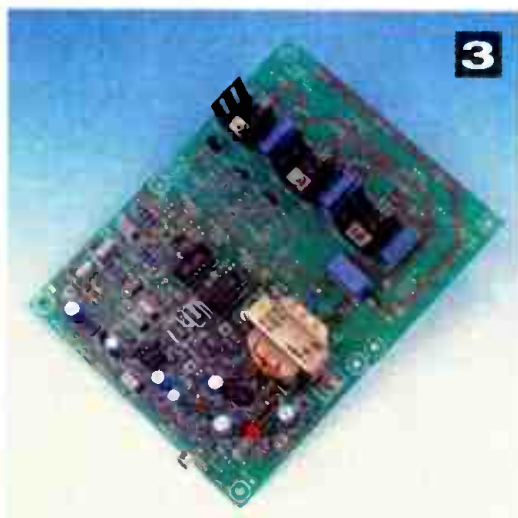
A complete kit, excluding case, lamp fittings and lamps, is available. the pcb is also available separately. Full construction details are supplied with the kit.

PCB dimensions: 120 x 75mm

Order Code	Type	Price each
LW93B	Partylite Kit	£12.99
GA42V	Partylite PCB	£2.75

FOR CASHTEL
Phone 01702 552941

DISCO PARTYLITE



- ★ **No Direct Connection to your Sound System Required**
- ★ **Automatic Level Adjustment**
- ★ **3-channel Operation**
- ★ **Zero Voltage Triggering**
- ★ **Electret Condenser Microphone Insert**

The Disco Partylite expands on the original Partylite design, which proved to be one of the best selling Maplin kits, by offering the following enhancements; improved electrical safety, cooler running circuitry, high quality microphone insert, improved ALC circuitry, better tone filters and triac mains switching. The Disco Partylite has a built-in microphone eliminating the need for direct audio connection, removing the possibility of damage to your hi-fi or power amp and making the unit completely free standing. Automatic Level Control (ALC) circuitry follows the volume of the music over a wide range, obviating the need for a manual level control while zero voltage triggering of the triacs minimises any interference generated by the unit.

Specification

Supply Voltage:	240V AC 50Hz
Supply Current:	5A Maximum
Power Handling:	300W per channel maximum
Number of Channels:	3 – Bass, Middle, Treble
Frequency Response:	10Hz to 20kHz
Case Dimensions:	Width 150mm, Length 220mm, Height 64mm

Optional Items

The following items, not included in the kit, may also be required.

Switch Dual Rocker Neon Red	1	(YR70M)
Safuseholder 20mm	1	(RX96E)
Fuse 5A 20mm Anti-Surge	1	(RA12N)
3-core 6A Mains Cable	3m	(XR03D)
Push-on Receptacle	1 Pkt	(HF10L)
Push-on Receptacle Covers	1 Pkt	(FE65V)
Euro-Facility Outlet	3	(HL42V)
13 A Plug Nylon	1	(RW67X)
Plug Fuse 5A	1	(HQ33L)
SR Grommet 6W-1	1	(LR49D)
Mains Warning Label	1	(WH48C)
ABS Box MB6	1	(YN39N)
Isobolt M3 x 12mm	1 Pkt	(BF52G)
Isoshake M3	2 Pkts	(BF44X)
Isonut M3	2 Pkts	(BF58N)
Isowasher M3	1 Pkt	(BF62S)
Stick-on Feet Square	1 Pkt	(FD75S)
Euro-Facility Plug	3	(HL43W)
Square Cloth 0.71m	1/4 Mtr	(XS10L)

Kit and Special Parts

A complete kit, excluding lamp fittings or lamps, is available. The two pcbs are also available separately. Full construction details may be found in Projects Book 25.

Order Code	Type	Price each
LM41U	Disco Partylite Kit	£24.99
GD72P	D/Party Contrlr PCB	£4.99
GD73Q	D/Party Triac PCB	£3.99

FEST-O-METER

Features

- ★ **Fun for all the family**
- ★ **Can be used as a simple lie detector**
- ★ **Ideal beginner's project**
- ★ **Low-cost**

Like the Christmas Tree project, the Fest-o-Meter is a simple project and should pose no constructional problems even to the absolute beginner. Hours of fun can be had by family and friends trying to get all 6 of the LEDs to light by holding a finger over the unit's two contacts – the Fest-o-Meter depends on moisture in the skin to act as a high-value resistor and complete a circuit. If you are successful, you will be rewarded with a Christmas tune.

This little project could be used beyond Christmas!

It could, for example, function as a simple form of Lie Detector, as some of these employ the same principle. When telling lies people are supposed to sweat more, according to psychologists. These increased levels of moisture noticeably alter the resistivity of the skin – to such an extent that the Fest-o-Meter can detect it

Optional Items

The following items, not included in the kit, may also be required.

Zinc Chloride HD PP3	1	(FK62S)
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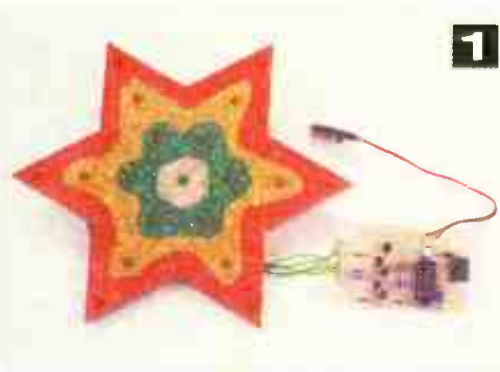
Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 60.

Order Code	Type	Price each
LT18U	Festometer Kit	£7.99
GH24B	Festometer PCB	£1.89
KP58N	Fest-O-Meter F/Panel	80p

XMAS STAR

- ★ **4 different LED colours**
- ★ **Easy to build**
- ★ **9V cell or DC supply option**



A novelty project brings life to the top of your Xmas tree. This unit is built around the CMOS 4060 IC, a 14 stage ripple counter and oscillator. Synchronised flashing is provided by a bank of LEDs, which can be mounted on to a glittered star. The project can be run from a 9V PP6 cell or a 9V voltage regulator. Current consumption of 70mA occurs when all LEDs are on, making the life of a PP6 cell approx. 20 hours. A DC mains adaptor able to deliver 300mA, is recommended for prolonged use. The star itself is not supplied, but this project can be used for other applications.

Optional Item

The following item, not included in the kit, may also be required.

PP6 Battery	1	(FM03D)
-------------	---	---------

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 41.

PCB dimensions: 67 x 43mm.

Order Code	Type	Price each
LP54J	LED Xmas Star	£7.99
GE72P	LED Controller PCB	£1.75

XMAS TREE



- ★ **21 LEDs in 3 different LED colours**

- ★ **Easy to build**

- ★ **9V battery or DC supply option**

An easy to build festive project, decorated with 21 low-current LEDs in three different colours, which light in random patterns. The LEDs can be made to light at different rates/patterns which change slowly, quickly or twinkle. The Tree can be powered from a battery or a mains adaptor in the range of +9V to +15V. If an unregulated mains adaptor is used e.g. XX09K, it should be set to 7.5V or 9V. The nominal current consumption at 9V is only 12mA with all LEDs illuminated, while at 15V it is 36mA.

Supplied with the kit is a full size template of the tree which can be cut out and stuck on a piece of thick card, plywood, hardboard, aluminium laminate or perspex. The holes for the LEDs can then be drilled, cut or punched out, and the tree finally cut out.

Optional Items

The following items, not included in the kit, may also be required.

Battery PP3 Alkaline	1	(FK67X)
Power Pack PP6 9V	1	(FM03D)
AC Adaptor Unrg: 300mA	1	(XX09K)
Aluminium Laminate Small	1	(XY19V)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Projects Book 48.

Order Code	Type	Price each
LP83E	LED Xmas Tree	£11.99
GE95D	LED Xmas Tree PCB	£2.49

THREE GUN SOUND GENERATOR

Features

- ★ Wide range of applications
- ★ Three sounds available
- ★ Wide supply voltage range
- ★ Drives piezo sounder or loudspeaker directly
- ★ Reverse polarity protection
- ★ Easy to build
- ★ No alignment required
- ★ Sound effects for toys and games



This three gun sound generator kit is a simple sound effects synthesiser based on the UM3562 CMOS IC. Any one of three different gun sounds, rifle, ray-gun and machine-gun, can be produced by the module, which is capable of driving a piezo-electric sounder (included in the kit) or a 64Ω loudspeaker directly, or the output can drive a following amplifier. The module will operate over a wide supply voltage range of 2.5 to 12V, and features a current drain of only 2mA or so while in standby mode (or not producing any sounds). If the supply is not to exceed 3V (e.g. from two AA cells), then there is the option of reducing this standby current still further by omitting a supply limiting zener from the board. It is also possible to adjust the pitch of the sound effect within a limited range by altering the on-chip clock rate. Any of the three different sounds can be selected at will with a three-pole switch, or a chosen sound can be hard-wired. A separate trigger switch initiates the sound, which is continuous until released for the machine-gun effect, and 'single-shot' for the other two effects. This small module (<40mm square) will find many applications in games, toys and models.

Optional Items

The following items, not included in the kit, may also be required.

PP3 battery clip	1	(HF28F)
Miniature 64Ω loudspeaker		
L/S Hi-Z 3864	1	(YT27E)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 36. PCB dimensions: 38 x 38mm.

Order Code	Type	Price each
LP11M	3 Gun Sound Gen Kit	£4.99
GE32K	3 Gun Sound Gen PCB	£1.80

ELECTRONIC DIGIDICE



Most games incorporate a degree of chance in the rules; this random element can take a variety of forms but in many cases it is obtained using dice. With ordinary dice, as long as they are manufactured properly there are unlikely to be any problems with obtaining a random result, however with an electronic version of the die, producing a truly random result can be a problem. The DigiDice uses a high frequency temperature controlled oscillator, a binary counter and a D-type latch to produce a pseudo-random result that should be for all practical purposes comparable with that obtained from a real die. The result is displayed by seven large (8mm) LED's which are arranged in the traditional dice pattern.

Optional Items

The following items, not included in the kit, may also be required.

ABS box	1 off	(LH21X)
Insulated spacer M3 x 25mm	1 Pkt	(FS39N)
Stick-on feet large	1 Pkt	(FW38R)

Kit and Special Parts

A complete kit is available. The adhesive front panel is not included in the kit and must be ordered separately. The pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 34. PCB dimensions 67 x 77mm.

Order Code	Type	Price each
LM99H	Elec Die Kit	£11.49
GE12N	Elec Die PCB	£2.99
JP39N	Elec Die Stick-on FP	£3.99

SUPER ELECTRONIC ROULETTE

- a Sound Master Kit



This Super Electronic Roulette is an electronic version of the well known game played in such places as Las Vegas! The traditional roulette wheel is essentially a random number generator where a ball is thrown over the spinning wheel, which eventually comes to rest at a number. The chances of landing on any one number is approx. 9.842×10^{-9} to 1! In this version, the wheel is produced by a ring of LED's which flash in succession producing a spinning effect: this rate eventually slows down and stops. Although the real

game is played for very high stakes, this project is intended to be used purely for the fun of playing the game. The kit comes complete in every detail including a plastic front panel and printed circuit board.

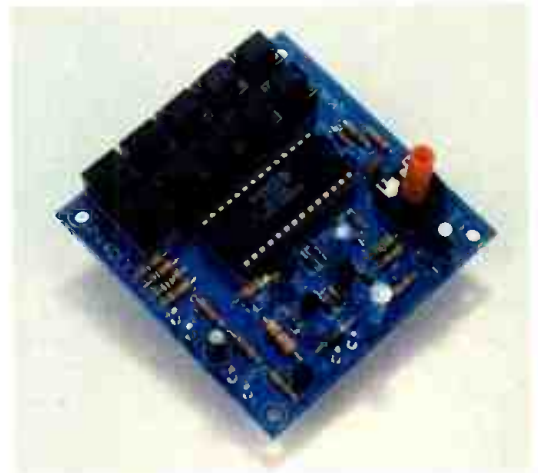
Kit and Special Parts

A complete kit of all parts is available. Full construction details may be found in the Maplin Magazine Issue 29.

Order Code	Type	Price each
LM67X	Roulette Kit	£15.99

VELLEMAN EDUCATIONAL & NOVELTY PROJECTS

K4401 SOUNDS GENERATOR



Features

- ★ 10 different sounds
- ★ Drives 8Ω loudspeakers
- ★ Adjustable pitch/speed
- ★ Reverse polarity protection

Applications

- ★ Sound effects
- ★ Disco jingles
- ★ Games and toys
- ★ Alarms

This pre-programmed sound generator is ideal for use in sound effects production, disco jingles, games and toys. The sounds that the completed unit generates are:

1. Tune: 'Wild Charge Tune'.
2. Mortar shot and explosion.
3. Explosion.
4. Car tyre screech.
5. Tune: 'Snake Charmer's Tune'.
6. Car engine (up/down rpm).
7. Phasor gun.
8. European siren.
9. Machine-gun and bullet impact.
10. USA siren.

The tempo of each effect is adjustable, so increasing the unit's versatility. The sounds are created using a peripheral interface controller (PIC), microprocessor-based IC, and the finished unit has provision for direct connection to an 8Ω loudspeaker. Additionally, a line level output is provided for connection to a mixer or amplifier.

Specification

Power requirements:	8V to 10V DC
Standby current:	11mA
Maximum current:	100mA
Output	
Loudspeaker:	1W into 8Ω
Line:	1V rms

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Optional Items

The following items, not included in the kit, may also be required.

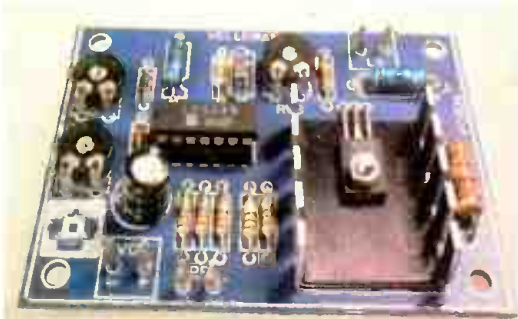
Sub-Min Toggle Switch (Type A)	1	(FH00A)
Hook-up Wire	As Req	(BL00A)
Single-core Screened Cable	As Req	(XR12N)
Low-cost Loudspeaker	1	(YW53H)
300mA Unreg DC Power Supply	1	(XX09K)
or PP3 Alkaline Battery	1	(FK67X)

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 57.

Order Code	Type	Price each
VE11M	Velleman Kit K4401	£20.99

K2604 KOJAK SIREN



Enter the world of amazing electronic sounds and noises. Create or imitate sirens of all kinds by adjusting three presets. Power sound with extra 2W on-board amplifier. Requires 8 to 14V DC, 1A.

Order Code	Type	Price each
VE87U	Velleman Kit K2604	£7.99

K2601 STROBOSCOPE



Flashing light effect for disco. Make your own snapshots and 'lightning' light effects. Flash frequency adjustable from 2 to 20Hz. Requires 220/240V AC.

Order Code	Type	Price each
VE52G	Velleman Kit K2601	£14.99

K2569 3-TONE CHIME



This inexpensive kit gives a 3 tone sound every time you activate it. The only extras required are a small loudspeaker and a battery. Full construction details may be found in Maplin Magazine Issue 58.

Power supply: 7 to 12V DC
Output: 8Ω

Order Code	Type	Price each
VE88V	Velleman Kit K2569	£10.99

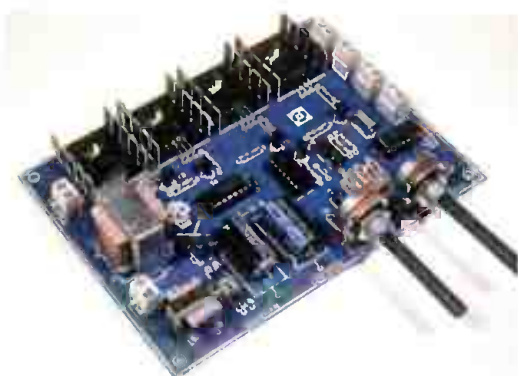
K2588 3-CHANNEL LIGHT ORGAN



Add amusing colours to your music. Three outputs for high, middle and low tones are separately adjustable. Compatible with your amplifier, tape/cassette recorder etc. Not suitable for use with halogen lamps. Input sensitivity: 100mV to 10V max
Channel separation: 20dB
Triac outputs: 500W max. each (uncooled)
Supply: 200 to 240V AC

Order Code	Type	Price each
VE53H	Velleman Kit K2588	£33.99

K2602 MUSIC MODULATED RUNNING LIGHT



Get your running lights to keep pace with your favourite disco hits. Compatible with all sound equipment. Isolated input is adjustable (100mV to 5V sensitivity). Speed adjustable from 0.25 to 3Hz. Operates on 220/240V AC. Four 2A triac outputs.

Order Code	Type	Price each
VE54J	Velleman Kit K2602	£29.99

K5200 4-CHANNEL MULTI-FUNCTION RUNNING LIGHT



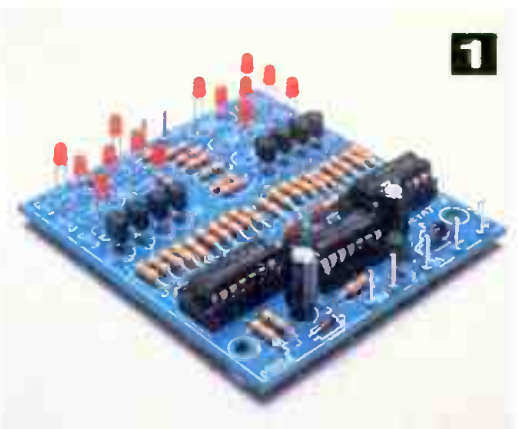
This circuit does more than an ordinary running light. Apart from running in both directions, it also flashes with two groups of lamps alternately (flip-flop), or with all the lamps at the same time. The four light effects follow each other automatically.

Multi-function: running to the right, running to the left, flip-flop, or with all the lamps flashing at the same time.
Four triac outputs: max. 2A each (400W at 240V)
Running speed: adjustable in asynchronous mode; constant speed in synchronous mode.

Radio noise is suppressed in synchronous mode. Can be synchronised by mains or can work synchronously. Power supply and transformer supplied with the kit.

Order Code	Type	Price each
VE55K	Velleman Kit K5200	£17.99

K3400 DUAL ELECTRONIC DICE



Features

- ★ Two independent dice; may be used in 'single die' mode if required
- ★ Displays are switched off after approx. 30 seconds to conserve battery power
- ★ Bright LED display
- ★ Powered by a PP3 Battery

Application

- ★ Ideal for playing dice-based games in limited spaces, or on the move!

Board games can be fun, but real dice can be a problem, they fall off the table, allow cheating, and sometimes a player may not see the result. There can be no doubt at all about the result on the display of this electronic dice, and cheating is out of the question! With this modern equivalent, a button is simply pressed and then released, the result being indicated by a pattern of 5mm red LEDs mimicking the standard die's number patterns. Using two fully independent dice, you can choose to play with one or both. Displays are switched off automatically after 30 seconds to conserve battery life. Requires 8V to 12V DC.

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Optional Items

The following items, not included in the kit, may also be required.

Centre-Off DPDT Toggle	1	(FH05F)
Push-to-Make Switch	1	(FH59P)
Alkaline PP3	1	(FK67X)
PP3 Battery Clip	1	(HF28F)

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 61.

Order Code	Type	Price each
VE07H	Velleman Kit K3400	£10.99

Optional Items

The following items, not included in the kit, may also be required.

HP Piezo Sounder	1	(FK84F)
Pan Mnt Pwr Skt 2-5	1	(JK10L)
Verobox 217	1	(LL11M)
AC Adaptor Regulated	1	(YB23A)
Quickstick Pad	1 Strip	(HB22Y)
Poziscrew M3 x 10mm	1 Pkt	(LR57M)
Shakeproof Washer M3	1 Pkt	(BF44X)
Steel Nut M3	1 Pkt	(JD61R)
C/sk Poziscrew M3 x 30mm	1 Pkt	(JC72P)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 61.

Order Code	Type	Price each
LT19V	Tele ring Simulator	£21.99
GH27E	Telephone Ringer PCB	£2.45

INTELLIGENT Ni-Cd BATTERY CHARGER



Features

- ★ 1h or 12h charge time with subsequent trickle charge
- ★ Battery temperature and contact monitoring
- ★ Charging interrupt for overvoltage or excessive temperature
- ★ Automatic predischarge cycle
- ★ Constant current charge and discharge
- ★ Charge pulse with modulation for battery capacity matching
- ★ LED status output for mode indication
- ★ Timer clock via internal oscillator

Applications

- ★ Charging/Discharging Ni-Cd cells
- ★ Reviving damaged or misused cells

The use of this charger can improve the performance of a cell or cells with 'reduced capacity' by providing constant current discharge to a flat condition first before the constant current charging cycle commences. Once the charge cycle is completed (giving a 95% charge), the battery is then (by pulse width modulation (PWM) 'trickle charged' for 100ms every 16-8s, which equates to a 'form factor' of 0.6%.

This 'intelligent' Ni-Cd battery charger is based around the U2400B IC which has been specifically designed to handle the needs of Ni-Cd batteries. The IC itself contains much of the electronics required, which include a processor unit, battery voltage and temperature monitoring comparators, PWM comparator, open collector charge and discharge outputs, LED status output, an oscillator, voltage reference and mains synchronisation. However, not all the features obtainable from the IC are used in this application.

To enable different voltage and lower capacity batteries than 1.5Ah to match the charger, two rotary switches are provided. The voltage select switch, divides the potential terminal voltage to provide the correct level for the voltage comparators; and the battery capacity selector switch which alters the PWM of the charge circuit, thus preventing over charging.

Specification

Power supply:	240V AC 50Hz
Power consumption:	33W maximum
Battery voltages:	1.2V, 6V, 7.2V, 8.4V, 12V
Battery capacity:	110mAh, 180mAh, 500mAh, 1.2Ah, 1.5Ah
Charge time:	1hr or 12hr
Overtemperature threshold:	45°C
Charge current:	1.5A, pulse width modulated
Discharge current:	500mA
Minimum/maximum cell voltage:	0.8V/2V
Input connector:	IEC plug
Output connectors:	4mm terminal posts
Overall dimensions:	205 x 106 x 197mm (WHD)

Optional Items

The following items, not included in the kit, may also be required.

Blue Case Type 237	1	(XY47B)
Euro Lead	1	(MK41U)

Kit and Special Parts

A complete kit of parts (including the PCB and front panel) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 79.

Order Code	Type	Price each
LT55K	Intllgnt Batt Chgr	£39.99
GH71N	NiCd Charger PCB	£4.49
KP69A	Nicad Charger Panel	£1.99

PWM DC MOTOR SPEED CONTROLLER



Features

- ★ High-current power rating
- ★ Short-term overload proof
- ★ Optional foot pedal control

Applications

- ★ Hobby drills
- ★ Model train sets
- ★ Remote-controlled model cars/boats

Many of us who own mini drills for making PCBs and drilling project-boxes, only have a general-purpose low-current variable-voltage bench PSU to power it up. More often than not, the PSU voltage collapses when asked for more than an amp or two. The drill PSU project presented here, is short-term overload proof (3 seconds maximum) and provides 100W of power for even the most current-hungry drills. The PWM (pulse width modulated) PSU even has an on-board 'current limit' LED indicator.

The drill speed is variable from zero to the maximum RPM of the drill. The project even has the option of a foot speed controller, allowing for fine control of the speed and for hands-free operation.

The PWM drill speed controller can be used (when suitably modified) for controlling the speed of model trains or even remote-controlled model cars or boats.

Specification

Power supply voltage:	12 to 18V AC or DC, 15V (nominal)
Supply current max:	15A 8-5A (nominal)
Maximum rated power:	125W

Continued on next page.

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ENVIRONMENTAL PROJECTS

AUTORING



Features

- ★ American, UK or European ringing sounds
- ★ Adjustable timing
- ★ Ringing pattern can be customised
- ★ Can be used with most BT-compatible plug-in telephones

Applications

- ★ Theatre or radio plays
- ★ Amateur film production
- ★ General sound effects
- ★ Telephone testing
- ★ Fooling friends!

One of the most difficult sounds to simulate in plays and films is a telephone which must ring on cue, and stop ringing when picked up. Finding a 'mock' telephone that rings with the exact timing cycle of a conventional BT-style telephone is even more difficult. The project is designed to simplify matters and, when operated, will cause a connected BT telephone to ring correctly. AutoRing will not work with bell-type telephones as the ringing current required by such telephones exceeds that produced by the unit. An optional internal bleeper can be added for 'off stage' effects, and the design includes an LED to indicate the correct ringing effect. The current required by AutoRing is very low and the total consumption of the circuit when connected to a typical phone is less than 100mA. AutoRing must on NO CIRCUMSTANCES be plugged into a BT socket.

AutoRing can easily be configured to generate the ringing sound of your choice, and the unit requires a regulated 12V DC supply with a standard 2.5mm power connector. A suitable power supply is YB23A.

Continued from previous page.

Optional Items

The following items not included in the kit, may also be required.

1/2in. Stereo PCB Socket	1	(FJ05F)
Metal Box Type AB15	1	(XB71N)
120VA 15V Toroidal	1	(DH63T)
K01 Bridge Rectifier	1	(BH47B)
5mm Convex LED Clip	1	(UK14Q)
10A 250V AC Dual Rocker Neon Switch Red	1	(YR70M)
Fused Mains Euro Chassis Plug	1	(FT37S)
Insulation Cover For Fused Mains Plug	1	(JK67X)
Red Terminal Post Small	1	(FD72P)
Black Terminal Post Small	1	(FD69A)
Push-on Receptacle Covers	1Pkt	(FE65V)
Knob Type K7B	1	(YX02C)
1A Antisurge Fuse	1	(WR19V)
13A Plug & Cable Black	1	(CY32K)
3A Two-core Mains Cable Black	1m	(XR47B)
Power Connection Wire Green/Yellow	1m	(XR38R)
High Current Wire Black	1m	(XR57M)
High Current Wire Red	1m	(XR59P)
Extra-Flexible Wire Black	1m	(XR40T)
Extra-Flexible Wire Red	1m	(XR44X)
M3 x 20mm Insulated Spacer	1Pkt	(FS38R)
M3 Solder Tag	1Pkt	(LR64U)
M3 Steel Nut	1Pkt	(JD61R)
M3 Shakeproof Washer	1Pkt	(BF44X)
M3 x 6mm Steel Bolt Countersunk Pozi	1Pkt	(BF36P)
M4 Steel Nut	1Pkt	(JD60Q)
M4 Shakeproof Washer	1Pkt	(BF43W)
M4 x 16mm Steel Bolt Pozi	1Pkt	(JY16S)
Stick-on Feet Square	1Pkt	(FD75S)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 81.

Order Code	Type	Price each
LT64U	PWM DC Drill Cntrlr	£14.99
GH86T	PWM Drill Cntrlr PCB	£3.49
DE78K	PWM Motor Cntrl F/P	£2.29

ENVIROSYNTH



2

- ★ Simulates a gentle breeze, or surf on the shore
- ★ Can provide pink and white noise outputs
- ★ Sounds can be tailored to users requirements

Applications

- ★ Sound effects for theatres, radio shows and video/film productions
- ★ May aid relaxation, insomnia and coping with stress

Do you suffer from insomnia caused by tinnitus, worry, or overtiredness?, or perhaps you need help coping with stress, then the EnviroSynth may be just what you need. The sound of breaking rollers on a pebble beach, or the gentle summer breeze rustling through the trees, are very therapeutic and can help overcome the problems mentioned. These sounds can also be very useful in doctors' or dentists' waiting rooms. Even white noise has its uses. Sounding as it does like escaping steam, it is completely unvarying and featureless. The EnviroSynth can be used to generate sound effects. By varying certain component values the effects can be altered and a range of very interesting sounds produced i.e. a gale!

Optional Items

The following items, not included in the kit, may also be required.

6W Elliptical Speaker	1	(GL17T)
250mA Transformer 6V	1	(YN14Q)
1 1/4in. Clickcatch F/H	1	(FA39N)
Fuse 1 1/4in. A/S 100mA	1	(UK58N)
Dual Rocker Neon Red	1	(YR70M)
Min Mains Black Cbl.	2m	(XR01B)
SR Grommet 5R2	1	(LR48C)
Case and knobs		

Kit and Special Parts

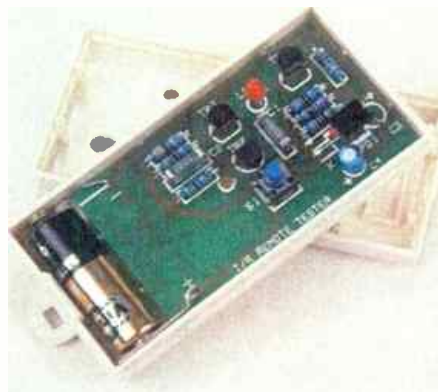
A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 54.

PCB dimensions: 162.6 x 63.5mm

Order Code	Type	Price each
LP67X	Enviro Synth	£18.99
GH10L	Enviro Synth PCB	£4.19

INFRA-RED REMOTE CONTROL TESTER

1



This handy little project is an infra-red (IR) detector. The unit checks to see if a remote control unit (or any other pulsed infra-red source) is transmitting an infra-red carrier or data stream. The unit ignores ambient infra-red energy, so it can be used in full sunlight. An indication LED shows when a signal is detected and is used for checking the internal battery. The strength of the transmissions from a control unit can be measured by the distance from which the remote control is able to operate. TV and Video repair engineers will find this infra-red tester an invaluable addition to their toolbox. It is also cheaper and more versatile than IR sensitive cards that attempt to serve the same purpose.

Specification

Supply voltage range:	6 to 12V
Battery type:	12V lighter battery 23A
Operating current:	11.4mA
Operating frequency:	10Hz to 100kHz
Minimum pulse width:	1µs
Detector peak spectral response:	940nm

Optional Item

The following item, not included in the kit, may also be required.

12V Lighter Battery 23A	1	(JG91Y)
-------------------------	---	---------

Kit and Special Parts

A complete kit is available. A pcb, keyring remote case and panel are also available separately. Full construction details may be found in Maplin Magazine Issue 44.

Order Code	Type	Price each
LP53H	I/R Remote Tester	£7.99
GE71N	I/R Tester PCB	£1.99
JX52G	Panel for Rem Tester	£1.75
JR90X	Keyring Remote Case	£1.35

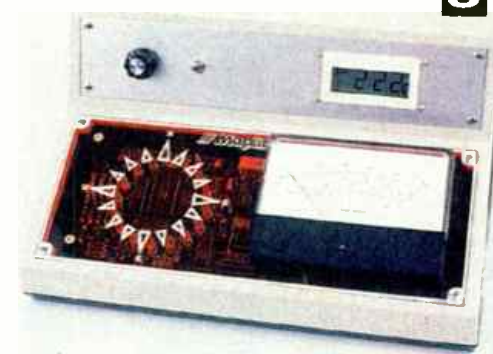
WEATHER MONITORING SYSTEM

Be your own Bill Giles with this superb meteorological monitoring system. This project is in two halves, an outside unit which gathers data on wind speed and wind direction and an indoor unit which displays the data gathered. An analogue meter shows the wind speed in mph and knots, and a 16 point LED compass display shows the wind direction. Wind speed meter can be set to 25 mph (22 knots) or 100 mph (87 knots) full scale reading.

Wind direction may be electronically damped (4 settings) to counter effects of turbulence. Additionally an optional digital temperature module gives a readout of inside and outside temperatures. Note: hardware (i.e. mechanics) and electronics are ordered separately.

Display Unit Kit

3



Optional Items

The following items are not included in the display unit kit, but may also be required.

Contact adhesive	1 off	(FL44X)
Temp/clock Module	1 off	(FE33L)
Ext Probe for temp/clock module	1 off	(FE34M)
Min/Max temp module	1 off	(FP64U)
Ext low temp min/max probe	1 off	(FP65V)
Ext high temp min/max probe	1 off	(FP66W)
Bezel for temp module	1 off	(FE35Q)
Case ABS Console 2803	1 off	(YN31J)

Kit and Special Parts

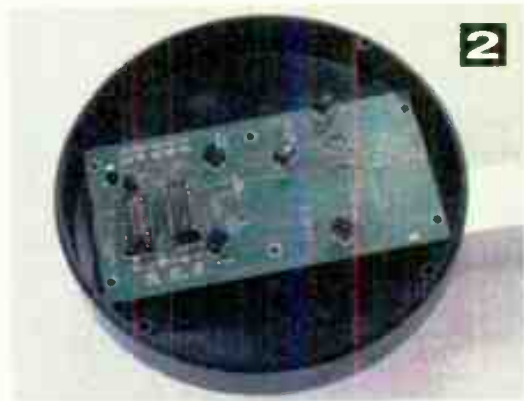
A complete kit is available. Also available separately are a pcb, metal top panel, acrylic front panel and a speed scale. Full construction details may be found in Maplin Magazine Issue 33. PCB dimensions: 130 x 80mm.

Order Code	Type	Price each
LM96E	Mapmet Kit	£39.99
GD98G	Mapmet Main PCB	£8.99
JL95D	Mapmet FP Metal	£3.49
JL96E	Mapmet FP Acrylic	£6.99
JL89W	W/S Scale	£1.20

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Wind Direction Indicator Kit



Optional Items

The following items are not included in the LM88V kit, but may also be required.

Red LED	4 off	(WL27E)
Min Res 680R	4 off	(M680R)
Multicore 6-way cable		(XR26D)

Kit

A complete kit of parts (electronics), excluding optional, for the exterior wind direction indicator.

Order Code	Type	Price each
LM88V	Wind Direction Kit	£22.99

Wind Speed and Direction Indicators Hardware Kit



Kit and Special Parts

A complete kit is available and the pcb and coded disc are also available separately. Full construction details may be found in Maplin Magazine Issue 31. PCB dimensions: 112 x 58mm.

Order Code	Type	Price each
LM90X	D4 Wind Hardware Kit	£39.99
GD96E	Mapmet Wind PCB	£3.49
GD97F	Mapmet Code Disk	£2.99

Many of the special parts used in the hardware kit (LM90X) are available separated.

Order Code	Type	Price each
GK14Q	A1 W/S Plastic Parts	£9.99
JL77L	W/Shaft	£1.59
JL78K	W/S Ball Race	£3.49
YT69A	W/S Pointer Shaft	£1.39
JL83E	W/S Pointer	£3.25
JL84F	W/S Tail Fin	£1.59
YT70M	A1 W/S Mounting Bar	£3.79
JL87U	W/S Mast Clamp	£2.25
JL88V	W/S End Cap	20p

PC WEATHER STATION



Features

- ★ Intended for use with the Wind Speed and Direction Sensor outdoor units ('Electronics' Issue 31)
- ★ Easy to build and set up
- ★ Can be used on any PC or compatible – minimum requirements: 8086, 512k RAM, mono text, single floppy drive.
- ★ Upgrading the existing Weather Station project (Electronics Issue 33) – both systems can be run from the outdoor units.
- ★ Expandable – up to 8 extra sensors may be added (add-on boards to follow, using an inexpensive analogue-to-digital converter (ADC) chip)
- ★ Accessible via easy-to-write BASIC routines (listings supplied)
- ★ All signal inputs/outputs via optoisolators for minimum risk of ESD damage to the host computer

Using the existing Wind Speed (LM87U) and Direction Sensor (LM88V) kits ('Electronics' issue 31), the PC Weather Station Card has been designed to either complement the Weather Station indoor unit (LM96E),

which was covered in 'Electronics' Issue 33, or to present a computer-based alternative capable of monitoring, displaying and recording the wind speed and direction. The addition of the vast level of computing power that modern PCs provide allows data logging to be easily achieved with suitable software, enabling the information to be processed (e.g., trends in wind speed to be followed over a 24-hour period). The power of the PC will also be useful when other devices are connected and options on the PCB allow for this expansion. In addition, control systems can be implemented which could be used to operate, for example, a gale alarm.

Optional Items

The following items, not included in the kit, may also be required.

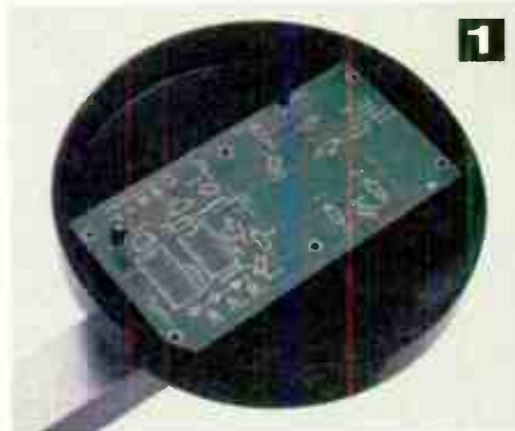
R2,R9	1k	8	(M1K)
R11,R12	560Ω	2	(M560R)
RN2	10k	1	(RA30H)
C6	100nF 16V Minidisc	4	(YR75S)
C7	10μF 16V Tantalum	3	(WW68Y)
IC8	74HC4051	1	(UF06G)
IC9	4094BE	1	(QW54J)
OP1,2	ILQ74 Quad Optoisolator	2	(YY63T)
FS1	Fuse 20mm 1A	1	(WR19V)
FS2	Fuse 20mm 250mA	1	(RA06G)
	20mm Fuseholder with Cover	2	(KU29G)
	6-Core Screened Cable	As req.	(XR26D)
	37-Way 'D' Plug	1	(FV71N)
	37-Way 'D' Hood	1	(JB66W)
	16-Pin DIL Socket	4	(BL19V)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 70.

Order Code	Type	Price each
LT28F	PC Weather Station	£32.99
CR45Y	PC Bracket 37 Way D	£2.25
GH53H	PC Weather Stn PCB	£12.99

Wind Speed Indicator Kit



Optional Items

The following items are not included in the LM87U kit, but may also be required.

Red LED	1 off	(WL27E)
Min Res 680R	1 off	(M680R)
Multicore 6-way cable		(XR26D)
Min Res 22k	1 off	(M22K)
Min Res 47k	1 off	(M47K)
BC557	1 off	(QQ16S)

Kit

A complete kit of parts (electronics), excluding optional, for the exterior wind speed indicator.

Order Code	Type	Price each
LM87U	Wind Speed Kit	£9.49

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MAPSTAT 2 WEATHER SATELLITE RECEIVER



A superb VHF weather satellite receiver, covering the 137 to 138MHz band. This fully synthesised receiver has many features including 24 memories, scanning, LCD display showing frequency, signal strength, AFC lock, and 'mode'. With a suitable antenna (LM00A), the unit will receive transmissions directly from the polar orbiting weather satellites, such as the Russian Meteor series or the American NOAA series. In addition, it will receive transmissions from the geostationary weather satellites (Meteosat for the UK & Europe) via a suitable down-converter and antenna. A new design for a down converter and antenna will be appearing in a future issue of *Electronics - The Maplin Magazine*.

This ready built mains powered unit has connections on the rear for two antenna, and each antenna socket also has +12V DC to power pre-amplifiers such as LT73Q (as featured in *Electronics - The Maplin Magazine* issue 81) and/or a down converter. An output is provided for a monitor loudspeaker, and an audio output, via phono connector, for a suitable interface to a PC (AQ50E).

Order Code	Type	Price each
AQ49D	D7 Mapsat 2	£399.99

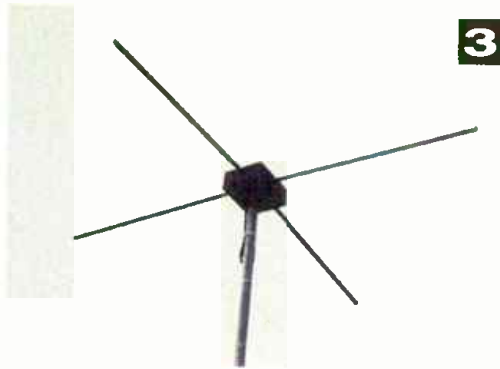
WEATHER SATELLITE RECEIVER PC INTERFACE



This PC interface and software for the Weather Satellite Receiver (AQ49D) will decode and produce images on a suitable PC that can be saved and printed. Easy-to-use, the menu driven software requires an IBM AT or compatible (286 12MHz processor minimum), with at least a VGA monitor and a minimum of 1Mb of free space on a hard drive. In addition, space will be required for stored images which can be up to 1Mb each in the highest resolution mode. The interface is designed to convert weather satellite transmissions from APT format into a high resolution PC display (a SVGA display will be required for the full 256 colour display). The interface accepts the Audio WEFAX (APT format) standard and provides RS232 data via a standard 25-way D-type connector. A suitable lead for connecting to a computer is supplied. The software will allow 'auto-capture' (scheduled by time) or 'free capture' (all images that are transmitted). The received black and white pictures can be saved and 'coloured', and then converted to a standard format (TIF, GIF), displayed and even printed.

Order Code	Type	Price each
AQ50E	B2 Mapsat 2 PC Interface	£99.99

Satellite Aerial



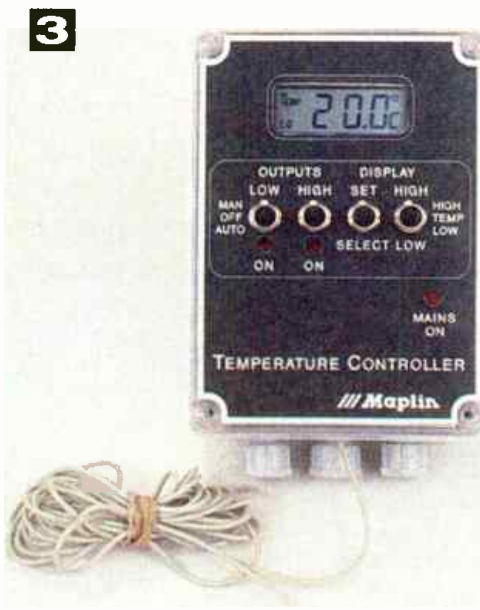
A four element aerial specifically designed for use with the MAPSAT receiver. In addition to the kit of parts you will require a wooden pole of 1in. diameter for use as the aerial mast. This mast must be non-conductive.

Kit and Special Parts

A complete kit, excluding the wooden mast, is available, the rod elements are also available separately.

Order Code	Type	Price each
LM00A	B2 Sat Aerial Kit	£16.99
YM58N	Aerial Rod	£1.49

TEMPERATURE CONTROLLER



- ★ Moisture proof enclosure
- ★ Outputs for heating and cooling
- ★ Switches resistive and inductive loads
- ★ Optional temperature logging output

This temperature controller was designed for use in a greenhouse, so the unit is protected against damp conditions. A waterproof box with a transparent lid houses the controller, allowing a liquid crystal display to be seen through the lid. The temperature controller can be used for numerous applications where a temperature regulated environment is needed.

There are two PCBs for the sensors and 240V mains supply control. The sensor board contains the control, LCD display, sensors and battery back-up. The mains board contains the output supplies for heating and cooling devices (240V AC).

Warning: this project uses Live Mains, care needs to be taken when following the construction details.

Specification	
Supply voltage:	250V AC 50Hz
Back-up supply:	1.5V AA alkaline cell
Display:	12.7mm high LCD
Temperature sensor:	3m external probe

Output modes

Low temperature:	Manual, off, automatic
High temperature:	Manual, off, automatic
Display mode:	Set high and low, temperature

Set-point adjust:

Set and select

Switching capacity

Resistive:	240W
Inductive:	240W
Switching arrangement:	Live side zero crossing triac, optically triggered

Temperature Logging

Data format:	13-bit serial
Clock:	Data limited

Temperature Module

Temperature range:	-5°C to +50°C
--------------------	---------------

Display range

Celsius:	-19.9° to 69.8°
Fahrenheit:	0° to 159.8°
Resolution:	0.1°

Basic Accuracy

-10°C to +40°C:	±1 C @ 1.5V
-20°C to -10°C:	±2 C @ 1.5V
+40°C to +70°C:	±2 C @ 1.5V
Probe accuracy:	±0.83 C/m
Temperature set-points:	1° steps
Supply voltage:	1.25V to 1.65V (1.5V typical)

Supply current:

15µA approx.

Optional Items

The following items, not included in the kit, may also be required:

Minicon Plug 3 Way	1	(BX96E)
Minicon Hsng 3 Way	1	(BX97F)
Minicon Terminals	1 Pkt	(YW25C)
C6A Mains Cable Orange	1m	(XR05F)
PCB Lacquer	1	(YB75S)
PCB Cleaner	1	(YJ45Y)
Alkaline KAA Battery	1	(FK64U)
AA Battery Box	1	(YR59P)
Cable Gland 5-8	1	(JR76H)

Kit and Special Parts

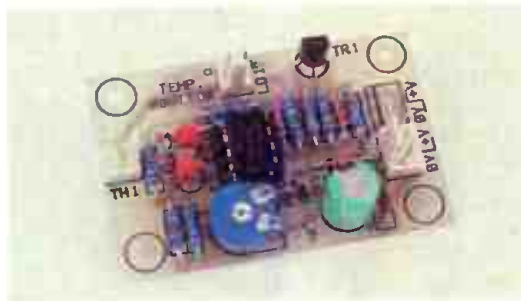
A complete kit is available. The front panel is also available separately. Full construction details may be found in *Maplin Magazine* Issue 43.

Order Code	Type	Price each
LP38R	B2 G/House Temp Ctrl	£72.99
JX43W	Greenhouse Panel	£2.25

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TEMPERATURE MONITOR

2



Features

- ★ +39°C to +98°C temperature range
- ★ Active high and low outputs
- ★ Trip temperature easily adjustable
- ★ In-built hysteresis
- ★ LED indicator

Applications

- ★ Amplifier protection
- ★ Power supply protection

This versatile Temperature Monitor is an optional 'add on' to the Amplifier Monitor LP32K, thus providing a complete monitoring system for amplifiers. The Temperature Monitor can be used with other protection circuits, providing that they have an external trigger input. Alternatively, the Temperature Monitor may be used in conjunction with the Zero Crossing Optoswitch LP55K, to turn a fan on at a preset temperature. The Temperature Monitor is based around a voltage comparator and a thermistor and the temperature range can easily be adjusted to be higher or lower by changing the value of the variable resistor and two fixed resistors.

Specification

Supply voltage	12V nominal, 15V max. DC
Quiescent current	
@ 12V:	3.6mA max.
@ 15V:	3.9mA max.
Operating current	
@ 12V	45.7mA max.
@ 15V	56.4mA max.
Temperature range:	+39°C to +98°C
Low temperature:	Trip +39°C, reset +31°C
High temperature:	Trip +98°C, reset +86°C

Optional Items

The following optional items, not included in the kit, may also be required.

PCB Latch Plug 3-way	1	(BX96E)
M3 Insulated Spacer	1 Pkt	(FS36P)
Double Bubble Sachet	1	(FL45Y)
Minicon Litch Hsng 3-way	1	(BX97F)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 48.

Order Code	Type	Price each
LP71N	Temp Monitor	£6.49
GE90X	Temp Mon PCB	£1.99

FRIDGE/CABINET ALARM CHECK

Features

- ★ Battery powered
- ★ Adjustable temperature range

Applications

- ★ For household refrigerators only
- ★ Keeps food safe
- ★ Electrical failure warning
- ★ Door not closed warning

NEW!



Food stored in a household refrigerator must be kept at a low enough temperature to keep harmful bacteria at bay. Above this temperature germs can multiply at a surprising rate, possibly resulting in food poisoning. The general consensus of opinion is that the temperature should be maintained at 5°C (41°F) or below.

'Fridge Check' is a small, battery powered unit which monitors the fridge temperature, and any increase above the preset temperature threshold will result in a high-pitched tone. This will normally be 6°C to 7°C (43°F to 45°F), but may be adjusted anywhere from 0° to 15°C approximately (32° to 59°F).

The whole device, including battery, is built in a very small plastic box so that it takes up hardly any space on the fridge shelf. Therefore, as well as being useful for full-size refrigerators, it can be used in the smaller gas-operated variety found in boats and caravans. The standby current of the unit has been kept extremely low (less than 30µA) so a whole year's operation may be obtained from one alkaline PP3 battery although the power consumption increases when the alarm sounds and the battery life will be reduced depending on the number of times it sounds).

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 76.

Order Code	Type	Price each
LT53H	Fridge/Cabinet Alarm	£8.99
GH70M	Fridge Alarm PCB	£1.99

SMALL TEMPERATURE MODULE FM-880LP



Features

- ★ 11mm High Digital Temperature Display
- ★ 0.1°C Temperature Resolution
- ★ Low Current Consumption
- ★ Buzzer Output
- ★ Internal Temperature Sensor

A compact and highly accurate temperature module ideal for use in applications where ambient air temperature sensing is required. The module covers temperatures in the range -5°C to +50°C in 0.1°C steps, sampling period is 15 seconds. Provision is made for either internal (silver oxide watch type battery) or external power supply (nominally 1.5V), current consumption is 10µA. Connections are provided for displaying/setting/enabling maximum and minimum temperature points, which are used to trigger a buzzer output. Connections may be made to the module using a 7-way minicon housing (female) and terminals (not supplied).

Specification

Temperature measuring range:	-5 to +50°C
Resolution:	0.1°C
Supply current:	10µA (Average)
Sample period:	15 seconds
Operating voltage:	Min. 1.25V
	Nom. 1.5V
	Max. 1.65V
Accuracy:	-5 to +25°C, ±1%
	>+25 to +50°C, ±2%
Battery type:	SG13
Battery life:	1 year
Storage temperature:	-20 to +60°C
Dimensions:	49 x 29 x 15.2mm

Pin Functions

- Pin 1 - +V (1.5V)
- Pin 2 - 0V
- Pin 3 - Buzzer output
- Pin 4 - Display lower temperature limit
- Pin 5 - Lower/higher limit set/reset
- Pin 6 - Advance lower/higher limit
- Pin 7 - Display higher temperature limit

Order

Code	Type	Price each
YU06G	Small Temp Mod Int	£8.99

SMALL TEMPERATURE MODULE FM-880LPEX



Features

- ★ 11mm High Digital Temperature Display
- ★ 0.1°C Temperature Resolution
- ★ Low Current Consumption
- ★ Buzzer Output
- ★ External Temperature Sensor Probe

A compact and highly accurate temperature module ideal for use in applications where external/remote temperature sensing is required. The module covers temperatures in the range -40°C to +50°C in 0.1°C steps, sampling period is 15 seconds. The external probe is supplied pre-connected to the module, cable length is 3 metres. Provision is made for either internal (silver oxide watch type battery) or external power supply (nominally 1.5V), current consumption is 10µA. Connections are provided for displaying/setting/enabling maximum and minimum temperature points, which are used to trigger a buzzer output. Connections may be made to the module using a 7-way minicon housing (female) and terminals (not supplied).

Specification

Temperature measuring range:	-40 to +50°C
Resolution:	0.1°C
Supply current:	10µA (average)
Sample period:	15 seconds

Continued on next page.

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Continued from previous page.

Operating voltage: Min.	1.25V
Nom.	1.5V
Max.	1.65V
Accuracy:	-40 to +25°C, ±1%
	>+25 to +50°C, ±2%
External probe length:	3m
Battery type:	SG13
Battery life:	1 year
Storage temperature:	-20 to +60°C
Dimensions:	49 x 29 x 15.2mm

Pin Functions

- Pin 1 – +V (1.5V)
- Pin 2 – 0V
- Pin 3 – Buzzer output
- Pin 4 – Display lower temperature limit
- Pin 5 – Lower/higher limit set/reset
- Pin 6 – Advance lower/higher limit
- Pin 7 – Display higher temperature limit

Order Code	Type	Price each
YU07H	Small Temp Mod Ext	£9.99

TEMPERATURE MODULE



A very versatile digital thermometer module with the LCD display and circuitry on a small pcb with a 16-way solder edge connection. The pcb is fixed to a small plastic bracket that houses the battery. The module has an on-board temperature sensor or an external probe or probes may be fitted. By making the appropriate connections to the module the following functions are available:

- ★ **Temperature display in °C or °F.**
- ★ **12-hour clock display.**
- ★ **Set minutes and hours of clock.**
- ★ **Temperature sampling rate once per second or once per 10 seconds.**
- ★ **Set high and/or low temperature detector.**
- ★ **Output goes high when high temperature set point exceeded.**
- ★ **Separate output goes high when below low temperature set point.**
- ★ **Pulse output when either set point reached.**
- ★ **4kHz alarm output for 6 seconds after either set point reached.**

The module also has a serial data output and a thirteen-bit code is sent at every sample-time containing the current temperature in BCD format. A further output transmits the data clock. A comprehensive operations manual is supplied with the module. It shows how to connect relays to the temperature set point outputs, how to connect a buzzer to the alarm output, and how to connect external probes to the module. Full details are also given on the serial data output and how to read it.

Specification

Range:	-19.9°C to 69.8°C
	0°F to 159.8°F
Resolution:	0.1°C, 0.1°F
Accuracy:	-10°C to +40°C
	±1°C at 1.5V
	-20°C to -10°C
	±2°C at 1.5V
	+40°C to +70°C
	±2°C at 1.5V
Temperature set points:	1° steps
Display:	3½ digit 12.7mm high LCD display

Clock:	12-hour clock
Clock accuracy:	±0.5s/day
Working voltage:	1.5V (1.25V to 1.65V)
Average current:	15µA approx.
Battery life:	>1 year
Overall size:	68 x 35 x 23mm deep

A plastic bezel is also available for use with the module, size 68 x 35mm and increases overall depth of module to 27mm.

External probes are also available:

Probe length:	40mm
Probe diameter:	7mm at base, 4mm at tip.



The probe is supplied connected to 3m approx. of miniature 2 core cable 2mm diameter with open end. Note that the accuracy of the meter decreases by ±2.5°C per 3m of cable and may be unstable with long wires or cable different from that supplied with probe.

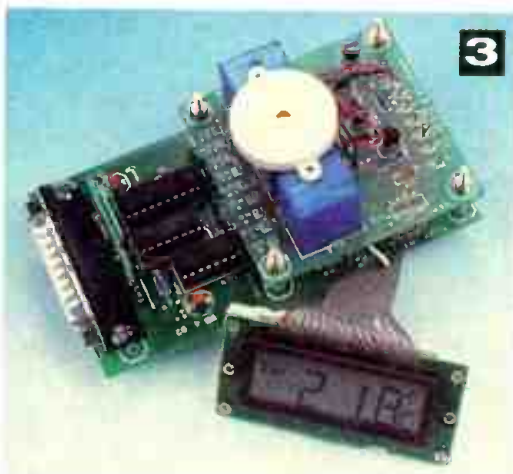
The meter itself will only operate in the temperature range -5°C to +50°C mainly because of the LCD display so for temperatures outside this range, the external probe will be required. Shortening the cable will improve the accuracy. The module requires a 1.5V AA cell (not supplied).

Applications Information

Further applications information on using this module may be found in issue 71 of *Electronics – The Maplin Magazine* (XA71N). The article *Using Temperature Modules* gives details of how to interface this module to a PC to measure temperature. Requires Temperature Module Expansion Converter Kit (LM36P) and Programmable PC I/O Card (LP12N) – article includes BASIC program listing. Also, details of how to control relays and a buzzer are included. Requires Temperature Module Relay Card Kit (LM37S).

Order Code	Type	Price each
FE33L	Temperature Module	£8.99
FE35Q	Bezel fr Temp Module	25p
FE34M	Probe fr Temp Module	£2.75

TEMPERATURE MODULE EXPANSION



- ★ **Serial to Parallel Conversion of Temperature Data**
- ★ **Hi-Lo Set Point, Switched Relay Outputs and Alarm Sounder**
- ★ **1.3V DC Output Eliminates Battery**
- ★ **Requires 9 to 12V DC Supply**

Two versatile temperature modules are currently available from Maplin, known as 'Temperature Module' (FE33L) and 'Min-Max Temperature Module' (FP64U). Both of these modules although similar in appearance have very different specifications. For example, the Min-Max Temperature version has a recall function which stores the highest and lowest temperatures recorded. The Temperature Module is different by having a real time clock and serial data output of the temperature scale. The expansion system comprises two projects, a relay switching card, which may be used with both modules and a serial to parallel converter which can only be used with the Temperature Module. Relay contacts on the switching module are rated at 3A 24V DC and could be used for controlling alarms, bells and buzzers or perhaps be interfaced to a computer. The converter has been designed with tri-state outputs for use with computers with a 1 or 2 byte I/O availability. Either integer or full decimal values of temperature are available along with a few extra items of data. All is explained in the construction notes.

Optional Items

The following items not included in the kits may also be required.

AA Battery	1	(YG00A)
Temperature Module	1	(FE33L)
25-Way D Range Socket	1	(YQ49D)
25-Way D Range Socket IDC	1	(FV82D)
Bezel	1	(FE35Q)
External Probe	1	(FE34M)
Min-Max Temperature Module	1	(FP64U)
Low Temp. Probe	1	(FP65V)
High Temp. Probe	1	(FP66W)

Kits and Special Parts

Complete kits of parts for both modules excluding the Optional items are available. The pcb's are also available separately. Full construction details may be found in the Maplin Projects Book 25.

Applications Information

Further applications information on using these modules may be found in issue 71 of *Electronics – The Maplin Magazine* (XA71N). The article *Using Temperature Modules* gives details of how to interface the Converter Kit to a PC to measure temperature. Requires Temperature Module (FE33L) and Programmable PC I/O Card (LP12N). Article includes BASIC program listing. Also, details on using Relay Card Kit are included. Depending on application, requires Temperature Module (FE33L), Min/Max Temperature Module (FP64U). Wide Range Temperature Module (YT99H) or Min/Max Dual Display Temperature Module (YU00A).

Order Code	Type	Price each
LM36P	Converter Kit	£16.99
LM37S	Relay Card Kit	£11.99
GD69A	Temp Mod Ser/Par Bd	£8.49
GD68Y	Temp Mod Relay Bd	£3.99

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MIN/MAX TEMPERATURE MODULE



A maximum/minimum digital thermometer module with the LCD display and circuitry on a small pcb with a 16-way solder edge connection. The pcb is fixed to a small plastic bracket that houses the battery. The module has an onboard temperature sensor or an external probe or probes may be fitted. By making the appropriate connections to the module the following functions are available.

- ★ Temperature display in °C or °F.
- ★ Set high or low temperature detector.
- ★ Output goes high when set points are exceeded
- ★ Display high or low temperature settings.
- ★ Set sample rate to once every second or once per 15 seconds.
- ★ Pulse output when either set point is reached.
- ★ 2kHz alarm output for approximately 1 minute when high or low temperature point is reached.
- ★ Recall the lowest or highest temperature reached since last reset.

A comprehensive manual is supplied with the module, it shows how to connect relays to the temperature set point outputs, how to connect a buzzer to the alarm output, and how to connect external probes to the module.



Specification	
Internal Probe:	-5°C to +50°C 23 F to 122°F
Resolution:	0.1°C (0.1°F)
Accuracy:	-5°C to 30°C ±1°C at 1.5V +31°C to +50°C ±2°C at 1.5V
External Probe, White (low range):	-40°C to +50°C -40°F to 122°F
Accuracy 3 metre cable:	-40°C to -21°C ±2°C at 1.5V -20°C to +25°C ±1°C at 1.5V +26°C to +50°C ±2°C at 1.5V
External Probe, Grey (high range):	+20°C to +110°C 68°F to 230°F
Accuracy 3 metre cable:	+20°C to +34°C ±2°C at 1.5V +35°C to +75°C ±1°C at 1.5V +76°C to +110°C ±2°C at 1.5V
Sampling Rate:	1 second or 15 seconds
Working Voltage:	1.5V (1.25V to 1.65V)
Average Current:	10µA approx. (at 15 second sample rate)
Battery Life	>1 year
Overall Size	68 x 35 x 23mm deep

A plastic bezel (FE35Q) is available for use with the module, size 68 x 35mm and increases the overall depth of the module to 27mm.

External probes are also available:
Probe Length: 40mm.

Probe Diameter: 7mm at base, 4mm at tip.

The probes are supplied connected to approximately 3 metres of miniature 2 core cable 2mm diameter with open end. Note that the accuracy of the meter decreases by ±2.5°C per 3m of cable and may be unstable with long wires or cable different from that supplied with the probes.

The meter itself will only operate in the range -5°C to 50°C mainly because of the LCD display so for temperatures outside this range, the external probes will be required. Shortening the cable will improve the accuracy. The module requires a 1.5V AA cell (not supplied).

Applications Information

Further applications information on using this module may be found in issue 71 of *Electronics – The Maplin Magazine* (XA71N). The article *Using Temperature Modules* gives details of how to control relays and a buzzer. Requires Temperature Module Relay Card Kit (LM37S).

Order Code	Type	Price each
FP64U	Min/Max Temp Module	£9.99
FP65V	Low Temp Probe	£2.75
FP66W	High Temp Probe	£2.75

WIDE RANGE MIN/MAX TEMPERATURE MODULE



A very versatile minimum/maximum temperature module with the LCD display and circuitry on one small pcb mounted on a battery holder, with a 17 way edge connection. The module uses an external probe to display temperatures in the range -10°C to +110°C with a resolution of one tenth of a degree, in centigrade or fahrenheit. The module records both the highest and lowest temperatures (maximum and minimum) measured by the probe, which are stored and updated in memory, and the max./min. values in memory can be displayed showing the highest lowest temperature reached since the memory was last cleared. The maximum/minimum threshold values are fully programmable. Also included is a 12 hour digital clock, a 4kHz max./min. alarm output, separate outputs for relay drivers or similar which go high for 1 minute if the relevant programmed temperature threshold is reached, and a further output which pulses at 4kHz for 1 minute if either threshold is reached and then remains high until reset. There is a separate connection for a complete system reset. The external probe is included.

Specification

Range:	-10°C to +110°C
Resolution:	0.2°C, 0.2°F
Accuracy:	-10°C – 0°C ±1.5°C @ 1.5V 0°C – 60°C ±1°C @ 1.5V 60°C – 110°C ±1.5°C @ 1.5V
Sampling rate:	1 or 10 seconds switchable
Alarm output:	4kHz for 1 minute
Temperature set points:	1° steps
Display measuring range:	°C or °F
Clock accuracy:	±0.5s/day

Working voltage:	1.5V DC (1.25V to 1.8V)
Average current:	10µA approx. @ 10s sample rate
Battery life:	>1 year
Overall size:	68 x 35 x 23mm

A comprehensive manual is supplied with the module showing how to connect a buzzer circuit to the alarm output and relay drivers to the high/low threshold outputs, and connections for the various functions and programming modes. The plastic bezel (FE35Q) can be fitted and increases the overall depth of the module to 27mm. Note that the meter itself and mainly the LCD display will only operate in the range of -5°C to +50°C.

The module requires a 1.5V AA cell (not supplied).

Applications Information

Further applications information on using this module may be found in issue 71 of *Electronics – The Maplin Magazine* (XA71N). The article *Using Temperature Modules* gives details of how to control a buzzer and an LED. Requires Temperature Module Relay Card Kit (LM37S).

Order Code	Type	Price each
YT99H	Temp Mod Wide Range	£12.99

MIN/MAX DUAL DISPLAY TEMPERATURE MODULE



A minimum/maximum digital thermometer module with the LCD display and circuitry complete on a small pcb with an 11 way solder edge connection and integral battery holder. In operation the module records both the highest and lowest of external temperatures as measured by the module's own external probe. Maximum and minimum temperatures are stored and updated internally until reset. A max./min. temperature alarm function can be set to output a 2kHz tone upon either threshold being reached for external measurements. Especially useful is the module's ability to display both internal and external temperatures at once, ideal for example for providing at a glance a comparison between indoors and outdoors temperature differences. Temperatures displayed in degrees centigrade. The external probe is included.

Specification

Internal sensor range:	-5°C to +50°C
External probe range:	-40°C to +50°C
Resolution:	0.1°C
Accuracy:	-20°C – +30°C ±1°C @ 1.5V -40°C – -20°C ±2°C @ 1.5V +30°C – +50°C ±2°C @ 1.5V
Sampling rate:	15 seconds
Alarm output:	2kHz for 1 minute
Temp. set points:	1° steps
Working voltage:	1.5V (1.25V to 1.65V)
Average current:	20µA approx.
Battery life:	>1 year
Overall size:	68 x 35 x 23mm deep

A comprehensive manual is supplied with the module showing how to connect a buzzer circuit to the alarm output and switches for the various functions and programming modes. The plastic bezel (FE35Q) can be fitted and increases the overall depth of the module to 27mm.

Note that the meter itself and mainly the LCD display will only operate in the range of -5°C to +50°C and it is this which limits the range of the internal sensor. The module requires a 1.5V AA cell (not supplied).

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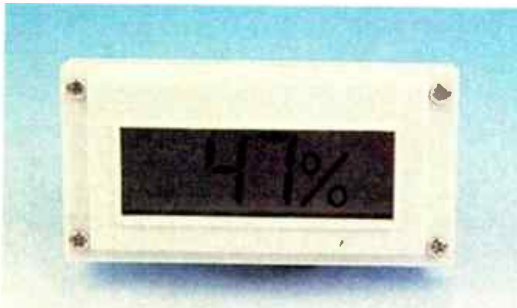
Applications Information

Further applications information on using this module may be found in issue 71 of *Electronics – The Maplin Magazine* (XA71N). The article *Using Temperature Modules* gives details of how to control a buzzer. Requires Temperature Module Relay Card Kit (LM37S) to control a buzzer.

Order Code	Type	Price each
YU00A	Dual Disp T Module	£10.99

MIN/MAX HUMIDITY MODULE

A small module in the same style as our temperature modules and specifically designed to measure the relative humidity of air and record the minimum and maximum levels reached at any time since last reset. The module covers the range of 25%RH to 95%RH in 1% steps with a sampling rate of 1 second, and can be placed in a fixed location to monitor humidity, but must only be used indoors. The sensor is internal and no external probe is required. The display normally shows the current humidity value continuously, but will show the minimum and maximum values stored through the use of two momentary action push buttons (not supplied), which are identified by the word 'MIN' or 'MAX' in the display. Both memories can be cleared by holding both buttons down. The display also shows the words 'COMFORT', 'DRY' or 'WET' depending on the humidity. 'DRY' is approximately <53% and 'WET', >67%.



There are a total of 11 connections to the module, four of which enable the module to output the currently measured value of either of the two stored values in the form of 4-bit parallel, packed BCD (Binary Coded Decimal). Each line of the 4-bit data packet begins with a pair of sync pulses, followed by its part of a bit pattern that informs the destination device whether the data is the current real-time, min. or max. reading, followed by two bits of binary data making up the two digits (most significant first), interleaved with sync pulses. The remaining data trains are specialised manufacturers codes and can be ignored. Similarly the specialised 'K' terminals can be ignored for most normal applications.

Specification

Measuring range:	25%RH to 95%RH
Operating range of module:	32%RH to 90%RH, 0°C to 50°C
Resolution:	1%RH
Supply current:	20µA (average)
Sample rate:	1 second
Operating voltage: Min.	1.25V
Nom.	1.5V
Max.	1.65V
Accuracy:	±5%RH between 40 to 80%RH @ 25°C ±7%RH below 40% or above 80%RH @ 25°C
Battery type:	Single AA cell (not supplied)
Battery life:	>1 year
Dimensions:	67 x 34 x 26mm

Pin Functions

- Pin 1 – display upper humidity limit
- Pin 2 – display lower humidity limit
- Pin 3 – +V (1.5V)
- Pin 4 – BCD output bit 0
- Pin 5 – BCD output bit 1
- Pin 6 – BCD output bit 2
- Pin 7 – BCD output bit 3
- Pin 8 – K1 Not used
- Pin 9 – K2 Not used
- Pin 10 – K3 Not used
- Pin 11 – 0V

Order Code	Type	Price each
ZA38R	Humidity Module	£14.99

COUNTER MODULE



An electronic Counter Module with 5-digit LCD display. The display increases by 1 every time a positive-going edge is applied to pin 3. A reset is available, and a tone output which can drive a piezo sounder directly and bleeps on every count and on reset. Square wave outputs at 512Hz and 32768Hz are also provided.

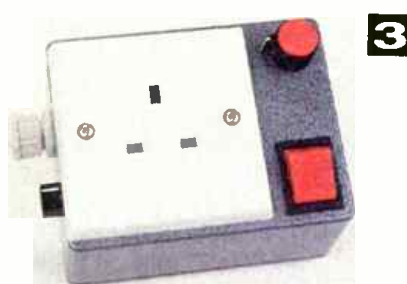
Specification

Working voltage:	1.5V DC
Current:	2µA standby 8µA average when counting
Count range:	00000 to 99999 (resets to 00000 after count 99999)
Max. input frequency:	7Hz
Input voltage range:	1V to 1.5V
Min. duration pulse:	<100µs
Overall size:	68 x 35 x 24mm

A plastic bezel (FE35Q) is available for use with this module, size 68 x 35mm and increases the overall depth of the module to 27mm. The module requires a 1.5V AA cell (not supplied).

Order Code	Type	Price each
FS13P	Counter Module	£8.99

1.2kW POWER CONTROLLER



- ★ Lighting
- ★ Power Tools
- ★ Soldering Iron Temperature

This versatile power controller is suitable for use as a lamp dimmer, power tool speed controller (not for use with 'electronic control' power tools) or for varying the temperature of a mains powered soldering iron. It can handle loads of up to 1.2kW which is more than sufficient for most normal domestic applications. The controller is easy and convenient to use, simply plug the appliance into the controller, plug the controller into a mains socket, switch on and set the required power level. Full constructional details may be found in Maplin Magazine Issue 40.

Specification

Input Voltage:	240V AC
Maximum Output Current:	5A
Maximum Output Power:	1.2kW

Optional Items

The following optional items, not included in the kit, may also be required.

Rubber 13A Plug	1	(HL58N)
Plug Fuse 5A	1	(HQ33L)

Kit and Special Parts

A complete kit of parts is available. The pcb and front panel are also available separately. Full construction details may be found in Maplin Magazine 40. PCB dimensions: 74 x 57mm.

Order Code	Type	Price each
LP41U A1	1.2KW Power Cntrlr	£27.99
GE62S	1.2KW Pwr Cntrlr PCB	£2.49
JU35Q	1.2kW Cntrl Panel	£1.35

PROGRAMMABLE TIMER CLOCK MODULE

A ready-built module which needs only a few additional components and a case to make a versatile, 24 hour clock/timer. The timer allows two programmable settings to be made, its output being an open-collector transistor. This could drive a relay if required. The clock is locked to the mains frequency although there is no reason why you could not use a 50Hz oscillator as a timebase – for example, 3.2768MHz divides by two exactly 16 times to get 50Hz. In this case battery back-up, in the event of a temporary mains failure, would be a possibility. The module requires a regulated 5V supply, and a connection to a secondary of the supply's mains transformer.



Specification

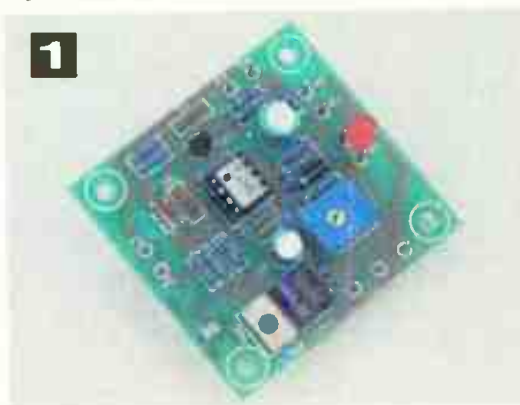
Display type:	4-digit 13.5mm LED
Clock type:	24 hour
Timer:	2 programmable switch-on times 2 programmable switch-off times Minimum switching interval of 1 min.
Supply voltage:	5VDC ±10% at 100mA typ.
Reference:	Mains frequency (integral prescaler)
Timer output:	Open collector, max. output current 50mA (at 40V)

A detailed review may be found in Maplin Magazine issue 50.

Order Code	Type	Price each
LP87U	Prog Clock/Timer	£26.99

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1/300 TIMER MODULE



Features

- ★ Adjustable operating period
- ★ Wide supply voltage range
- ★ Low current consumption
- ★ Switches up to 500mA
- ★ LED output state indicator
- ★ Triggerable on negative or positive pulses

Based on the TLC555 timer IC, this 1/300 timer provides a switched output for an adjustable period of between approximately 1 second to 5 minutes. Applications include short duration 'time out' or auto switch off for devices such as lights and sounders after a set period. It can switch currents up to a maximum of 500mA making it ideal for driving relays, sirens, etc. A light emitting diode provides an indication of the output state.

Please note that the 1/300 timer is not a precision device and the operating times stated may vary due to component tolerances.

If in some applications it is necessary to switch higher voltages or currents than are possible directly, the module can be used to switch a relay which is suitable for higher power switching, and the open collector output makes the circuit ideal for operating relays. The 1/300 Timer is ideal for use with the Audio Controlled Switch (LP29G) as it is triggered by both positive and negative going pulses.

Specification

Power Supply Voltage		3V to 15V
Power Supply Current	With no external load	12mA Max at 12V
Maximum Load current		500mA
Switch-on Period	Adjustable	1s to 310s Approx.
Input Trigger	Positive & Negative Edge	± Supply Voltage
PCB Dimensions		57mm x 54mm

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 38.

PCB dimensions: 56 x 53.3mm.

Order Code	Type	Price each
LP30H	1/300 Timer	£5.49
GE28F	Adj Time Sw PCB	£2.25

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EXERCISE PULSE MONITOR

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A superb watch designed for those who are serious about fitness, housed in a black resin case with matching strap. By simply programming the watch with the relevant data i.e. age, the watch measures your pulse, and displays your optimal aerobic range. An 'intensity' gauge even indicates the intensity of the activity you are performing. Additionally, there are three sets of 7 measurement data memories. The watch has the usual timekeeping functions i.e. hours, minutes, seconds, month, date and day, and automatically determines and sets the number of odd or even days in the month. A daily alarm can be set to provide a gentle reminder at the same time every day, and time signals can be set to 'beep' on the hour. The time display can be set to show the time in either the 12 or 24-hour format. Power is supplied by a CR2016 type battery with an approximate battery life of two years. Water resistant to a depth of 50m (static water pressure).



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HI-LOW SWITCH



An ingenious electronic switch that can be used in numerous applications. The Hi-Low Switch is a resistance operated transistor switching circuit with an output capable of driving a small buzzer or relay or other loads which draw up to a maximum of 50mA. The current drain of the circuit when in the standby mode is very low (30µA) and therefore the circuit will operate from a 9V PP3 type battery for long periods. The switching threshold may be adjusted between approximately 500kΩ and 10MΩ.

Optional Items

The following items, not included in the kit, may also be required.

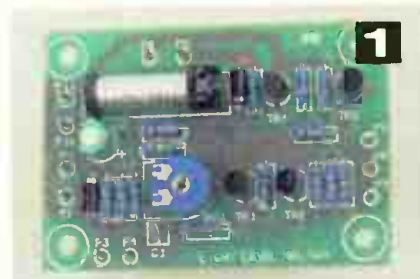
PT Buzzer	1 off	(FK83E)
3A min relay	1 off	(YX96E)

Kit and Special Parts

A complete kit of parts, excluding optional items is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 32.

Order Code	Type	Price each
LM89W	Hi-Lo Switch Kit	£3.75
GE08J	Hi-Lo Switch PCB	£1.59

LIGHT LEVEL SWITCH



- ★ Adjustable trigger threshold
- ★ Wide supply voltage
- ★ Selectable output state
- ★ Switches currents up to 500mA

The light level switch is a simple light operated switching circuit which operates a relay when the ambient light level rises above or falls below a preset threshold. The module uses an on-board reed relay which is capable of switching currents up to 500mA. For current levels exceeding this the reed can be used to switch an external relay suitable for higher power applications. The reed itself must not be used to switch voltages exceeding 50V or power levels exceeding 10VA. A sensitivity control allows different switching thresholds to be set to allow for a diverse range of lighting conditions. The module can run from a supply of 9 to 12V DC, with a maximum current drain of 19mA max. at 12V. The circuit uses a Schmitt trigger to change state, and the reed relay switching stage can be hard wired or switched to be either normally off, or, with the help of an inverter stage, normally on. In this way the response to light level can also be either way around where either dark or light is a 'normal' condition.

Kit and Special Parts

A complete kit of parts is available. The PCB measures 44 x 63mm and is also available separately. Full construction details may be found in Maplin Magazine Issue 37. PCB dimensions: 63.5 x 44.5mm.

Order Code	Type	Price each
LP14Q	Light Level Sw Kit	£6.99
GE34M	Light Level PCB	£2.25

ZERO CROSSING OPTO SWITCH



3

- ★ Switches 240W resistive load
- ★ Limits switching surges

Primarily designed for the Christmas Star project, this module can also be used in other applications which require a noise free, zero crossing opto-isolator switch, able to handle a 250W load (resistive). The unit avoids inherent interference problems associated with switching the 240V mains supply across a load, while part way through a mains voltage cycle. A snubber network suppresses any unwanted noise generated by the unit. This project is not recommended for absolute beginners as it involves working with mains circuitry directly. The output switch is isolated from the input by an opto-coupler.

Specification

Max control voltage:	12V DC
Max mains voltage:	240V DC
Max power rating:	250W Resistive

Optional Items

The following items are not included in the kit but may also be required.

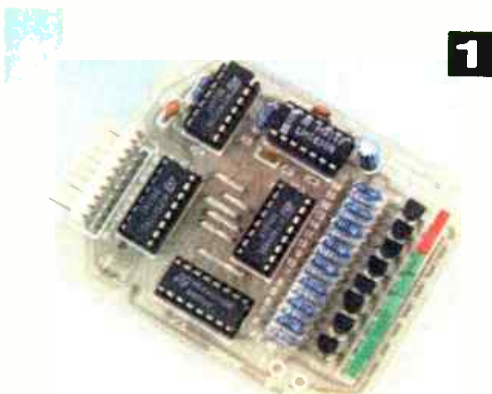
ABS Box MB2	1	(LH21X)
Europlug	1	(FT64U)
Eurosocket	1	(FT63T)
Terminal Block 2A	1	(FE78K)
Safuseholder 20	1	(RX96E)
Fuse A/S 1A	1	(WR19V)
SR Grommet SR2	1	(LR48C)
Min. Mains Black	3 Mtr	(XR01B)
Isobolt M3 20mm	1 Pkt	(JD17T)
Isonut M3	1 Pkt	(BF58N)
Isoshake M3	1 Pkt	(BF44X)
M3 Insulated Spacer 10	1 Pkt	(FS36P)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 48.

Order Code	Type	Price each
LP55K	Mains Opto Switch	£6.99
GE73Q	Mains Opto Sw PCB	£2.25

8 CHANNEL FLUID DETECTOR



1

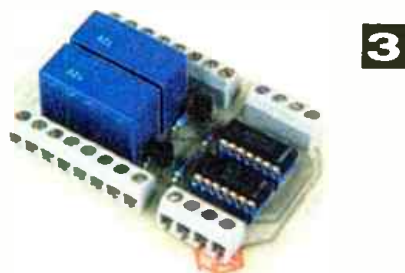
Using the LM1830 fluid detector IC, this module will provide an indication of water level to eight demarcations over whatever range chosen, or water level in eight separate locations, or any combination of the two. Eight LED indicators form a visual display of fluid level, which can be made compatible with the location and meaning of the eight probes. Applications include monitoring level in water tanks, for the automatic switching of electric valves and pumps, car windscreen washer bottle 'low' warning, the watering of greenhouse plants; your imagination is the limit. Requires a 12 volt DC supply.

Kit and Special Parts

Complete kit of all parts; pcb also available separately. Full construction details may be found in the Best of Maplin Projects Book 6. PCB dimensions: 79 x 63mm.

Order Code	Type	Price each
LK48C	8 Ch Fluid Dctr Kit	£15.99
GB66W	8 Ch Fluid Dctr PCB	£4.25

MAINS CONTROLLER



3

Exclusively for use with the 8-channel Fluid Detector. The instructions for this project include suggestions for modifying the 8-channel detector to operate relays as well as LED indicators. The mains controller has logic controlled relays for the purpose of operating mains equipment, e.g. pumps, valves, etc. This project allows complex control over the water level in a tank where a pump is used to partially empty the tank when the level has reached a certain threshold as determined by the fluid detector. If the tank was being filled from a continuous supply of water, the controller can cut this off via an electric inlet valve until the pump has done its work, to prevent the tank overflowing. All this is primarily controlled by the 8-channel fluid detector. PCB mounted terminal blocks are provided for simple connection between module and appliances.

Kit and Special Parts

Complete kit of all parts; pcb also available separately. Full construction details may be found in the Best of Maplin Projects Book 6. PCB dimensions: 87 x 58mm.

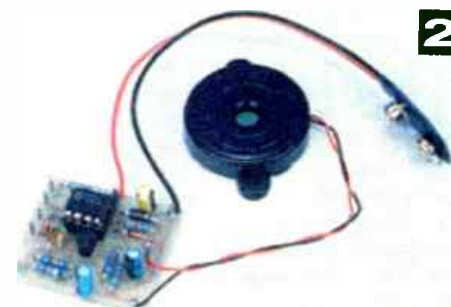
Order Code	Type	Price each
LK59P	Mains Cntrlr 8Ch Kit	£11.99
GB77J	Mains Cntrlr PCB	£2.99

SIREN SOUND GENERATOR

- ★ Low Cost
- ★ Easy to Build
- ★ Minimum of Tools and Test Gear Required
- ★ No Setting-up Required
- ★ Low Power Consumption
- ★ Wide Range of Applications
- ★ Audio Output to External Amplifier

Specification of Prototype

Integrated circuit:	UM3561 low-power CMOS LSI
Memory:	masked Read Only Memory (ROM) 256 words by 8 bits
Tone generator:	logic controlled divider
Four sound patterns:	1. Police siren 2. Fire engine siren 3. Ambulance siren 4. Machine gun
Operating voltage:	2.4V to 15V
Supply current:	9mA at 9V (Piezo sounder fitted)
Reverse polarity protection	
Output:	Piezo sounder or 8Ω/64Ω loudspeaker
External amplifier	
Output:	1V square wave at 10kΩ
Operating ambient temperature:	-10°C to 60°C
Storage temperature:	-55°C to 125°C



2

A simple to construct siren generator kit built around the UM3561 LSI chip. The UM3561 is designed for use in toy and model applications. However, the sounds produced could be used as an audio warning signal in security, or environmental monitoring systems. To accommodate this, the unit is designed to operate over a wide range of voltage and temperatures. Three siren and one other sound effect is generated and provision has been made for connection to an external amplifier should louder volumes be required.

Optional Items

The following items, not included in the kit, may also be required.

Hi-Z Loudspeaker 64R	1	(WF57M)
5in. Hom Speaker	1	(XQ73Q)

Kit and Special Parts

A complete kit is available, the pcb is also available separately. Full construction details can be found in the Maplin Magazine Issue 26.

Order Code	Type	Price each
LM42V	Siren Sound Gen Kit	£4.49
GD76H	Siren Sound PCB	£1.75



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SEALED LEAD-ACID BATTERY CHARGERS

- ★ 2 kits available for 6V or 12V
- ★ Charge current up to 500mA
- ★ Current foldback
- ★ Charge indicator
- ★ Power on indicator

These mains-powered chargers are ideally suited for charging batteries from the wide range of sealed lead acid batteries, that are rated at between 1Ah and 8Ah. The kits are based on either the 6V charger module (JY65V) or the 12V module (JY64U), and are very easy to build. The chargers feature a regulated output and current foldback, and may be used for cyclic or trickle charging. The Chargers have mains and output fuses, 'power on' and 'charge' indicators, and the kits include a suitable mains step-down transformer.

life and not least because these batteries are not equipped to deal with abruptly changing internal gas pressures normally associated with vigorous charging.



The charger quickly and safely charges lead acid batteries, even employing temperature compensation with a remote temperature sensor used in the vicinity of the battery. The two-step charging feature provides a high initial charging voltage to rapidly bring a discharged battery to near full charge. The actual charging current is then monitored until the battery reaches its full capacity. As the battery approaches the fully charged condition and the charging current falls below 180mA the charger enters the float condition, which prevents the battery from being overcharged. LED indicators are used to display these two modes. The charger can be used with conventional lead acid batteries as the charging voltages required are very similar.

Important Note

The more usual type of car battery charger must not be used with Sealed Lead Acid batteries.

Kit and Special Parts

A complete kit including case, hardware, cable, battery clips, front panel etc. is available. The pcb and front panel are also available separately. Full construction details may be found in the Best of Maplin Projects Book 5. A ready-built, aligned and tested Battery Charger is also available. PCB dimensions: 66 x 70mm.

Order Code	Type	Price each
LM01B	L'Acid Bat Chrgr Kit	£54.99
YM60Q	L'Acid Chrgr Assmbl'd	£99.99
GD13P	Lead Acid Bat Chrgr	£1.49
FSC0A	L'Acid Bat Chrgr Pnl	£4.49

MOVING MESSAGE DISPLAY SYSTEM

Features

- ★ Designed for use with any computer equipped with three 8-bit I/O ports - e.g., an IBM PC or compatible equipped with the Maplin 24-line P/I/O card
- ★ Easily programmable from BASIC
- ★ Expandable to 32 boards by 'daisy-chaining' modules together
- ★ Large viewing area makes display highly readable in all lighting conditions
- ★ Programmable scrolling in all directions
- ★ Facilities for fade up/down
- ★ Programmable 'fizzle' effects
- ★ Direct pixel addressing for Speed (Animations, etc.)
- ★ Easy to build

Applications

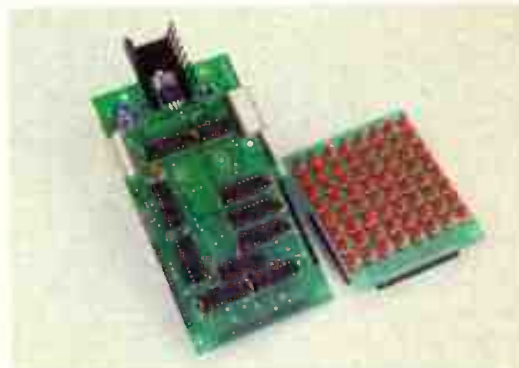
- ★ Shop displays
- ★ Announcements in public areas
- ★ Special effects

In recent years, moving message displays have become widely available commercially. The basis of these systems is often a fixed-length LED display

controlled by a microcomputer system, the messages being entered on a miniature keyboard and stored in non-volatile memory.

This moving message display system uses a direct access architecture, and is fully controlled by a host computer. As a result, a wide variety of display techniques can be employed, all programmed in BASIC by the user. The system can, with appropriate programming, perform any of the functions seen on commercial displays. The computer must have two 8-bit plus one 2-bit, parallel latching output ports. For example, the Intel 8155 and 8255 PPI (Programmable Peripheral Interface) are suitable. The 8255 PPI is used in the Maplin 24-line P/I/O Card. Note that an IBM PC's printer port is not suitable.

The project requires a BASIC interpreter (or compiler). For the expandable display, the BASIC interpreter must be capable of directly calling machine code routines, which will involve some advanced programming. This project uses the GW-BASIC Interpreter running on an IBM PC compatible computer, but other types of BASIC can be used. A unique feature of this moving message display system is that it has been designed to be expandable. The unit module is the moving message display module. The system is expandable from one module up to a maximum of 32 display modules, giving a 2.6m long high-resolution display, which is comparable with the largest commercial displays. All the necessary electronics to drive the LED display are also contained on the same board. As a result, the modules are easy to build.



For interconnection of the display to the computer, knowledge of how to correctly connect to the parallel ports will be required.

When more than one display module is used a controller board is required with every two display modules requiring one controller board.

There are three practical variations of the controller board which allow for daisy-chaining, as well as component minimisation. These three variations are as follows:

- Controller Board 1 – Master Controller
- Even subsequent controller boards – Slave Controller (for even numbered display modules)
- Odd subsequent controller boards – Slave Controller (for odd numbered display modules)

In addition, there are three levels of construction to the moving message display system.

Moving Message Display Module (MMDM)	Minimum System Configuration
Two MMDMs and Master Controller	Base System
4 or more MMDMs, 2 or more Controllers	Expandable system

Display module specification

Power supply requirement:	9V unregulated, 1.5A maximum, 2A peak
Computer interface required:	2 x 8-bit and 1 x 2-bit parallel latching output ports
Data feed:	Parallel load

Continued on next page.



Specification

	6V Charger	12V Charger
Supply voltage:	Mains (240V AC RMS)	
Output current max:	700mA	525mA
DC max. continuous load Current:	525mA	375mA
Charge LED cut-off current:	245mA	175mA
Suitable battery range:	1Ah to 8Ah	
Dimensions:	71(Max 78) x 45 x 25mm	

Optional Items

The following items, not included in the kit, may also be required.

16/0-2 Wire 10m Red	1 Pk	(FA33L)
16/0-2 Wire 10m Black	1 Pk	(FA26D)
4mm Croc Clip Black	1	(HF23A)
4mm Croc Clip Red	1	(HF24B)
Charger Clip	2	(HF26D)
Large Battery Clip Red	1	(FS86T)
Large Battery Clip Black	1	(FS87U)
13A Nylon Plug	1	(RW67X)
2A Fuse Plug	1	(HQ31J)

Kit and Special Parts

A complete kit to build either a 6V or 12V charger is available, including the mains transformer and box, but excluding optional items. Full construction details may be found in Maplin Magazine Issue 53.

Order Code	Type	Price each
LP91Y	6V Lead Acid Chrgr	£44.99
LP73Q	12V Lead Acid Chrgr	£44.99

SEALED LEAD ACID BATTERY CHARGER

- ★ Selectable 4V, 6V or 12V
- ★ Automatic Two Stage Charging
- ★ Simple Construction

This project is intended for use with our range of sealed lead acid batteries, and for this reason the output is deliberately intended to maintain a ripple free supply with a close voltage tolerance, using electronic regulation with temperature compensation. Proper charging of these sealed batteries is very important (see notes on charging, Sealed Lead Acid Batteries, Batteries section), to ensure a long, trouble free service

Continued from previous page.

Hardware control: Direct addressing, hardware blanking.
 Display type: 64.5mm Red LEDs in an 8 x 8 matrix with 10mm spacing
 PCB dimensions: 5.8in. x 3.1in.
 Viewing area: 3.2in. x 3.2in.
 Message effects: Scroll left, scroll right, scroll up, scroll down, fade up, fade down, flash, animations.

Display controller specification

Power supply: 3.5 to 4.1V DC, 120mA max (Master Controller)
 100mA max (Maximum Slave Controller)
 80mA max (Minimum Slave Controller)
 Power supply source: Derived from odd numbered Moving Message Display Modules in system.
 Outputs: One of 16 decoded outputs generated from D0 to D3.
 Module pair select, bits 1 to 16
 Inputs: Parallel port B, bits 0 to 7, Parallel port C, bit 1 (Master Controller)
 Module Pair select 1 to 16, D0 to D3 (Slave Controllers)

Optional items for display controller

The following items, not included in the kit, may also be required.

100nF 16V Minidisc	4	(YR75S)
74LS154	1	(YF58N)
74LS08	1	(YF06G)
74LS244	2	(QQ56L)
IBM PC P/I/O Card	1	(LP12N)
Maplin Magazine 43	1	(XA43W)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available for the display module and for the display controller (excluding optional items). The PCBs are also available separately. Full construction details may be found in Maplin Magazine Issues 62, 63, 64 and 65.

A 5 1/4 in disk (PC 360k format) containing software for use with the Moving Message Display System is also available.

Order Code	Type	Price each
LT21X	LED Graphics Display	£32.99
LT22Y	LED Graphics Ctrller	£16.99
GH28F	LED Graphic Main PCB	£9.99
GH29G	LED Graphic, LED PCB	£3.29
GH31J	LED Dsply, Cntrlr PCB	£9.99
XL57M	MMD Software V2.2	£9.99

LASER TUBE AND PSU

— a KTE Kit

- ★ Helium-neon Laser Tube with 2mW Output Power
- ★ 1.8kV Power Supply with High Ignition Voltage
- ★ Protective Aluminium Case for Tube and PSU
- ★ 240VAC Operation

Lasers are capable of producing holograms where a recorded pattern of interference fringes produces a three dimensional image. Laser light is also used in disco's and displays as well as finding educational and scientific applications in schools and laboratories. The helium-neon laser emits a randomly polarised, 632.8nm wavelength red light, at a low 2mW power output level which makes it completely safe provided the light beam is not directed into the eye. Staring directly into the beam may well result in damage to the retina and must be avoided at all costs. However, the laser is incapable of cutting or drilling and will not burn when directed at the skin. The glass envelope is protected by an aluminium tube and all electrodes are

terminated with high voltage insulated cables and plugs. The power supply uses high voltage rated components, transformer and pcb to generate both the ignition strike voltage of 8kV and the continuous running voltage of 1.8kV at 5mA. It is recommended that the PSU be powered up only when fitted with the laser tube and assembled into the metal case provided, otherwise voltages in excess of 10kV may be generated and these are liable to arc over.



Kit and Special Parts

A complete kit and the ready-built version are available. Full construction details may be found in Maplin Magazine Issue 29.

Order Code	Type	Price each
LM72P	H4 Laser & PSU Kit	£119.99
XM14Q	H4 Laser & PSU Assmbl	£169.99

LASER CONTROLLER

— a KTE Kit

- ★ Motorised Mirrors for X and Y Light Beam Deflection
- ★ Three Operating Modes for Manual, Auto and Audio Input
- ★ Lissajous and Spiral Graphics Effects
- ★ 12VDC Operation

The Laser Controller is a two channel motor drive system designed to rotate two specially angled mirrors. Each mirror deflects a laser beam through 90° and the beam is reflected onto a wall in a series of Lissajous figures. Although primarily intended for use with our laser and PSU project, the controller can be used with similar lasers having an output port aperture 0.5 to 0.75mm in diameter. Patterns can be generated according to one of the three available modes, either 'Manually' where the two motor speeds can be individually preset for a fixed pattern; 'Auto' where the motor speeds are ramped up and down at a variable rate for a continuously changing graphic display and 'Audio' where the speed is controlled by the frequency and amplitude of an external audio input. In the latter mode, the laser can be used in a sound to light system with a music signal as the source.



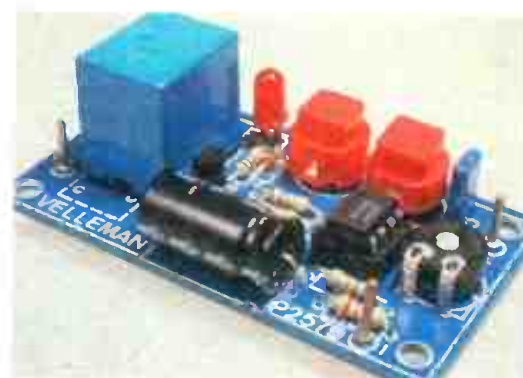
Please Note: The Laser Controller Kit includes the motor/mirror assembly and the controller box. It does not include the Laser and PSU. This must be ordered separately as LM72P. The Controller Kit requires a 12V DC power supply such as XX09K.

Kit and Special Parts

A complete kit and the ready-built version are available. Full construction details may be found in Maplin Magazine Issue 29.

Order Code	Type	Price each
LM73Q	F2 Laser Controller Kit	£99.99
XM15R	H3 Laser Cntrlr Assmbl	£144.99

VELLEMAN ENVIRONMENTAL PROJECTS K2579 UNIVERSAL TIMER



Miniature universal timer with periods ranging from a few seconds to 15 minutes with a switch-on delay of up to 60 minutes. Relay can switch 240V at up to 2A. Requires 12V DC.

Order Code	Type	Price each
VF06G	Velleman Kit K2579	£8.99

K6000 7 DAY MICROPROCESSOR TIMER/CONTROLLER



This 7-day timer allows you to programme 4 outputs independently of each other. Together with 4 x K6001 you can build a thermostat yourself with 4 independent temperature zones so that, for example, the temperature in the living-room, in the kitchen, in the bathroom and in the bedrooms can be controlled separately and at different points in time. With the built-in illuminated LCD matrix display you can easily read out all the program steps. Memory back-up with Ni-Cd battery, protects memory and clock during power loss. The front plate is supplied with the kit. Black plastic housing to match (B6000) separately obtainable.

Order Code	Type	Price each
VE67X	A2 Velleman Kit K6000	£99.99
VF07H	B6000 Plastic Case	£11.99

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K2603C 1 YEAR MICROPROCESSOR CONTROL TIMER



This powerful timing device allows programming of 4 independent outputs from 1 second to 1 year. The memory can store 336 functions (on-off, sleep, enable-disable). The two independent sleep times are programmable from 1 second to 100 minutes. Extra protection of the memory is provided to avoid accidental erasing or overwriting by unauthorised persons. The kit includes housing, keyboard, 4 relays, full memory, and Ni-Cd back-up battery.

Time range: 1 second min. to 1 year max.
 Memory capacity: 336 steps switchable to 560 if no dates required.
 Memory back-up: Ni-Cd battery (incl.)
 Memory protection: clearing requires pressing of two keys simultaneously.
 Writing can be disabled internally.
 Membrane keyboard with key beep and LED indication.
 Outputs: 4 relays 240V/3A.
 Power supply: 8V AC/1A or 12V DC/1A unswitched.
 Dimensions: 242 x 116 x 59mm.

Order Code	Type	Price each
VE79L A2	Velleman Kit K2603C	£134.99

K6003 DIGITAL THERMOMETER SENSOR WITH LED DISPLAY



Although this kit was especially designed to operate in conjunction with our controllers K6000, K6010 or K6002, it is also very well suited for use as a conventional thermometer. The digital display gives the following consecutive information:

1. The current temperature
 2. The minimum temperature
 3. The maximum temperature
- When a 'rest' key is pressed the highest and lowest temperatures measured are stored and, if necessary, adjusted.
 An aluminium case is supplied with the kit, to allow the thermometer/sensor to be mounted on a wall.

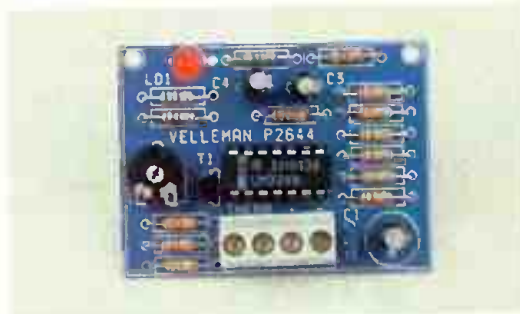
Microprocessor technology
 Minimum and maximum temperature
 Temperature range of the sensor: -50°C to +150°C
 Linearity from -10° to +50°: better than 0.5%
 Full scale accuracy: better than 2%

Adjustable to degrees Fahrenheit
 Display: 3 1/2 digits (0.1° display accuracy)
 Supply voltage: 12 to 15VDC/150mA
 Dimensions (W x H x D): 144 x 50 x 22mm

Order Code	Type	Price each
VF09K	Velleman Kit K6003	£51.99

K6001 TEMPERATURE SENSOR

This kit has been developed to be combined with K6000 or K6002 for building a temperature regulating and control system. Together with kit K6000 you can build a complete programmable thermostat. The advantage of a separate sensor is that the distance between the controller and the sensor is of no importance (tested up to 50m).



Temperature range of the transmitter: -40°C to 150°C
 Linearity from -10°C to 50°C: better than 0.5%
 Supply voltage: 12V DC (±2V) unswitched
 Current consumption: 20mA max.

Order Code	Type	Price each
VE68Y	Velleman Kit K6001	£12.99

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K6002 MICROPROCESSOR TEMPERATURE CONTROLLER



Unlike a normal thermostat this kit has two inputs, one for a 'high' alarm e.g. to switch on the air conditioning, and one for a 'low' alarm e.g. to switch on the central heating. Both 'alarms' are adjustable separately, each with its own hysteresis. Several temperature sensors (K6001) can be connected (1 x K6001 supplied with the kit). Separate opto-coupler sensor input (for K6001) is also provided.

Relay outputs: 5A/220V AC changeover contact
 Accuracy: ±0.1°C
 Read out: from -40°C to +150°C (together with K6001)
 24 hour clock (50Hz mains frequency accuracy)
 Alarm setting: from -50°C to +154°C

Order Code	Type	Price each
VE69A	Velleman Kit K6002	£59.99

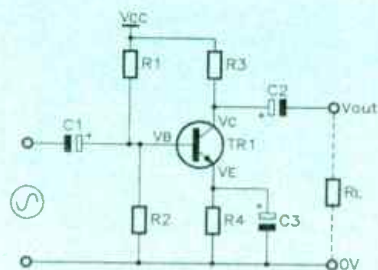
▶ IT'S A FACT! ◀

The following circuit and formulae are suitable for a general purpose npn transistor amplifier.

$$V_B = V_E + 0.6$$

$$V_B = \frac{V_{CC} - V_E}{2}$$

$$V_E = \frac{V_{CC}}{10}$$



$$C_1 = \frac{10}{2\pi R_1 f_L} \mu F$$

$$C_1 = \frac{10}{2\pi R_m f_L}$$

where f_L = Lowest frequency to be handled by amplifier

$$R_1 = \frac{V_C}{I_C} \text{ and } R_2 = \frac{V_E}{I_E}$$

$$C_2 = \frac{10}{2\pi R_L f_L} \mu F$$

$$I_E = I_C + I_B$$

$$F_{bias} = \frac{10I_C}{H_{fe}}$$

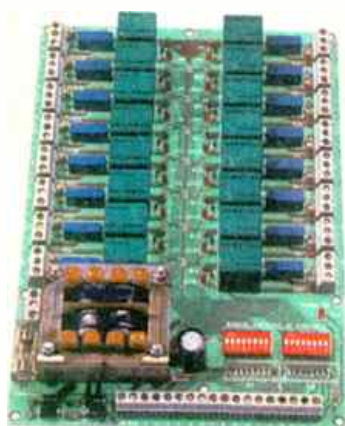
$$R_m = R_1 // R_2 = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$

$$R_1 = \frac{V_{CC} - V_B}{I_{bias}}$$

$$R_1 + R_2 = \frac{V_{CC}}{I_{bias}}$$

$$R_2 = \frac{V_B}{I_{bias}}$$

K6714 UNIVERSAL RELAY CARD

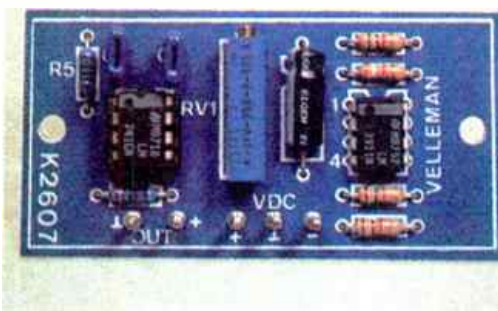


If you want an electronic controller to be able to switch higher currents and at the same time provide isolation between the controller and the controlled items, then this relay module is for you. It is very well suited to be connected to our kits K6711 (15 channel IR receiver) and one or two times K6701 (8 channel 2 wire receiver). For those two kits power can be taken direct from the relay module. The module can also be used together with the open collector interface module K2609. In its standard version the module contains 8 relays, but it can be extended up to a maximum of 16 relays.

Relay switch-over contact: max. 5A at 220V.
Output voltage: 12V/250mA for feeding K6701/K6715
Power supply: 220 or 125VAC/12VA
Dimensions: 150 x 212mm

Order Code	Type	Price each
VF10L	Velleman Kit K6714	£39.99

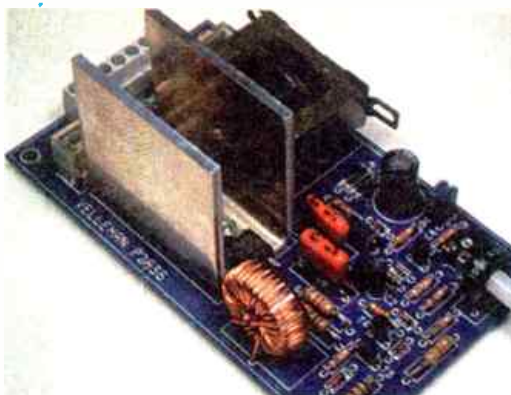
K2607 THERMOMETER ADAPTOR



This very useful compact unit provides an output voltage that varies proportionally with temperature. Ideal for computerised, or non-computerised, control systems, temperature monitoring or simply to construct a digital (or analogue) thermometer. The zero point is adjustable over a wide range and does not necessarily have to be zero volts out for 0°C. The output is buffered and can directly control an analogue or digital millivoltmeter, such as kit K2032, or an ordinary multimeter. The sensitivity is selectable for 10, 20 or 40mV per °C and the adaptor covers the range -25°C to +85°C. For convenience, the sensor may be remotely located. The adaptor requires a non-regulated ±12V to ±15V DC supply.

Order Code	Type	Price each
VE65F	Velleman Kit K2607	£9.99

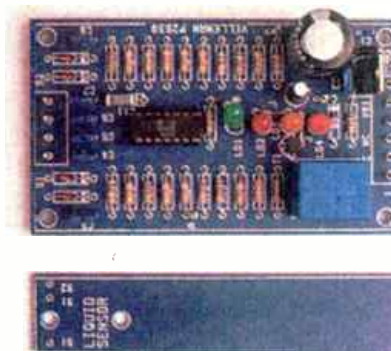
K2636 DRILL SPEED CONTROLLER



Designed to control universal AC motors (with carbon brushes). High torque even at low rpm. Also applicable for low voltage loads (24V), i.e. for halogen lighting. Supply and load circuits are electrically isolated. Supply: 110 to 125V or 220-240V AC
Load: 24 to 240V AC, max. 5A Minimum rpm adjustable.
Low interference level. Control range: 5-95%

Order Code	Type	Price each
VE90X	Velleman Kit K2636	£21.99

K2639 LIQUID LEVEL CONTROLLER

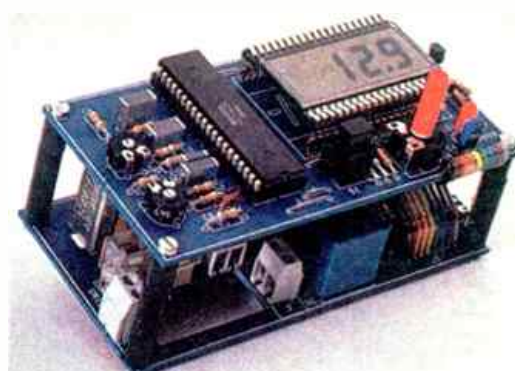


Did you forget to turn off the tap? Is the washing machine leaking? Will the aquarium level go too low? Has the rain water butt overflowed? Do you have water in the cellar? Just a minor mishap, or a disaster? You can avoid all this by installing the liquid level controller

Power supply: 12 to 14V AC or 16 to 18V DC
Supply current: 100mA max.
Relay output: 240V/3A max.
Dimensions: PCB: 104 x 60 x 29mm
sensors: 104 x 25 x 1.5mm

Order Code	Type	Price each
VF11M	Velleman Kit K2639	£12.99

K2649 THERMOSTAT WITH LCD DISPLAY



Wide range: -50° to +150°C (-60° to +300°F)
Adjustable hysteresis: 0.2 to 10°C (0.5 to 20°F)
Can be calibrated in degrees Celsius or Fahrenheit.
Resolution: 0.1°C or 1°F
Economy switch input: lowers temperature when external switch (or relay contact of a timer) is closed, e.g. at night.
Relay output: max. 250V/3A
Power supply and transformer included.
Dimensions: 124 x 62 x 65mm

Order Code	Type	Price each
VE66W	Velleman Kit K2649	£39.99

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K2657 SLOW ON/SLOW OFF DIMMER



One could name this dimmer a 'soft switch'. The lamp does not go on or off instantly, but slowly. Dimming times are adjustable within a wide range while the number of possible applications is increased by the following two working modes.

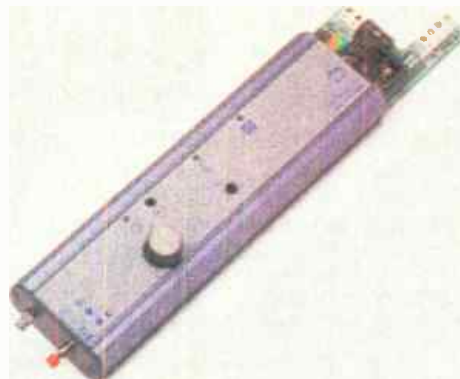
- 1) Dimming slowly. Dimming on and off times adjustable independently (2 seconds up to one hour).
- 2) Timer/dimmer. On-time adjustable independently (1 sec. up to 30 min.).

Mains voltage: 100/125 or 220/240V, 50 or 60Hz.
Max. load: 2A (400W at 220V or 200W at 110V).

Order Code	Type	Price each
VE51F	Velleman Kit K2657	£15.99

K6004 DAY/NIGHT THERMOSTAT

Ease of operation and low-cost combined with many possibilities are the key features of this thermostat. Both day and night temperature may be set simply by means of rotary knobs. The switch-over time from day to night is repeated automatically every day, once it has been programmed. Manual override, to switch-over from day to night temperature, is also possible by means of a push-button. Also, a one hour sleep function is provided that can be used in a bathroom or other rooms that are only used occasionally. Alternatively, the thermostat may be switched from day to night by means of a remote switch. The thermostat is also provided with an alarm output to provide warning of when the temperature falls below 5°C (41°F). Supplied with aluminium housing.

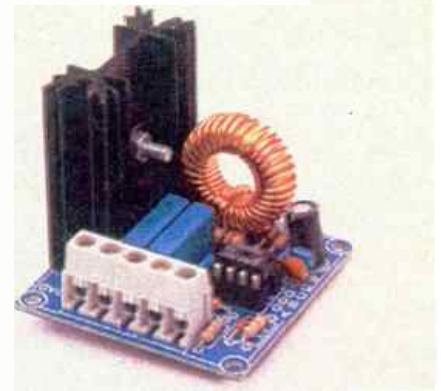


Specification

Number of switch-over steps: 19
 Minimum time between steps: 4 seconds
 Adjustment range: 5°C to 30°C (41°F to 86°F)
 Relay output: 3A/50V
 Alarm output (open collector): 50mA/70V at 5°C
 Clock accuracy: 50Hz to 60Hz (mains frequency)
 Hysteresis adjustable from: ±0.2°C to ±0.4°C
 Supply requirements: 9V to 12V AC 100mA
 Dimensions: 170 x 50 x 23mm

Order Code	Type	Price each
VF36P	Day/Night Thermostat	£49.99

K5002 HALOGEN LAMP DIMMER



This small circuit may be used to vary the brightness of lights, or as a dimmer for induction current, such as transformer voltage for halogen lighting, motor power, etc. The dimmer can easily replace an existing switch, without additional wiring. The dimmer switch may be controlled by means of an ordinary push-button. It is also acceptable to connect an unlimited number of push-buttons in parallel to control the dimmer switch from different places. Three different dimming functions are provided:

- A: Same direction dimmer function.**
- short repeated pressure: start/stop
 - long pressure: dims light
 - repeated long pressure: dimming in same direction
- B: Memory function.**
- short repeated pressure: continues in previous dimmer state
 - long pressure: dims light
 - repeated long pressure: backward dimming
- C: Identical to A but dims backwards with repeated long pressure.**

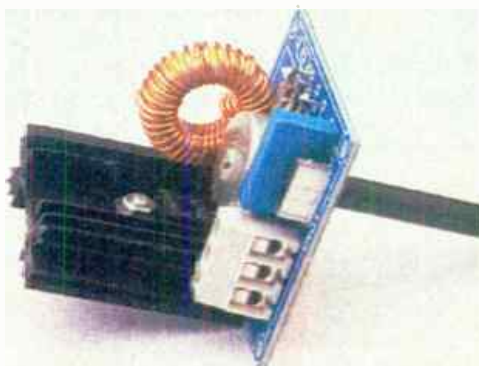
Specification

Mains voltage: 110 or 220/240V AC 50Hz to 60Hz
 Maximum power: 750W at 250V or 380W at 110V
 Dimming duration: 3.5 seconds
 Dimensions: 48 x 45mm

Order Code	Type	Price each
VF37S	Halogen Lamp Dimmer	£16.99

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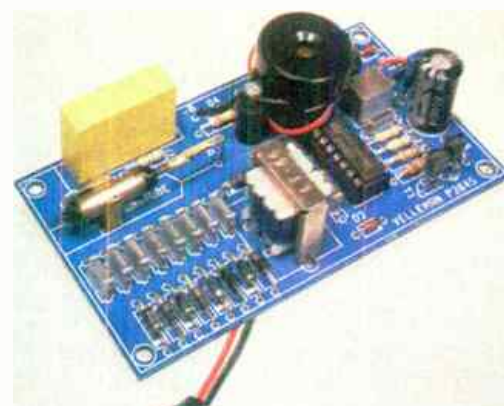
K5001 SUPPRESSED 3.5A DIMMER



Owing to its small size this compact dimmer can replace an existing switch, (but check depth of pattern) allowing you to vary the brightness of a light or group of lights. The dimmer may also be used to adjust the speed of a motor, vacuum cleaner, portable electric drill, or any other motor with carbon brushes. A mains suppressor is provided, eliminating undesirable radio interference. The dimmer is not suitable for halogen lighting. Isolated triac. Dimensions of PCB: 45 x 47mm.

Order Code	Type	Price each
VF41U	3.5A Dimmer Suprsd	£10.99

K2645 GEIGER-MÜLLER COUNTER



This Geiger-Müller counter provides an 'acoustic' measurement of radiation levels – the higher the radiation level, the 'faster' the audible output. The counter is most sensitive to high energy gamma and beta radiation. The counter is self-contained, compact, and may be mounted in a small box, together with the 9V battery (not supplied). The battery should provide about two months of continuous use with normal radiation levels.

Order Code	Type	Price each
VF34M A1	Velleman Kit K2645	£71.99



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MUSICAL PROJECTS

SIMPLE MELODY GENERATOR



- ★ Simple Construction
- ★ Small Size
- ★ 4 Different Versions

A simple to construct melody generator based on the UM66 series CMOS LSI chips designed for use in door bell, telephone and toy applications. The 64 note Read Only Memory (ROM) integral to the UM66 is programmed with one of four different melodies and is available as follows:

Kit 1: A medley of Jingle Bells, Santa Claus is Coming to Town, and We Wish You A Merry Christmas.

Kit 2: Happy Birthday to You

Kit 3: Wedding March

Kit 4: Love Me Tender, Love Me True

Specification of prototype

64 Note ROM Memory	
Tone Generator	
Range:	C4 to C6
Operating Voltage:	1.3V to 15V
Stand-By Supply Current:	1µA at 1.3V
Reverse Polarity Protection	
Output:	Piezo Sounder or 8Ω Loudspeaker
External Amplifier Output:	1V Square Wave at 10kΩ

Optional Items

The following items, not included in the kit, may also be required.

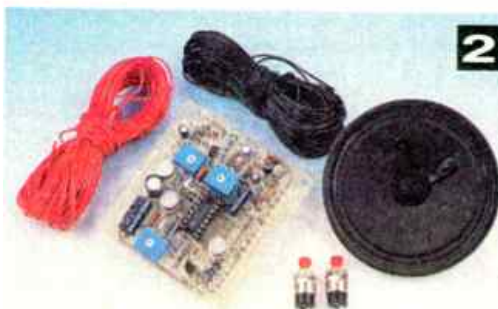
Miniature Loudspeaker	1	(WF57M)
Push Switch	1	(FH59P)
5in. Horn Speaker	1	(XQ73Q)

Kits and Special Parts

Complete kits are available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 26.

Order Code	Type	Price each
LM43W	Simple Melody Gen 1	£2.99
LM44X	Simple Melody Gen 2	£2.99
LM45Y	Simple Melody Gen 3	£2.99
LM46A	Simple Melody Gen 4	£2.99
GD75S	Simple Melody PCB	75p

MULTI-TUNE GENERATOR



- ★ Easy to Build
- ★ Minimum of Tools and Test Gear Required
- ★ No Setting-up Required
- ★ No Musical Knowledge Required
- ★ On-board Power Amplifier
- ★ Audio Output to external Amplifier
- ★ Automatic Switch off at end of Tune for Power Saving
- ★ Variable Envelope for Piano to Organ Type Sounds
- ★ Variable Volume and Pitch/Speed
- ★ Two Control Switch Inputs
- ★ Transistor Switched Voltage Output

Specification of Prototype

Integrated circuit:	UM3481 1A low-power CMOS LSI
Operating voltage:	1.5V to 4.5V
Supply current:	150mA at 4.5V
Stand-by supply current:	2.5µA at 4.5V
Transistor switched supply output:	1.5V to 12V
Output current:	200mA at 12V maximum
Memory:	Masked Read Only Memory (ROM) 512 words by 7 bits
Master Oscillator tuning range:	50kHz to 175kHz
Tone generator:	Logic controlled divider

Number of tunes – 16:

1: Twinkle, Twinkle, Little Star	9: London Bridge Is Falling Down
2: Cuckoo Waltz (1)	10: Little Brown Jug
3: Eency Weency Spider	11: Butterfly
4: Lullaby	12: Long Long Ago
5: Santa Lucia	13: Cuckoo Waltz (2)
6: Oh My Darling Clementine	14: Mary Had A Little Lamb
7: Are You Sleeping	15: The Train Is Running Fast
8: Rock-A-Bye Baby	16: Dream Of Home And Mother

The UM34811A is a low-cost, low-power CMOS LSI chip designed for use in door bell and music box applications. Inside the chip is a pre-programmed memory containing 512 notes and is capable of generating 16 different tunes. To trigger the unit, two pulse generator circuits have been incorporated. A bell push, mercury tilt, pressure mat or microswitch can be used to start the tune playing. The comprehensive control facilities enable the playing of all tunes repeatedly or stopping at the end of each tune. Three preset resistors on the PCB control the volume, pitch and envelope. An on-board amplifier capable of driving a small loudspeaker is included in the design. However, provision has been made for an external amplifier if louder volumes are required. The construction details describe the operation of the UM34811A chip.

Optional Items

The following items, not included in the kit, may also be required:

Zip Wire	As Req	(XR39N)
Horn Speaker	1	(XQ73Q)
Bell Push	As Req	(FS17T)

Min Microswitch	As Req	(FP41U)
Miniature Mercury Tilt Switch	As Req	(FE11M)
Pressure Mat	As Req	(YB91Y)
Bulb MES 6V 0.6W	1	(WL78K)
MES Batten Holder	1	(RX86T)
Miniature Motor	1	(YG12N)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 26.

Order Code	Type	Price each
LM47B	Multi-tune Gen Kit	£11.49
GD83E	Tunes Generator PCB	£2.99

MELODY MAKER



- ★ 47 note memory
- ★ 15 pre-programmed songs
- ★ Minimal wiring
- ★ Hand-held case with integral keypad and battery compartment

It looks just like an ordinary TV remote control, but is in fact a fun musical instrument intended for young children to gain experience in playing simple tunes. In its compose mode, the keys G3 to G5 are used to enter your own songs into a 47 note memory, the recording process starts when the first key is pressed. There is a default duration of four seconds (maximum) rest duration, and your song can be replayed as many times as you like by pressing the 'replay' key. Additional notes can be added as soon as the song finishes, and if you exceed the capacity of the memory you can still play notes, but they will not be stored, and only the previous 47 notes will be retained. The memory is wiped by pressing the 'reset' key, or by switching the power off, or switching from compose to play. In its 'play' mode, any of the 15 built-in songs can be accessed by pressing the keys G3 to G5, and if the 'replay' key is pressed then all 15 will be played in sequence. The 15 in-built songs include a selection of children's carols and nursery rhymes including: "Twinkle, Twinkle, Little Star", "Mary Had A Little Lamb", and "Christmas Carol". The Melody Maker requires two AA size batteries (not included in the kit).

Specification

DC power supply:	3V (2 x AA)
Standby current:	2mA
Average play current:	4mA
Note scale:	15 notes (G3 to G5)
Replay note capacity:	47 notes (compose RAM)
Programmed songs:	15 songs (play ROM)

Kit and Special Parts

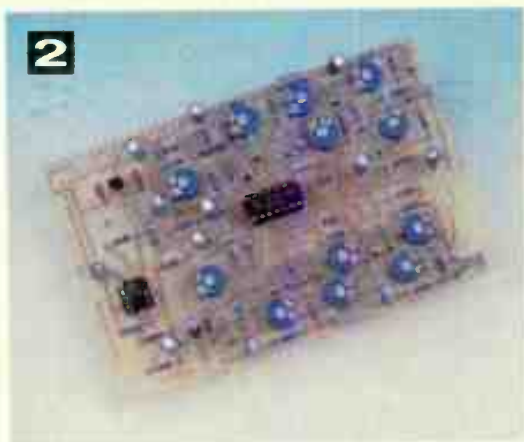
A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 56. PCB dimensions: 54 x 121.5mm.

Order Code	Type	Price each
LP94C	Melody Maker Kit	£13.99
GH08J	Melody Maker PCB	£2.89
KP48C	Melody Maker F/Panel	99p

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COMPUTADRUM



A six channel drum synthesiser enabling a home computer to generate drum sounds whilst functioning as a programmable sequencer. The six various sounds are adjustable for pitch and resonance. Output is to an external amplifier. The Computadrum can be used directly with the BBC model B, the VIC-20, Commodore 64, Atari 400/600XL, 800/800XL, 130XE and the Memotech MTX500/512 home computers. It can also be used with the ZX81 and ZX Spectrum provided these are fitted with an external input/output port providing at least six digital outputs. The Maplin ZX81 I/O Port would be ideal for the ZX81, for example. Since the Computadrum only requires brief trigger pulses to initiate operation, it may be possible to devise a form of digital controller instead of a computer.

Kit and Special Parts

A complete kit is available and the pcbs are also available separately. Full construction details may be found in the Best of Maplin Projects Book 3.

Order Code	Type	Price each
LK52G	Computadrum Kit	£15.99

This novel and easy to use metronome is operated by a simple switch to input the beat period, and by tapping the unit on two successive beats of the music, the resulting interval is measured and stored in memory. From this memory a sounding beat or flashing display is derived which repeats at the measured interval. The 'metronome marking' can also be displayed on an easy-to-read, digital display. All this is contained in a small calculator style box. The input switch can be used both for re-synchronising the beat/flashing display to reset and subsequently repeat at the interval still stored in memory and re-setting to a new speed. The nature of setting up the Metrobeat means that it has a useful self-training value where a metronome marking has been specified in the music. Having seen the marking, the user can select a beat speed for the music and then have the facility to check whether or not that speed was correct. Additionally, the Metrobeat lends itself to making a quick measurement of the tempo used, by, for example, different artists on their interpretation of the music. The Metrobeat has an easy-to-read digital display of the metronome tempo and is set either by tapping the box itself or by use of an external foot switch (not included). The beat frequency output is indicated by the flashing of the digital display. A simple arrangement for adding an audible output is by using a piezo buzzer with built-in driver (KU56L). The Metrobeat is split into two modules. Module A contains all the basic measuring, recording and output generating circuits, and can exist independently, making a very useful unit minus a display. Module B contains the digital display with its calculating logic and display drivers, and is designed as an 'add-on' unit. It is entirely dependent on Module A and the two modules plug together sandwich fashion for mounting in the calculator style box.

Optional Items

The following items, not included in the kit, may also be required.

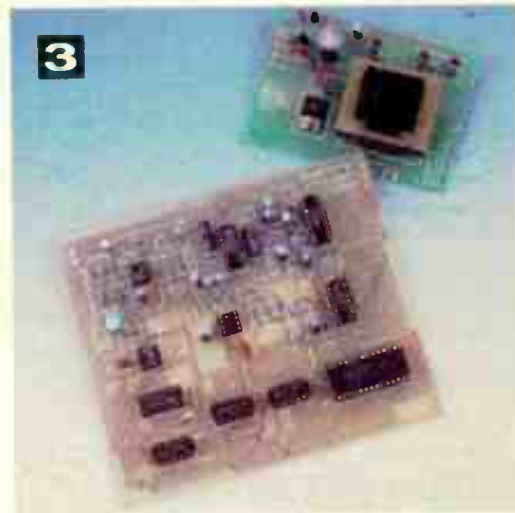
AAA Batteries	4	(FK63T)
Plug Plastic 3.5mm	1	(HF80B)
DC Piezo Buzzer	1	(KU56L)

Kit and Special Parts

A complete kit of parts (including the two PCBs and instruction leaflet) is available (excluding optional items). The PCBs are also available separately. Full construction details may be found in Maplin Magazine Issue 58.

Order Code	Type	Price each
LP95D	Metro Beat	£39.99
GH13P	Metro Beat PCB A	£3.49
GH14Q	Metro Beat PCB B	£6.49

ADA ECHO



- ★ Based on the 6264-3 CMOS Static RAM
- ★ Echo Variable from 75 to 450 Milliseconds
- ★ Can be Driven Directly from a Synthesiser

A simple, low cost echo machine, suitable for use with most electronic instruments, which does not use spring-lines, tape loops or analogue bucket-brigade delay IC's. Instead the signal is processed using analogue to digital conversion techniques so that it can be shifted through a 16K RAM, controlled by a variable timebase clock. Until quite recently digital delay lines of this type were extremely expensive pieces of equipment which relatively few people could afford. The massive drop in the cost of memory chips in recent years enables the digital echo unit design to take advantage of this situation and the unit is based on the 6264-3 CMOS static RAM. It enables reasonable delay/bandwidth combinations to be provided, which in analogue delay line terms is equal to a 16384 stage device. The echo time is continuously variable from approximately 75ms to 450ms, giving a range of effects which vary from a short reverberation type sound to a medium-long echo. A feedback control enables the echo level and the echo decay time to be adjusted over a broad range. The unit requires an input level of several hundred millivolts r.m.s. Therefore with low level sources, such as microphones and low output guitar pick-ups, a suitable preamplifier must be added at the input to the unit. Bandwidth is approximately 8kHz, although it is only the bandwidth of the delayed signal that is restricted; the straight-through signal is not subjected to any filtering, and distortion is approximately 5% with a signal to noise ratio of 40dB.

Continued on next page.

METROBEAT



- ★ Range 30 to 200+ beats per minute
- ★ Quartz crystal accuracy
- ★ Easy setting by built-in transducer
- ★ Clear easy-to-read, digital display
- ★ Input for foot switch setting while playing
- ★ Beat indication by flashing display
- ★ Change speeds easily
- ★ Output available for extra LED or sounder or for hi-fi amplifier

Maplin

PHONE BEFORE 5PM FOR SAME DAY DESPATCH

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Continued from previous page.

Optional Items

The following part, not included in the kit, may also be required.

13A Mains Plug (RW67X)

Kit and Special Parts

A complete kit is available and the pcbs are also available separately. Full construction details may be found in the Best of Maplin Projects Book 5.

Order Code	Type	Price each
LM04E E3	ADA Digi Echo Kit	£62.99
GD20W	ADA Digital Echo PCB	£7.65
GD21X	ADA Dig Echo PSU PCB	£2.49

AUTO-WAA EFFECTS UNIT



A Waa-Waa Unit for guitars where the filter frequency is automatically controlled by the input signal amplitude, as opposed to a foot operated pedal, for example. Very easy to use whilst giving a good range of various effects. The filter frequency is adjustable, and a sweep depth control is also included. Positive feedback is used to give a peak in the response just above the cut-off frequency to obtain the best "waa" effect, or alternatively operate as a 12dB/octave lowpass filter for more subtle effects.

Kit and Special Parts

A kit is available (excluding case, battery, feet and fixings) and the pcb (included in the kit) is also available separately. Full construction details may be found in the Best of Maplin Projects Book 3.

Order Code	Type	Price each
LK36P	Auto-Waa Kit	£17.99
GB54J	Auto-Waa PCB	£2.75

NOISE GATE



This useful project has the following features: Provides automatic shutdown of unwanted noise during 'pause' conditions. Compressor technique eliminates 'signal snapping'. User adjustable characteristics for high or low level network insertion. Allows the use of otherwise

'too noisy to use' effects units. Can effectively cancel crosstalk in multi-microphone set-ups. Can be used in multi-instrument layouts for instant unit shutdown on changeovers. Will eliminate 'beehiving' in older type 'spaghetti' wired organs. No circuit trimming required or tight specification devices used. Can be used in its own right as an effect to create soft attack bowing characteristic. Uses only two low-cost and readily available IC's. Self contained, jack-in jack-out unit allows instant in-line connection.

Kit and Special Parts

Complete kit of all parts excluding the case and front panel. Full construction details may be found in Maplin Magazine Issue 40. PCB dimensions: 59 x 70mm.

Order Code	Type	Price each
LK43W	Noise Gate Kit	£12.49
GA43W	Noise Gate PCB	£1.99
JR87U	Noise Gate Panel	£2.65

SSM2044 4-POLE VOLTAGE CONTROLLED FILTER

Features

- ★ Low external parts count
- ★ Wide supply voltage range

Applications

- ★ Electronic music systems
- ★ Voltage controlled oscillators
- ★ Sweep oscillators

The SSM2044 is a low cost 4-pole voltage control filter IC, ideal for use as an electronic low-pass filter. It is possible to use the device as a voltage controlled sine wave oscillator. The IC uses a unique filtering technique to provide low noise operation and a high rejection of control signals with an extended control range. A variable Q is achieved to determine resonant frequencies using feed-back techniques.



A cut-off frequency (10Hz to 50kHz) is reached when the current is maximised. Used as an oscillator the IC is capable of producing a pure sine wave. The module requires a supply of between 12V to 30V and up to 50mA. The device may be used in many different ways requiring a voltage controlled filter or oscillator. Different operating frequencies can be achieved by changing capacitor values. Applying the output of a low frequency ramp or triangular wave to the control voltage input, the module could be used to form part of a sweep generator circuit.

Note: this is intended as a 'building block' project only, and is not eligible for our 'Get-you-working' service.

Kit and Special Parts

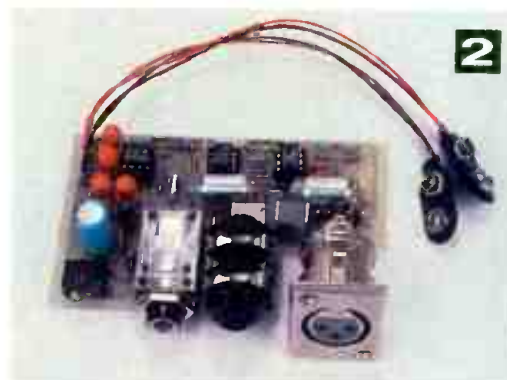
A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 42.

PCB dimensions: 91.4 x 71.2mm.

Order Code	Type	Price each
LP45Y	SSM2044 4 Pole VCF	£13.99
GE75S	SSM2044 PCB	£2.49

AUDIO BALANCED LINE TRANSMITTER

- ★ Wide frequency range
- ★ Operates from mains adaptor or internal batteries



Balanced line systems were originally developed to overcome the hum and noise pickup problems that inevitably crop up with unbalanced (single-ended) cables over long runs. The situation does not exist when using a balanced line because any external introduced noise component will be equally induced on both the in-phase and out-of-phase signal lines keeping the signal difference voltage the same, which effectively cancels any common-mode noise. In addition, this project may be used to 'bridge' two mono amplifiers together. Further details on the construction and use of the balanced line TX can be found in Maplin Magazine Issue 49.

Specification

Supply voltage:	9V min. 35V max.
Quiescent current	
@ 9V:	8.2mA
@ 35V:	9.5mA
Maximum input signal	
@ 9V:	1.4V rms
@ 35V:	10V rms
Frequency response	
@ -3dB:	1.5Hz to 100kHz

Optional Items

The following, not included in the kit, may also be required.

22µF 16V Tantalum	4	(WW72P)
Box CEN80	1	(YN50E)
Gasket CEN80	1	(FE41U)
Pozi Screw M2.5 x 10mm	1 Pkt	(JC68Y)
Steel Nut M2.5	1 Pkt	(JD62S)
Isoshake M2.5	1 Pkt	(BF45Y)
Battery Alkaline K9V	2	(FK67K)
AC Adptr Unreg 300mA	1	(XX09C)
Quickstick Pads	1	(HB22Y)
Rubber Foot	1	(XR93B)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 49.

Order Code	Type	Price each
LP49D	Balanced Line Tx	£21.99
GE99H	Direct Inject PCB	£2.99

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SSM2045 MUSIC VOICING SYSTEM

3



Features

- ★ 2-pole and 4-pole low-pass filter
- ★ On chip mixer/VCA
- ★ Low noise Applications
- ★ Electronic music
- ★ Sweep oscillators

The SSM2045 offers a wide range of filtering and mixing options such as a voltage controlled low-pass filter, with both 2-pole and 4-pole features, and a mixer/VCA combination. The filter section has input levels up to 150mV peak to peak with a signal impedance about 90Ω; signal-to-noise at approx 84dB. An internal voltage controlled feed-back amplifier provides the electronic Q for the filter. It is possible to sweep the operating frequency over a range of 5000:1, however sweep rates are restricted to 1000:1. For performance the mixer/VCA section is separate from the filter. Two inputs allow signals to be mixed, a third input is used for balancing the output level. The unit requires a split rail PSU being able to deliver ±10V to ±15V at 50mA. This project can be used for electronic music circuits, sweep oscillators and mixers.

Note: this is intended as a 'building block' project only, and not eligible for our 'Get-you-working' service.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details are shown in Maplin Magazine Issue 43. PCB dimensions: 83.8 x 61mm.

Order Code	Type	Price each
LP46A	SSM2045 Mixer Filter	£12.99
GE77J	SSM2045 Voicing PCB	£2.65

- ★ Minimal adjustment
- ★ IC design, no laborious coils to wind
- ★ Adjustable resonance and range
- ★ Economically priced with unbelievable performance

Applications

- ★ Ideal for both Guitars, Bass and other instruments

Specification:	
Power supply:	+9V DC
Current consumption:	14.7mA
Maximum boost @ 1kHz:	20dB
Minimum frequency:	90Hz
Maximum frequency:	20kHz

This sophisticated Wah Wah pedal uses the LM13700 transconductance op amp. Unlike other designs, the Psychedelic Wah Wah has a number of advantages which include adjustable resonance, which determines the subtlety of the effect and adjustable range, used for both guitar and bass guitar, in fact, on any electric music instruments such as keyboards and electric violins. The circuit also features a compander that reduces noise in the circuit and improves the harmonic content of the output which makes for a very warm rich sound. The Wah Wah acts as a kind of tone boost control, and moving the pedal adjusts the frequency point at which the boost occurs. Rhythm or lead guitar usually play through the device. When playing rhythm, the pedal is moved in time with the 'strum', and when playing lead, extra expressive abilities become available enabling almost 'infinite sustain' without screaming feedback.

Kit and Special Parts

A complete kit of parts (including the PCB) is available. The PCB and front panel is also available separately. Full construction details may be found in Maplin Magazine Issue 82.

Order Code	Type	Price each
LT43W	Wah-Wah Pedal Kit	£34.99
GH88V	Wah Wah Pedal PCB	£3.29
KP70M	Wah Wah Pedal F/Pnl	£2.49

MIDI MERGE UNIT



Features

- ★ Active design
- ★ Maintains isolation between units
- ★ Operates for up to 6 months from a PP3 battery
- ★ Compact design
- ★ Easy to build

Applications

- ★ Control a sound module from two sources
- ★ Sequencer setting up

A sophisticated MIDI Merge Unit can function with simultaneous input signals. In most instances, however, all that it required is a unit that simply mixes two inputs direct into one output, and such a unit remains small and cheap. However, simultaneous inputs must be avoided, or else the output signal will be scrambled and meaningless. Hence, the Simple MIDI Merge is more useful, but no less effective, as an automatic MIDI switch, allowing a sound module to be played from a MIDI keyboard or from a sequencer (but not at the same time!), without the need for much plugging and unplugging of signal leads.

The unit is powered from a single 9V PP3 battery, the life of which is directly related to the quantity of data passed through the unit, but average current consumption is only 7mA with continuous data throughput.

Optional Items

The following items, not included in the kit, may also be required.

5-pin DIN Type A Plug 180°	As Req	(HH27E)
Twin Overall Braided Screen Microphone Cable	As Req	(XR98G)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB and the front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 77.

Order Code	Type	Price each
LT52G	MIDI Merge Kit	£15.49
GH69A	Midi Merge PCB	£2.49
KP64U	Midi Merge F/Panel	£1.49

2 WAY MIDI SWITCH BOX

- ★ Low component count
- ★ Easy to build
- ★ Easy to use

The two way MIDI switch box is ideal for the electromusic musician with multiple samplers, keyboards, etc. The project allows signals to be routed along one of two channels by the flick of a switch. The circuit consists of several sockets, switch and PCB. The advantage of this system is that it needs no power supply and will work either way around, i.e two inputs to one output or two outputs to one input.



Optional Items

The following items, not included in the kit, may also be required.

DIN Plug	As Req	(HH27E)
Fleximic Black	As Req	(XR98G)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 46.

Order Code	Type	Price each
LP75S	Midi Switch Box	£7.49
GE86T	Midi Switch Box PCB	£1.99

PSYCHEDELIC WAH WAH PEDAL

NEW



Features

- ★ Powered from 9V PP3 battery or regulated power supply
- ★ Regulated reference to prevent low battery voltage drift
- ★ Built in compander to minimise noise
- ★ Traditional Wah Wah sound (without the crackle)
- ★ Rich warm harmonic content

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E510 MIDI KEYBOARD SCANNING MODULE



2

Features

- ★ Scans up to 128 keys
- ★ Velocity (touch) sensitive
- ★ Transmit channel selectable
- ★ On-board regulator
- ★ AC or DC supply
- ★ Compact
- ★ Versatile

Applications

- ★ MIDI keyboard
- ★ MIDI pedal-board
- ★ Basis of a MIDI master keyboard
- ★ MIDI retrofit for non-MIDI keyboards

The Musical Instrument Digital Interface (MIDI) has been adopted as a worldwide serial interface standard by manufacturers of electronic musical instruments and ancillary equipment; providing unparalleled possibilities for control and communication. MIDI allows a diverse range of devices to be interconnected; almost regardless of manufacturer or type. MIDI devices include; synthesizers, MIDI guitars, MIDI 'wind' instruments, drum machines, effects processors, mixers, computers and lighting equipment. Commonly, MIDI is used by keyboard players to interconnect synthesizers, allowing a range of 'instruments' to be played and controlled from one master keyboard.

Conventionally, generation of serial MIDI data requires a microprocessor-based scanning system, comprising CPU, ROM, RAM, and both serial and parallel I/O. The use of such a system is costly and is a 'sledgehammer to crack a nut' solution.

This module is a compact and versatile building block, around which a MIDI keyboard, pedal-board or master keyboard can be constructed. The module utilises a dedicated IC to perform scanning. For maximum versatility, an on-board supply regulator is provided, along with various inputs and outputs routed to strategically grouped connectors. The module only requires the addition of an AC or DC supply, some address decoding and a keyboard with changeover contacts to operate.

It must be realised that the module does not produce any sound of its own, just MIDI data. A MIDI sound module or synthesizer is required to interpret the MIDI codes and generate the required sounds.

Ideas and Expansion

The module has been designed with flexibility in mind, to this end, all signals have been brought out to connectors. The module is ideally suited to a wide variety of keyboard and pedal-board applications, such as: Portable guitar-style 'performance' keyboards; Bass pedal-board for guitar and keyboard soloists. With the addition of a processor board, a wide variety of master keyboard functions can be added; keyboard split, pitch bend and modulation wheels, patch change, data entry sliders, foot pedals, transposition, arpeggiator, etc.

Specification:

Module dimensions: 101 x 35 x 69mm (WHD)
 Power requirements
 AC: 6-0-6V to 15-0-15V AC
 or DC: +7 to +25V DC

Current: 20mA quiescent
 Logic connections: TTL/HC compatible
 Serial data output: MIDI standard 5mA current loop
 Auxiliary output: MIDI format TTL compatible
 Scanning range: 128 notes
 Velocity resolution: 128 steps/256µs

Kit and Special Parts

A complete kit of parts (including the PCB) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 69.

Order Code	Type	Price each
LT35Q	Midi Kbd Scanner	£35.99
GH35Q	Midi Scanning PCB	£3.49

PROGRAMMABLE METRONOME



- ★ Audio & Visual Beat and Accent Indication
- ★ Variable Tempo from Slow (adagio) to Fast (presto)
- ★ programmable Time Signature on 7 Segment Displays
- ★ Powered from 5V to 12VDC

Metronomes are commonly used in music, to help musicians keep time. The traditional metronome is based on an oscillating arm that swings from side to side and ticks as it goes. Various electronic metronomes use LED's and sounders to indicate the tempo, as indeed does this design. They have the advantage of being robustly transportable, compact, and in this version the facility to set time signatures with an appropriate note duration indication. The module is housed in a small plastic box, with enough room for a small 9V battery, and a self adhesive front panel to finish.

Optional Item

The following item, not part of the kit, may also be required.
 Switch SPST Ultra-Min Toggle 2 (FH97F)

Kit and Special Parts

A complete kit is available, the pcb and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 26.

Order Code	Type	Price each
LM49D	Metronome Kit	£34.99
GD61R	Metronome PCB	£10.99
JG23A	Metronome Front Panl	£2.99

16-WAY AUDIO PATCHBAY

1



Features

- ★ Balanced, unbalanced or 'insert point' versions
- ★ Normalised or non-normalised operation
- ★ One PCB for all options
- ★ Low loss signal path Applications
- ★ Recording studios
- ★ Theatres
- ★ Home recording
- ★ P.A. systems

Used extensively in radio, TV and recording studios, the most commonly used inputs and outputs are taken to a patchbay where they can be simply connected together using short cables. This patchbay is configured as two rows of sockets, one above the other. It is conventional to designate the lower sockets as signal inputs to a device, while the sockets above will often be the output from the same device. Often a patchbay is 'normalised', which means the top socket is normally wired to the bottom socket and the path is broken when a jack is inserted. In this case the top socket will be the output from one piece of equipment that is normally fed to the input of another e.g. the output from a tape deck fed to the input of a mixer. The ability to easily break this feed allows the use of an additional piece of equipment to be inserted in the path i.e. noise reduction equipment. A PCB is available allowing a single channel patchbay module to be constructed. By fitting a combination of stereo and mono 1/4 in. jack sockets, balanced, unbalanced or insert point versions can be constructed on the same PCB.

There is NO kit of parts for this project, but the Maplin 'Get-You-Working' Service is available. Full constructional details can be found in Maplin Magazine Issue 52.

Parts List

Unbalanced Module:		
Mono PCB 1/4 in. J/Skt	4	(FJ00A)
Patchbay PCB	1	(GH09K)
Balanced Module:		
Stereo PCB 1/4 in. J/Skt	4	(FJ05F)
Patchbay PCB	1	(GH09K)
Insert Module:		
Mono PCB 1/4 in. J/Skt	2	(FJ00A)
Stereo PCB 1/4 in. J/Skt	1	(FJ05A)
Links	2	Fitted
Patchbay PCB	1	(GH09K)

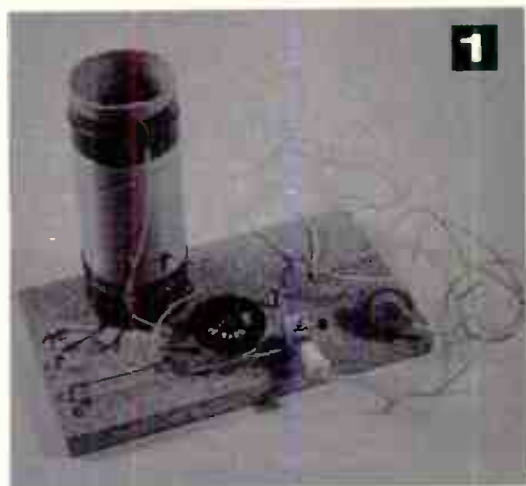
Optional

Patch Lead Set	As Req.	(YZ32K)
Rack Jackfield	1	(KW61R)
PCB dimensions: 61 x 78.7mm		

Order Code	Type	Price each
GH09K	Patch Bay PCB	£2.69

RADIO PROJECTS

CRYSTAL SET RADIO



A novel mini project that is easy to build and ideal for construction of all ages. A Crystal Set was an early design for a radio receiver, our design incorporates modern components in place of difficult or impossible to obtain old style components. For example, what once would have been a 'cat's whisker' detector has been replaced by a germanium point contact diode. Original designs would have driven a pair of high impedance headphones, but its modern counterpart uses an inexpensive crystal earpiece, etc. Please note that this project is not eligible for repair under our 'Service' rules

Full construction details are available on leaflet XU01B.

Order Code	Type	Price each
XU01B	Crystal Set Leaflet	40p NV

TRF REFLEX RECEIVER

A PCB only for a TRF (tuned radio frequency) receiver as featured in Part 7 of the series 'Exploring Radio' in *Electronics, the Maplin Magazine*. Much simpler than a super-heterodyne design, this AM band TRF 'reflex' receiver is complete from ferrite rod antenna to loudspeaker with just four transistors. A single RF stage also produces the audio signal by itself acting as a second stage AM detector. While there is no actual kit of parts, all components required are Maplin stock items, although most need not be critical. Ideal beginners radio project as part of reading the 'Exploring Radio' series.

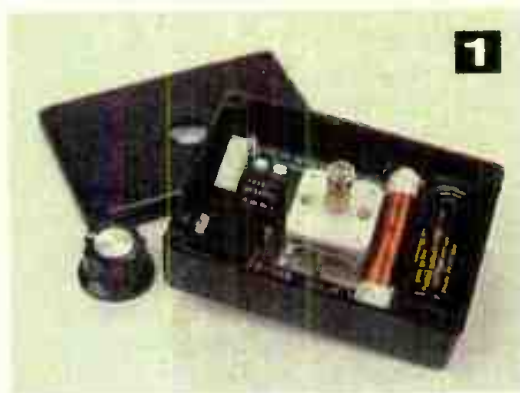


Printed Circuit Board

A high quality fibre-glass PCB is available. Note: as this board is intended as a 'building block' project it is not eligible for our 'get-you-working' service. Full construction details may be found in *Maplin Magazine Issue 31*.

Order Code	Type	Price each
GE15R	TRF Reflex Rx PCB	£3.75

BEGINNERS AM RADIO



- ★ On board attenuator
- ★ Compact design
- ★ Integral aerial
- ★ Headphone operated on/off

This project is ideal for the total beginner to radio electronics. Based around a ZN415 IC the unit has a limited amount of components, including a 'wind-it-yourself' aerial. The small compact project uses basic electronics techniques to receive local stations. The device is tuned by a knob on the box, varying the frequency between 540 and 1600kHz depending on the aerial winding. An attenuator is provided to reduce the AM signal. The receiver is designed to be used with personal stereo headphones of 32Ω impedance. A power supply of 1.5V is delivered by an N type cell fitted into the box LL12N. The box, knob, battery and screws are not supplied in the kit.

OPTIONAL ITEMS

The following items, not included in the kit, may also be required.

Verobox 301	1	(LL12N)
Alkaline KN Battery	1	(FM13P)
Knob K7A	1	(YX01B)
Spacer 4BA x 1/4 inch	1 Pkt	(FW31J)
Poziscrew M2.5 x 12mm	1 Pkt	(BF40T)
Isoshake M2.5	1 Pkt	(BF45Y)
Isonut M2.5	1 Pkt	(BF59P)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in *Maplin Magazine Issue 42*.

Order Code	Type	Price each
LP28F	Beginners AM Radio	£8.99
GE43W	AM Radio PCB	£2.20

TDA7000 RADIO MK II



- ★ No Alignment Equipment Needed
- ★ Easy To Build
- ★ Ready Wound RF Coils
- ★ Onboard Power Amplifier
- ★ Headphone/earpiece Jack Socket

This design is based on the TDA 7000 IC which contains essentially a complete FM receiver on a chip. With only the core of one coil to be adjusted, building and aligning this radio is no more difficult than the simple ZN414 AM radio! The frequency coverage is 88 to 108MHz and uses a telescopic six section aerial. The receiver also incorporates a power amplifier IC, the TDA820M delivering 250mW RMS to an internal 8Ω speaker. Four small batteries provide the power with a maximum current drain of just 80mA, making this radio truly portable.

Optional Items

The follow items, not included in the kit, may also be required.

Battery R6S Silver Seal	4	(FK59P)
Mag Earpiece 3.5mm	1	(LB24B)

Kit and Special Parts

A complete kit is available separately, as well as a pcb and front panel. Full construction details may be found in *Maplin Magazine Issue 27*

Order Code	Type	Price each
LM55K	TDA7000 MkII Kit	£25.99
GD77J	TDA7000 MkII PCB	£2.85
JG28F	TDA7000 MkII F/Panel	£5.25

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160m RECEIVER



- ★ Receives AM/CW/SSB transmissions
- ★ Superheterodyne design
- ★ Variable frequency BFO
- ★ 1.8 to 2.2 MHz range
- ★ Switched AGC time constant

The 160m receiver covers frequencies from 1.8MHz to 2.2MHz and is capable of receiving both Amplitude Modulation (AM) and Carrier Wave (CW)/Single Side Band (SSB) modes. Primarily designed for the amateur radio band this project also covers 'ship to shore', coast stations and marine navigation beacons. The receiver uses the superheterodyne principle, based on the LM3820 IC. An internal amplifier TDA7052 drives an internal loud speaker and headphones jack. A tape deck may also be connected. An external aerial must be connected for the best signal reception, and an optional external ground point is provided.

Gains of both the Audio Frequencies (AF) and Radio Frequencies (RF), can be varied along with the pitch. The signal strength can be represented using an S meter on the front of the box.

Specification

Power supply	
Voltage:	12V to 16V
Current (quiescent):	33mA
Frequency range:	1.795MHz to 2.24MHz
Sensitivity AM:	Less than 2µV
CW/SSB:	Less than 0.5µV
Headphone output:	4Ω to 32Ω
Intermediate frequency:	455kHz
Local oscillator frequency:	1.34MHz to 1.785MHz

Optional Items

The following items, not included in the kit, may also be required.

SO239 Skt (Square)	1	(BW85G)
Grounding Post with 4mm Skt	1	(JL99H)
Isobolt M3 x 6mm	1 Pkt	(BF51F)
Steel Nut M3	1 Pkt	(JD61R)
Isoshake M3	1 Pkt	(BF44X)
Isotag M3	1 Pkt	(LR64U)
Case 3502	1	(YN33L)
Poziscrew M2.5 12mm	1 Pkt	(BF40T)
M3 1/4 in Spacer	1 Pkt	(FG33L)
M2.5 Nuts	1 Pkt	(JD62S)
Self Tapper No. 4	1 Pkt	(FE68Y)
Front Panel	1	(JX41U)
Back Panel	1	(JX42V)
Knob K7A	3	(YX01B)
Knob K7B	1	(YX02C)

Kit and Special Parts

A complete kit is available. A pcb and front and rear panels are also available separately. Full construction details may be found in Maplin Magazine Issue 43. PCB dimensions: 162 x 129mm.

Order Code	Type	Price each
LP31J	160m Receiver	£47.99
GE49D	160m Receiver PCB	£14.49
JX41U	160m Rx Front Panel	£3.25
JX42V	160m Rx Back Panel	£3.49

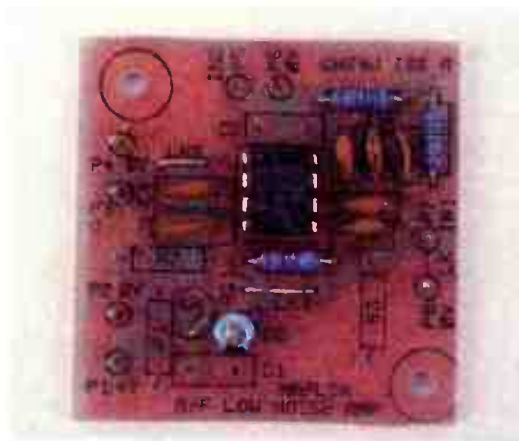
SL560C LOW NOISE RF AMPLIFIER

Features

- ★ Over 30dB of gain
- ★ Noise less than 2dB
- ★ Bandwidth up to 300MHz
- ★ Supply voltage +2V to +15V DC
- ★ Low power consumption

Applications

- ★ Aerial preamplifiers for HF and VHF radios
- ★ 50Ω line drivers
- ★ Low power wideband amplifiers
- ★ Instrumentation preamplifiers



The SL560C is a very flexible, monolithic Integrated Circuit (IC) ideally suited for a number of different Radio Frequency (RF) amplification roles, depending on how it is configured. However, RF ICs are often quite difficult to use successfully, and because the component layout becomes more critical as frequency increases, a universal amplifier PCB has been developed which supports four configurations for HF and VHF aerial preamplifiers, 50Ω line drivers, low power, wideband amplifiers and instrumentation preamplifiers.

The Low Noise Preamplifier configuration exhibits a typical noise figure of typically 2dB with a gain of 35dB and a bandwidth of 75MHz. The Low Power Consumption version has lower gain of 13dB, but will run from a supply voltage as low as 2V, where current consumption is only 3mA. Bandwidth can be up to 125MHz, and noise typically 2.5dB.

The Wide Bandwidth version uses negative feedback to extend bandwidth up to 300MHz, while the 50Ω Line Driver has a gain of 14dB and a bandwidth of 220MHz, with an input SWR of typically 1.3:1.

Optional Items

The following items are not included in the kit, but may also be required.

BNC round socket 50Ω	2	(HH18U)
Coax Cable	As Req	(XR19V)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 74.

The Maplin 'Get-You-Working' Service is not available for this project.

Order Code	Type	Price each
LT42V	SL560 VHF PreAmp Kit	£6.45
GH64U	SL560C Preamp PCB	£1.99

VHF/UHF PREAMPLIFIER



Features

- ★ Multi-range VHF/UHF preamplifier
- ★ Low power consumption
- ★ Power supply through co-ax cables
- ★ High gain
- ★ No tuning required
- ★ Surface mount components

Applications

- ★ VHF satellite bands
- ★ UHF TV
- ★ FM radio broadcasts
- ★ Amateur radio bands
- ★ Aircraft transmissions

This preamplifier was originally intended for use with the MAPSAT VHF Weather Satellite Receiving System; it was designed to be a replacement for the previous Maplin VHF preamplifier kit. However, the new design is based around a MAR-6 MMIC (Monolithic Microwave Integrated Circuit), which is unconditionally stable across its entire range (DC-2GHz). The gain is at least 16dB over this range, and may rise up to a maximum of 19dB for certain applications. Note that the MAR-6 is actually useable up to 4GHz, with a typical gain of around 9dB at this frequency. This means that the preamplifier is highly versatile, and can be used for any number of different applications.

The power supply for this preamplifier can be fed via the co-ax cable that carries the signal to a receiver. If your receiver does not supply 12V DC through the co-ax cable, then a power supply can be either purchased ready made (PU1 stock code BW50E suitable for 40-1000MHz), or built very easily from a few stock components.

Surface mount components are used in this project but do not be put off, as the component count is very low and there is a way to solder these tiny components using only 'ordinary' equipment.

Specification

Power supply:	+12V DC
Power source:	External PSU or via co-ax cables
Power consumption:	16mA
Gain:	up to 19dB
Frequency range:	DC-2GHz

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Optional Items

The following items, not included in the kit, may also be required.

16.5mm Heatshrink Sleeving	1m	(BA01B)
Gasket CAN	1	(FE40T)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is available separately. Full construction details may be found in Maplin Magazine Issue 81.

Order Code	Type	Price each
LT73Q	VHF/UHF Pre-Amp Kit	£14.99
GH84F	VHF/UHF Preamp PCB	£4.29

DIRECT CONVERSION SHORT WAVE RECEIVER



- ★ Receives Speech (SSB, DSB, AM) and Morse (CW)
- ★ Choice of Amateur Band, 160 to 10 metre
- ★ Reduction Drive 'Vernier' Tuning
- ★ Signal Strength Meter
- ★ Buffered RF Oscillator Output
- ★ On-board Voltage Regulator and Audio Power Amplifier

The cost of sophisticated ready-made commercial short wave receivers, often costing hundreds of pounds is generally the main reason why newcomers to the hobby are discouraged. However, good results may be obtained using relatively simple home constructed receivers of the direct conversion design. This type of receiver has the advantage of simplicity of construction and ease of alignment, with the minimum of test gear. In fact the only test gear required is a good general purpose multimeter and a non-metallic trimming tool for the RF transformers. The frequency range of the short wave bands start as low as 1.7MHz and extends up to 30MHz. To include all these bands on one receiver would present switching and tracking difficulties that would result in a compromise in performance. For this reason the receiver only covers one band, and this needs to be decided upon before embarking on construction. There are nine Amateur Bands as shown in the Table together with the corresponding tuning pack required. Which one you choose depends on your likely listening requirements. The 80 metre band is good for European stations after dark and British stations during the day, although if conditions are good much further stations could be received. The 20 metre band is good for Europeans and, if conditions are very good stations far away such as America, Africa and Australia could all be received. The choice is up to you but **DO NOT FORGET TO ORDER THE TUNING PACK WHEN ORDERING YOUR RECEIVER KIT.**

Tuning Kits

Four tuning kits are available as follows. Select the one you require from the table.

Amateur Band	Receiver Tuning Range	Tuning Pack
160m 1.810-2.000MHz	1.800-2.010MHz	1
80m 3.500-3.800MHz	3.490-3.810MHz	1
40m 7.000-7.100MHz	6.690-7.150MHz	2
10.100-10.150MHz	10.000-10.500MHz	2
20m 14.000-14.350MHz	13.990-14.400MHz	3
18.068-18.168MHz	18.000-18.500MHz	3

15m 21.000-21.450MHz	20.990-21.500MHz	3
24.890-24.990MHz	24.540-25.000MHz	4
10m 28.000-29.700MHz	A, 27.975-28.525MHz	4
	B, 28.475-29.025MHz	4
	C 28.975-29.525MHz	4
	D 29.475-30.025MHz	4

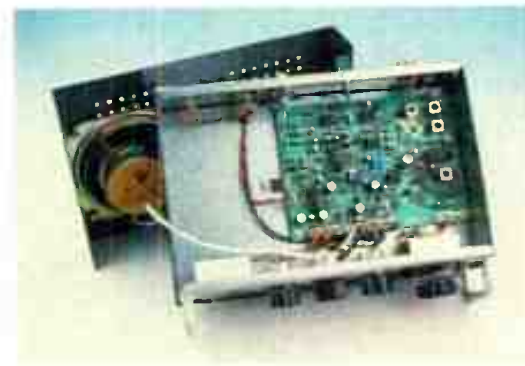
Optional Items

The following items, not included in the kit, may also be required.

Case	1	(XJ33L)
Chassis	1	(XJ41U)
Power Supply Unregulated	1	(YM85G)
Power Plug 2.5mm	2	(HH63T)
Fuse Holder In-line	1	(RX51F)
Fuse 1.25in. 1A	1	(WR11M)
Trim Tool Set	1	(BK34M)
Preset Trim Tool	1	(BK49D)
Grommet Small	1	(FW59P)
Pot Nut M10	1 Pkt	(FP06G)
Pot Washer M10	1 Pkt	(FP07H)
Spacer Tapped 6BA x 1/4 in	1 Pkt	(FD10L)
Bolt 6BA x 1/2 in.	1 Pkt	(BF06G)
Nut 6BA	1 Pkt	(BF18U)
Shake Washer 6BA	1 Pkt	(BF26D)
Isobolt M2 x 6mm	1 Pkt	(JD11M)
Isobolt M3 x 10mm	1 Pkt	(HY30H)
Isonut M3	1 Pkt	(BF58N)
Isoshake M3	1 Pkt	(BF44X)
Isobolt M4 x 12mm	1 Pkt	(BF49D)
Isonut M4	1 Pkt	(BF57M)
Isoshake M4	1 Pkt	(BF43W)

Kit and Special Parts

Tuning kits and the Receiver kit (which excludes the box, bracket and panels) are available. The pcb, pot mounting bracket and front and rear panels are available separately. Full construction details may be found in Maplin Magazine Issue 28. PCB dimensions: 145 x 107mm.



Order Code	Type	Price each
LM60Q	Direct Conv Rx Kit	£77.99
GD78K	Dir Conv Rx PCB	£13.99
LM61R	Tuning Kit 1	£3.75
LM62S	Tuning Kit 2	£3.49
LM63T	Tuning Kit 3	£3.99
LM64U	Tuning Kit 4	£3.49
JG47B	Dir Conv Bracket	89p
JG48C	Dir Conv F/Panel	£6.25
JG49D	Dir Conv B/Panel	£4.49

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AERIAL ACTIVATOR



NEW!

Features

- ★ Gain of over 15dB
- ★ Six wavebands
- ★ Useable with a wide range of radio receivers
- ★ Low power consumption
- ★ On-board voltage regulator
- ★ Signal input protection
- ★ Power input polarity protection
- ★ Internal battery or external power supply

Applications

- ★ Improve radio reception
- ★ Indoor active aerial
- ★ Active aerial tuner

The Aerial Activator is designed as an add-on device for your LW/MW/SW receiver. It is designed to increase the strength of the radio signals received over a wide range of frequencies. For LW/MW broadcasts and shortwave listeners using a general coverage receiver, the unit offers an improvement in reception even when used in conjunction with a small aerial system. The RF amplifier used in this design is based upon the SL560C data file first seen in the February 1994 issue of *Electronics*. The SL560C is a monolithic Integrated Circuit (IC) which contains three very high performance transistors and associated biasing components held in an eight-pin package. In this application it is configured as a 50Ω line driver circuit, with a gain of approximately 15dB.

Specification

Frequency range:	150kHz to 30MHz (six wavebands)
	1. 150kHz - 300kHz
	2. 300kHz - 600kHz
	3. 600kHz - 1.5MHz
	4. 1.5MHz - 4MHz
	5. 4MHz - 10MHz
	6. 8MHz - 30MHz
RF gain:	15dB
Noise figure:	2dB
Input impedance:	Variable
Output impedance:	50Ω
Internal power:	Four AA cells (+6V DC)
External DC power:	-10 to +16V DC
Supply current	20mA (internal batteries) 28mA (external +12V DC)

Optional Items

The following items, not included in the kit, may also be required.

Metal Panel Box M4005	1	(WY02C)
M3 x 16mm Steel Screw	1Pkt	(JY24B)
M3 Steel Washer	1Pkt	(JD76H)
M3 Shakeproof Washer	1Pkt	(BF44X)
M3 Steel Nut	1Pkt	(JD61R)
M3 1/4 in. Spacer	1Pkt	(FG33L)
4prs 1in. Velcro	1Pkt	(FE45Y)
BNC Round Socket 50Ω	1	(HH18U)
Small Terminal Post White	1	(FD71N)
Small Terminal Post Green	1	(FD71N)
UHF Socket Round	1	(BW84F)
Panel Mount 2.5mm Power Socket	1	(JK10L)
Alkaline AA Cells	4	(FK64U)
AC Adaptor Unregulated 300mA	1	(XX09K)
Standard 2.5mm Power Plug	1	(HH62S)
BNC Plug 50Ω	1	(HH17T)
PL259 Plug	1	(BW81C)

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UHF Reducer Small	1	(BW82D)
UHF Reducer Large	1	(BW83E)
4mm Plug White	1	(HF67X)
4mm Plug Green	1	(HF65V)
144/430 BNC Aerial	1	(JM12N)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 80.

Order Code	Type	Price each
LT58N	Aerial Activator	£44.99
GH78K	ATU/Active Ant PCB	£8.99
KP68Y	Aerial activator F/P	£1.99

6BA Shake washer (4 required)	1 pkt	(BF26D)
6BA x 1/4 Hex Threaded Spacer (4 required)	1 pkt	(FD10L)
Stick-on Feet	1 pkt	(FW38R)

Kit and Special Parts

A complete kit is available. A pcb, screening plate and a front panel are also available separately. Full construction details may be found in Maplin Best of Projects Book 5.

Order Code	Type	Price each
LM05F	Active Aerial Kit	£69.99
GD18U	Active Aerial PCB	£16.99
GD26D	Aerial Screen Plate	£1.20
FA99H	Active Aerial F/pnl	£5.99

Kit and Special Parts

A complete kit, excluding case and front panel, is available. The pcb, coil former and printed front panel are also available separately. Full construction details may be found in the Maplin Best of Projects Book 5. PCB dimensions: 193 x 113mm.

Order Code	Type	Price each
LM06G	Aerial Tuner Kit	£53.99
FD07H	Aerial Tuner Plate	99p
GD19V	Aerial Tune PCB	£3.99
YM61R	Pre-drilled Tube	£5.99
FD11M	Aerial Tuner F/panel	£4.99

ACTIVE AERIAL



An active aerial pre-amplifier having five selectable tuned RF ranges which cover a total frequency range of 150kHz to 30MHz. The tuning of the amplifier is very similar to that of a radio using the band selector switch and a tuning control. To obtain the best results the active aerial is tuned to the same wavelength as the receiver for a peak in signal strength. The Active Aerial offers very good selectivity. The unit includes a gain control operating on the MOSFET amplifier, a fine tuning card, and a low battery LED warning indicator. The unit is powered by one standard PP3 size 9V battery. An external power socket is provided for an external 9V DC battery eliminator, 12V car battery or any supply of ±7V to 15V output. Connections to aerial and receiver are made using UHF series connectors, with a direct, straight through or 'by-pass' mode operative when the unit is switched off. A telescopic aerial is included for use where a proper outdoor aerial is not practical or possible. If the Aerial Tuning Unit (described elsewhere in this section) is to be used in conjunction with the Active Aerial then this should be connected between the aerial and the input of the Active Aerial.

Specification

Frequency Range	150kHz to 30MHz
Gain	Variable 0 to +20dB
Input Impedance (telescopic aerial)	50kΩ
Input Impedance (external aerial)	50Ω
Output Impedance	50Ω
Power Supply (internal)	PP3 battery
Power Supply (external)	+7V to +15V DC
Low Batt Indicator Threshold	<+7V DC

Optional Items

The following parts, not supplied in the kit, can be used if you wish to put the Active Aerial Kit into its own box.

Blue Case 222	1	(XY45Y)
Front Panel	1	(FA99H)
PP3S Silver Seal Battery or AC Adaptor Regulated	1	(FK62S)
Re-usable Cable Tie	2	(RK59P)
1/2 in 6BA Bolts (4 required)	1 pkt	(BF06G)
6BA Nut (4 required)	1 pkt	(BF18U)

SW/MW AERIAL TUNING UNIT

One of the most common types of receiving aerials, especially for Short-Wave, is the end-fed, long wire. An average length for such an aerial could be between 20 and 30 metres, the main disadvantage of this being that its impedance as presented to the aerial input of the receiver will vary depending on frequency, the range of impedance values swinging from a few ohms to several thousand ohms. The relationship between the impedance and the wavelength of the aerial will vary, appearing at a full or half wavelength as a relatively high impedance source to the receiver, while at quarter-wave, or at an odd multiple of quarter-waves it is much lower. Given that the aerial impedance of most communications receivers is 50Ω, unless the impedance of the aerial matches this exactly all of the RF energy will not be efficiently transferred from the aerial to the receiver. The greater the mismatch, then the weaker the signal will appear, and under adverse conditions it could vanish completely into background noise. This Aerial Tuning Unit comprises two variable tuning capacitors and a tapped inductor in a passive 'T' configuration. This arrangement covers approximately 600kHz to 30MHz, and matches the aerial load impedance to the input impedance of the receiver. Operating bands are switch selectable, and the ATU can be quickly switched in or out of the system by the bypass button, so signal leads remain undisturbed.

The ATU can also be used for transmitter aerial matching in the same frequency range, including the 27MHz citizens band, up to a power rating of 10 Watts.



Specifications

Frequency Range	600kHz to 30MHz
Input Impedance	Aerial = variable
Output Impedance	Receiver = 50Ω
RF Power-handling Capability	10 watts max.

Optional Items

The following items, not included in the kit, may also be required.

Case Blue 222	1	(XY45Y)
Front Panel	1	(FD11M)
Stick-on Feet	1 Pkt	(FW38R)

AF NOTCH FILTER

An add-on for a communications receiver to go with the ATU and Active Aerial projects to form a complete high performance system. The Notch Filter uses solid state capacitive dividers in order to 'clean up' the audio output from a receiver. Frequently, when listening to stations on the short wave bands the audio can be accompanied by a loud, interfering whistle. The origin of this interference is varied, it may be local electronic equipment, an adjacent station very close in frequency or even military or commercial jamming attempts. Most good quality communications receivers have tight IF filtering and maybe a switched bank of filters to select the appropriate bandpass for the transmission mode being received. But if the interfering signal is within this passband it will still be heard. The AF Notch Filter has two functions, to first notch out an interfering tone within a tuneable range of 200Hz to 4.5kHz, and secondly, over the same range, it can peak or boost the wanted tone received, very useful when trying to extract morse or data transmission. A difference of unwanted to wanted signal ratio of up to 61dB can be achieved in this way.



Specification

Test Conditions:

Power supply voltage:	+12V
Frequency input:	1kHz
Loudspeaker:	8Ω
Input level:	0dB

Results:

Tuning range of filter:	200Hz to 4.5kHz
Notch mode:	-55dB
Peak mode:	+6dB and -12dB off peak (difference of 18dB)
THD:	0.04% at tape output
Power output:	1 Watt peak
Quiescent current:	47mA
Current at full output (8Ω):	200mA
Current at full output (4Ω):	400mA
DC input voltage range:	Minimum: +9V Maximum: +14V

Optional Items

The following items, not included in the kit, may also be required.

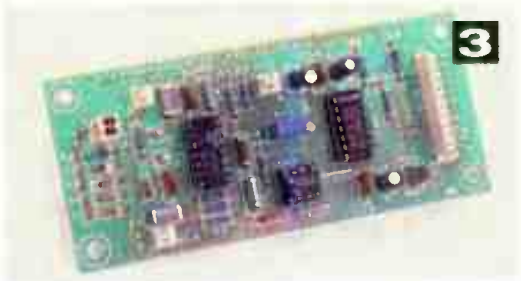
Blue Case 212	(XY43W)
Front Panel	(FP05F)
Standard Power Plug	2.5mm (HH62S)

Kit and Special Parts

A complete kit is available and the pcb, metal screening cans and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 21. PCB dimensions: 95 x 145mm.

Order Code	Type	Price each
LM16S	Notch Filter Kit	£36.99
GD30H	Notch Filter PCB	£10.99
FP57M	Screening Can High	£1.20
FP58N	Screening Can Low	89p
FP05F	Notch Filter F-Panel	£5.99

RTTY FSK DEMODULATOR



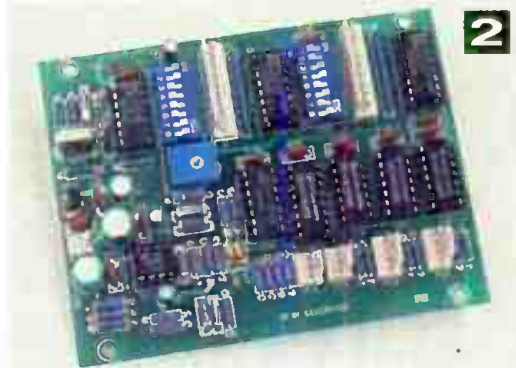
The reception and transmission of Radioteletype (RTTY) is an increasingly popular pastime amongst radio amateurs. This unit complements the TU1000 self-contained terminal unit, in that it does not contain tone generation circuitry and therefore is ideal for use when demodulation only is required (i.e. no transmission capability). This RTTY Demodulator project forms part of a building block set of units that can be used to construct a custom RTTY system, tailored exactly to the needs of the user/operator. The RTTY Demodulator will convert two-tone encoded signals to a serial data stream and the unit also incorporates a carrier detect circuit to prevent reception of spurious data when a transmission ceases. The tone shift system used is set by the values of certain components. The serial data output from the unit will need to be decoded and normally this will be achieved by using a microcomputer with a serial I/O port.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 32.

Order Code	Type	Price each
LM95D	RTTY D Mod Kit	£16.75
GD94C	RTTY PCB	£3.49

AFSK GENERATOR



- ★ Easy construction
- ★ Crystal controlled oscillator
- ★ On-board voltage regulator
- ★ No alignment required
- ★ Simple testing

The transmission of Radio Teletype (RTTY) using Audio Frequency Shift Keying (AFSK) requires the accurate generation of two tones. In this project this is achieved by using digital circuitry locked to a crystal controlled clock with the frequency of the tones set by two 8-way dual-in-line switches. These tones represent

the logic conditions high or low, commonly referred to as mark or space tones. The frequency difference (shift) can vary considerably, but in practice three are used: 170Hz, 425Hz and 850Hz. The AFSK generator has the ability to be set to any of these shifts. In addition to internal dual-in-line switches, the shifts may be set externally by means of two 8-bit digital inputs.

Kit and Special Parts

A complete kit including the pcb is also available. Full constructional details may be found in Maplin Magazine Issue 39. PCB dimensions: 81 x 104mm.

Order Code	Type	Price each
LP13P	AFSK Generator Kit	£26.99

RTTY UNIT TU1000



'RTTY' is an abbreviation of 'Radio Teletype', a means of transmitting and receiving information by radio in the form of the written word. RTTY can be used in place of telephone modems with the advantage of avoiding telephone bills. Although in order to transmit the user must hold an amateur radio transmitting licence, this isn't the case if 'listening' only is intended. The TU1000 converts RTTY signals (from the short-wave band) into RS232 logic compatible with home computers having this facility. The TU1000 requires the addition of a short-wave communications receiver, that need not be necessarily expensive. The TU1000 will also encode RS232 into RTTY should you have the required transmitting licence and communications transceiver. The short-wave bands abound with commercial stations sending news, weather reports and other services, 24 hours a day. You will need a receiver with SSB demodulation to receive them. Almost any station can be received by the TU1000 as it is very versatile, having fixed and variable tone shifts, VCO controlled filters etc.

Optional Items

The following items, not included in the kit, may also be required.

Blue Case 222		(XY45Y)
DIN Plug L/S	2 off	(HH24B)
DIN Plug 5-pin		(HH27E)
13 Amp Plug		(RW67X)
3 Amp Fuse		(HQ32K)

Kit and Special Parts

A complete kit excluding optional items is available and the pcbs, front panel and rear panel are also available separately. Full construction details may be found in Best of Maplin Projects Book 3.

RTTY PCB: 195 x 121mm.
Meter PCB: 71 x 30mm.

Order Code	Type	Price each
LK53H	TU1000 RTTY Kit	£73.99
FJ53H	TU 1000 Front Panel	£5.25
FJ54J	TU 1000 Rear Panel	£4.25
GB67X	RTTY Terminal	£14.95
GB73Q	Meter PCB	£1.99

▶ IT'S A FACT! ◀

Nikola Tesla (1856-1943) was an American electrical engineer and inventor. In 1888 Tesla designed the first practical system of generating and transmitting alternating current for electric power. The American rights were bought by George Westinghouse, and in 1895 Tesla's alternating-current motors were installed at the Niagara Falls power project. Tesla's many inventions include high-frequency generators (1890) and the Tesla coil (1891), a transformer with important applications in the field of radio communications.

16

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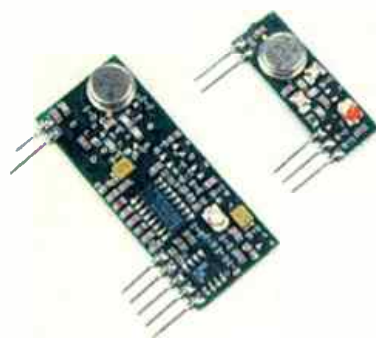


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418MHz TRANSMITTER AND RECEIVER MODULES

Radiometrix



3

Features

- ★ Ready made and tested modules
- ★ DTI approved to MPT 1340
- ★ High stability
- ★ Small size (SMD-Based)
- ★ Ease of use
- ★ Wide supply range
- ★ Low current

Applications

- ★ Domestic and commercial security
- ★ Guard patrol protection
- ★ Lone worker protection
- ★ Medical alert
- ★ Nurse call systems
- ★ Mobile panic attack
- ★ Site paging receivers
- ★ Paging car alarms
- ★ Fire alarms
- ★ Remote control systems
- ★ Door bell

The TXM-418-A radio transmitter and matching SILRX-418-A receiver are low cost PCB mounting modules capable of reliably transferring analogue and digital data over distances of 50m in buildings, and over 200m under open field conditions. The modules can transmit data at speeds up to 5kbit/s. The transmitter is type approved to DTI (RA) specification MPT 1340, thus avoiding the need to submit the finished product for further approvals. Optimised for battery powered operation, both modules are designed for reliability and performance. They perform well with very small antennas, and require no complicated RF alignment.

The modules are suitable for general purpose telemetry/telecommand, where their small size and high data rates may be used to advantage. Typical applications include: domestic and commercial security, guard patrol/lone worker protection, medical alert, nurse call systems, mobile panic attack, site paging receivers, paging car alarms, fire alarms, remote control etc.

The transmitter has a DC to 10kHz modulation bandwidth and will accept direct analogue (AFSK) or digital data. A modulation lowpass filter (10kHz @ -6dB, 1st order) is used internally. Data input, pin 5, is normally driven directly by CMOS logic levels from a data encoder IC, such as a UM3750 (UK77J), which should be powered from the same power supply as the transmitter module.

The positioning of the receiver antenna is very important and will determine the system range. The antenna should be kept clear of other metal in the system, and ideally should protrude directly out of the case in which it is enclosed.

Specification MPT 1340 requires that the transmitter must only be used with an integral antenna.

Three types of integral antenna are approved for use with the TXM-418-A transmitter module: the helical aerial, which is a wire coil connected directly to pin 2 at one end, and left free at the other; the loop aerial which consists of a loop of PCB track, tuned by a fixed or variable capacitor, and fed from pin 2 and the ground end, pin 1; the whip aerial, which can be a wire, rod, PCB track or combination that is connected directly to pin 2 of the module. Optimum total length is 17cm (a quarter-wavelength of 418MHz).

The choice of antenna and its position will greatly influence the effective range of the transmitter.

Antenna parameters	Type of Antenna		
	Helical	Loop	Whip
Ultimate performance	Good	Fair	Excellent
Ease of design set up	Good	Fair	Excellent
Size	Excellent	Good	Fair
Immunity to proximity detuning	Good	Excellent	Fair

Specification - Transmitter

Power supply voltage:	6V to 12V DC
Current consumption:	6mA (6V) to 14mA (12V)
Effective Radiated Power (ERP):	-10dBm (6V) to -6dB (12V)
Initial frequency accuracy:	±50kHz
Overall frequency accuracy:	±80kHz
Spurious radiation:	To MPT 1340
FM deviation:	±25kHz
Modulation bandwidth (analogue):	DC to 10kHz (-3dB)
Pulse width (digital modulation):	100µs

Specification - Receiver

Operating supply range (VCC):	4.5V to 9V DC
Supply current:	13mA
Overall frequency accuracy:	±100kHz
Sensitivity:	0.5µV for 20dB S/N
Carrier detector threshold:	1µV
RF input impedance:	50Ω
LO leakage:	-54dBm
IF bandwidth:	250kHz
AF output level:	500mV pk to pk
AF bandwidth:	DC to 5kHz (-3dB)
Frequency to voltage conversion:	10mV/kHz
Data output - logic low:	0.2V
Data output - logic high:	3.8V
Data bit duration:	0.2ms to 30ms

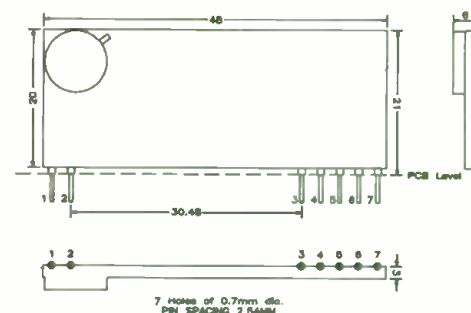
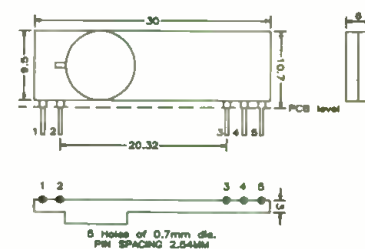
Data mark/space ratio:	5% to 66%
Data settling time:	10ms
Enable time:	1.5ms
Signal detect time:	1ms

Transmitter

- Pin 1: RF GND - internally connected to pin 4 and should be connected to the ground plane against which the integral antenna radiates.
- Pin 2: RF out - connects to the integral antenna with an output impedance of 50Ω.
- Pin 3: Positive supply.
- Pin 4: 0V connection for the modulation and supply.
- Pin 5: Data In - should be driven directly by a CMOS logic device powered from the same supply voltage as the module.

Receiver

- Pin 1: RF in - nominal impedance 50Ω
- Pin 2: RF ground - internally connected to pin 4, and should be connected to any ground plane against which the antenna works.
- Pin 3: Detect - may be used to derive a carrier detect to enable external circuits when a signal is being used. other wise a 10kΩ pull up resistor to pin 5 should be connected.
- Pin 4: 0V
- Pin 5: +4.5V to 9V DC supply.
- Pin 6: AF - FM demodulated output which can be used to drive analogue data decoders.
- Pin 7: DATA - a digital output derived from an internal data slicer and is a squared version of the AF output.



Experimental circuits and explanations for using these modules are described in the Maplin Magazine Issue 73.

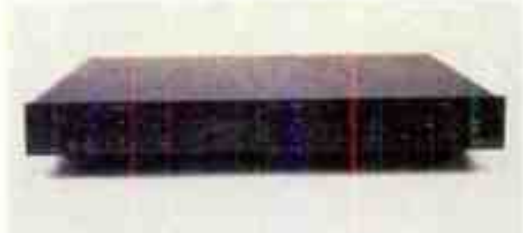
Order Code	Type	Price each
AM27E	418MHz Tx	£17.99
AM28F	418MHz Rx	£29.99

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VELLEMAN RADIO PROJECTS

K4500 DIGITAL SYNTHESIZER FM TUNER

3



- ★ Superb sound quality
- ★ Remote control facility (when used with VE47B Infra-red transmitter)
- ★ Complements the VE99H stereo valve amplifier and VE46A digitally-controlled preamplifier
- ★ Search tuning - adjustable sensitivity
- ★ 8-LED signal strength indicator
- ★ 40 available presets
- ★ Two selectable aerial inputs
- ★ Preset station naming

This unit is a microprocessor-controlled single-conversion VHF stereo FM phase-locked loop tuner with alphanumeric display and infra-red remote control facility. The tuner has been designed to complement the Digitally-Controlled Preamplifier (Velleman Kit K4100). This tuner offers many features, one of which is the selection between two 75Ω aerial inputs. This would allow two aerials to be pointing in different directions, for the reception of VHF programmes from different transmitters.

Even with a decent aerial, mounted on the roof, wall, or in the loft, there will always be stations too weak to be heard. For this reason, an adjustable 'stop' sensitivity is provided on the rear panel; this is adjusted so that only the very weakest stations are overlooked when the tuner is operating in 'seek' mode. The tuner is provided with a total of 40 presets to cope with the growing number of VHF broadcasters. A unique feature of this superb tuner is that each of the 40 channels can be assigned a 4-character 'identification tag', such as the abbreviated station name. Station frequency and identification apart, the unit also stores the selected aerial socket, and can even remember which station it was last tuned to on powering up from either 'stand-by' mode or from the mains.

An infra-red remote receiver is incorporated into the unit; this is compatible with the 15-Channel Infra-Red Transmitter that also controls the Digitally-Controlled Preamplifier.

Specification

Tuning range:	87.5 to 108MHz, in 50kHz steps
Sensitivity:	5.5dBu (1 st 8μV)
S/N ratio:	80dB (A-weighted)
Distortion	
mono:	0.08%
stereo:	0.2%
Channel separation:	40dB (1kHz)
Frequency response:	5 to 15kHz (-3dB)
Output voltage:	550mV (100% modulation)
Number of presets:	40
Supply voltage:	220V to 240V AC
No. of 75Ω aerial inputs:	2

Optional Items

The following items, not included in the kit, may also be required.

Heat shrink CP24	1m	(BF87U)
Silicone grease tube	1	(HQ00A)
Hex trim tool	1	(BR48C)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 67.

Order Code	Type	Price each
VF20W	G12 Velleman Kit K4500	£199.99

K2622 AM/FM ANTENNA AMPLIFIER



Do away with weak signals! The K2622 gives you 22dB gain where it's needed. DC supply direct or via the coax cable (50 to 75Ω impedance), metal box included.

Frequency range: 10 to 150MHz.
Power supply: 12V at 3mA.
Dimensions: 86 x 36 x 24mm.

Order Code	Type	Price each
VE18U	Velleman Kit K2622	£9.99

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K2659 MORSE DECODER WITH LCD DISPLAY



Features

- ★ LCD readout
- ★ Adjustable centre frequency
- ★ Adjustable sensitivity and lock range
- ★ Low voltage operation
- ★ Compact size

If you have problems trying to decode those mysterious Morse Code signals, or keeping up with experienced signallers or automatic stations, then this decoder is the ideal solution. It will keep up with fast signallers, and conveniently 'notates' everything on a clear alphanumeric LCD readout. The decoder operates over a wide range of audio frequencies and picks up the Morse from the speaker of a suitable receiver using an on board electret microphone. Sensitivity, centre frequency and maximum frequency deviation are adjustable.

Optional Items

Display:	Alphanumeric LCD, 1 line of 16 characters
Power supply voltage:	9V to 12V DC
Power supply current:	100mA DC
Centre frequency:	Variable 700Hz to 1.9kHz
Dimensions:	105 x 70 x 28mm

Kit and Special Parts

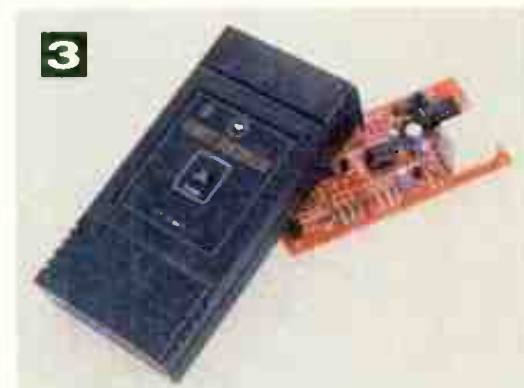
A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 53.

Order Code	Type	Price each
VE89W	Velleman Kit K2659	£59.99

REMOTE CONTROL PROJECTS

INFRA-RED REMOTE CONTROL SWITCH

— a Sound Master Kit



- ★ Ranges in Excess of 10 Metres
- ★ Relay Output
- ★ Latched or Momentary Output

In many situations it may be impractical to use direct manual switching, especially when switches are located in inaccessible places or where it is inconvenient to operate them. A useful option for short range is the use of infra-red remote control. This has the advantage of needing no extra wiring to a control unit and is relatively free from interference associated with radio control. This project will provide remote switching of a single pole changeover relay with the provision of either selecting a latched output or momentary output. LED's on both the transmitter and receiver flash when they are operating. A purpose made case is provided for the transmitter although the receiver needs to be housed, preferably in a metal enclosure.

Specification

Receiver Supply Voltage:	9V to 12V
Standby Current:	35mA @ 12V
Operating Current (relay switched):	120mA @ 12V
Transmitter Power Supply:	9V battery (PP3 alkaline)
Operating Current:	Dependent on required range, but between 35mA to 180mA
Carrier Frequency:	18.5kHz to 23.5kHz

Kit and Special Parts

A complete kit of parts for the transmitter and receiver is available. Full construction details may be found in Maplin Magazine Issue 33. A ready assembled version is also available.

Order Code	Type	Price each
LM69A	IR Remote Switch Kit	£17.99
AM12N	Remote Switch Assm	£32.99

▶ IT'S A FACT! ◀

FETs

FETs operate in a different manner to transistors, which are normally classified as bipolar devices i.e. both positive and negative carriers are used. The FET makes use of the electric field established in a p- or n-type channel of semiconductor material to control the flow of current through the channel. The current path is wholly through one type of channel, normally the n-type as the mobility of its carriers (electrons) is higher than for p-type (holes). Such devices are referred to as *n-channel unipolar* devices. Since the electric field is established by a bias applied to the gate connections, the FET is a voltage controlled device, and therefore, has a very high input impedance.

UM3750 ENCODER/DECODER



Features

- ★ Wide supply voltage range
- ★ Same chip and PCB can be used as encoder and decoder
- ★ Up to 4096 unique codes Applications
- ★ Alarm control systems
- ★ Security systems
- ★ Automatic door openers
- ★ Remote control

The UM3750 encoder/decoder IC is a complete digital code transmit and receive system. A high quality PCB is available on which can be built an infra-red transmitter or a receiver (but not both sharing the same board). In the transmit mode 12-bit data, offering up to 4096 unique values, can be presented in parallel to the IC which is provided with internal pull-up resistors, thus greatly reducing component count and enabling simple, single pole switches or buttons to be used. Using the suggested component values, a clock frequency of 100kHz will generate 43.4 coded 12-bit words per second. The PCB has provision for two infra-red emitter LEDs and an indicator LED if desired. For receiving the addition of a dual op-amp as a preamplifier for an infra-red photo-diode is made instead, and the incoming signal is in serial bit form when received, which is sequentially compared with a local programmed 12-bit word pattern which should be identical for a single signal output to go active low. Several decoders can be cascaded, each simultaneously attempting to match words; in this way two or more 'channels' can be accommodated for simple remote control applications.



Specification	
Supply voltage range:	+3 to 11V DC
For $V_s = 9V$:	
Receive input low:	+0.5V max.
high:	8.5V min.
Transmit/signal	
output level low:	1V, 2mA sink
high:	3.5V, 5µA source

Full information is given in the 'Data File' in Maplin Magazine Issue 36. See end of this section.

A PCB only is available for the UM3750 application circuit.

Note: as these projects are intended as 'building block' projects only, they are not eligible for our 'Get-you-working' service.
PCB dimensions: 76 x 63mm.

Order Code	Type	Price each
GE33L	UM3750 PCB	£2.49

LOW POWER RADIO CONTROL SYSTEM

- ★ 27MHz Operation For Ground-Based Model Control
- ★ Two Positive Pulse PWM Channels
- ★ Two Digital On/Off Channels

Since 1981 and the legalising of Citizens Band Radio on 27MHz, the licensing requirement for model radio control is no longer operative. However, certain conditions apply to both users of this band, and for RC modellers this means that signal transmissions must be within the frequency range 26.96MHz to 27.28MHz at a maximum mean power of 1.5W. Higher frequencies on this band are used for CB transmissions. The 35MHz band (35.005 to 35.205) is also available for radio control, but for use with model aircraft only - not ground-based models, and the 458MHz band would be complex for constructors to set up and align. Therefore a 27MHz system is used with limited power output and receiver sensitivity to avoid interference both to and from other users on the band.



Although capable of six channel operation the design utilises two channels (1 and 2) for pulse width modulation (PWM) and four channels for encoded digital (on/off) information.

Kit and Special Parts

Kits for the 27MHz transmitter and receiver are available, but they do not include crystals, batteries, aerial, or hardware. Full construction details may be found in the Best of Maplin Projects Book 6.

Tx PCB: 57 x 46mm

Rx PCB: 42 x 59mm.

Order Code	Type	Price each
LK55K	27MHz Transmitter Kit	£13.49
LK56L	27MHz Receiver Kit	£10.99
YQ69A	LM1871 Xmitter PCB	£1.80
YQ70M	LM1872 Receiver PCB	£1.80

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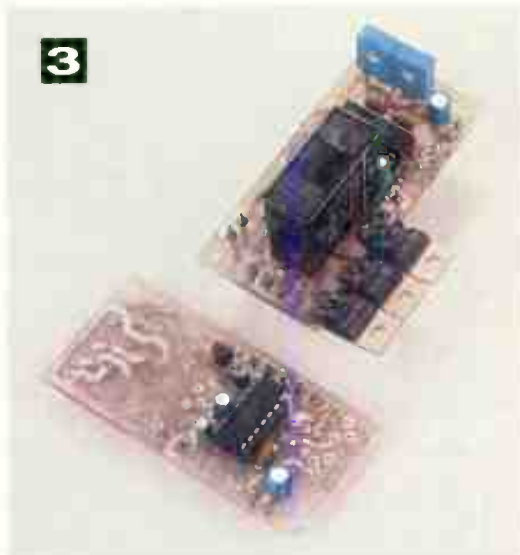
ZN419/409 PRECISION SERVO MOTOR DRIVER

Features

- ★ High output drive
- ★ Low component count

Applications

- ★ PWM motor speed control
- ★ PWM servo control



The ZN419 is a Pulse Width Demodulator chip for servos and motors. This project has been designed with a low component count and small power consumption in mind, making this ideal for boats and planes. Equivalent to the PWM motor drive project this module controls a motor, plus a servo unit. Either one of two different circuits can be built using the PCB: For the servo option a pulse width modulated input is needed to drive the module, with variable pulse width between 0.2ms and 2.5ms. A supply of 4V to 6V at a current of 8mA is needed.

For the motor option a PWM input with variable pulse widths is again required. also a 4V to 6V supply. In addition a high current supply (6V to 8V) is needed to drive the motor.

Parts for the project have to be ordered separately from the PCB.

Full construction details may be found in Maplin Magazine Issue 45.

Note: this is intended as a 'building block' project, and is not eligible for our 'Get-you-working' service.

Printed Circuit Board

Size 75 x 35mm.

Order Code	Type	Price each
GE83E	ZN419 PWM PCB	£3.25

PWM MOTOR DRIVE MODULE



- ★ 6 to 12V Forward and Reverse Model Motor Driver
- ★ Proportional Control Offers Smooth Transition from Off to Full Speed
- ★ Ideal for Model Boats, Cars and Robotics

A Model Motor Drive Module that will operate a small electric motor in either direction as required, with

proportional speed control using the Pulse Width Modulation method. The output circuitry will handle motor stall currents up to 5A, and uses a power pack independent of the control circuit batteries, thus avoiding upsetting modulation of the control circuit. The motor driver initially caters for 6V motor and battery combinations (the model radio control standard), but optional extras can be added to uprate the module for 12V operation, and provide for increased current output demanded by the bigger motors, e.g. electrically driven model aeroplanes. The module also finds applications in robotics, where computer control of movement and direction is required.

Kit and Special Parts

A complete kit excluding optional relay and capacitors is available, the pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 3. A ready assembled version is also available.

PCB dimensions: 57 x 71mm.

Order Code	Type	Price each
LK54J	PWM Motor Drive Kit	£10.99
GB71N	PWM Motor Drive PCB	£1.99
AM13P	PWM Motor Dr Assm	£17.99

SERVO TESTER



- ★ Two Automatic Check Modes
- ★ Manual Switch Incorporated
- ★ Checks Servo Travel, Sensitivity, Transit Times and Overshoot
- ★ Simple Construction

Ideal for radio control enthusiasts, this easy to build project can be used to measure the performance of servos and aid fault finding in the unit itself or in the remote control system. Proportional servo output is fully adjustable, and two automatic modes of operation allow testing of the slow and fast response times of the servo. In the first automatic mode the output signal is slowly changed from one end of the range to the other and back again. This tests the slow response of the servo (regulator response). The speed of change is adjustable from about 0.2 seconds to 50 seconds for full travel. The second automatic mode switches the output signal from one end of the range to the other, to test the fast response of the servo (servo response) and repeatable accuracy. The time between switching is adjustable over the same range as in the first automatic mode. The tester uses the standard format train of positive going pulses in a frame rate of 20ms. The Tester requires a 4-8V radio control battery pack as a power supply, or alternatively a suitable 5V supply up to a maximum of 1A output can be used.

Kit and Special Parts

A complete kit of parts is available. A pcb and the printed stick-on front panel for the Servo Tester are also available separately. Full construction details may be found in Maplin Projects Book 23.

Order Code	Type	Price each
LM23A	Servo Tester Kit	£15.49
GD41U	Servo Tester PCB	£2.20
FP75S	Servo Tester FPanel	£2.75

SLOW CHARGER



- ★ Reverse Polarity Protected
- ★ LED Charging Indicator
- ★ Can be Used with 7.2V or 8.4V Packs
- ★ Simple to Construct

High performance model racing cars and electric powered model aircraft make huge demands on their ni-cad racing packs. For optimum model performance, ni-cad's must be able to deliver extremely high currents whilst maintaining the rated terminal voltages for long periods of use. The regular rapid charging techniques employed in the field, tend to reduce the capacity of the ni-cad battery packs, preventing the full charge/discharge parameters from being reached. To maintain maximum ni-cad capacity, it is necessary to regularly slow charge discharge the pack at regular intervals and for reduced capacity ni-cads, a sequential cycle of slow charge/discharge over several days can restore much of the original capacity. The Slow Charger is ideal for charging both 7.2V and 8.4V ni-cad battery packs over a period of 10 to 15 hours. Instructions for the slow discharge of packs are provided in the construction details.

Optional Items

The following items, not included in the kit, may also be required.

Bulb MES 6V 0.6W	1	(WL78K)
MES Batten Holder	1	(RX86T)
Tag 4BA	1 Pkt	(BF28F)
Race Pack Lead Female	1	(JG05F)
High Power Resistor 22Ω 3W	1	(W22R)

Kit and Special Parts

A complete kit of parts excluding Optional items is available. A pcb is also available separately. Full construction details may be found in Maplin Projects Book 25.

PCB dimensions: 38 x 33mm.

Order Code	Type	Price each
LM39N	Slow Charger Kit	£8.49
GD71N	Slow Charger PCB	80p

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RAPID TRACK SIDE CHARGER FOR NI-CAD RACING PACKS

3



- ★ Electronic Timer
- ★ Trickle Charge
- ★ Reverse Polarity Protection
- ★ Audio and Visual Charging Indicator
- ★ Portable

A Rapid Charger for model car Ni-Cad battery packs. The charger is powered from a conventional 12 volt lead acid car battery, which can be left in the vehicle or removed for track side use. Housed in a tough steel case the Rapid Charger is ideally suited for use at outdoor off-road race meetings.

Specification of Prototype

Supply voltage:	12V lead-acid car battery
Supply current:	5A maximum
Batteries charged:	6 cell 7.2V and 7 cell 8.4V racing packs
Charge time:	7.5, 15 and 30 minutes
Charge current:	3A for 7.2V packs and 1.8A for 8.4V packs
Trickle charge:	60mA for 7.2V packs and 40mA for 8.4V packs
Audio/visual:	Red LED charging indicator, Piezo ticker sounder
Case dimensions:	Width 118mm, length 143mm, height 51mm

Kit and Special Parts

A complete kit of parts including pcb but excluding front panel and case is available. The stick-on front panel and pcb are available separately. Full construction details may be found in Maplin Projects Book 25.

PCB dimensions: 101 x 130mm.

Order Code	Type	Price each
LM40T	B2 12V Rapid Charger	£19.99
GD70M	12V Rapid Chgr PCB	£2.99
JG19V	Rapid Chgr F/Trim	£2.99

DIGITAL MULTI-TRAIN CONTROLLER

4

Features:

- ★ 14 locomotives individually controlled on the same track
- ★ Any 4 loco's controlled simultaneously
- ★ Automatic short circuit protection
- ★ Supply always present for carriage lighting, etc.
- ★ Remote control and computer interfacing
- ★ Low-cost, two wire system
- ★ Receiver has modern microprocessor technology

Railway enthusiasts have for many years appreciated the need for a control system that enables trains to be driven as if the operator were in the driving cab of the locomotive. This not only means the control of speed and direction of the locomotive, but also the ability to move anywhere on the layout without the need for

track isolation or switching, thus making the wiring of the layout much simpler.

This system fulfils all these needs by producing a constant 18V DC on the track with digital information superimposed on it, to which only a selected train or trains will respond. The permanent track voltage also means that locomotives' headlights, carriage lighting and many accessories may be used unaffected by the speed of the trains. This system can control up to 14 locomotives all on the same track, and any four of these may be driven independently at one time. Provision is also made for any or all of the four control units to be operated by a 7-bit digital input, thus enabling remote control either from hand-held units (using wire or radio) or from a home computer, giving full control of direction and speed.



The completely redesigned receiver module uses the very latest PIC16C54 IC which replaces most of the components used in the original design. Other advantages are a smaller PCB that has a 'breakable' power section, to allow the controller to be fitted in restricted spaces. This allows the receiver to be used with other motorised models, such as Scalectrix, trams etc.

The common/PSU kit includes all the parts to build the common board and PSU. A suitable punched and painted aluminium case with sloping front is also available.

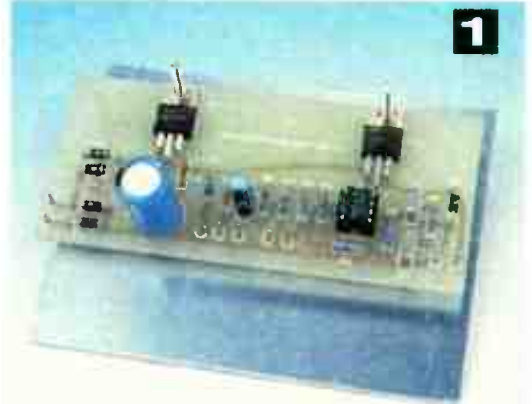
Kits and Special Parts

A complete kit of parts for the common board and PSU (including the PCB, PSU, and front panel, but not the case) is available. Additionally, a kit of parts for one train controller (up to four will fit in the case) is available. The common board, controller and receiver PCBs are all available separately. Full construction details are described in Maplin Magazine Issue 71.

Order Code	Type	Price each
LW61R	C4 Train Common/PSU Kit	£47.99
LW62S	Train Control Kit	£9.99
LT29G	Train Rx Kit	£14.99
XG09K	Train Control Case	£24.99
XX47B	Train Cntrl Front Pnl	£6.49
GA72P	Train Common PCB	£3.75
GA73Q	Train Control PCB	£2.75
GH41U	Dig Train Rx PCB	£2.49

CONTROL-A-TRAIN

- ★ Pulse Width Modulated for Excellent Low Speed Performance
- ★ Inertia Control of Momentum and Braking
- ★ Box or Panel Mounted
- ★ Easy to Build
- ★ Low Cost



Things have moved on from the days when model train controllers were little more than a rectifier and a high power potentiometer (called a 'rheostat'), and using modern electronic devices it is possible to produce a simple controller that has quite advanced facilities. This design is based on just two operational amplifiers but it has a pulsed output for good starting and low speed performance, plus simulated inertia, momentum and braking. It also has output current limiting which protects the circuit when the inevitable overloads and short circuits occur. The unit is designed to operate from the 15 volt AC output from a train transformer or from the 15 volt AC auxiliary output of a train controller, or it could easily be built as a self-contained unit having its own built-in mains transformer if desired although details are not given for this. It should also operate from the 12V DC output of a train controller or transformer unit.

This controller uses the method of pulse control; the idea is to provide a series of output pulses that drive the motor at full power. The average output voltage (and thus the speed of the train) is varied by altering the mark-space ratio of the output signal. A must for all serious model train enthusiasts looking for a lifelike, hands-on-throttle feel for their models.

Kit and Special Parts

A complete kit, excluding case and 4mm wander plugs is available. The pcb, printed stick-on front panel and heatsink bracket are also available separately. Full construction details may be found in the Best of Maplin Projects Book 4.

PCB dimensions: 112 x 51mm.

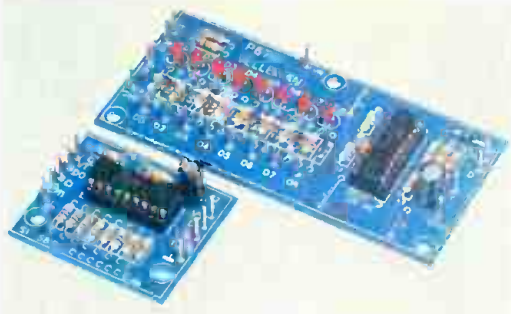
Order Code	Type	Price each
LK64U	Control-A-Train Kit	£15.99
GB87U	Control-A-Trn PCB	£2.25
FT40T	Cntrl-A-Train Fr Pan	£2.99
FT53H	Cntrl-A-Trn Heatsink	60p

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VELLEMAN REMOTE CONTROL PROJECTS

K6700/1 2-WIRE 8-CHANNEL COMMUNICATION TRANSMITTER & RECEIVER



Features

- ★ 8-channel communication
- ★ Expandable to 16 channels
- ★ Power supply through data line
- ★ 2-wire communication between transmitter and receiver
- ★ LED status indication of each output

Applications

- ★ Part of a security system
- ★ Signal and control systems
- ★ Railway modelling
- ★ Data logging

These modules enable up to eight individual switching devices to be operated from a distance of 50m or more. Further expansion using more modules is also possible. There are only two connecting wires between the transmitter and receiver, with power for the transmitter obtained from the data line. It is also possible to connect several receivers to one transmitter, to receive switching connections in several places. There are many more uses for this project, using a combination of switching devices for controlling models, lighting, motors, alarms, locks, various theatrical on-stage applications, and indication wiring in cars and caravans. The hobbyist can control lighting in individual rooms in a doll's house, or houses and street lighting in a model village, where the houses may be situated remotely. Model train enthusiasts can use pairs of transmitters and receivers to cut down on the wiring between the control panel and the layout. Other possibilities include data logging where contacts embedded in remote machinery can be checked to see if the particular piece of equipment is on. Similarly, machinery interfaced, with suitable switching arrangements, such as heavy duty relays, could be switched on remotely.

Specification

Power supply:	+9 to +16V DC
Current quiescent:	80mA
Current maximum (full load):	480mA
Channels:	8 channels expandable to 16

Optional Items

The following items, not included in the kit, may also be required.

Micro-Min Relay 12V	As Req	(BK47B)
Micro-Min 12V 1A 200mW	As Req	(DC52G)
Ultra-Min Relay 12V SPDT	As Req	(YX94C)
Ultra-Min Relay 12V DPDT	As Req	(JX55K)
BT Relay 12V DPDT	As Req	(DC77J)
BT47W/6 Relay 12V	As Req	(DC80B)
Min Relay 3A	As Req	(YX96E)
Min Relay 12V/5A	As Req	(JM18U)
Min Relay 12V/10A	As Req	(JM67X)
Mains Relay 10A	As Req	(YX97F)
Relay 12V 16A	As Req	(YX99H)
Min Relay 12V 6A	As Req	(FJ43W)

Relay Flat 12V	As Req	(HY20W)
Relay 16A 250V AC	As Req	(JG22Y)
Reed Relay 12V SPDT	As Req	(JH13P)
Reed Relay 12V DPST	As Req	(JH16S)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 77.

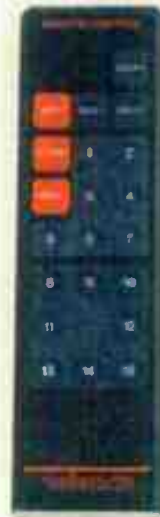
Order Code	Type	Price each
VE70M	Velleman Kit K6700	£8.99
VE71N	Velleman Kit K6701	£15.99

K6710 15-WIRE INFRA-RED TRANSMITTER

Features

- ★ 15 channels
- ★ Remote control of light dimmer
- ★ 21 keys
- ★ 'Click-touch' keypad
- ★ Robust aluminium case

2



This infra-red transmitter can be used with the universal 15-channel receiver K6711 and/or the one-channel receiver K6712. One key will reset all the outputs at once. The keypad features a superb 'click-touch' design which has a characteristic responsive feel, unlike other membrane designs which offer no tactile feedback whatsoever. Additionally, 'click-touch' offers a high degree of protection against moisture ingress. The transmitter is housed in an attractive and robust aluminium case.

Specification

Range:	30m maximum
Tx carrier frequency:	38kHz
Identification codes:	6
Independent channels:	15
Power supply voltage:	9V (PP3 battery)
Current consumption	
standby:	0.1µA
transmit:	10mA average
Dimensions:	175 x 50 x 23mm

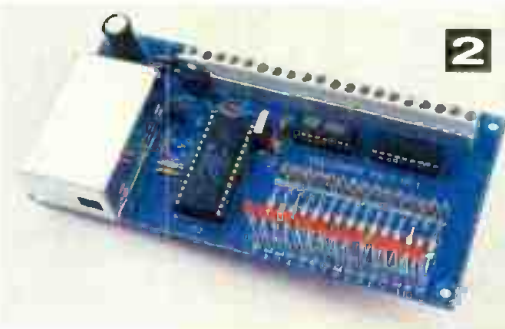
Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 59.

Order Code	Type	Price each
VE72P	Velleman Kit K6710	£33.99

K6711 15-CHANNEL INFRA-RED RECEIVER

2



Features

- ★ Controls up to 15 separate open collector outputs
- ★ Each output can have 'pulse' or 'toggle' operation modes
- ★ 'Rotary' switching or independent channels

- ★ Two memories for storing commonly-used output combinations

Applications

- ★ Lighting
- ★ Stage effects
- ★ Home automation
- ★ Adding infra-red remote control to logic-controlled VCRs and cassette decks
- ★ Security systems

The receiver has 15 independent outputs, each of which can be operated separately, and for every single output there is the option of using it as a changeover switch or as a pulse contact. The receiver is built around a modern microcontroller, allowing two output states to be stored in memory, which can be called at any time. A reset function allows the resetting of ALL outputs at once using only one key (could be adapted for use as a panic alarm).

Specification

Number of open collector outputs:	15 outputs at 50V 500mA maximum
Output status monitoring:	LED for every output
Emitting/receiving area:	30m maximum
Supply voltage:	8 to 14V DC, or 2 x 6 to 2 x 12V AC, 150mA

Optional Items

The following items, not included in the kit, may also be required.

15-channel Infra-red Transmitter Kit	1	(VE72P)
250mA Transformer 9V-0-9V	1	(YN15R)
Relays	As Req	
1N4001	As Req	(QL73Q)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 69.

Order Code	Type	Price each
VE73Q	Velleman Kit K6711	£32.99

K6705/K6704 INFRA-RED CODE LOCK RECEIVER AND TRANSMITTER



Features

- ★ 60,000 possible code combinations
- ★ Tx housed in key-ring box
- ★ Tx/Rx LED display
- ★ 10A toggle or momentary-action relay

Applications

- ★ Remote arm/disarm of alarm systems
- ★ Electric door catch release
- ★ Garage door opener
- ★ Remote power switch

In any security system, the quality of the locking device determines the level of difficulty presented to an intruder attempting to gain access. Ordinary mechanical key or combination locks are vulnerable as direct physical access to them is often possible. However, with a remotely controlled electronic code-lock, an additional level of security is provided since no direct access to the lock device is necessary. In this system the transmitter key generates an electronic code (60,000 possible) which is sent to the receiver lock by infra-red where it is decoded.

The Tx (VE10L) is particularly easy to build as at the heart of the system is one IC, many of the remaining devices are SMD and are supplied bonded to the PCB. The Rx (VE09K) consists of two PCBs, a small preamplifier board and a larger main decoder PCB. A very popular application is as an electric door catch controller, using the solenoid-activated mortice lock release mechanism (YU89W).

Specification

Tx/Rx range: 10m
 Code combinations: 60,000
 Rx output mode: Toggle or momentary
 Relay output: 10A at 12V DC
 Power requirements
 Tx: 4 x LR44 button cells
 Rx: 2 x 9V AC or 10V to 16V DC at 100mA

Kits and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 56.

Order Code	Type	Price each
VE09K	Velleman Kit K6705	£23.99
VE10L	Velleman Kit K6704	£15.99

K6703 CODELOCK RECEIVER

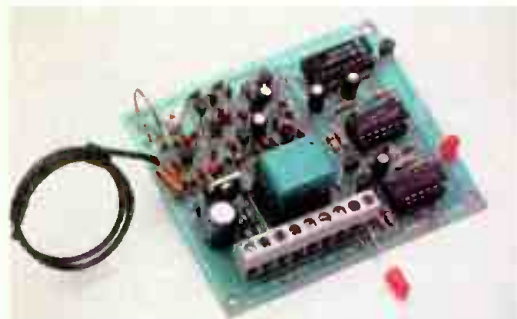
The receiver kit for transmitter K6702. There is an LED to indicate receive signal strength.

Relay output: 5A toggle or momentary switching action.

Separate output to switch car alarm on or off.

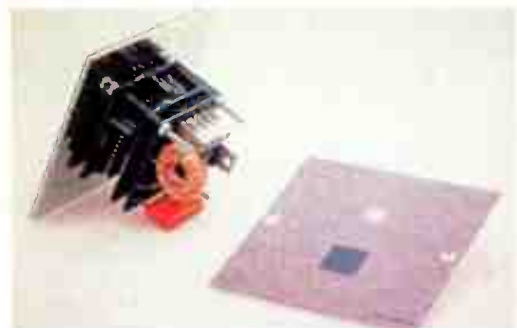
Power supply: 2 x 9VAC or 12 to 16VDC/100mA max.

Note: this product is not licensable and should not be used in the U.K.



Order Code	Type	Price each
VF13P	Velleman Kit K6703	£25.99

K6712 IR REMOTELY CONTROLLED DIMMER



This one-channel IR-receiver/dimmer works together with the 15-channel IR-transmitter (K6710). The receiving code can be set to one of the 15 transmitting codes so that you could operate up to 15 receivers (K6712 and/or K6713) independently of each other. Can be fitted to a standard light switch wall box by using ZB40T with the back knocked out. Emitting/receiving area up to 30m. Max. load: 2A (4A with cooling). Not suitable for use with halogen lamps.

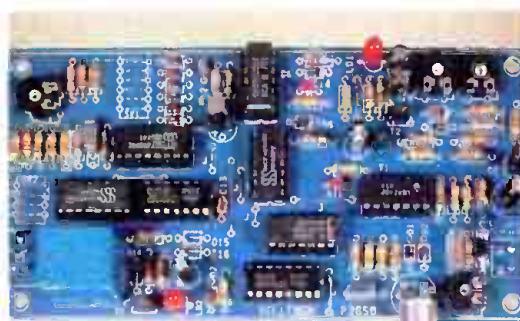
Order Code	Type	Price each
VE74R	Velleman Kit K6712	£30.99

MULTI-PURPOSE RECHARGEABLE LAMP



A very practical combination lamp which combines a bright torch, a flashing yellow hazard warning light, and an efficient twin tube fluorescent lamp. These features make the lamp ideal for camping, around the home or emergencies. The tubes are 8in. 6W and either one or both can be switched on. The fluorescent lamp can be operated alone or in combination with either the torch or the hazard warning light. The torch end is twisted off for bulb replacement. The lantern is powered by an integral, rechargeable, 6V DC 3Ah sealed lead-acid battery which is recharged from the battery charger supplied, via a standard 2.1mm power socket. A red LED indicates when charging is taking place. Overall dimensions: 282 x 105 x 94mm.

K2650 CALL CODE ACTIVATED SWITCH



A remote control system that operates over a telephone line, yet requires no approval as there is no connection to the telephone line. Moreover, it saves you money as its use is free, even when you are the other side of the world, because the telephone only needs to ring - no communication has to be established. There are a lot of applications e.g. turning on and off the lights at irregular times during a prolonged absence, turning on the heating before you drive home etc. 42 different codes can be set, so abusing the system is almost impossible. Timer can be set from 3s to 56h. Requires a 12V DC 90mA regulated supply and has a 240V/3A relay output.

Order Code	Type	Price each
VE86T	Velleman Kit K2650	£22.99

FOR TOP QUALITY & VALUE!

K6702 CODELOCK TRANSMITTER



Together with the code lock receiver K6703, this kit forms the basis of a remote control system for a variety of applications, such as: Garage door, door lock, car alarm (e.g. K3504) perhaps in combination with the central door lock, wireless operation of lighting inside and outside, etc. You can choose among more than 4000 codes, to give unwanted visitors no chance. It is also possible to configure several transmitters for use with one receiver or vice versa.

Range of the transmitter/receiver 40m

LED on/off indication

Housing in the shape of a key holder

Battery protected against pole reversal

Power supply: 12V battery type V23GA, GP23A, 23, 23M, VR22

Note: this product is not licensable and should not be used in the U.K.

Order Code	Type	Price each
VF12N	Velleman Kit K6702	£17.99

SECURITY PROJECTS

FORGED BANK-NOTE DETECTOR

NEW!



Features

- ★ Visible deterrent
- ★ Simple 3-transistor design
- ★ Powered from +12V DC
- ★ Audible and visual signals
- ★ Adjustable sensitivity
- ★ Fully enclosed to prevent UV exposure
- ★ Low cost

Applications

- ★ Car boot sales
- ★ Small stores and shops
- ★ Bazaars and fêtes
- ★ Pubs and clubs

A slight variation on the standard type of bank-note checker, where an ultra-violet light is used to illuminate the bank-notes. Fake or counterfeit notes reflect the UV light whereas real ones do not. The note is simply slid into the checker, and an extra circuit is incorporated which sounds a buzzer and illuminates an LED if the note is OK, but if it is fake then the LED will not light and the buzzer will not sound. The unit will operate from a single +12V supply, and so is ideal for portable use at car boot sales, bazaars and fetes where counterfeit notes are often tendered. For indoor use the unit can be supplied by a mains adaptor.

Optional items

The following items, not included in the kit, may also be required.

Panel Mount Power Socket 2.5mm	1	(JK10L)
M3 x 30mm Pozzi Screw	1 Pkt	(JC72P)
Steel Nut M3	1 Pkt	(JD61R)
Shakeproof Washer M3	1 Pkt	(BF44X)
AC Adapter Unregulated 12V 800mA	1	(YM85G)
Plain Stripboard Board Type 3962	1	(JP53H)
1 1/4 in. Fuse Clip	2	(KU28F)
Insulated Spacer M3 x 10mm	1 Pkt	(FS36P)
Spacer M3 x 1/4 in.	1 Pkt	(FG33L)
ABS Box Type H2852 Matt Black	1	(BZ75S)

Stick-on-Feet	1 Pkt	(FD75S)
Standard Power Plug 2.5mm (HH62S)	1	
Zip Wire (Bell Wire) (XR39N)	As Req	
Large Battery Clip Red	1	(FS86T)
Large Battery Clip Black	1	(FS87U)
LED Clip 5mm	1	(YY40T)
Quickstick Pads	1 Pkt	(HB22Y)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 77.

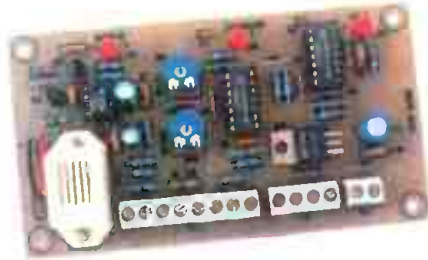
Order Code	Type	Price each
LT54J	Till Saver	£14.99
GH76H	Till Saver PCB	£2.59

3

LOW COST HOME ALARM

- ★ Tamper and panic button loop
- ★ Adjustable exit/entry delay
- ★ Extremely low stand-by current

2



This project contains many of the facilities normally found on more expensive alarm systems. These include entrance/exit delay, security loop trigger, siren entry delay, tamper and panic loop trigger, as well as switches for these controls. A small buzzer mounted on the PCB sounds when the entry/exit loop is activated, indicating the alarm is armed.

All usual protection accessories can be connected to the home alarm. A siren can be connected to the PCB as well as switches, panic buttons and arm/disarm key. Indication LEDs show the state of the unit, whether active, intruder, or help sections have been activated.

Specification

Supply voltage:	6V to 12V DC
Current (12V):	Standby 1.3µA
	Active 3mA
	Intruder 7.5mA
	Help 4.5mA
Siren switching current:	1A Max
Entry/exit delay time:	1 to 60 seconds

Security loops:	Normally open
	Normally closed
Tamper loop:	Normally closed
Panic button loop:	Normally open

Optional Items

The following items, not included in the kit, may also be required.

Micro Piezo Siren	1	(JK42V)
Help Button	As Req	(FP12N)
Std Pressure Mat	As Req	(YB91Y)
Surface BA Reed	As Req	(YW47B)
Window Foil	As Req	(YW50E)
Foil Terms	As Req	(YW51F)
4-Wire Burglar Cable	As Req	(XR89W)
Alkaline KAA	8	(FK64U)
12V Battery Box	1	(RK44K)
PP3 Clip	1	(HF28F)
Gen Purpose 991	2	(YJ19V)
Gen Purpose HP992	2	(YJ23A)
Gen Purpose HP1	1	(YJ22Y)
AC Adaptor Regulated	1	(YB23A)
Rectifier Diode 1N4001	2	(QL73Q)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 45. A ready assembled version is also available. PCB dimensions: 119 x 66mm

Order Code	Type	Price each
LP72P	Lo Cost Alarm	£18.99
GE82D	Lo Cost Alarm PCB	£4.19
AM14Q	Lo Cost Alarm Assm	£26.99

LOOP ALARM



Features

- ★ Low-Cost
- ★ Easy to build
- ★ Needs no complicated adjustment, or test equipment to set up
- ★ Long standby time from 1 set of alkaline batteries – typically 3 years or more

Applications

- ★ Shop loop alarm – protect display items
- ★ Office/school loop alarm – protect computers, monitors etc.
- ★ Home loop alarm – protect ladders, garden tools, bicycles, etc. when left in back gardens.
- ★ Could be adapted for use with a back garden gate or garden shed.

This little gadget was developed in response to a growing problem – the pilfering of items from shops, and as the crime rate is increasing, so shopkeepers need to provide some kind of investment to protect their stock. In the case of this simple but effective Loop Alarm, this investment need not be too great. Also vulnerable are householders. Leaving aside obvious targets like bicycles, surprisingly large objects like ladders (and in one case, a 6 foot satellite dish!), have not been unknown to go missing. This situation has developed to the point that some insurers will not provide cover for such items; even where cover is

Continued on next page.

IT'S A FACT!

THE FREQUENCY SPECTRUM

Frequency	Frequency Band
10kHz to 30kHz	VLF - Very Low Frequency
30kHz to 300kHz	LF - Low Frequencies (long wave)
300kHz to 3MHz	MF - Medium Frequencies (medium wave)
3MHz to 30MHz	HF - High Frequencies (short wave)
30MHz to 300MHz	VHF - Very High Frequency
300MHz to 3GHz	UHF - Ultra High Frequency
3GHz to 30GHz	SHF - Super High Frequency
87.5MHz to 108MHz	'FM' - Normal band for stereo radio
108MHz to 142MHz	Civil Airband Frequencies
Most radio stations transmit on a particular frequency, whereas, amateur radio	

enthusiasts refer to 'bands' which are quoted as wavelengths (in metres). Wavelength is defined as the speed of light (metres per second) divided by the frequency (Hz).

$$\text{Wavelength } \lambda = \frac{300,000,000}{\text{Frequency (Hz)}} = \frac{300}{\text{Frequency (MHz)}}$$

Short wave radio stations broadcast on frequencies between 2MHz and 30MHz, i.e. 150 to 10 metres.

Typical shortwave bands	Frequency MHz
80m	3.560
40m	7.030
30m	10.106
20m	14.060
15m	21.060
10m	28.060

Continued from previous page.

provided, in some cases (garden tools, for example) it is simply not economically viable to pursue claims – but the annoyance and expense of replacement are still there. Again, the Loop Alarm will help considerably at home – it can be used to protect a garden shed, and/or even alarm a back gate – and is priced at a fraction of the cost of a new set of 40ft. aluminium ladders!

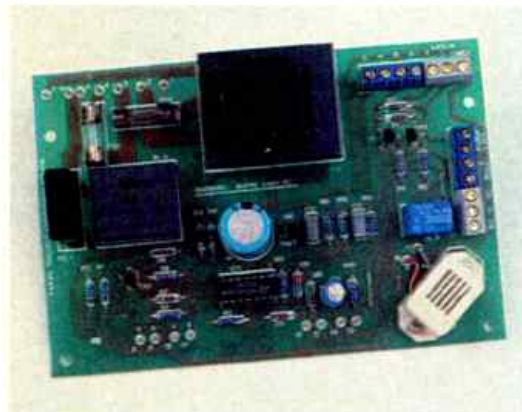
Kit and Special Parts

A complete kit of parts (including the PCB) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 70.

Order Code	Type	Price each
LT36P	Loop Alarm	£16.99
GH46A	Loop Alarm PCB	£1.99

AUTOMATIC FLOODLIGHT CONTROLLER

3



- ★ Interfaces with other Security Systems
- ★ Adjustable Time Delay
- ★ Switches up to 1kW
- ★ Manual or Automatic Control
- ★ Local Alarm Indication
- ★ Recorded Alarm
- ★ Lamp Failure Indication

Used in conjunction with a PIR Sensor (see Protection Section) this unit provides intruder activated mains power switching for powerful flood lamps, sirens, etc. It was primarily designed as a security device in its own right, although provision has been made for it to be linked into a larger security system. This controller also has other applications where it is required to switch on a mains-powered device for a preset period of time after which it will automatically switch off until re-triggered. This system could also be operated from any make or break detection device. The controller supplies the infra-red detector with 12V DC, and the detector's internal relay trips the alarm part of the controller. The controller output is in the form of the 240V AC mains for mains powered appliances. The on time duration is adjustable from 20 seconds to 4 minutes, and a latch signals that the alarm has been tripped until the controller is reset. A buzzer will sound for the duration of the floodlight 'ON' time, and provision is made for a latched output for a low current alarm bell for example which will ring continuously until the controller is reset.

Optional Items

The following items, not included in the kit, may also be required.

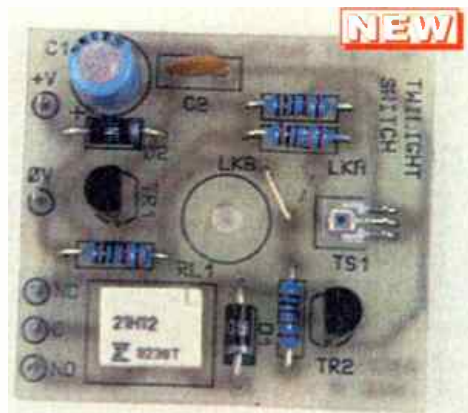
Mains Cable	(XR03D).
13A Mains Plug	(RW67K).

Kit and Special Parts

A complete kit is available. The pcb is also available separately. Full construction details may be found in the Best of Maplin Projects Book 4.

Order Code	Type	Price each
LK73Q	B2 Floodlight Alarm Kit	£39.99

TWILIGHT SWITCH



Features

- ★ Photodiode with all on-chip electronics
- ★ 50% hysteresis
- ★ Temperature compensation

Applications

- ★ Night-time security
- ★ Automatic porch light
- ★ Light/dark sensor

This useful module owes its small size and simple construction to the use of a specialised optoelectronic IC, the ULM3390T. Designed for use in twilight sensing applications as well as emergency and outdoor lighting, the ULN3390T optoelectronic switch is a 3-pin, monolithic integrated circuit containing a photodiode, a low-level amplifier, comparator, voltage regulator and output driver. To make the module as simple to use as possible output switching is performed by a relay, providing normally open, normally closed or changeover functions, and allows total electrical isolation between the sensor circuit and the controlled circuit. For increased flexibility, inverted or non-inverted operation of the relay can be selected with an on-board link.

Electrical connections to the on-board relay should not exceed 28V DC and 1A. To control mains powered lighting or other devices, a second 'slave' relay rated for mains use should be used, for example Order Code YX97F (3A max. for inductive loads).

Alternatively the Zero Crossing Opto-Switch kit (Order Code LP55K) can be used.

Specification

Supply voltage range:	4V min. to 16V max.
Supply current:	5.3 to 43.8mA, depending on mode and settings
Output risetime:	<500ns
Output fall time:	<500ns
Light threshold, $\lambda = 880\text{nm}$:	
dark level:	10 $\mu\text{W}/\text{cm}^2$
light level:	20 $\mu\text{W}/\text{cm}^2$
Hysteresis:	50% nominal

Optional Items

The following items, not included in the kit, may also be required.

20mm Single Pattress	1	(YB14Q)
Blanking Plate	1	(HL86T)
Insulated Spacer M3	1 Pkt	(FS36P)
AC Adaptor Unregulated 300mA	1	(XX09K)
2.5mm Panel Mount Power Socket	1	(JK10L)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 73.

The Maplin 'Get-You-Working' Service is not available for this project.

Order Code	Type	Price each
LT47B	Twilight Switch	£5.99
GH63T	Twilight Switch PCB	£2.29

INFRA-RED PROXIMITY DETECTOR

1

Features

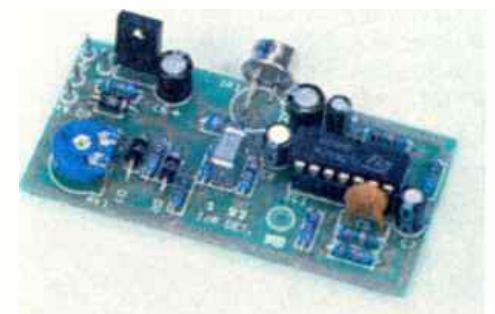
- ★ Uses latest pyro-electric device
- ★ Short-range, heat/movement detector
- ★ Low power consumption for long battery life

Applications

- ★ Doorways, stairs and similar proximity systems

This I/R Proximity Detector has been designed as a simple, low-cost system for detecting heat changes, movement of a warm body, etc., such as those emitted from the human body. The unit responds to a definite change or disturbance in ambience – or background – heat levels and could be placed across a doorway or stairs to register movement in those areas.

Supply requirements for the module are 9V DC at 2 to 3mA. With such low current consumption, long periods of use from a PP3 battery are possible. The



module is not capable of switching heavy loads and should only be used with external systems up to 12V DC and current levels below 100mA. Relays could be used for controlling larger voltage/current devices. Any battery supplying the electronics should NOT also be used for supplying the external devices as well (if more than a simple LED arrangement is to be used). Sensing range is 4 to 5 feet, depending upon the sensor's field of view and variations in the light/heat background levels. A whole room could not adequately be covered by this system, but doorways, narrow hallways and corridors are suitable areas.

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 54.

Order Code	Type	Price each
LT00A	I/R Proximity Dctr	£10.99
GD27E	I/R Prox Detectr PCB	£1.99

CALL CASHTEL NOW PHONE 01702 552941

COMPACT DISC LASER LENS CLEANER

This laser lens cleaner is a special encoded cleaning disc provided with a cleverly designed unique brush system that ensures thorough and reliable cleaning without causing any harm to the sensitive, coated lens – it even plays music while it is cleaning. This disc is easy to use and has been designed to be played like a standard CD and work effectively with all CD players. Regular use will prevent the mistracking and distortion which would otherwise be caused by a dirty laser lens. Supplied in a storage



TOP QUALITY!
£11.99
RT58N

EXPLOSIVE GAS ALARM

- ★ Operates from 12V battery
- ★ Very low average current consumption
- ★ Detects all common explosive or inflammable gases
- ★ Loud strident alarm



Dangerous gas leaks, particularly in confined spaces, causing explosions and fires, are becoming a more common occurrence, usually damaging property and often maiming or even killing people. The Maplin Gas Detector has been designed to prevent the build-up of these gases by sounding a loud alarm before sufficient gas has leaked to cause a damaging explosion. The sensor used consists of two separate units, the sensor itself and a reference compensator. The system will detect all common explosive or inflammable gases such as Butane, Propane, Methane, Town Gas, Natural Gas and Petrol Vapour. The sensors are enclosed in double wire mesh housings to prevent any chance of the sensor itself igniting any gases encountered. Ideal for caravans and boats. Runs from 12V battery and to conserve power, the air is tested for gas approximately every 5 or 6 minutes.

Optional items

The following items, not included in the kit, may also be required

Case	(LH62S)
Knob K7B	(YX02C)

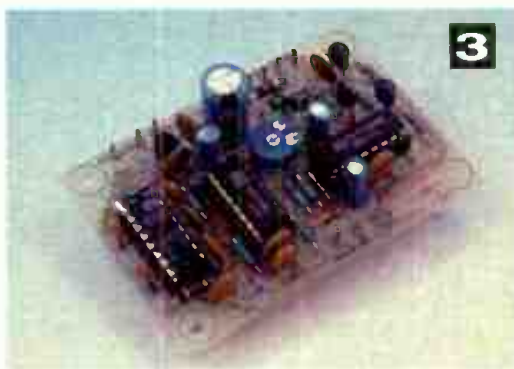
Kit and Special Parts

A complete kit of parts excluding case, control knob and hardware is available. Full construction details may be found in the Best of Maplin Projects Book 6.

Detect PCB: 127 x 82mm.
Alarm PCB: 46 x 26mm.

Order Code	Type	Price each
LK60Q	Explosive Gas Alarm Kit	£28.99
GB79L	Gas Alarm Sensor PCB	£1.20

INFRA-RED DOOR LOCK



Features

- ★ Infra-red controlled
- ★ Uses simple-to-install solenoid-controlled door catch mechanism
- ★ Sensor can be installed away from the receiver for flexibility
- ★ Uses same controller as Compuguard car alarm
- ★ Output for switching external loads
- ★ Adjustable 'on' time for external output

Applications

- ★ No more keys to worry about when your arms are loaded!
- ★ Open your door while you arm your Compuguard!
- ★ Security systems

This project will unlock your door, and can turn on the (porch or hall) light for a few minutes (with the addition of a relay, or the LP55K Mains Opto Switch Kit) by a simple press of a button. The remote control is the one used with the Compuguard car alarm system; if you already have Compuguard fitted to your car, set the same codes for both items and you will only need the one transmitter! This project has many other applications – opening garage doors, for example. By using the optional Mains Opto Switch kit (LP55K) with the Infra-red Door Lock a resistive mains load of 250W (max.) can be switched at the same time as the door solenoid. A porch or hall light would be ideal for use with such a system. The actual 'on' period is, thankfully, a great deal longer than that of the door solenoid – it can be varied between 1 and 2 minutes using RV1. The actual details for the Mains Opto Switch can be found in 'Electronics' Issue 41 (December 1990/January 1991); by a twist of fate, the infra-red transmitter appears in the same issue, but in its original guise as part of the 'Compuguard' system! As an alternative to the Mains Opto Switch, a relay

may be used to switch an external load. This option should be used if the load to be switched exceeds 250W (a 500W halogen lamp, for example), but note that a relay with suitably-rated contacts must be used.

Optional Items

The following items, not included in the kit, may also be required

ABS Box MB2	1	(LH21X)
PSU Box Large	1	(YU31J)
PSU Grommet	1	(JM16S)
250mA Transformer 6V	1	(YN14Q)
Fuse 20mm 50mA	1	(WR93B)
Fuse A/S 315mA	1	(RA07H)
Safuseholder 20	2	(RX96E)
Fuseholder Boot	2	(FT35Q)
Filter Red	1	(FR34M)
Standard Power Plug 2.5mm	1	(HH62S)
Panel Mount Power Skt 2.5mm	1	(JK10L)
Cable P Clip 3/16 in.	1	(LR44X)
Steel Screw M3 x 10mm	1 Pkt	(JY22Y)
Steel Nut M3	1 Pkt	(JD61R)
Steel Washer M3	1 Pkt	(JD76H)
Isoshake M3	1 Pkt	(BF44X)
Zip Wire	1 Pkt	(XR39N)
Lapped Pair	1m	(XR34M)
Twin Mains DS Black	1m	(XR47B)
Double Surface Pattach 47mm	1	(YB17T)
Double Blank Plate	1	(ZB49D)
Mains Opto Switch	1	(LP55K)
5A Mains Relay	1	(YX98G)
Insulated Spacer M3 x 10mm	1 Pkt	(FS36P)
SR Grommet F31	1	(LR47B)
Sub-Min Toggle B	1	(FH01B)
Wire 3202 Brown	1m	(XR34M)
Spade 3.2mm	1 Pkt	(JH64U)
Heat Shrink CP 32	1m	(BF88V)
Double Bubble Satchet	1	(FL45Y)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 68.

Order Code	Type	Price each
LT32K	Infra-Red DoorLock	£37.99
GH50E	I/R Door Lock PCB	£2.49

VHS VIDEO ALARM

- ★ Protect your Video Player
- ★ Simple Construction
- ★ Includes Alarm Set-up Delay
- ★ Blank Case Included



A portable, self-contained, alarm system disguised as a video cassette tape which detects movement from any pre-determined position. The cassette can be inserted into a front or top loader VHS video player and will give an audible warning if the machine is moved or the cassette ejected. The cassette could also be placed on top of a video, television or hi-fi or mixed with other tapes in a library or indeed placed in any position where a video cassette will not seem out of place.

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The unit is armed and disarmed by an easily accessible switch hidden from view inside the cassette. After switching on, there is a 10 to 12 second delay before the unit arms itself, allowing time for loading or positioning the cassette. When moved the module waits for approximately 6 seconds and then triggers two penetrating electronic buzzers, which will sound continuously until either the module is switched off, or the battery runs down. Power for the unit is provided by a 9 volt PP3 dry cell or ni-cad battery. A constant current charger for the ni-cad battery has been included in the circuit design but will require the addition of a suitable power socket and a 12/15V DC Supply. Details for incorporating the ni-cad facilities are given in the construction details.

Optional Items

The following items, not included in the kit, may also be required:

1 PP3 Battery	(FK62S)
1 PP3 Ni-Cad Battery	(HW31J)
1 Power Socket	(HF82D)
1 Unregulated 300mA DC power supply	(XX09K)

Kit and Special Parts

A complete kit of parts excluding the battery is available. The pcb is also available separately, as is the video cassette shell. Full construction details may be found in the Maplin Projects Book 24. A ready assembled version is also available. PCB dimensions: 64 x 64mm.

Order Code	Type	Price each
LM27E	VHS Video Alarm Kit	£16.99
GD56L	VHS Video Alarm PCB	£5.75
YP27E	Video Cassette Shell	£1.99
AM17T	Video Alarm Assm	£24.99

CYCLE ALARM



- ★ Loud sounder with 2 minute time-out
- ★ Vibration and movement sensing
- ★ Warning and anti-tamper switch facilities
- ★ Keyswitch arming delay

Help protect your expensive custom-designed or mountain bike from theft, with this easy to construct vibration cycle alarm. The unit is completely self-contained in a 129 x 64 x 44mm case, which is simply attached to one of the 'V' frame tube uprights. A special keyswitch 'arms' the system and after a short delay period the alarm will become active. Should the bicycle be tampered with, movement and vibration sensors will trigger the alarm and the sounder will give off a very loud 110dB 'screech' for 2 minutes (depending on the condition of the battery). The case can also be made tamper-proof, and a flashing red LED indicates that the alarm is in an armed state. In addition, an input is provided for connecting a push-to-make handlebar switch (not supplied) which can be used to operate the siren independent of the alarm. The PP3 type 9V battery used to power the unit should have a long operational life.

Optional Items

The following optional items are not included in the kit, but may also be required.

Battery PP3	1	(FK62S)
Min Lever Micro Sw	1	(FP42V)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 49.

Order Code	Type	Price each
LP76H	Vibration Alarm	£20.99
GE89W	Cycle Alarm PCB	£2.49

PEEP ALARM

Features

- ★ Simple effective design
- ★ Light sensitivity control
- ★ LED alarm indicator
- ★ Low quiescent current consumption from 9V PP3 battery
- ★ Reverse-polarity protection

Applications

- ★ Door open reminder
- ★ Case alarm

The Peep Alarm is a light-operated sounder, simple but effective in its operation. In a dark environment, the unit remains quiet, and is for all practical purposes switched off. However, when light falls on the alarm's photosensor, the unit emits a loud, 4-6kHz shrill tone. In addition, an LED illuminates, providing secondary indication that the circuit has been triggered. An on-board sensitivity control is included in the design to allow operation in a variety of situations, over a range of light levels. In a typical application, it could be used to provide an indication that a cupboard or darkroom door, a suitcase or brief case has been opened. This neat, compact alarm is housed in an ABS box. Current consumption from a PP3 alkaline battery is less than 1µA, rising to only 14mA when the alarm is activated.



Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 51. PCB dimensions: 33.7 x 41

Order Code	Type	Price each
LP50E	Peep Alarm	£8.49
GH06G	Peep Alarm PCB	£2.49

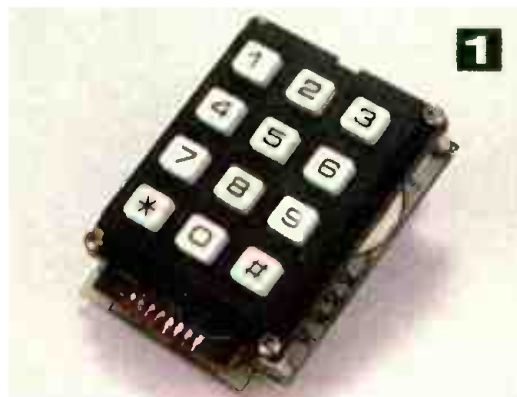
µA3730 ELECTRONIC CODE LOCK

Features

- ★ Low power consumption
- ★ Key-pad entry
- ★ 3 different outputs
- ★ 10¹² unique codes
- ★ Programmable up to 12 digit

Applications

- ★ Security systems
- ★ Electronic locks



The µA3730 is a single chip electronic code-lock IC utilising CMOS technology. The IC can handle passcodes of up to 12 digits, allowing the use of up to 1 million million unique codes. If an incorrect code is entered three times or more, an output is activated allowing a burglar alarm to be triggered. The code may be changed as many times as required by the user providing additional security. The IC requires a battery back-up to prevent the code being lost if the main power supply fails. There are three outputs which are activated from the keypad. OUT1 activates for two seconds when the correct code followed by 'K'(#)' is entered. OUT2 changes state when the correct code followed by 'K' is entered providing a toggle action. OUT3 activates for 1 minute if an incorrect code is entered three times or more. All outputs are open drain types and require a pull-up resistor; the total load current should not exceed 40mA at any time as irreparable damage could occur. The module requires a regulated and well decoupled 4V to 6.5V DC power supply, that is capable of supplying at least 20mA. Outputs are provided for 3 LED indicators to show the state of the outputs OUT1 to OUT3.

Note: this is intended as a 'building block' project and not eligible for our 'Get-You-Working' Service.

Specification

Power supply voltage:	4V to 6.5V
Back-up battery voltage:	3.7V to 6V (<supply voltage - 0.5V)
Power supply current at 5V stand-by:	220nA
operating (without LEDs):	310µA
operating (LEDs active):	17mA
PCB size:	71 x 51mm
Output sink current:	40mA (absolute max.)

Optional Items

The following items, not included in the kit, may also be required.

LED Red 5mm 2mA	1	(UK48C)
LED Green 5mm 2mA	1	(UK49D)
LED Yellow 5mm 2mA	1	(UK50E)

Kit and Special Parts

A complete kit of parts (including the PCB, numeric keypad and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 56.

Order Code	Type	Price each
LP92A	UA3730 Code Lock	£11.99
GH18U	UA3730 Code Lock PCB	£2.49

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01702 553935

VELLEMAN SECURITY PROJECTS

K2655 ELECTRONIC WATCHDOG



Features

- ★ Choice of two different barks
- ★ Reacts to environmental noise
- ★ External trigger input
- ★ Loudspeaker and audio output
- ★ AC and DC power supply input

The Electronic Watchdog generates two selectable, different dog barks when triggered by environmental noise. Such a loud, furious, barking dog sound should deter even the most determined burglars! The circuit features a highly sensitive electret microphone, with a sensitivity control, to pick-up environmental noise. The barking sounds are held in a non-volatile memory IC that is supplied with the kit. The unit requires either a 6V-0-6V step down mains transformer or a non-stabilised DC power supply. Any 2W, 4Ω or 8Ω loudspeaker can be used, but XQ73Q, a horn speaker, is recommended, as it offers a high sound output without the need for an enclosure.

Specification

Loudspeaker output:	2W at 4Ω
Supply current	
Standby:	75mA
Barking:	400mA maximum

Optional Items

The following items, not included in the kit, may also be required.

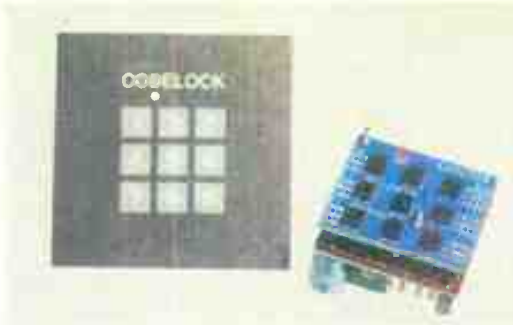
Horn Speaker 10W	1	(XQ73Q)
AC Unregulated Adaptor 300mA	1	(XX09K)
Transformer 6V-0-6V 500mA	1	(WB06G)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 53.

Order Code	Type	Price each
VE85G	Velleman Kit K2655	£23.99

K6400 KEYCODE LOCK



Features

- ★ More than 3,000 possible codes
- ★ Relay output
- ★ LED active indicator
- ★ Pulse or switched output
- ★ Nine keys for four digit code

Are you tired of losing your keys? Would you like a high tech way of locking up your valuables? Then the Keycode Lock is the answer. A small numerical keypad is placed by the door, and to open it, the correct code must be entered. However, it doesn't have to be confined to doors, as it could be used on cupboards, filing cabinets, desks, cars, caravans, trailers, lock-ups, garages, equipment, etc. Anything in fact that would normally require a conventional lock to secure a door or lid, and room enough for a door solenoid lock, the number of applications are endless. The PCB mounted connector and track are not suitably spaced for voltages above 50V, and if mains voltages are switched then use an off-board mains rated relay. The external relay may require a diode to protect the circuit from the induced emf produced by the relay when it de-energises.

Using the optional Mains Opto Switch kit (LP55K) with the Keycode Lock enables switched resistive mains loads of up to 250W (maximum). The actual details for the Mains Opto Switch are in Electronics Issue 41 (December 1990/January 1991).

Specification

Power supply:	9 to 15V DC or 8 to 12V AC
Current consumption	
off:	0.3µA
on:	40mA
Time limit for code input:	5s (only in pulse mode)
Dimensions:	80 x 80 x 40mm

Kit and Special Parts

A complete kit of parts (including the PCB) is available. Full construction details may be found in Maplin Magazine Issue 80.

Order Code	Type	Price each
VE76H	Velleman Kit K6400	£22.99

IT'S A FACT!

TYPE NUMBERS

In general, especially among European transistor manufacturers, if a device starts with a 'A' then it is germanium, and if it is a B, then it is silicon. The second letter indicates that the device is one of the following types:

A: Diode	P: Photo type
C: Low power AF	S: Low power switching
D: Power AF	U: Power switching
E: Tunnel diode	Y: Power diode
F: Low power HF	Z: Zener diode
L: Power HF	

TEST PROJECTS

TEMPERATURE CONTROLLED SOLDERING IRON STATION



Features

- ★ Temperature range 70°C to 450°C
- ★ Minimal noise emission
- ★ Negligible element leakage current
- ★ LED indication of heating

Applications

- ★ Precision soldering
- ★ Thermal fault location
- ★ Pyro-graphic pen

Because of the high price of adjustable temperature soldering irons, the home hobbyist is often resigned to having a 'standard issue' 17 to 25W mains powered iron. Although often adequate for most tasks, a fixed temperature iron suffers from several drawbacks. It may be too hot for delicate soldering operations involving thin PCB tracks, signal diodes and small polystyrene capacitors for example, or, at the other extreme, not powerful enough to solder something onto a piece of brass or tin-plate more than two inches square. The Soldering Station is ideal for hobbyists on a budget, who cannot afford the expensive ready built units. This kit version offers a considerable saving over commercially available units, and includes the 50W XSD iron as used with the TCSU-D Solder Station. The temperature of the iron can be adjusted over a range from 70°C to 450°C, making the unit very versatile and having more applications than just soldering, e.g., sealing plastic bags, a pyro-graphic pen, and even a controllable heat source for checking 'thermal faults' in semiconductors.

N.B. This project is designed to operate with the 50W XSD iron, and other irons of this type are NOT suitable for use with this project.

Optional Items

The following items not included in the kit, may also be required.

13A Plug Nylon	1	(RW67X)
2A Plug Fuse	1	(HQ31J)

Continued on next page.

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Continued from previous page.

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 59.

Order Code	Type	Price each
LT13P	Soldering Station	£64.99
GH17T	Solder Station PCB	£2.39

LIVE WIRE DETECTOR



- ★ Gives Visual and Audible Warning of the Presence of 240V AC mains live
- ★ Does not Require wires under test to be connected to a load
- ★ Adjustable for sensitivity

The Maplin Live-Wire Detector will detect the presence of mains electricity whether there's a current flowing or not. It's better than neon screwdrivers or multimeters because you do not have to make contact with the wire – it signals the presence of mains better than metal detectors, because it only indicates if the wire is live; also, it's considerably cheaper.

It's the sort of device every household should own and anyone can use it because you don't have to actually touch dangerous points with any part of the Live-Wire Detector. Even if the wires are not connected to anything at one end, Live Wire will tell you if they're live. You could use it to find buried wires in dry plaster or plastic conduit or under floor or ceiling boards up to a distance of 2 inches (50mm).

Other uses of Live Wire include detecting breaks in cables or appliance leads. If a fuse blows, Live Wire will indicate mains present up to all the fuses, and mains presence on the wires leaving the fuses except the dead one. Before doing any work on your house wiring use Live Wire to make sure the circuit really is safe after pulling out what you think are the relevant fuses. Uses one PP3 battery.

Kit and Special Parts

A complete kit of all parts is available, excluding PP3 battery. The case and pcb are also available separately. Full construction details may be found in the Maplin Magazine Issue 48. PCB dimensions: 25 x 46mm.

Order Code	Type	Price each
LK63T	Live Wire Det Kit	£4.75
GB85G	Live Wire Detect PCB	60p
FT39N	Live Wire Det Case	£1.35

THE BEST OF SERVICE

MINI METAL DETECTOR



- ★ 25mm Search Range Dependent Upon Size of Object
- ★ Finds Partition Studs From Nailheads or Screws
- ★ Compliments the Live Wire Detector
- ★ Simple to Build and Use

If you have ever had to fit cupboards or shelving to partition walls then you will know how 'hit and miss' it can be when trying to find the studding. With this Mini-metal Detector you can detect the presence of ferrous or various non-ferrous metals within the search area. Along with the Live Wire Detector project, this is a must for DIY'ers of all ages.

Optional Item

The following item, not included in the kit, may also be required.

Battery PP3 9V	1	(FK58N)
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Kit and Special Parts

A complete kit is available. The pcb and box are also available separately. Full construction details may be found in the Maplin Project Book 48. PCB dimensions: 29 x 29mm.

Order Code	Type	Price each
LM35Q	Mini Metal Dctr Kit	£7.49
GD63T	Mini Metal Dctr Bd	£1.85
JC24B	Mini Metal Dctr Box	£1.35

TESTER FOR ELECTRICAL DOMESTIC APPLIANCES



- ★ Checks for Earthing Continuity between Appliance and Plug
- ★ Indicates when Live/Neutral Shorting to Appliance Case
- ★ Plug/Appliance Fuse Test
- ★ Low Battery Indicator

The Appliance Tester has a number of safety features which enables the security of the earthing system to be thoroughly checked. Two groups of appliances may be tested, Class 1 types include kettles, washing machines, electric fires and many more. The second

group of appliances are known as 'double insulated' and rely on having two separate sets of insulation. Appliances in this group include electric drills, vacuum cleaners, radios, tape recorders and so on. Fault conditions are indicated by the following: Green LED – no fault; Flashing Red LED – earth pin is not connected to the appliance case. This will occur if the appliance is double insulated; Steady Red LED – The Live or Neutral is shorting to the appliance case; Modulating Red LED – This occurs when all the above faults are on the appliance. The fuse test will illuminate the green LED when the fuse in the appliance is blown. UNDER NO CIRCUMSTANCES CONNECT THE APPLIANCE TESTER TO THE MAINS.

Optional Item

The following will be required to complete the project.

PP3 Battery	1	(FK62S)
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Kit and Special Parts

A complete kit excluding battery is available. The pcb and adhesive front panel are also available separately. Full construction details may be found in the Maplin Projects Book 25.

Order Code	Type	Price each
LM38R	Appliance Tstr Kit	£21.99
GD60Q	Appliance Tstr PCB	£2.20
JG18U	Appliance Tstr F/Pnl	£2.65

FOR CASHTEL
Phone 01702 552941

LOW RESISTANCE CONTINUITY TESTER

Features

- ★ Provides 3 ranges of resistance indication
- ★ Buzzer indicates continuity

Applications

- ★ Tracking faults
- ★ Continuity testing
- ★ Testing components



This compact, fast, easy to use, continuity tester is a combined low resistance and continuity tester. It is different from the more familiar type of instrument because it indicates, at a glance, one of three ranges in which the value of the resistance falls. A multicoloured LED is used as the visual indicator together with a continuity beep when the resistance is below 0.5Ω. The LED glows red to indicate very high 'leakage' resistance, and this range is ideal for testing insulation, capacitor dielectrics and even skin. When the resistance across the probes is around 5kΩ, or less, the LED appears to glow orange. This range is ideal for indicating dry joints, the resistance of switch contacts and connectors, semiconductor junctions etc. In the lower range 0.5Ω to 300Ω, the LED glows

green, and below 0.5Ω the buzzer simultaneously beeps, (the LED stays green). The continuity tester is powered by one 9V PP3 battery, and a push-to-make type switch ensures that the unit is not left on by accident.

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding the battery). The PCB and box label are also available separately. Full construction details may be found in Maplin Magazine Issue 53.
PCB dimensions: 89 x 25mm.

Order Code	Type	Price each
LP51F	Int Continuity Tstr	£10.49
GH03D	Int Cont Tester PCB	£1.69
ZF40T	Cont Tester Label	£1.75

LOW-COST AUDIO WAVEFORM GENERATOR

Features

- ★ Four frequency ranges
- ★ Three output waveforms
- ★ Push-button switching
- ★ High and low outputs
- ★ Minimal wiring
- ★ Battery powered

Applications

- ★ Testing projects
- ★ Setting filters
- ★ Bandwidth testing

This simple, low-cost, easily constructed, audio waveform generator is ideal for the hobbyist working on a restricted budget. The generator can be used for a range of applications including test tape production; testing projects; gain and phase measurement; setting filters and bandwidth testing. All the components are mounted on one PCB, keeping internal wiring to a minimum. Long term reliability is excellent due to the use of electronic switching; just two push-to-make non-locking PCB mounted switches. Power is provided by two PP6 9V batteries, not included in the kit, which will provide several hours of continuous use. To give your generator a professional finish, an optional front panel is available.



Specification

Power supply input:	±6V to ±9V DC
Current @ ±9V:	±25mA
Standby current:	<±1μA
Waveforms:	Sine, Triangle, Square
Frequency ranges:	
10 to 100Hz:	9Hz to 105Hz
0.1 to 1kHz:	100Hz to 1.1kHz
1 to 10kHz:	895Hz to 10kHz
10 to 100kHz:	9.2kHz to 106kHz
Output amplitude full:	9V (Pk-to-Pk)
attenuated:	400mV (Pk-to-Pk)
Output impedance:	600Ω
Sinewave distortion:	
10Hz to 10kHz:	<1%
10kHz to 100kHz:	<4%
Triangle linearity:	
10Hz to 40kHz:	<0.1%
40kHz to 100kHz:	<1%
Square rise/fall time:	<2μs

Optional Items

The following items, not included in the kit, may also be required.

Metal Panel Box	1	(WY02C)
PP6 9V Battery	2	(FM03D)
Screw-Cap Phono Black	1	(HQ54J)
Cable Single Black	1	m(XR12N)
Red Croc Clip	1	(FM37S)
Black Croc Clip	1	(FK34M)
100μF 63V PC Elect	2	(FF12N)
Front Panel	1	(KW56L)

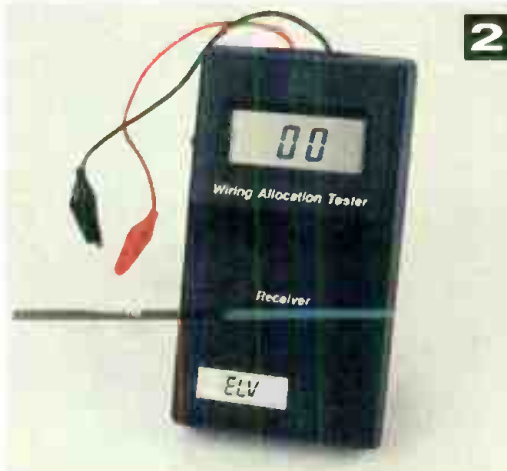
Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB and Front Panel are also available separately. Full construction details may be found in Maplin Project Book 48.

Order Code	Type	Price each
LP01B	Lo cost Wave Gen	£23.99
GE87U	Lo cost Wave Gen PCB	£5.49
KW56L	LC Gen Front Panel	£4.75

WIRING ALLOCATION TESTER

- ★ Electronic wire identifier
- ★ Independent sender and receiver
- ★ Up to 16 wires encoded simultaneously
- ★ Digital readout of wire number
- ★ Crystal controlled accuracy



This project is a handy test instrument which takes the hassle out of identifying and trouble-shooting, multi-way cable installation. The wiring allocation tester can be used over extremely long distances, with the aid of a transmitter and receiver. The transmitter sends different data pulses down each wire, the receiver on the other end converts the data depending on the pulse width of the signal and displays the wire number on an LCD display.

Both the receiver and transmitter are powered by a 9V PP3 battery, approximate operating time is 2000 and 400 hours respectively due to the low power components. Uses include, testing multi-core cables, and for telephone, intercom and alarm systems where long wires need to be interconnected.

Kit

A complete kit is available. Full construction details may be found in Maplin Magazine Issue 45.

Order Code	Type	Price each
LP61R	B1 Wire Tester	£49.99

FOR CASHTEL
Phone 01702 552941

AUDIO FREQUENCY SINE/SQUARE WAVE GENERATOR

Features

- ★ Excellent performance at low-cost
- ★ 3 frequency ranges
- ★ Low distortion
- ★ Single 9V DC power requirement
- ★ Precision attenuator

Applications

- ★ Testing and designing low-frequency circuits
- ★ Setting up audio systems
- ★ Producing test tapes
- ★ Scientific experiments



An audio frequency (AF) oscillator is an essential piece of test apparatus for the construction and servicing of audio products, such as Hi-Fi, PA and disco equipment. Because of the very low distortion sine wave output from this oscillator, it is suitable for use with even the most sophisticated Hi-Fi equipment. In conjunction with an oscilloscope, problems such as crossover distortion (incorrectly biased amplifier output stage), intermodulation by hum (power supply smoothing capacitors suspect) and the effects of clipping (overdriving) can all be investigated. This essential piece of test equipment can also be switched to produce square waves; these, being rich in harmonics, are useful for evaluating the frequency response and phase shift characteristics of an amplifier.

The unit may be used to make test tapes for the alignment or evaluation of tape recorders. In conjunction with a suitable amplifier, this unit could also be used to drive various transducers; this may be of benefit in certain types of scientific experiment – physics, structural engineering etc.

General Specification

Frequency Range:	17.5Hz to 22.8kHz in 3 ranges
Sine wave distortion (1kHz, maximum output):	<0.05%
Sine wave distortion (1kHz, 2/3 max. output):	<0.042%
Attenuator:	3 ranges; continuously variable
Sine wave output:	4V pk-to-pk
Square wave output:	2V pk-to-pk
Off-load current consumption:	8mA (square wave setting)

Optional Items

The following items, not included in the kit, may also be required.

Verobox 213	1	(LL10L)
PP6 9V Battery	1	(FM03D)
AC Adaptor Regulated	1	(YB23A)

Kit and Special Parts

A complete kit of parts (including the PCB, front panel and instruction leaflet) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 63.

Order Code	Type	Price each
LT25C	Sine/Square Gen Kit	£39.99
BB72P	Sine/Square Gen PCB	£6.39
BB73Q	Sine/Square Gen FP	£4.25

PROGRAMMABLE PULSE GENERATOR

Features

- ★ High accuracy
- ★ Microsecond and millisecond ranges
- ★ Easy programming (BCD switches)
- ★ Variable and fixed TTL outputs

Applications

- ★ Oscilloscope calibration
- ★ Timing
- ★ Test signals



Modern pulse generators have a wide variety of applications, from the operation of relays or counters, to the calibration of oscilloscopes. The pulse width is usually set by means of a potentiometer, in conjunction with several switched ranges. If the exact frequency needs to be known, it is necessary to monitor the output with a digital frequency meter.

This programmable pulse generator does not require monitoring, as the pulse width is set by using three programmable binary-coded decimal (BCD) switches, together with two non-overlapping ranges. Two outputs are provided, fixed and variable, and it is not recommended that both outputs are used simultaneously. The minimum load impedance is 50Ω, and the outputs should not be shorted, as possible damage to transistors can occur. The unit requires a 9V DC power supply capable of supplying 125mA. The accuracy of the unit depends entirely on the internal 1MHz oscillator, as the rest of the circuit does not cause drift.

General Specification

Power supply:	9V DC @ 125mA (max.)
Standby current:	25mA (approx.)
Pulse width ('µs' range):	0 to 999µs
Pulse width ('ms' range):	0 to 999ms
Rise time:	20ns (approx.)
Accuracy:	±1% (max.)
Reference oscillator frequency:	1MHz
Output voltage (variable output):	0 to 5V
Output current (variable output):	100mA
Output voltage (TTL output):	5V (fixed)
Output current (TTL output):	4mA (max.) into 1.5kΩ

Optional Items

The following items, not included in the kit, may also be required.

Verobox 202	1	(LL06G)
AC Adaptor Regulated	1	(YB23A)
Piezo Sounder	1	(FM59P)
5mm LED Red	1	(WL27E)
220Ω Min Res	1	(M220R)
BNC Round Skt 50Ω	2	(HH18U)

Kit and Special Parts

A complete kit of parts (including the PCB, front panel, and instruction leaflet) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 61.

Order			3584
Code	Type	Price each	
LT20W	Prog Pulse Generator	£26.99	
GH26D	Prog Pulse Gen PCB	£4.49	
KP59P	Prog Pulse F/Panel	98p	

SWEEP OSCILLATOR

- ★ Rapid Frequency Response Checks
- ★ Adjustable Sweep Speeds 0.2Hz to 10Hz
- ★ Interconnection To Oscilloscope Provides Instantaneous Assessment



The Maplin sweep oscillator provides a fast method of frequency response, assessment and measurement. Its wide range of sweep speeds allows for connection to an oscilloscope to provide an instantaneous display of frequency characteristics. The easy to assemble module is on one pcb providing easy construction.

Kit and Special Parts

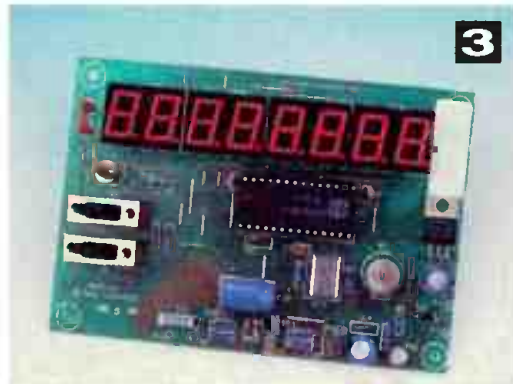
A complete kit, excluding case, is available and the pcb is also available separately. PCB dimensions: 172 x 68mm.

Order			3588
Code	Type	Price each	
LK06G	A1 Sweep Osc Kit	£31.99	
GB22Y	Sweep Oscillator PCB	£4.45	

LOW COST 10MHz COUNTER

- ★ Functions as frequency, period and unit counter
- ★ 8-digit display
- ★ Low cost design
- ★ 10/100/1000 cycle gate times

Most multi-function generators are quite expensive, but this three function counter has been designed to be low cost. It is designed around the InterSil ICM7216A, allowing measurements of frequency, periodic time or a totalising count. Maximum frequency is 10MHz in frequency and unit counter modes and 2MHz in periodic time mode. For period measurement there is a 0.1µs resolution whilst frequency modes have gating periods of 0.1, 1 or 10 seconds, and display to an accuracy of 0.1Hz. Four 0.56in high contrast, double digit displays are used, multiplexed at 500Hz with a 12.5% duty cycle. A low cost design, replacing three vital test bench facilities at a fraction of the price!



Specification	
Supply voltage:	10V to 15V
Average current @ 12V:	110mA
Input impedance (nominal):	1MΩ
Input signal amplitude	
10kHz to 1MHz:	30mV
1MHz to 5MHz:	45mV
5MHz to 10MHz:	90mV
Gate times:	0.1, 1, 10 seconds (frequency)
	10, 100, 1000 cycles (period)

Resolution:	0.1Hz (frequency)
	0.1µs (period)
Indicators:	8 seven-segment LEDs
	2 range LEDs
Timebase:	10MHz high-stability crystal

Optional Items

The following items, not included in the kit, may also be required.

Box M4005	1	(WY02C)
Red display filter	1	(FR34M)
Regulated adaptor	1	(YB23A)

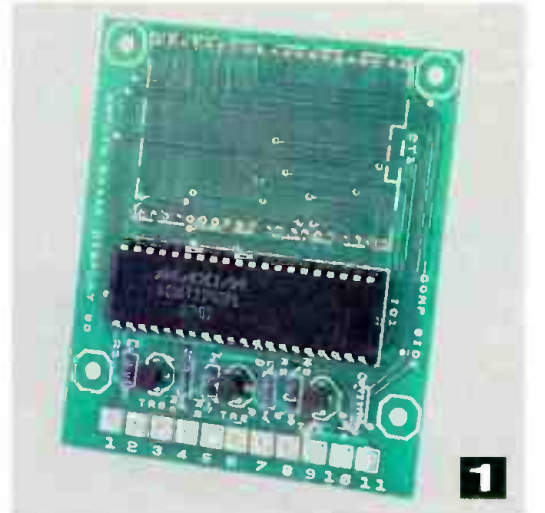
Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Project Book 45.

Order			3590
Code	Type	Price each	
LP37S	10MHz Counter	£49.99	
GE55K	10MHz Display PCB	£4.29	

GENERAL PURPOSE 4 1/2 DIGIT COUNTER

A simple general purpose 4 1/2 digit counter with an LCD display and low power consumption. The module may be incorporated into a system requiring a display count readout. It can stand alone as an item of test equipment in the workshop or as a self contained instrument for a particular counting task. The basic module provides incremental counting only with automatic leading zero blanking, and three buffered inputs for COUNT, HOLD and RESET, which have a wide input operating range from 2V to 20V. With some modification to the pcb the module could be updated to form the essential basis of a period or frequency counter. The display provides a maximum count of 19999, and includes plus, minus and decimalpoint symbols which are brought out and



made available on the board. It is even possible to cascade more than one module. Requires a single, +5V stabilised supply.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 55. PCB dimensions: 84 x 71mm.

Order			3597
Code	Type	Price each	
LM19V	4.5 Digit Countr Kit	£26.99	
GD44X	4 1/2 Dig Countr PCB	£9.99	

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DIGITAL CAPACITANCE METER



Testing capacitors properly is something that is beyond the capability of most multimeters and similar test equipment owned by the average amateur electronics enthusiast. A few simple checks are possible with an analogue multimeter, and some oscilloscopes include a component tester function which could be used to indicate a capacitor's value. For accurate measurement of capacitance, a specialised item of test equipment is really required, and here is a capacitance meter covering the values of <math><9.99\text{nF}</math> (100pF absolute minimum) to 99.9 μF in five switched ranges. The actual value of the component under test appears directly on a 3-digit 7-segment LED display, which includes an overflow indicator to avoid range errors. With a small selection of accurate reference components to hand, unknown or suspect values can be determined quite accurately. Battery powered and fully portable, the tester is a must for finding the value of all those capacitors you have never used because their printed value is obscure or long since been rubbed away.

Optional Items

The following items, not included in the kit, may also be required.

9 Volt Battery Holder	1 off	(HQ01B)
Type AA Batteries	6 off	(FK59P)

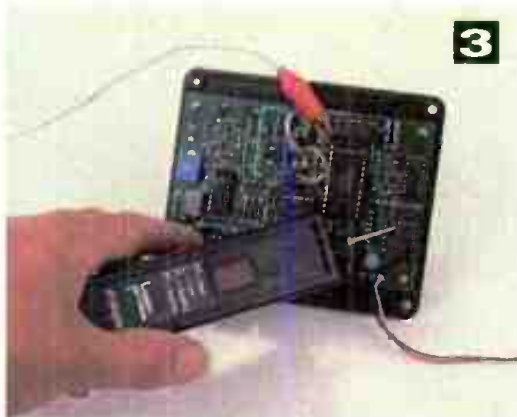
Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in the Maplin Best of Projects Book 7.

Order Code	Type	Price each
LM28F	Digi Cap Meter Kit	£34.99
GD59P	Capacitance Meter B'd	£3.79

CMOS LOGIC PROBE

- ★ Designed for high CMOS levels
- ★ High, low, floating and pulse indicator
- ★ Over voltage protection
- ★ Low current consumption



This logic probe shows its output on a seven segment LED display, as a letter of the alphabet; H for High; L for Low; F for Floating; P for Pulsing. In this way, the logic state is instantly recognisable and totally unambiguous, unlike some commercial logic displays. The use of a special high efficiency display means that the total current consumption at a supply voltage of 15V is only 15mA and quite suited to battery operated circuits. In addition the probe is protected against over voltage inputs and reversed supply. As well as

detecting High and Low logic states, open circuit (floating input) and pulsing inputs are displayed. Pulse trains from around 1Hz are detected as a pulsing input, the upper limit is above that attainable in most common CMOS logic. The two pcb construction, and straightforward design make this probe highly competitive with those costing substantially more.

Kit and Special Parts

A complete kit is available. The pcbs, box and label are also available separately. Full construction details may be found in Maplin Project Book 46.

Order Code	Type	Price each
LK13P	Logic Probe Kit	£19.99
GB30H	Probe Upper PCB	£2.85
GB31J	Probe Lower PCB	£2.85
JX58N	Logic Probe Label	28p
JX57M	Logic Probe Box	£1.60

LOGIC IC TESTER

It is often necessary to check the operation of logic IC's, new or used. When dealing with simple gate circuits, this can be done without too much trouble. However, as the operating mode of the IC's becomes more complex, then checking out circuits, using simple tools such as switches and LEDs, becomes much more troublesome. The Logic IC Tester has been developed to bring about quick and simple testing of the operating mode of these standard devices. Nearly all devices in the standard TTL and CMOS families, up to 20 pin DIL package size, can be tested. IC's are simply inserted into the 'ZIF' test socket. This project is used in conjunction with an IBM PC-XT-AT or compatible clone, the Logic IC Tester card simply plugging into a vacant expansion slot. Software is supplied, ready-to-run on 5 $\frac{1}{4}$ inch floppy disk. Disk contains READ ME files for additional information. Software is compatible with all standard video cards i.e. Hercules, EGA, etc. The cost of the Logic IC Tester compares favourably with other commercial systems and finds many applications in servicing, test and other areas.



Kit and Module

A complete kit and a ready-built version are available. Full construction details for the kit may be found in Maplin Best of Projects Book 8.

Order Code	Type	Price each
LM83E	IBM IC Tester Kit	£119.99
XM17T	IBM IC Tester Assm	£149.99

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AUDIO/VIDEO GENERATOR

- ★ Internal/External Audio/Video
- ★ Low Distortion Audio Oscillator
- ★ Crystal Controlled Video Timing
- ★ Sync and Blanking to CCIR Standard
- ★ RF and Audio/Video Outputs
- ★ 6MHz Sound Sub-carrier



When setting up video equipment, it helps enormously to have a suitable test pattern generator at hand to produce stable test patterns for evaluating picture contrast, convergence and distortion. This project uses a single integrated circuit to generate all the waveforms necessary to produce greyscale, crosshatch, dot, vertical and horizontal lines. The high accuracy line and field timing is derived from a quartz crystal which provides a very stable frequency reference. The output from the generator is black and white composite video at 1V peak to peak, but as not all TV's may have a video socket, a UHF modulator is included to provide an RF output on channel 36. This signal includes a 6 MHz sound sub-carrier for the sound channel which is modulated by a 1kHz tone. The unit can also receive external audio and video signals from a wide range of external sources if required.

Specification

Power supply: 10V to 15V DC
Supply current: 195mA @ 12V

Audio oscillator –
Waveform: Sine
Frequency: 1kHz $\pm 2\%$
Output level: 400mV rms into 1.5k Ω

loadDistortion: 0.015% THD

External audio –
Input level: 400mV rms
Input impedance: 5k Ω
Bandwidth $\pm 3\text{dB}$: 6Hz to 1.7MHz
 $\pm 6\text{dB}$: 4Hz to 2.1MHz

Output level: 1.7V rms into 600 Ω load
Distortion: 0.025% THD
Video generator: Black and white
CCIR timing: Line 15-625kHz (64 μs)
Field 50Hz (20ms)

Video patterns:
Vertical lines, 16 visible
Horizontal lines, 18 visible
Crosshatch, 1.4:1 aspect ratio
Dots
Greyscale, 8 steps
Blank raster
White raster

External video:
Bandwidth: 7MHz
Input level: 1V peak to peak
Input impedance: 1M Ω (no termination)
75 Ω (terminated)

Output level: 1V peak to peak into 75 Ω load

RF output: Channel 36 (591.5MHz)
Sound sub-carrier: 6MHz
Output impedance: 75 Ω
Output socket: Phono

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Kit and Special Parts

The kit of parts to build the Audio/Video Generator does not include case, AC adaptor, the stick-on panels or phono to coax video lead. Ready printed front and rear panels for the Audio/Video Generator are available separately as well as the double-sided plated-through pcb. Recommended case is YN33L. Full construction details may be found in Maplin Magazine Issue 37.

Order Code	Type	Price each
LM98G	A1 Pat Gen Kit	£74.99
JP03D	Pattern Gen Kit FP	£2.95
JP02C	Pattern Gen Kit BP	£2.95
GE10L	Pat Gen PCB	£14.99

LOW-COST BENCH AMPLIFIER

NEW



Features

- ★ Excellent value
- ★ 500mW output power
- ★ Input bandwidth limiting for optimum efficiency
- ★ High input impedance
- ★ Protected against DC offsets and reverse-polarity power connection

Applications

- ★ Signal tracing during servicing
- ★ Monitoring audio signals

Based on the TDA820M IC, the full output power of the Bench Amp is a little over half a watt before distortion starts to become objectionable. 500mW is quite adequate for test-bench signal tracing and monitoring applications. The input impedance of the amplifier is approximately 400kΩ, which will prevent the circuit under test from being significantly loaded. There is a second-order filter on the input of the amplifier that limits its bandwidth from 50Hz to 15kHz (-6dB). This means that all of the amplifier power is used at frequencies that the speaker can comfortably reproduce.

Optional Items

The following items, not included in the kit, may also be required.

Verobox 215	1	(LQ08J)
AC Adaptor Unreg. 300mA	1	(XX09K)

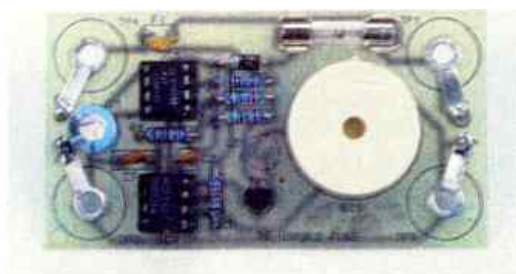
Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 64.

Order Code	Type	Price each
LT30H	Lo Cost Bench Amp	£13.99
GH36P	Bench Amp PCB	£2.75

REUSABLE FUSE

1



Features

- ★ Audio and visual warning
- ★ Low holding value
- ★ Self-resetting
- ★ Easy to use

NEW

Applications

- ★ Protection for test circuits
- ★ Added protection for low-voltage circuits

The important feature of electronic fuses is that they are self-resetting. For this reason, they have a significant advantage over the traditional type for experimental work, especially for initial trials on newly constructed circuits. This project uses as a basis the MFR020 fuse which is the smallest one in the range stocked by Maplin, and suitable for currents up to 200mA. This will usually be sufficient for most purposes.

The Reusable Fuse is an 'intelligent' fuse which is fitted between any test circuit and the power supply. It guards against many problems that the experimenter or electronics constructor may come up against. Thus, if the current exceeds 200mA for any reason, a buzzer gives a short bleep and the LED flashes continuously. The current then falls to a very low holding value until the fault has been corrected.

The device is suitable for circuits needing a supply voltage between +4 and +18V DC and this covers the majority of circuits which the electronics enthusiast is likely to construct. The device must NOT be connected in the mains supply line - it is strictly for low-voltage use only.

Specification

Voltage:	+4 to +18V DC
Quiescent supply current:	7.50mA
Hold current:	200mA
Trip current:	300mA
Power dissipation tripped:	400mW
Nominal resistance:	2.67Ω

Optional Items

The following items, not included in the kit, may also be required.

Plastic Box Type T4	1	(KC93B)
Small Plastic Feet	4	(FE32K)
Solder Tags M3	4	(LR64U)
6.5V 150mA Lamp (See Text)	1	(BU00A)
6.5V 300mA Lamp (See Text)	1	(WL79L)
Lampholder (See Text)	1	(JX87U)

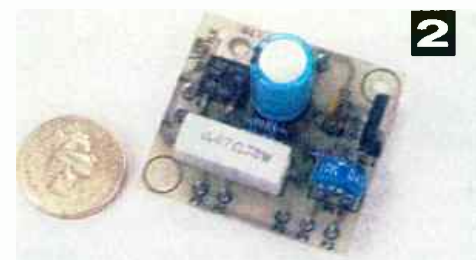
Kit and Special Parts

A complete kit of parts (including the PCB and front panel) is available (excluding optional items). The PCB and front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 79.

Order Code	Type	Price each
LT70M	Re-Usable Fuse Kit	£12.99
GH79L	Re-Usable Fuse PCB	£2.49
KP67X	Re-Use Fuse F/Panel	£1.29

L200 ADJUSTABLE VOLTAGE/CURRENT REGULATOR

- ★ Adjustable output current
- ★ Adjustable output voltage
- ★ Short circuit protection
- ★ Thermal over-load protection



The L200 is a monolithic IC designed for programmable voltage and current regulation. Voltages of 2.85V to 36V, and currents up to 2A, can be achieved. Internal protection in the L200 cuts down the risk of possible damage. This comprises current limiting, power limiting, thermal shut-down and input over-voltage protection (up to 60V for 10ms). The unit can be used for different applications such as a battery charger, power supply or DC-DC converter.

Specification

Supply voltage:	40V max
Current @ 20V:	4.2mA
Voltage range:	2.85V to 36V
Temperature range:	-5°C to +150°C (max)
Line regulation:	60dB (nominal)
Dropout voltage:	2V (nominal)
	2.5V (max)

Reference voltage: 2.77V (nominal)

Note: As this board is intended as a 'building block' project it is not eligible for our 'Get-you-working' service.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Projects Book 46.

Order Code	Type	Price each
LP69A	L200 Kit	£4.99
GE84F	L200 PCB	£1.39



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APPLIANCE RESIDUAL CURRENT DETECTOR

A Residual Current Detector (RCD) for individual appliances that may be plugged into a 13A mains wall socket or distribution block. The device provides added protection for you and your family against the risk of electric shock and is suitable for use with most electrical household appliances and power tools. Once set and in use, it compares the Live terminal current against the Neutral return current. If this shows a difference of more than 30mA, because of a leak either to the Earth terminal or elsewhere, then the device will trip open circuit, disconnecting and isolating both Live and Neutral terminals.

Particularly suitable for use with electric lawnmowers and hedge trimmers where cables are in danger of being cut. Can also be used for all appliances around the home, especially in the kitchen for kettles and irons where water is present. Also for use with an extension lead, you can make sure that the RCD is connected to the plug of the lead. The device plugs into a conventional 3-pin mains socket, and the appliance then plugs into the device. A trip indicator window will show red when reset, indicating that power is available via the device. When tripped the window shows white. A TEST button is included to make sure that the device operates correctly and should be tried before service every time it is used.

Dimensions of unit: 100 x 56 x 54mm deep not including pins.



AMAZING VALUE!
£19.99
RC53H

Specification

Rated voltage:	240V AC @ 50Hz	Trip speed:	40ms nominal
Maximum operating current:	13A	Switching method:	Double pole break
Rated trip current:	30mA	Maximum load:	3kW

Specification

Output voltage	Master TB1 & TB2	Slave TB3 & TB4
SW3 position 1:	Variable Tracking	Variable Tracking
SW3 position 2:	Master (RV1), 3V to 15V	Slave (RV1), 3V to 15V
SW3 position 3:	Variable Single (RV1) 3V to 15V	Variable Single (RV2) 3V to 15V
SW3 position 4:	Variable Single (RV1) 3V to 15V	12V Fixed (RV2)
	Variable Single (RV1) 3V to 15V	5V Fixed (RV2)
Current limit threshold:	10mA, 100mA, 1A, switchable	
Output ripple voltage:	5mV (500mA output current)	

Optional Items

The following items are not included in the kit but may also be required.

Steel Case 1608	1	(XJ28F)
Min Mains Black	As Req	(XR01B)
Isobolt M4 x 12mm	1 Pkt	(BF49D)
Isonut M4	1 Pkt	(BF57M)
Knob K7A	2	(YX01B)
Knob K7B	2	(YX02C)
Isoshake M4	1 Pkt	(BF43V)
Isonut M3	1 Pkt	(BF58N)
Isoshake M3	1 Pkt	(BF44X)
pacer M3 x 1/8 in.	1 Pkt	(FG32K)
Poziscrew M3 x 16mm	1 Pkt	(JC70M)

Kit and Special Parts

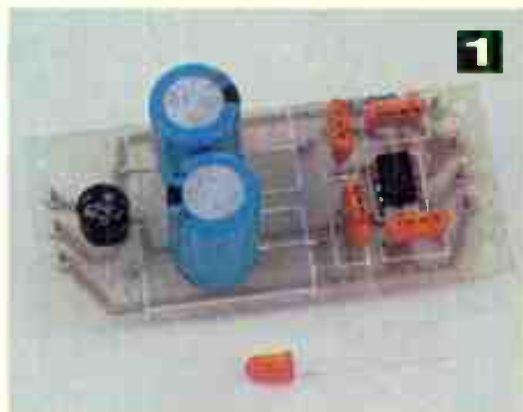
A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 47.

Order

Code	Type	Price each
LP74R	C4 Lo Cost PSU	£41.99
GE93B	Lo Cost PSU PCB	£4.39

RC4195 ±15V REGULATOR

- ★ Low component count
- ★ ±100mA output current
- ★ Short circuit protection
- ★ Thermal shutdown



The RC4195 is a dual-polarity 'tracking' regulator designed to provide balanced positive and negative 15V output voltages. The IC can supply currents of 100mA per supply rail.

Note: this is intended as a 'building block' project only, and is not eligible for our 'Get-You-Working' Service.

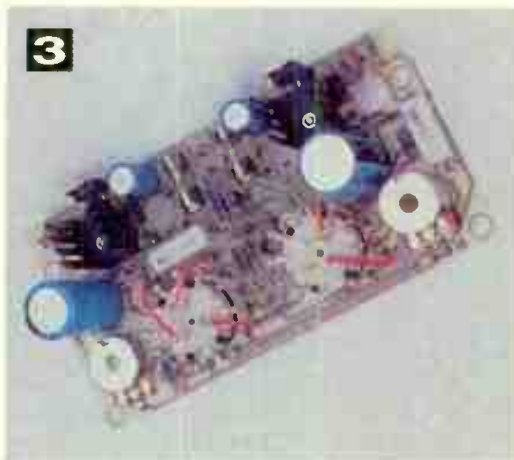
Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available. The PCB is also available separately. Full construction details may be found in Maplin Projects Book 50/62.

Order Code	Type	Price each
LP88V	4195 15V Regulator	£5.49
XX04E	15V Supply PCB	£1.28

LOW-COST GENERAL PURPOSE PSU

- ★ Variable and fixed outputs
- ★ Current up to 1A
- ★ Stable regulated supply
- ★ Single or split rail outputs
- ★ LED status indicators



This low-cost, general purpose, power supply is a relatively simple design that provides reliable performance and is ideal as a power supply for the home constructor. The supply makes available a variety of voltage combinations which include variable split supply, variable single supply, a fixed 5V and fixed 12V supply. A three position, switchable current limit is also provided and the unit is capable of supplying current levels up to 1A. The supply features full overload protection as it is based around the L200C monolithic IC regulator (YY74R), additionally the outputs are protected against unwanted positive transients.

HIGH QUALITY POWER SUPPLY



- ★ Audio grade transformer and capacitors
- ★ Multifuse™ protection
- ★ Fast recovery rectifier diodes
- ★ Regulated ±12V auxiliary supply

This project uses high grade components to produce a symmetrical ±50V rms at 2A. A stable tonal balance over the audio bandwidth, keeps second and third harmonic distortion to a minimum.

Fast switching rectifier diodes with fast recovery rates are used in conjunction with a high grade transformer to produce a better supply. Large 10000µF capacitors across the DC rails reduce the ripple to 350mV maximum. Protection for the circuit comes in the form of a re-usable fuse that has a high impedance when 'tripped'. The fuse protects the speakers from being overdriven and from large DC offsets due to failed components.

A ±15V preamplifier supply and ±17V for a speaker protection device has been included in the circuit, in addition to the main supply. The low voltage winding of the transformer is capable of delivering 160mA max. This project has been designed for the 150W MOSFET amp, but can be used for any amplifier requiring ±50V DC supply.

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Optional Items

The following items, not included in the kit, may also be required.

A4 Rotary Mains Switch DPST	1	(FH57M)
Fuse 20mm 2A A/S	1	(WR20W)
Fuse Holder 20mm	1	(RX96E)
Fuse Holder Insulating Boot	1	(FT35Q)
M3 Insulated Spacer 10mm	1	(FS36P)
Cable Min. Mains Black	1 Mtr	(XR01B)
Cable Three Core and Earth	1 Mtr	(XR53H)
SR Grommet 5R2	1	(LR48C)
Zip Cable	1 Mtr	(XR39N)

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 42. PCB dimensions 152 x 121mm

Order Code	Type	Price each
LP15R	H6 HQ PSU Kit	£94.99
GE29G	HQ PSU PCB	£8.99

Power Supply Ripple:	less than 5mV per rail
Oscillator Output:	TTL compatible – frequency 1Hz or 1kHz
Octal Logic Input:	TTL compatible—indication by LED (On = High)
Octal Logic Output:	TTL compatible
'One Shot' Switch:	TTL compatible – debounced

* The total load on the +5V and +12V supplies must not exceed a peak value of 1A, since the 5V supply is sourced from the +12V supply's regulator. The same is true of the -5V and -12V supplies.

Optional Items

The following items, not included in the kit, may also be required.

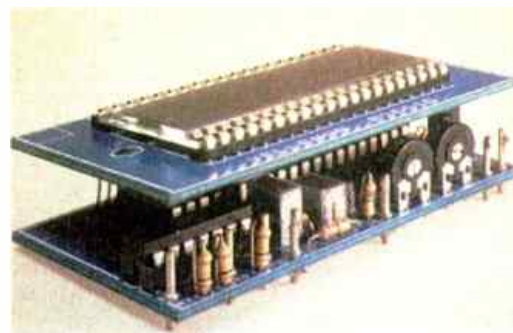
Steel Case 2108	1	(XJ30H)
13A Plug Nylon	1	(RW67X)
Plug Fuse 2A	1	(HQ31J)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB and the front panel are also available separately. Full construction details may be found in Maplin Magazine Issue 66.

Order Code	Type	Price each
LT26D	D4 Mini-Lab 2	£52.99
DH85G	Minilab 2 F/Panel	£1.45
GH34M	Minilab 2 PCB	£3.99

K2651 LCD PANEL METER



A digital meter is a lot easier to read and can be much more precise than its analogue equivalent. Moreover this panel meter is hardly more expensive than an analogue one, because no stabilised power supply is required; in many cases, an ordinary 9V battery suffices. As a result of the simple power supply and the compact construction of the meter itself, you will never have problems in finding a mounting place for it. You can easily combine it with an adaptor or a sensor for portable instruments, e.g. a precise thermometer. Measuring range: selectable -200mV to +200mV or -2V to +2V.

Can be used as a thermometer with a range from -50 to +150°C or -60 to +300°F, sensor not included. Power supply: 8 to 15V DC or 9V battery.

Order Code	Type	Price each
VE61R	Velleman Kit K2651	£18.99

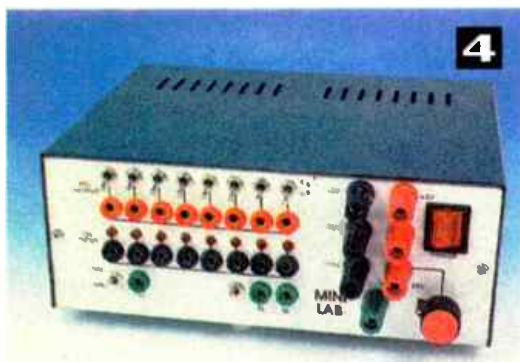
THE MAPLIN MINILAB

Features

- ★ Wide variety of power supplies – ±5V, ±12V, -15V and +1.25 to 24V variable
- ★ Eight LED TTL-logic state indicator
- ★ Eight TTL-logic test outputs
- ★ 1Hz/1kHz TTL-level oscillator
- ★ Debounced TTL-level switch with complementary outputs

Applications

- ★ Education
- ★ Servicing analogue and digital equipment
- ★ Project development



The Minilab is a very useful piece of test equipment, for repairing and developing both digital and analogue circuits. Features of the Minilab include fixed DC voltage supplies at ±5V at 500mA continuous (1A peak), ±12V at 500mA continuous (1A peak), and -15V at 100mA continuous (200mA peak). There is also a variable positive DC voltage supply that can be adjusted to give between 1.25V and 24V; the current available from this supply depends upon the output voltage. However, the current drawn by the +5V and +12V rails combined must not exceed a total of 1A – the same comment applies for the ±5V and ±12V rails. Other features of the Minilab include eight TTL-level outputs, and eight TTL-level inputs – each fitted with an LED that indicates a logic 1 ('high') condition when illuminated. There is also a TTL-level oscillator switchable between approximately 1Hz and 1kHz and, a debounced TTL-level 'one-shot' switch with complementary (Q and \bar{Q}) outputs, which is very useful for single-stepping through digital circuits that use sequential logic. Debouncing is, as the name suggests, a 'cleaning up' of the switching action – the complementary outputs are always either high or low.

Specification

Power Supply Voltages: +5V*, +12V*, +1.25V to 24V Variable -5V*, +12V*, +15V (100mA continuous, 200mA peak)

MAPLIN KEY CALL

Phone 01702 556751

VELLEMAN TEST PROJECTS

K2032 DIGITAL PANEL METER



This panel meter is an almost ideal replacement for the traditional moving coil type instrument, offering greater accuracy and stability, with a bright, highly visible display. This very compact unit can be built into a variety of housings, or even into existing equipment. The unit features positive and negative overload indication.

Display:	-99mV to +999mV (full scale)
Resolution:	1mV
Input impedance:	1MΩ
Supply voltage:	5V DC at 250mA
PCB dimensions:	65 x 35mm

Order Code	Type	Price each
VE60Q	Velleman Kit K2032	£22.99

K1823 1A POWER SUPPLY



This small power supply provides a stable voltage adjustable between 1.5 and 35V at 1A. Its LM317 floating regulator provides markedly better ripple and regulation characteristics than standard regulators. Current limiter and thermal overload protection are on the chip.

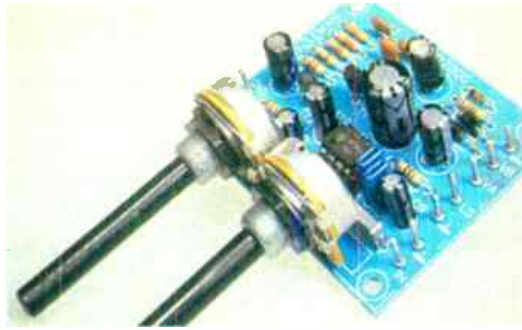
Input voltage:	28V AC max.
Line reg:	typ. 0.01%
Load reg:	typ. 0.1%
Ripple rejection:	80dB

Order Code	Type	Price each
VE58N	Velleman Kit K1823	£7.99

FAX YOUR ORDER NOW!

01702 553935

K7000 SIGNAL TRACER/INJECTOR



Features

- ★ Low cost
- ★ 1kHz sine wave oscillator (signal injector)
- ★ 40dB gain amplifier with 1W output (signal tracer)
- ★ Battery or mains operation

Applications

- ★ Servicing audio equipment
- ★ 'Hands-on' learning
- ★ Can be used as simple amplifier/oscillator

This low-cost signal tracer/injector is a very useful piece of test equipment that will help to quickly find faults in low-frequency analogue equipment. It will also be an invaluable addition to anyone's toolbox. The module can be used as a simple amplifier/oscillator, making it ideal for Morse Code practice, or just as a general-purpose amplifier. The signal tracer/injector will work from a standard 9V battery, and requires a small low impedance loudspeaker. Total power consumption under full load conditions is 170mA.

Optional Items

The following items, not included in the kit, may also be required.

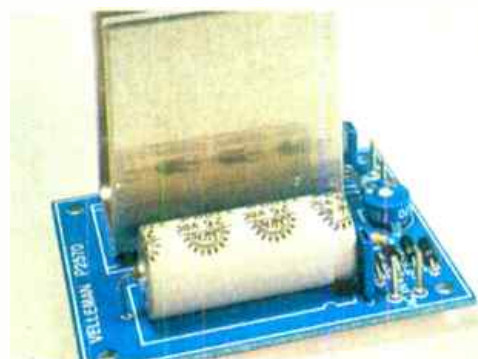
9V PP3 Alkaline Battery	1	(FK67X)
PP3 Battery Clip	1	(HF27E)
Low-Z 778 Speaker	1	(YW53H)
PX-3 ABS Box	1	(YU54J)

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 54.

Order Code	Type	Price each
VE62S	Velleman Kit K7000	£10.99

K2570 UNIVERSAL POWER SUPPLY 5 TO 14V DC/1A

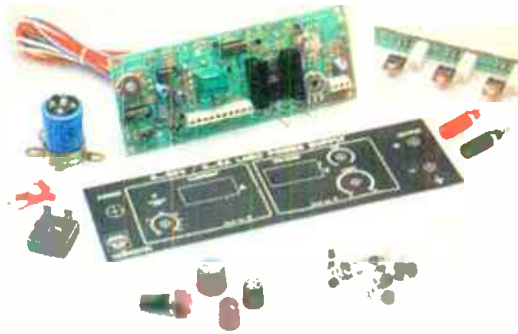


Suits all Velleman kits which need a regulated power supply between 5 and 14V DC rated at no more than 1A.

Input voltage:	7 to 16V AC, 1A (depending on the application)
Output:	5 to 14V DC stabilised, 1A max.
Ripple rejection:	typ. 78dB
Temperature stability:	0-0.25°C
Thermal overload protected.	

Order Code	Type	Price each
VE59P	Velleman Kit K2570	£7.99

K7202 30V 5A LABORATORY POWER SUPPLY



A laboratory power supply is indispensable for both the professional and amateur electronic engineer. This power supply is short-circuit protected and variable from 0 to 30V and from 0 to 5A. A connection is supplied for both voltage meter and ampere-meters, such as K7201. A front foil and matching buttons are supplied. The heatsink, case, and transformer are not included.

Output voltage variable from 0 to 30V
Fine control over 1V
Output current limit variable from 0 to 5A.
Fine tuning between 0 and 1A
LED (light emitting diode) – indication of current limitation
Output current: 4A continuous/5A peak
Short-circuit protected
Ripple maximum: 0.5mV rms
Input voltage 2 x 15V AC 5-3A
Connection for K7201 digital volt/ampere-meter

Order Code	Type	Price each
VF16S	A Velleman Kit K7202	£56.99

K7201 DOUBLE DIGITAL PANEL METER

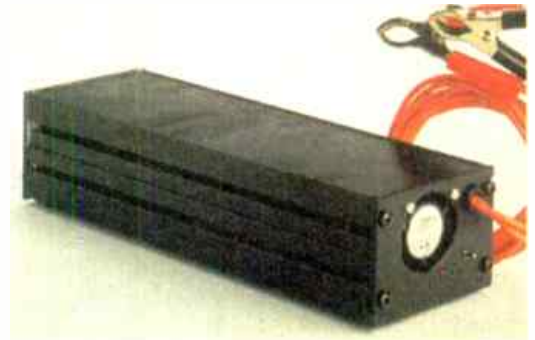


This DPM was designed for use with our 30V 5A power supply K7202, but can easily be used in other applications. 3-digit LED (light emitting diode) readouts
Readout one from 0 to 99.9 (0.1 resolution) (e.g. for voltage). 0 to 9.99 (0.01 resolution) (e.g. for current).
Input sensitivity for full scale: 99.9mV
Automatic zero adjust
Input impedance: 10¹⁰ Ohm
Overload indication for current readout
Power supply 125 or 240 VAC
Dimensions: 170 x 70mm

Order Code	Type	Price each
VF15R	Velleman Kit K7201	£42.99

K3507 250W 12V DC TO MAINS AC INVERTER

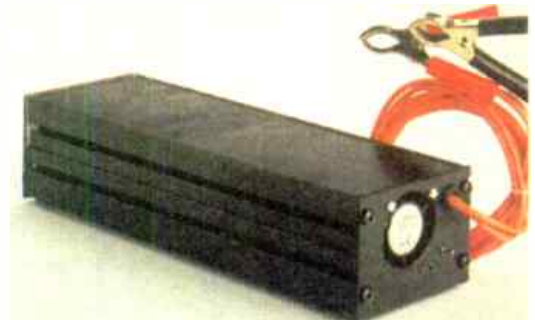
A very compact 12V car battery to AC mains inverter that has a quartz controlled, 50Hz 'modified' sine wave output frequency. The inverter has a continuous power output of 250W and a peak output of 500W. Additional features include short circuit and overload protection, temperature compensation with full thermal protection, 12V polarity protection and low battery voltage indicator. It is possible to modify the converter to produce a 110V AC 60Hz output at 150W. The inverter is not suitable for driving capacitive loads. Supplied with heavy-duty battery clips, battery cable and 30A fuse.



Continuous output:	220V AC at 200W 210V AC at 250W
Maximum peak power output:	500W
Input voltage:	12V DC (25A approx.)
Size:	270 x 85 x 65mm
Weight:	1.4kg

Order Code	Type	Price each
VF35Q	B4 Velleman Kit K3507	£109.99

K3509 250W 24V DC TO MAINS INVERTER



A very compact 24V DC to 230V AC mains inverter having a quartz controlled 50Hz 'modified' sine wave output frequency. The inverter has a continuous power output of 250W but is capable of handling peak outputs of up to 500W. Other features include short circuit and overload protection, temperature protection of output transistors, 24V DC inverse polarity protection and low battery voltage protection – the unit will shut down if battery power becomes too weak. It is possible to modify the inverter to produce an output of 110V AC at 60Hz that will give 150W. The inverter is not suitable for capacitive loads.

Specification

Input voltage:	20V to 28V DC
Current consumption:	13A max.
No-load consumption:	0.2A
Output voltage:	230V AC at 26V DC input

Continuous output power:	250W
Peak output power:	500W
Output frequency:	50Hz
Efficiency:	80% max.
Battery protection:	±20V
Thermal limit:	90°C
Dimensions:	270 x 85 x 60mm
Weight:	1.4kg

Order Code	Type	Price each
VF42V	H Velleman Kit K3509	£118.99

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K7200 30V 10A LABORATORY POWER SUPPLY



Features

- ★ Digital voltage meter: 3 digit 0.1V accuracy
- ★ Digital ampere meter: 3 digit 0.01A accuracy
- ★ Output voltage variable from 0V to +30V (fine adjustment over 1V)
- ★ Variable current limit from 0 to 10A
- ★ LED current limit indicator
- ★ Output short circuit protected
- ★ Maximum output ripple 0.5V rms
- ★ Cooling fan for prolonged usage at full power

Applications

- ★ Laboratories and test benches
- ★ Powering mobile radio equipment
- ★ Precision charging of batteries

This extremely flexible laboratory PSU is capable of supplying a well-regulated continuously variable DC voltage up to 30V at currents up to 8A continuous, 10A peak. As a result, there is a wide range of potential applications for the hobbyist, service department and educational establishments. It is ideal for testing prototypes, and with the current limiting function, suitable for the more sensitive circuits. In addition, it is suitable for the running of CB and amateur radio equipment, and even the charging of batteries. A digital voltage meter and a separate digital ammeter are supplied as indicators. With the built-in fan, the power supply is able to cater for long-term full loads. It is supplied complete with housing, buttons and transformers.

Specification

Output voltage:	0V to 30V variable with fine control over 1V
Output current:	8A continuous, 10A peak, variable limit from 0 to 10A, LED indication when limiting. Short-circuit protected
Maximum ripple:	0.5mV rms
Digital volt meter:	3-digit, 0.1V accuracy
Digital ammeter:	3-digit, 0.01A accuracy
Consumption:	300W maximum
Dimensions:	330 x 90 x 215mm

Optional Items

The following items, not included in the kit, may also be required.

Nylon Mains Plug 13A	1	(RW67X)
Fuse 3A	1	(HQ32K)
Insulating Boot for Fuseholder	1	(FT35Q)
Insulating Boot for Chassis plug	1	(JK66W)
Heat Transfer Compound	1 syringe	(FL79L)
BC Lampholder	1	(FQ02C)
Mains Lamp Bulb 40W	1	

Kit and Special Parts

A complete kit of parts (including the PCB) is available (excluding optional items). Full construction details may be found in Maplin Magazine Issue 58.

Order Code	Type	Price each
VF14Q	H14 Velleman Kit K7200	£223.99

VIDEO PROJECTS

COLOUR & MONOCHROME CCD TV CAMERA MODULATOR



Features

- ★ Low-cost
- ★ Easy to build
- ★ Gives boost to upper video frequencies
- ★ Reverse polarity protection
- ★ On board regulator

Applications

- ★ View CCD pictures on a normal TV with no modification
- ★ CCTV security systems
- ★ Interface video only devices to TV sets

The video output from either the colour or black-and-white CCD camera modules (CJ75S and ZA35Q) cannot be connected directly to the majority of domestic TV sets. Some TVs have a direct video input socket (Peritel, or SCART), but many only have a UHF aerial input socket. This add-on project is based around a low cost UHF colour modulator which superimposes the video signals from the CCD camera, or a wide range of other units, onto a high frequency carrier wave. A pre-tuned modulator module (type UM1233) is used to simplify the construction and alignment of the project. The RF output from this modulator is suitable for connection to the aerial input of UK UHF TV sets.

There are two basic methods of using the CCD TV Modulator with your TV set. The first is to plug the RF output lead from the modulator into the UHF aerial socket on your TV and tune to channel 36 (591.5MHz), but this will inhibit the reception of all TV channels. The second method uses a coax 'Y' adaptor to combine the UHF signals from the modulator and the TV aerial, thus allowing signals from both to be received. However, to prevent any stray signals from the modulator reaching the TV aerial, an indoor aerial amplifier should be used in line with the aerial and the 'Y' adaptor to block the modulator signal and to compensate for the insertion loss of the 'Y' adaptor. The modulator can be tuned to a clear channel if it clashes with any TV stations or a VCR/satellite receiver. Ideal for home security applications.

Specification

DC power supply voltage:	10.5V to 17V
Supply current at 12V:	8mA
Video input level:	1V pk to pk
Video input impedance:	600Ω (no termination) 75Ω (R1 terminated)
RF TV output:	Channel 36 (591.5MHz)
Output socket:	Phono

Optional Items

The following items, not included in the kit, may also be required.

Unregulated 300mA Mains Adaptor	1	(XX09K)
Monochrome CCD Video Camera	1	(ZA35Q)

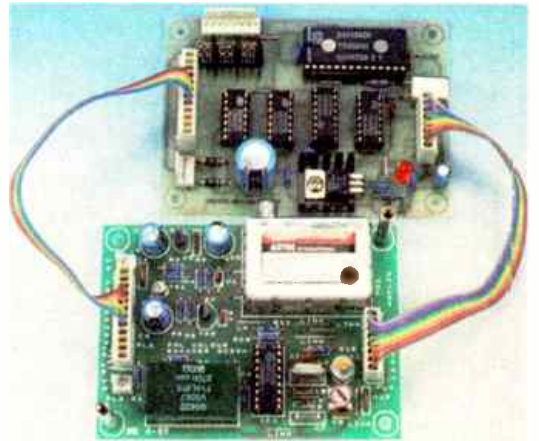
Colour CCD Camera	1	(CJ75S)
2-into-1 'Y' adaptor	1	(FS23A)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (but excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Magazine Issue 75.

Order Code	Type	Price each
LT37S	CCD Camera TV Modultr	£11.99
GH62S	CCD Camera TV MD PCB	£2.49

TV COLOUR BAR GENERATOR



Features

- ★ PAL composite video output
- ★ PAL UHF RF output
- ★ RF output channel adjustable
- ★ AC or DC supply
- ★ On-board regulator
- ★ Produces EBU, 100% and 75% colour bars
- ★ Easy to build

Applications

- ★ TV/Monitor servicing
- ★ Video servicing
- ★ Workshop and field use
- ★ TV outside broadcasts
- ★ TV studio

If you are involved in sending TV pictures up and down cables, or to or from VTRs and monitors, it is really necessary to be able to check that the pictures at the far end are being displayed correctly. Whilst the black and white test stripes that some VTRs give out in their 'test mode' are useful, it is not normally possible to properly adjust a TV or monitor to exactly the right settings to display correct colour pictures.

Similarly, when servicing TVs, monitors, VTRs or other video equipment, it is necessary to have a constant and stable colour test signal to accurately set up the various preset controls. Over the last decade, the previously familiar colour test card has vanished from our TV screens, much to the chagrin of TV and video engineers the length and breadth of the country.

The Colour Bar Generator produces a steady, standardised colour bar test signal, of the type and quality widely used by broadcasters for checking and setting up all manner of equipment which is required to work in colour. The colour bars test signal is also used in any situation where sources need to be switched or mixed, as with a studio vision mixer for example.

Important: this project also requires the Colour Encoder Kit (LM66W) to function, see ordering information below.

Specifications

Power supply voltage range:	15V to 25V AC or DC
Power supply current:	105mA at 15V DC
Colour system:	PAL
Colour bar standards:	100%, EBU and 75%
Composite video output:	1V pk to pk into 75Ω (EBU Bars)

UHF RF output: 591.5MHz (channel 36)
 UHF RF output connector: Phono
 PCB dimensions: 99 x 73 x 31mm
 Mounting Holes: M3 clear

Optional Items

The following items are not included in the kit but may also be required.

Rotary Switch 3-pole 4-Way	1	(FF75S)
Ribbon Cable 10-way	1m	(XR06G)
Miniature Coax	As req	(XR88V)
Wire 1.4A Red	As req	(BL07H)
Wire 1.4A Black	As Req	(BL00A)
Phono to Coax Cable	1	(FV90X)
Bolt M3 x 25mm	1 Pkt	(JY26D)
Bolt M3 x 6mm	1 Pkt	(JY21X)
Nut M3	1 Pkt	(JD61R)
Shakeproof Washer M3	1 Pkt	(BF44X)
Threaded Spacer M3 x 14mm	1 Pkt	(FG38R)
Clearance Spacer M3 x 1/8in.	1 Pkt	(FG32K)

Kit and Special Parts

A complete kit of parts, including the PCB, is available (excluding optional items). The PCB is also available separately. Both Colour Bar and Colour Encoder kits can be ordered together as special Order Code BE75S. Full instructions can be found in Magazine Issue 77 and also Projects Book 29.

Order Code	Type	Price each
LT50E	Colour Bar Generator	£22.99
BE75S	C/Bar & PAL Enc Kits	£49.98
GH67X	TV Colour Bar PCB	£3.49

VIDEO AMPLIFIER

An ELV Kit



- ★ High frequency and level controls
- ★ Four buffered outputs
- ★ Requires +12V DC supply

A video amplifier able to distribute one input video signal to four outputs, either monitors or video recorders. A level control allows the input signal strength to be varied whilst an HF booster improves the signal quality. The unit offers high input impedance, minimal phase shift and excellent bandwidth.

Specification

DC voltage:	12V
DC current:	17mA
Gain (max):	8dB (one output terminated 75Ω) 6dB (all outputs terminated 75Ω)
Frequency:	30Hz to 10MHz
Input impedance:	75Ω (nominal)
Output impedance:	75Ω (nominal)
HF Boost:	2dB
Gain boost:	2dB

Optional Items

The following items, not included in the kit, may also be required.

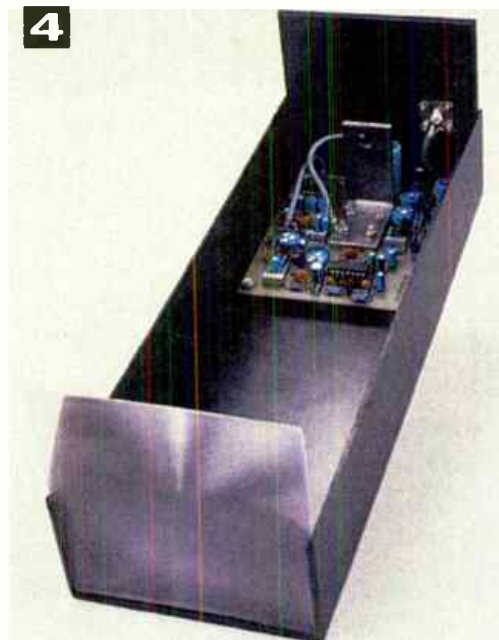
ABS Box MB2	1	(LH21X)
Pozi Screw M3 12mm	1 Pkt	(BF37S)
Steel Nut M3	2 Pkts	(JD61R)
Isoshake M3	1 Pkt	(BF44X)
Steel Washer M3	1 Pkt	(JD76H)
Phono Socket twin	1	(JK15R)
Phono Socket quad	1	(BW74R)
Power Socket 2.1mm	1	(JK09K)
Hook-up Wire (7/0.2) Black	1 Pkt	(BL00A)
Regulated 300mA PSU	1	(YB23A)

Kit and Special Parts

A complete kit of parts is available. Full construction details may be found in Maplin Magazine Issue 44. A ready assembled version is also available.

Order Code	Type	Price each
LP60Q	Video Pre-Amp	£12.99
AM22Y	Video Pre-Amp Assm	£22.99

INFRA-RED VIDEO LINK



Features

- ★ Range up to 100m
- ★ 12V operation
- ★ Replaces long video cables

Applications

- ★ Point-to-point video link
- ★ Security
- ★ General communications

The Infra-red Video Link allows the transmission of monochrome composite video over a distance of up to 100 metres. The system makes use of large fresnel lenses to focus the infra-red energy at much greater distances than are possible using standard techniques. The Infra-red Video Link has many varied applications, but is particularly suited to security, e.g. to link a security camera to a video monitor. This is particularly useful between two buildings on the same premises. In this case, the infra-red link obviates the need for long external cable runs. Clearly, the system is only practical where the buildings are close enough together, and there is a direct line-of-sight between the Transmitter and Receiver. Under typical environmental conditions, a range of up to 100m may be expected from the link; however, if the optical path is attenuated (for example, by fog or heavy rain), reduced range can be expected.

The quality of picture is not as good as that from a TV receiver, or a direct connection to a video monitor, due to the reduced bandwidth. However, it is sufficient for general-purpose surveillance applications where fine detail is less important.

Specification

Supply voltage:	12V to 14V DC
Supply current:	150mA Tx (quiescent @ 12V) 200mA Rx
Range:	Up to 100m.
Video bandwidth:	4MHz approx.
Peak infra-red	
Wavelength:	270mm approx.
Comp. video input:	1V Pk-to-Pk Tx
video output:	1V Pk-to-Pk Rx

Kit and Special Parts

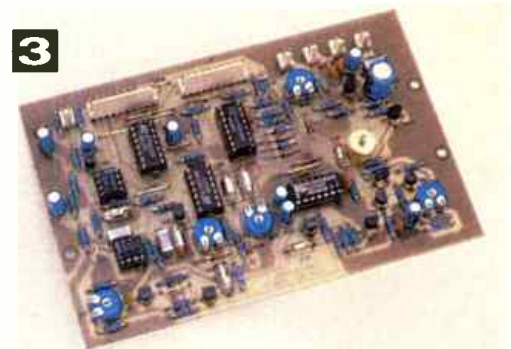
The Transmitter and Receiver are available as two separate complete kits, excluding any power supply. The kits include a case, PCB, fresnel lens, suitable mounting bracket and construction details. Full construction details may be found in Maplin Magazine Issue 52 and Projects Book 51.

Tx PCB: 83 x 94mm.
 Rx PCB: 109 x 94mm.

Order Code	Type	Price each
LP59P	I/R Video Link Tx	£49.99
LP99H	I/R Video Link Rx	£44.99
GH01B	Video Link Tx PCB	£4.29
GH02C	Video Link Rx PCB	£4.49
KW65V	Diode Bracket	£2.99

VIDEO BOX

- ★ Composite colour video in/out
- ★ Sync in/out
- ★ Fade to black
- ★ Normal or negative picture
- ★ DC video control
- ★ Picture synchronised switch functions



The main function of this excellent design is to provide the ability for fading the picture information down to a blank screen. This effect can be used as a 'fade-in' or 'fade-out' on dubbed recordings (e.g. camcorder to VCR), lending a more professional appearance to your video productions. The Video Box permits the reduction in amplitude of picture information, while maintaining the level of the timing signals used to synchronise it. To achieve this, the incoming composite video signal must be split up into its component parts, each of which undergo selective processing. Following this, these components are re-assembled, to produce the final composite output. An additional video inverter has been included, allowing the option for a negative picture to be displayed (useful for home video and long distance/satellite TV enthusiasts!). Apart from its own function as a video fader, the system timing signals have been made available, and as a result the finished unit can be used as a versatile building block for use within other video projects. Two additional video effects have been provided. When operated, the picture inverse switch produces a 'negative' image. The colour burst defeat switch should have the effect of turning off the colour circuits within your video equipment. This function is commonly referred to as the 'colour-killer' circuit, and when activated has the effect of producing a black-and-white picture.

It is strongly recommended that the Video Box is powered from a regulated power supply e.g. 12V

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300mA type (YB23A). Note: the Video Box is NOT reverse-polarity protected, so damage will occur to the circuit if the power supply connections are reversed.

Specification

DC power requirement:	+12V
DC current:	120mA
Video system:	Comp. PAL colour video; 1V Pk-to-Pk
Video gain:	0dB
Frequency bandwidth:	10MHz
Input impedance:	75Ω (nominal)
Output impedance:	75Ω (nominal)
Video control:	Fade to black External control
Synchronised switches:	Video normal or inverted Video defeat Colour burst defeat Output defeat
Composite sync:	On/off External input
Timing outputs: (All +12V CMOS)	Composite sync. Inverted composite sync. Vertical sync. Odd/even field index Video blanking Inverted video blanking Colour burst gate Inverted colour burst gate

Optional Items

The following items, not included in the kit, may also be required.

Min Slide Pot Lin 10kΩ	1	(JM85G)
Slide Knob B	1	(YG09K)
Knob K14B	1	(FK39N)
LED Clip 5mm	1	(YY40T)
SPST Ultra Min. Toggle	5	(FH97F)
AC Adaptor Regulated	1	(YB23A)
ABS Console M6006	1	(LH66W)
BNC Round Skt 75Ω	2	(FE31J)
Panel Mount Pwr Skt 2-5	1	(JK10L)
Self Tap Screw No. 4 x 1/4 in.	1 Pkt	(FE68Y)

Kit and Special Parts

A complete kit of parts (including the PCB and instruction leaflet) is available (excluding optional items). The PCB is also available separately. Full construction details may be found in Maplin Projects Book 51.

PCB dimensions: 144 x 97mm.

Order Code	Type	Price each
LP48C	Video Box Kit	£27.99
GE85G	Video Box PCB	£4.99

VCR DUBBING AND CHANGEOVER KIT

A KTE Kit



- ★ Eliminates constantly changing leads
- ★ Amplifies the video signal
- ★ Connections for three video recorders

With video cameras becoming more and more popular, a need arises for a simple way of editing tapes. This high quality kit permits two video recorders to be permanently connected together via special video relays in the unit. A switch on the front panel transposes all the connections so that the playback machine becomes the recorder and the VCR that was recording becomes the playback machine. Thus tapes

can be edited backwards and forwards, completely eliminating the laborious task of transferring all the connections each time. The unit also incorporates an amplifier to eliminate losses in the video signal. A further feature is that a third VCR can be connected, which can record the final output to make the finished master. Connections are via scart sockets for all three machines (the plugs are not included in the kit), duplicated on 6-pin DIN sockets for machines 1 and 3 and for machine 2 on phono sockets for right and left audio and BNC socket for the video. NB Not S-VHS compatible.

Kit and Assembled Unit

A complete kit, including case and pcbs, is available. The plugs and interconnecting leads are not supplied and must be made up according to the particular connectors on your VCR's. Full construction details may be found in Maplin Magazine Issue 30. A ready assembled VCR dubbing and changeover unit is also available.

Order Code	Type	Price each
LM71N C2	Video Dubber Kit	£64.99
XM16S H2	Video Dubber Assmbld	£129.99

AUDIO AND VIDEO MODULATOR

2



- ★ No Alignment Equipment Required
- ★ Colour or Black & White
- ★ 6MHz Sound Carrier
- ★ Good Modulation Linearity

When using certain video equipment, an ordinary television receiver cannot be connected directly to the video signal. Some TV sets do have a direct video input socket (SCART), but most domestic sets only have an aerial input for reception of UHF TV stations. To solve this problem, a UHF modulator is required, which superimposes the video and audio signals onto a high frequency carrier wave. To simplify the construction and alignment of the project, a pre-tuned modulator module (UM1286) has been employed in the design. From the composite video and mono sound signals the modulator produces an RF output suitable for connection to the aerial input of a UK UHF TV set. The modulator is tuned to UHF channel 36.

Specification

Supply Voltage:	8V to 16V DC
Supply Current:	26mA at 8V 32mA at 12V 48mA at 16V

Audio Input Level:	1V p-p
Audio Input Impedance:	30kΩ
Video Input Level:	1V p-p
Video Input Impedance:	1MΩ (not terminated) 75Ω (terminated)
RF TV Output:	Channel 36 (591.5MHz)
Sound Sub-carrier:	6MHz
Video Bandwidth:	8MHz
Output Socket:	Phono

Optional Items

The following items, not included in the kit, may also be required.

AC Adaptor unreg. 300mA	1	(XX09K)
Preset Trimmer	1	(BR49D)
Video Lead 6	1	(FV90X)

Kit and Special Parts

A complete kit of parts excluding hardware is available. The hardware kit comprises case, top panel and all fastenings. The following items are also available separately, a high quality fibre-glass pcb, a pre-drilled case, and a self-adhesive top panel. Full construction details may be found in the Maplin Projects Book 30. A ready assembled version of LM78K (Modulator Kit) is also available. PCB dimensions: 102 x 57mm.

Order Code	Type	Price each
LM78K	Aud/Vid Modultr Kit	£21.99
LM79L	Aud/Vid Mod Hard Kit	£12.99
GE09K	Aud/Vid Modultr PCB	£3.35
YT64U	Modulator Box	£7.99
JL74R	Mod F/Panel Label	£1.60
AM23A	A/V Modulator Assm	£29.99

TEA2000 PAL COLOUR ENCODER

This colour encoder module is a building block used to convert digital signals into colour video. The module provides two outputs, direct video for a monitor and modulated RF for a domestic colour television. The heart of the unit is the TEA2000, which generates the necessary signals to provide a PAL or NTSC compatible video signal from the colour and timing inputs. The video output is buffered and a link is provided for video termination if required. The on board modulator is tuned to UHF channel 36.

5



Specification (PAL)

Power Supply Voltage:	+11.5V to +12.5V DC
Power Supply Current:	68mA at +12V
Regulator Output:	+5V, 90mA max
Video Output:	1V p-p (75Ω load)
UHF TV Output:	Channel 36 (591.5MHz)
TTL Input Levels:	Low +0.8V max High +2.0V min
Crystal Frequency:	8.867238MHz
Chrominance Filter:	4.433619MHz
Luminance Delay:	270ns

Optional Items

The following items, not included in the kit, may also be required.

Trim Tool	1	(BR51F)
Video Lead 6	1	(FV90X)
Threaded Spacer M3	1 Pk	(FG38R)
Isolbolt M3 x 6mm	1 Pk	(BF51F)
Isoshake M3	1 Pk	(BF44X)
Isonut M3	1 Pk	(BF58N)

Kit and Special Parts

A complete kit of parts (PAL version), is available. The high quality pcb is also available separately. Full construction details may be found in the Maplin Magazine Issue 29.

A ready assembled version is also available.
PCB dimensions: 99 x 72mm.

Order Code	Type	Price each
LM66W	Pal Col Encdr Kit	£26.99
GD99H	Pal Col Encdr PCB	£4.49
AM24B	PAL Encoder Assm	£36.99

NICAM 728 DIGITAL STEREO TV SOUND SYSTEM

The technique for converting an analogue audio signal into a digital representation for reproduction is now well known in the form of the compact disc player. A similar process is applied to the audio channel of a television signal to produce the high quality stereo sound track that is NICAM 728 – 'NICAM' being an acronym of 'Near Instantaneous Companded Audio Multiplex', and '728' referring to the transmitted data rate of 728k-bits per second. This is going to be the standard for the future of quality TV sound, comparable with compact discs and provides TV sound quality on a par with the kind of picture quality now possible (and not before time). However, if you don't feel ready as yet to go all the way and 'splash-out' on a complete NICAM TV receiver, and there's nothing wrong with your present set in all other respects, then these projects are for you. Independent NICAM compatible TV tuner and NICAM decoder require no modification to your existing TV set, and will be able to use your hi-fi system to the full.

Outside the UK the system is only suitable for use on PAL I systems with NICAM carrier at 6.552MHz.

NICAM 728 Stereo Decoder

- ★ **NICAM mode indicators**
- ★ **Optional external audio input while NICAM is not present**
- ★ **Automatic mono/stereo/bilingual audio switching**
- ★ **Operates from single 12V supply**



To operate a working system using the Toshiba NICAM 728 chip set, an external i.f. input is needed with mono audio inputs, for when NICAM is not active. The output comprises of a left and right channel for a stereo amplifier. 'Reception mode' indicators include red/green NICAM/F.M. LED indicators, with NICAM/F.M. manual override (F.M. = external source, or 'normal' TV mono sound). NICAM active stereo/mono indicators show the mode of operation according to the transmitted 'application control word' and the position of mode selector switches, if used. The module can be made to output either 'M1' or 'M2' only (independent mono sound signals transmitted in alternate picture frames) to outputs L and R as twin channel mono, or both simultaneously ('M1' to L, 'M2' to R). Also includes the NICAM option to receive one mono signal for two channels with a second transparent data channel for other uses. The Maplin Magazine Issue 34 expands on these in greater detail.

TELEPHONE WITH 20 DIRECT MEMORIES

Audioline

This telephone features 20 direct touch memories and pause facility for PABX use, and has full approval for use on the Mercury phone system. Compatible with new BT star services.



Specification

Power supply input voltage:	11 to 13V DC
Supply current at 12V:	157mA (stereo) 190mA (mono)
Input frequency:	6.552MHz
Sensitivity:	100µV
Impedance:	1kΩ at 6.552MHz
External Audio Input frequency:	100mV RMS
Input Impedance:	10kΩ at 1kHz (5kΩ mono)
Audio output level:	1V r.m.s. into 1kΩ
Distortion:	0.01% THD
Signal to noise ratio:	70dB
Dimensions:	142 x 102 x 25mm
Weight:	143g

Optional Items

The following items, not included in the kit, may also be required.

Sub-Min Toggle A	4	(FH00A)
2k2	2	(M2K2)
1N4148	2	(QL80B)
Trim Tool Pot Core Type	1	(BR51F)
Miniature Coax	1m	(XR88V)
Hook-Up 7/0.2 wire 10M Bk	1 Pk	(BL00A)
Hook-Up 7/0.2 wire 10M Red	1 Pk	(BL07H)

Kit and Special Parts

A complete kit is available, the pcb is also available separately. Full construction details may be found in the Maplin Magazine Issue 35.

Order Code	Type	Price each
LP02C	A1 Decoder Kit	£69.95
GE22Y	Decoder PCB	£6.99

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NICAM Stereo Tuner Accessory Kit

Features

- ★ **Power input protection**
- ★ **Voltage synthesis tuning system**
- ★ **SCART, DIN and Phono sockets**
- ★ **Push-button function switches**
- ★ **LED indicators**
- ★ **Superbly finished case**
- ★ **Expandable to include Infra-red remote control**

Specification

Power supply input voltage:	11V to 13V
Current at 12V:	130mA 530mA with NICAM tuner and decoder
Input Protection (crowbar)	
Over-voltage:	+15V
Reverse polarity:	-0.6V
Fuse rating:	1A
Tuning System (M491B)	
Station memory:	16 Channel
Memory type:	Non volatile (Ten year data retention)
Memory supply voltage:	+25V (µA78S40 switching regulator)
Channel display:	7 Segment LED
Voltage synthesiser:	13 Bits (8192 steps)
Clock oscillator:	455KHz
Keyboard matrix:	Channel, Tuning Up/Down and Store
Remote control input:	PCM signals
Push-button switching:	Power ON/OFF Audio tune NICAM/FM UK/Continental M1+M2 M1 M2
Sockets	
Stereo audio output:	SCART, DIN and Phono
Composite video output:	SCART and Phono
DC power input:	2.5mm

Designed for use with the Maplin NICAM tuner and decoder projects. Three circuit boards are used to link-up and provide the optimum working environment for the tuner and decoder modules. The socket PCB has a selection of audio/video connections for SCART, DIN and Phono with the DC entering the power input protection circuit via a 2.5mm socket. On the display

Continued on next page.

Continued from previous page.

PCB a voltage synthesis tuning system with a non volatile 16 channel memory supports the tuner board. In addition to the function switches on the switch PCB a voltage generator IC is used to provide the +25V read and write memory supply.

The circuit boards can be housed in a specially manufactured metal case which is available drilled, cut and painted to a very high standard. To power the unit a regulated 12V DC mains adaptor capable of providing up to 600mA must be used (e.g. stock code YZ21X). With its variety of sockets the tuner system can be connected to a wide range of home entertainment equipment and the SCART connector is compatible with most modern single, or twin speaker (stereo) televisions.

Kit and Special Parts

A complete kit is available. The pcbs, bracket and NICAM tuner case are also available separately. Full construction details may be found in Maplin Magazine Issues 38 and 39.

Order Code	Type	Price each
LP18U	H4 NICAM Accessory Kit	£89.99
XM81C	B2 NICAM TV Tuner Case	£19.99
JR72P	NICAM Display Bkt	£2.49

The 'Conventional' (mono) audio sound I.F. is switchable for the U.K. standard of 6MHz or the European standard of 5.5MHz. This is in addition to and parallel with the special NICAM I.F. channel.

Specification

Power supply input voltage range:	11 to 13V DC
Supply current at 12V:	210mA
U.H.F. stages	
Tuning range:	470 to 860MHz (Channels E21 to E69)
Aerial input:	75Ω phono
Gain:	40dB
Noise level:	10dB max.
AGC range:	30dB
AFC range:	±120kHz
I.F. components	
Vision carrier:	39-500MHz
Colour carrier:	35-070MHz
Continental standard F.M. sound:	34-000MHz
U.K. standard F.M. sound:	33-500MHz
NICAM stereo sound:	32-948MHz

Video

Output format:	Composite
Output level:	1V Pk to Pk
Output load:	75Ω
Bandwidth:	7.5MHz
Signal to noise ratio:	58dB

F.M. (mono) sound

Continental standard carrier freq.	5.5MHz
U.K. standard carrier freq.	6.0MHz
Output format:	audio
Output level:	1V Pk to Pk at 50kHz deviation
Output load:	1kΩ
Bandwidth:	10Hz to 15kHz
Distortion:	0.1% T.H.D.
Signal to noise ratio:	60dB

NICAM stereo

Carrier freq.	6.552MHz
Output format:	6.552MHz I.F. for decoder
Output level:	300mV Pk to Pk
Output load:	1kΩ

General

PCB composition:	Double-sided plated-through glass fibre
Dimensions :	142 x 102 x 45mm
Weight:	160g

Optional Items

The following items, not included in the kit, may be required according to installation and use:

Video output chassis connectors:		
1 BNC round	(FE31J),	or
1 BNC square	(YW00A),	or
1 Phono	(YW06G),	or
1 SCART socket	(FV89W)	
SPDT switches:		
1-3 Ultra min. toggle	(FH98G),	or
1-3 Sub-min. toggle A	(FH00A),	or
1-3 Sub-min. slide	(FF77J),	or
1-3 Pushlock	(FH41U),	or
1-3 Latchswitch 2-pole	(FH67X)	

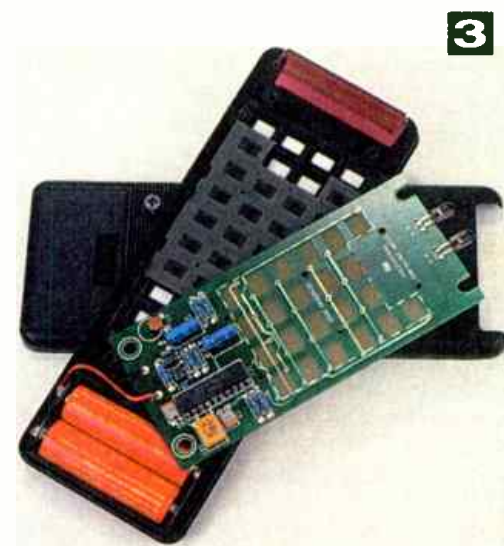
Or any combinations of these. One of these switches fulfils the 'AGC defeat' function and TV electronics enthusiasts upgrading an existing chassis can use a microswitch for this operated by a door concealing the tuning presets for station selectors.

Kit and Special Parts

A complete kit is available and the pcb is also available separately. Full construction details may be found in Maplin Magazine Issue 36.

Order Code	Type	Price each
LP09K	UHF TV Tuner Kit	£54.99
GE35Q	UHF TV Tuner PCB	£9.49

NICAM Infra-red Transmitter and Receiver



Designed for use with the Maplin NICAM stereo TV tuner unit. The receiver board links-up with the display board providing easy installation. The receiver unit has two sections for IR decoding and a stereo volume control. The remote control uses the M708L chip, designed in conjunction with the M491B on the display board, and requires few components to correct the IR data. The hand-held transmitter uses direct (no carrier) transmissions reducing the risk of interfering with other remote devices.

Specification
Infra-red Transmitter

Commands:	TV channel 1 to 16 TV channel +/- Volume +/- Sound mute On/Off Standby On/Off
Transmission mode:	Flash
Transmit source:	Two high power IR emitting diodes
Peak wavelength:	940nm
Clock frequency:	455kHz
Power supply:	Two AA size alkaline cells
DC voltage:	3V
Transmit current:	Average 1.65mA Peak 1.1A

Infra-red Receiver

Receiver detector:	High speed photodiode
Peak response:	950nm
Effective range:	4.5m
Gain:	70dB
Output data:	Negative pulses
DC power supply:	+5V at 1mA

Stereo Volume Control

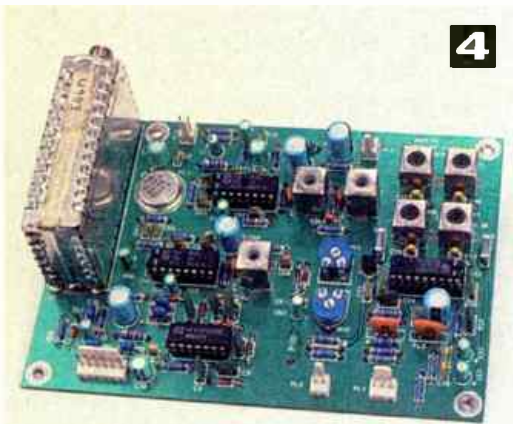
Frequency response:	5Hz to 150kHz (at -3dB)
Output level:	1V RMS into 1kΩ
Gain:	0dB
Tracking:	0.3dB
Signal to noise:	68dB
Distortion:	0.2% THD
DC voltage:	+12V at 16mA

Optional Items

The following items, not included in the kit, may also be required.

Alkaline AA Batteries	2	(FK64U)
IR Photodiode (see text)	1	(YH71N)

**UHF TV Tuner Kit
NICAM Broadcast Compatible**



- ★ Parallel vision and sound I.F.
- ★ TV video and F.M. mono outputs
- ★ NICAM carrier output
- ★ F.M. squelch control for off-station muting
- ★ Dual standard F.M. sound demodulation
- ★ NICAM S.A.W. filter
- ★ Operates from single 12V supply

This superb TV tuner can be used to provide superior quality video and audio signals for a high grade colour monitor or TV with provision for an external video input. The tuner has many features, not least a video signal bandwidth of 7.5MHz, which may be a considerable improvement over some other tuners. It possesses A.G.C. (automatic gain control), A.F.C. (automatic frequency control), and F.M. audio squelch, driven by the output of noise from the video I.F. detector directly in the absence of a valid TV signal, thus neatly preventing that aggravating 'roaring' noise whilst tuning between stations. The 'front-end' is a ready built commercial module requiring no alignment and using the latest surface mount component technology. Aerial input is as standard via 75Ω coax. feeder from a TV antenna. Parallel vision and sound I.F. are produced using an S.A.W. (surface acoustic wave) filter as is usual in a modern TV receiver, but in this case having a response peak to extract the NICAM I.F. carrier frequency at its best. Tuning is accomplished by the absolute minimum requirement of an on-board rotary control, but the tuning of the front-end module is voltage controlled and so lends itself to all manner of additional alternative tuning systems.

To build the experimental IR Detector mentioned in the construction details the following items will also be required.

4k7	1	(M4K7)
3M3	1	(M3M3)
47k	2	(M47K)
150R	1	(M150R)
10k	1	(M10K)
680R	1	(M680R)
100k	1	(M100K)
100nF Polylayer	2	(WW41U)
1µF 63V Minelect	1	(YY31J)
10µF 16V Minelect	1	(YY34M)
IR Photodiode	1	(YH71N)
Mini LED Red	1	(WL32K)
BC549	2	(QQ15R)
BC559	1	(QQ18U)

Kit and Special Parts

A complete kit is available, excluding batteries and photodiodes, however, the photodiode is included in kit LP18U. Full construction details may be found in Maplin Magazine Issue 41.

Tx PCB: 54 x 115mm.

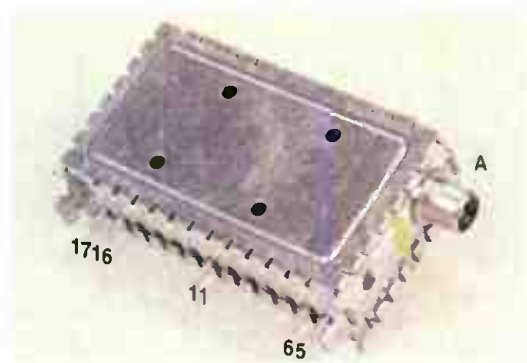
Rx PCB: 65 x 60mm.

Order Code	Type	Price each
LP20W	NICAM IR Controller	£34.99
ZA00A	Nicam IR Tx Case	£5.99

UHF TV TUNERHEAD MODULE

Philips

The U943 is a high quality varicap tuned TV receiver front-end having three tuned circuits, three stages of amplification including post-I.F. amplifier, and covering the UHF TV channels E21 to E69 (471.25 to 855.25MHz picture carrier frequency). Aerial input is via a phono socket, normally this is linked to a standard 75Ω coaxial chassis socket with coaxial feeder. Output is TV I.F. comprising luminance, chrominance, F.M. sound I.F. and NICAM sound I.F. if present. This output should be processed with an S.A.W. (Surface Acoustic Wave) filter to separate the sound and vision signals. The module is designed for vertical mounting onto a PCB and is provided with five PCB pins and can securing tags at each end.



Specification

Supply voltage:	+12V DC ±10%
Current consumption:	57mA max.
R.F. input impedance:	75Ω
R.F. bandwidth:	20MHz typ.
Voltage gain into I.F. load of 1200Ω/15pF:	40 – 42dB max., E21 – E69
A.G.C. level for gain of 10dB:	+1V min.
A.G.C. voltage range:	+0.85 to 9.2V ±0.5V
A.G.C. current max:	15µA max.
Tunable R.F. range:	471.25MHz (E21) to 855.25MHz (E69)
Tuning voltage range:	+1 to 28V
Tune slope characteristic:	4MHz/V
Current drawn from tuning circuit:	0.6µA max.
I.F. components – Vision:	39.5MHz

Sound:	35.5MHz		
Bandwidth:	9MHz		
Output impedance:	100Ω		
I.F. rejection:	80dB min.		
Image rejection:	60dB typ.		
Cross modulation:	1% typ.		
Dimensions of screening can:	length 66.2mm, height 38mm (not including PCB pins), width 20.1mm		
Length of pins:	5mm.		
With input phono socket (A) at top lefthand side, lead connections are:			
5	A.G.C. input	16	Earth
6	Supply +V	17	I.F. output
11	Tuning voltage		

The case must be connected to ground

Order Code	Type	Price each
JR59P	UHF Tuner Module 943	£16.99

UHF MODULATORS



From composite video, these modulators produce an RF output suitable for connection to the aerial input of a standard UK UHF TV set. The output is preset to approximately channel 36.

They have a wide linear bandwidth to cater for the chroma sub-carrier from a source video generator, and UM1286 has an integral RF oscillator for 6MHz sound carrier. The output on both modules is via a phono socket.

Specification

	UM1233	UM1286
Supply Voltage	5V	5V
Supply Current	6mA	9mA
Bandwidth	8MHz	8MHz
Sound Sub-carrier	—	6MHz
Size (mm)	43x30x18.5	71x37x20

The lead connections are as follows:

	UM1233	UM1286
A	Supply +V	Fine tune
B	Video input	Audio input
C	None	Supply +V
D	None	Video input

The case must be connected to ground.

Order Code	Type	Price each
FT30H	UHF Modulator UM1233	£7.99
BK66W	UM1286 Modulator	£12.99

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TVFX MODULE

- ★ Displays full colour
- ★ Video and TV outputs
- ★ Internal/external triggering

3



A 'partylite' for your TV, the TVFX is a sound to light system with patterned or single coloured screens. The circuit uses the TEA2000, SAA1043 and an array of logic circuits to produce each screen.

TVFX can be connected in two ways, either from the preamp to power amp link or from the power amp to speakers link. A switch for low and high sensitivity and a variable sensitivity control on the front panel allows different power levels to be selected. In addition to an audio input, internal triggering with a variable clock speed can change the screen patterns. Outputs to PAL TVs and videos display 64 different patterns, 8 plain screens and 8 different colours.

Specification

Supply voltage:	12V
Supply current:	100mA
Power:	1.2W

RF (UHF)

Carrier output:	Channel 36, 591.5MHz
-----------------	----------------------

Video (composite)

Output level:	1V peak to peak
Impedance:	75Ω

Audio

Input attenuator:	-30dB (Low sensitivity)
Input impedance:	140kΩ (high) 1.2MΩ (low)
Filter response:	15Hz to 90Hz at -6dB
Trigger sensitivity:	100mV (high) max sensitivity 1.5V (low) max sensitivity

Pattern control

Clock speed:	Max 12 screens per second Min 1 screen every 3 seconds
Audio trigger:	Max 9 screens per second

Optional Items

The following items, not included in the kit, may also be required.

Case 3502	1	(YN33L)
Self-Tapping screw no. 4 x 1/4"	1 Pk	(FE68Y)
TVFX Front Panel	1	(JR68Y)
TVFX Back Panel	1	(JR69A)
AC Adaptor Regulated	1	(YB23A)
Phono/Coaxplg Vid Lead	1	(FV90X)

Kit and Special Parts

A complete kit is available. The main pcb, LED pcb, front and back panels are also available separately. Full construction details may be found in Maplin Magazine Issue 42.

Main PCB: 162 x 125mm
LED PCB: 51x12.7mm

Order Code	Type	Price each
LP00A	TVFX Kit	£59.99
GE00A	TVFX Main PCB	£14.99
GE01B	TVFX LED PCB	£2.49
JR68Y	TVFX Front Panel	£3.25
JR69A	TVFX Rear Panel	£2.99

Electronics' Magazine Binder



A binder that holds twelve issues of 'Electronics - The Maplin Magazine'. The binder is made in hard wearing, laminated art board that not only looks good on your bookshelf or workshop desk, but is also a great way to build up an 'Electronics' reference library. Now you can keep all your copies of 'Electronics' together and on hand for whenever you need that extra piece of information, or as an archive of all your favourite articles. Gloss black with red and white lettering. Size 320 x 210 x 70mm.

Order Code	Type	Price each
XH99H	Magazine Binder	£5.99

Magazine Index



A comprehensive index to Electronics - The Maplin Magazine: it covers every issue from December 1981 to October 1994. Included are details of every article, series and project published during that period. Conveniently arranged, sectionally and alphabetically, it'll take minutes instead of hours to find the exact issue number and page you need. You'll be able to rediscover a wealth of information you never knew you had! A list of all of the Corrigenda published is also included so you will be able to find details of changes or amendments. You'll find the index an invaluable addition to the issues of Electronics that you have. If your collection is incomplete, many issues are still available as back issues.

Order Code	Type	Price each
XU87U	Magazine Index	80p NV

BACK ISSUES AND PROJECT FINDER

Looking for that illusive project? Now it's easy to find, just look down the project list and check out the cross reference telling you which Magazine, Projects Book, etc. contains the project. The order codes for the books are listed at the end of this csection. Magazine back issues are available whilst stocks last, then the projects only from the issues are reprinted in the form of Projects Books. As these Projects Books go out of print, Best of Projects Books are compiled to replace them. The key below gives cross-reference designations. Read on and make your selection:

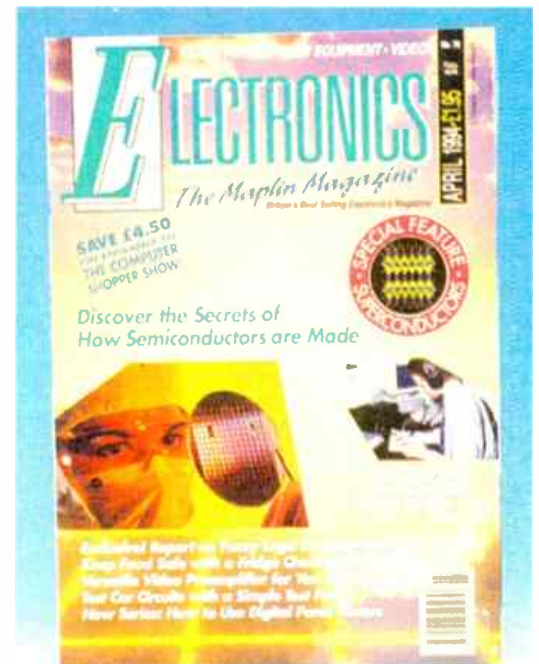
KEY	
Mxx	Magazine
PBxx	Projects Book
BPx	Best of Maplin Projects Book
SAT	The Weather Satellite Book
MIX	A guide to Using Maplin Mixer Modules
CAT	1994 Catalogue

AUDIO PROJECTS

Project	Details in
100W Pro-Amp	M56
12V P.A. Amp	BP7
150W MOSFET Amplifier	M41
150W Power Amplifier	CAT
15W Power Amplifier	PB64
16-Way Audio Patchbay	M52
1kW MOSFET Amplifier	PB26/PB29
2 x 100W Stereo Car Amp	M55
3 Gunsound Generator	BP7
4-Way Speaker Switchbox	M30
50W Power Amplifier	M67
8W Power Amplifier	CAT
AF Signal Source	M31
Amplifier Monitor	PB47
Audio Isolator	PB22
Audio Level Tester	PB22
Audio Notch Filter	BP7
Audio Oscillator	M63
BBD Reverb IC	M49
Bridging Module for 150W MOSFET Amps	BP6
Bucket-Brigade Delay Line	M48
Car Radio Switch-Mode PSU	PB46
Cartridge/High Impedance Mic	MIX
D.I. Box	M49
Digital Speech EPROM Programmer	M31
Digital Speech Record/Playback Modules	M30/M31
Digitally Controlled Preamp	M52
Dynamic Noise Reduction	M40
Fibre-Optic Audio Link	BP5
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Hi-Fi Stereo Valve Amplifier	M51/PB52
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LM1875 20W Power Amplifier	M30
LM386 Low Power Amplifier	M29
Low Impedance Mic	MIX
Low Impedance Pre-Amplifier	MIX
Low-Noise Mic Pre-Amplifier	BP7
Microsonic Audio Booster	M55
Mixer Amp	MIX
Mixer Input Module	MIX
Peak Overload Detector	MIX
Pink-Noise Generator	BP23
'Play Along' Mixer	BP5
Power Supply for Mixer	MIX/PR19
Scratch/Rumble Filter	M21
Speaker Cabinets	PB22
SSM2017 Balanced Mic Pre-Amp	M69
SSM2016 Differential Amplifier	M41
SSM2120 Dynamic Range Processor	M47
Stereo Output Module	M30
Stereo Preamp Module	BP8
TDA1514A 50W Power Amp	M40
TDA2822 Stereo Amplifier	BP8
TDA7052 Power Amp	M37
Temperature Monitor	M48
Tone Control	MIX
Valve Amplifier	M73.M74
VOGAD System	M51
Voice-Over Unit	M21
VU Meter/Headphone Module	MIX
Watt Watcher	BP6

AUTOMOTIVE ELECTRONICS PROJECTS

Project	Details in
12V PA Amp	M21/BP7
2 x 100W Stereo Car Amp	M55
Car Audio Switch-Mode PSU	PB46
Car Battery Monitor	M37/M78
Car Interior Light Controller	M82
Car Lamp Monitor	M80
Compuguard Car Alarm	M40/M41
Courtesy Light Extender	M44
Lights-On Reminder	M50
Remote Power Switch	BP8
Tachometer	M37
Ultrasonic Car Alarm	BP6
Vehicle Intruder Alarm	PB46



COMPUTER PROJECTS

Project	Details in
Centronic Relay Unit	M57
Fibre-Optic Data Link	M47
Fibre-Optic Multiplexer	M48
IBM PC 24-line P/O Card	M43
Logic IC Tester	BP8
Opto-Port	PB23
PC Opto Isolator	M66
PC Proto Card	M67
PC Relay Card	M65
PC Sound Card	M58
PC Weather Station	M70
RS232 - TTL Level Shifter	M31
Serial to Parallel Converter	M49
TMS77C82 Microcontroller	M40
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DATA FILE (APPLICATION CIRCUITS)

Project	Details in
418MHz TX/RX Modules	M73
741 Op Amp Card	M68
E510 Scanning Module	M69
Fixed Voltage Regulators	M52
H14/H14DL Humidity Sensors	M55
L200 Voltage/Current Regulator	PB46
L9801 High-Side Driver	M54
LM1037 4-Channel Analogue Switch	BP8
LM13700 Transconductance Op-Amp	M31
LM1875 20W Power Amplifier	M30
LM331 Voltage/Frequency Converter	M57
LM386 Low-Power Amplifier	PB23
MAX293/297 Filters	M80
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SL561C Low Noise Pre-Amp	M76
SL6270 VOGAD System	M51
SSM2015 Microphone Pre-Amp	BP7
SSM2016 Differential Amplifier	M41
SSM2044 Voltage-Controlled Filter	M42
SSM2045 Music Voicing System	M43
SSM2120 Dynamic Range Processor	M47
TDA1514A 50W Power Amp	M40

FOR TOP QUALITY & VALUE!

TDA2822 1W x 2 Stereo Amplifier
TDA7052 1W Power Amplifier
TLC548 A/D Converter
UA3730 Code Lock
Variable Voltage Regulators
ZN419 Servo Driver

BP7
M37
M75
M56
M53
M45

Tungsten Lamp Surge Controller
VHS Video Alarm
Whistle-Activated Switch
Xenon Tube Driver
Xmas Lanten and Candle
Xmas Tree
Zero Crossing Opto-Switch

M21
PB24
M58
BP6
M72
M48
M41/M48

GENERAL PROJECTS

Project
1/300 Timer
12V Fluorescent Tube Driver
1-2kW Power Controller
3 Gun Sound Generator
555 Timer Card
8-Channel Fluid Detector
Autoring
Baragraph Display Modules
Car Battery Monitor
Car Lights-On Reminder
Car Tachometer
Christmas Star
Clap Switch
Courtesy Light Extender
DC Motor Speed Controller
Digital Timer
Disco Partylite
Electronic Die
Electronic DigiDice
Envirosynth
Fest-o-meter
Funtronics Bulb/Fuse Tester
Funtronics Decision Maker
Funtronics Electronics Siren
Funtronics Flasher
Funtronics Light/Dark Indicator
Funtronics Morse Communicator
Funtronics Pet Communicator
Funtronics Water Indicator
Galactic Timer
Hi-Low Switch
I/R Remote Control Switch
Laser and Controller

Details in
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BP6
M40
BP7
M69
BP6
M61
BP6
M37
M50
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BP5
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M81
M50
PB25
M30
BP8
M54
M60
M48
M55
M53
M52
M51
M56
M54
M50
M44
BP8
BP8
PB29



MODEL CONTROL

Project
Control-A-Train
Low Power Radio Control System
Multi-Train Controller
PWM Motor Drive Module
Rapid Slow Ni-Cad Chargers
Servo Tester
SLA Battery Charger
Train Chuffer
Train Controller
ZN419 Servo System

Details in
BP6
BP6
M71
BP6
PB25
PB8
BP5/M53
M79
PB25
M45

MUSICAL PROJECTS

Project
100W Pro-Amp
16-Way Audio Patchbay
2-Way MIDi Switch Bcx
Accented Metronome
Auto-Waa Effects Pedal
Basic Noise Gate
Bass Fuzz Unit
BBD Reverb System
Bucket Brigade Delay Line
Chorus Unit
D.I.Bcx/Balanced-Line Driver
Digitat' Echo Unit
Dual-Tracking Effects Unit
E51C Scanning Module
Envelope Tremolo
Envirosynth
Funtronics Music Maker
Guitar Compressor
Guitar Dynamic Treble Booster
Guitar Headphone Amp
Low-Pass Filter Effects Unit
Melody Maker
Metal Peda' Effects Unit
Metro Beat
MIDI Interface
MIDI Lead Checker
MIDI Merge
MSM6322 Pitch Sniffer System
Multi Tune Generator
Noise Gate
Partylites
PC Sound Card
Programmable Metronome
Simple Melody Generator
Siren Sound Generator
Sound Effects Generator
SSM2045 Music Voicing System
Wah-Wah Pedal Kit

Details in
M56
M52
PB46
M30
BP6
M30
M21
M49
M48
M57
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BP5
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M69
M21
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M50
M47
M31
BP5
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PB23
M58
PB22
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M77
M44
M26
M21/M40
CAT/PB25
M58
M26
M26
M26
M57/BP7
M43
PB3

RADIO/COMMUNICATIONS

Project
Active Aerial
Aerial Activator
Aerial Tuning Unit
AGC Mic Preamp
Beginners AM Radio
Crystal Set Radio (Leaflet)
Direct Conversion HF Receiver
Fibre-Optic Audio Link
Fibre-Optic Data Link
Fibre-Optic Multiplexer
Funtronics Morse Communicator
I/R Video Link Receiver
I/R Video Link Transmitter
Microsonic Audio Booster
Morse Decoder
Morse Regenerator
'Ranger' 160m Receiver
RTTY FSK Tone Decoder
RTTY Tone Decoder
Rugby Clock Receiver
Stereo Output Module M30
TDA7000 FM Radio
TRF Reflex Receiver
VHF Preamplifier
VHF/UHF Preamplifier
Weather Satellite Aerial
Weather Satellite Decoder
Weather Satellite Down Converter
Weather Satellite Receiver

Details in
BP5
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BP5
M51
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XU01B
BP7
BP5
M47
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M56
M52/M57
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M55
M53
M31
M43
BP8
M21
M47
M30
BP6
M31
SAT
M81
SAT
SAT
SAT
SAT

SECURITY/PROTECTION PROJECTS

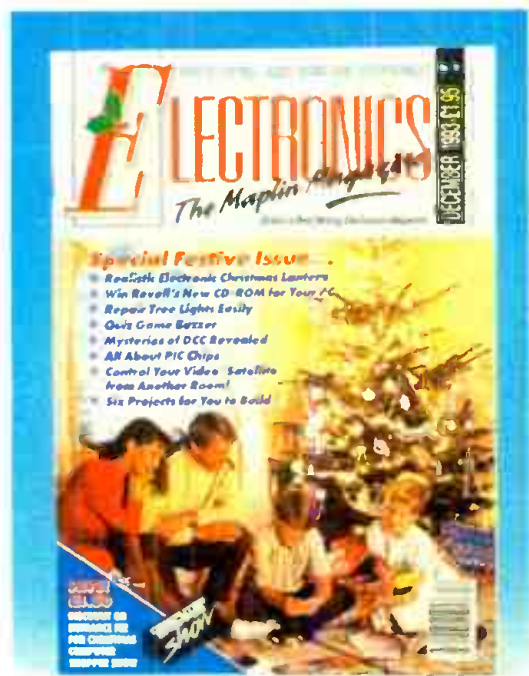
Project
Bank Note Detector
Bicycle Alarm
Compuguard Car Alarm
Electronic Lock
Electronic 'Watchdog'
Explosive Gas Alarm
Fridge Alarm
Infra-Red Code Lock
Infra-Red Door Lock
Infra-Red Proximity Detector
Loop Alarm
Low-Cost Home Alarm
Movement Alarm
'Peep' Alarm
Twilight Switch
Vehicle Intruder Alarm
Video Alarm
µA3730 Code Lock

Details in
M77
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M40/M41
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BP6
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M70
M45
PB23
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M73
PB46
BP8
M56

TEST/MEASUREMENT PROJECTS

Project
10A Laboratory PSU
4 1/2 Digit LCD Counter
AF Signal Generator
AF Signal Source
Bench Amp
Capacitance Meters
Capacitor Checker
CMOS Logic Probe
Crystal Checker
Digital Panel Meter
Domestic Electrical Appliance Tester
Expansion for Temperature Module
Funtronics Bulb/Fuse Tester
Funtronics Transistor Tester
H14DL Humidity Sensors
I/R Remote Tester
In-Circuit Resistance Meter
LED Capacitance Meter
Live-Wire Detector
Logic IC Tester
Low-Cost 10Mhz Counter
Low-Cost PSU
Low-Cost Signal Generator
Low Resistance Meter
Low Resistance Tester
MIDI Lead Checker
Minilab
Mini-Metal Detector
Nuclear Radiation Meter
Programmable Pulse Generator
Reusable Fuse
Signal Tracer/Injector
Temperature Monitor
Tetraprobe
Transistor Tester

Details in
M58
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PB24
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PB64



Light-Level Switch
Live-Wire Detector
Live-Wire Game
Melody Maker
Mini-Metal Detector
Moving Message Display
Ni-Cd Battery Charger
Programmable Timer
Pulsed Speed Controller
Quiz Buzzer
Radiation Meter
Reaction Tester
Rear Window Wiper Controller
Remote Power Switch
Roulette Wheel
Rugby Clock Receiver
Sealed Lead/Acid Battery Charger
Siren Sound Generator
Snooze Timer
Soldering Station
Sound Effects Generator
Sound-Triggered Flash
Stepper-Motor Drivers
Temperature Controller

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PB23/BP5
M43/BP5

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TTL Logic Tester	M31
TV Colour Bar Generator	M77/PB29
Weather Station	BP8
Wiring Allocation Tester	M45



VIDEO PROJECTS

Project	Details in
Audio and Video UHF Modulator	M30
Audio/Video Test Signal Generator	M37
Infra-Red Video Link Receiver	M52/M57
Infra-Red Video Link Transmitter	M51
NICAM I/R Tx and Rx	M41
TEA2000 TTL PAL Encoder	PB7/PB29
TV Camera Modulator	M7S
TV FX	M42
TV Tuner Module	BP7
VHS Video Alarm	PB24
Video Amplifier	M44
Video Box	M51
Video Dubber and Switching Unit	M30

THE BEST OF SERVICE

Having selected the magazines/books you require, look down this list for the order code numbers and prices.

Order Code	Type	Price each
XA25C	Projects Book 25	£1.60 NV
XA26D	Map Mag Vol.7 No.26	85p NV
XA29G	Projects Book 29	£1.60 NV
XA30H	Projects Book 30	£1.60 NV
XA31J	Map Mag Vol.8 No.31	£1.00 NV
XA37S	Map Mag Vol.9 No.37	£1.20 NV
XA40T	Map Mag Vol.9 No.40	£1.45 NV
XA41U	Map Mag Vol.10 No.41	£1.45 NV
XA42V	Map Mag Vol.10 No.42	£1.45 NV
XA43W	Map Mag Vol.10 No.43	£1.45 NV
XA44X	Map Mag Vol.10 No.44	£1.45 NV
XA45Y	Map Mag Vol.10 No.45	£1.45 NV
XA46A	Project Book 46	£1.60 NV
XA47B	Map Mag Vol.11 No.47	£1.60 NV
XA48C	Map Mag Vol.11 No.48	£1.60 NV
XA49D	Map Mag Vol.11 No.49	£1.60 NV
XA50E	Project Book 50/62	£1.60 NV
XA51F	Projects Book 51	£1.60 NV
XA52G	Map Mag Vol.11 No.52	£1.60 NV
XA53H	Map Mag Vol.11 No.53	£1.60 NV
XA54J	Map Mag Vol.11 No.54	£1.60 NV
XA55K	Map Mag Vol.11 No.55	£1.60 NV
XA56L	Map Mag Vol.11 No.56	£1.60 NV
XA57M	Map Mag Vol.11 No.57	£1.60 NV
XA58N	Map Mag Vol.11 No.58	£1.75 NV
XA59P	Map Mag Vol.11 No.59	£1.75 NV
XA60Q	Map Mag Vol.12 No.60	£1.75 NV
XA61R	Map Mag Vol.12 No.61	£1.75 NV
XA62S	Map Mag Vol.12 No.62	£1.75 NV
XA63T	Map Mag Vol.12 No.63	£1.75 NV
XA64U	Map Mag Vol.12 No.64	£1.75 NV
XA65V	Map Mag Vol.12 No.65	£1.75 NV
XA66W	Map Mag Vol.12 No.66	£1.95 NV



Order Code	Type	Price each
XA67X	Map Mag Vol.12 No.67	£1.95 NV
XA68Y	Map Mag Vol.12 No.68	£1.95 NV
XA69A	Map Mag Vol.12 No.69	£1.95 NV
XA70M	Map Mag Vol.12 No.70	£1.95 NV
XA71N	Map Mag Vol.12 No.71	£1.95 NV
XA72P	Map Mag Vol.13 No.72	£1.95 NV
XA73Q	Map Mag Vol.13 No.73	£1.95 NV
XA74R	Map Mag Vol.13 No.74	£1.95 NV
XA75S	Map Mag Vol.13 No.75	£1.95 NV
XA76H	Map Mag Vol.13 No.76	£1.95 NV
XA77J	Map Mag Vol.13 No.77	£2.00 NV
XA79L	Map Mag Vol.13 No.79	£2.00 NV
XA80B	Map Mag Vol.13 No.80	£2.00 NV
XA81C	Map Mag Vol.13 No.81	£2.00 NV
XA82D	Map Mag Vol.13 No.82	£2.10 NV
XC05F	Best of Projects 5	£2.95 NV
XC06G	Best of Projects 6	£2.95 NV
XL47B	The Mixer Book	£2.99 NV



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PROFESSIONAL BENCH POWER SUPPLIES from **INSTEK**



GW08J



GW09K



GW10L



GW11M



GW12N



GW13P



GW14Q



GW16S



GW15R

A superb range of Professional Bench Power Supplies from Instek. All models have excellent load and line regulation with very low ripple and noise figures.

There are nine high-quality models in the range, from a single 30V, 3A unit to a dual, voltage tracking, 32V, 2.5A unit with a fixed 5V, 3A output and two built-in digital meters.

All models are capable of operating in constant current mode, as well as constant voltage, the current being set by a rotary front panel control. A front panel LED indicator shows when the unit is operating in constant current mode. The four dual supply units all feature a voltage tracking mode and have a built-in TTL logic compatible 5V, 3A fixed supply. In voltage tracking mode the dual supplies can produce two equal, positive and negative supplies with a central commoned rail, operated from a single rotary control.

GW08J 60V, 1A **H** £139.99

GW09K 30V, 3A **H** £149.99

GW10L 30V, 3A **H** £199.99

GW11M Dual 30V, 3A **H** £299.99

GW12N Dual 32V, 2.5A **H** £349.99

GW13P Dual 60V, 3A **H** £479.99

GW14Q 30V, 6A **H** £279.99

GW16S 30V, 10A **H** £429.99

GW15R Dual 30V, 6A **H** £479.99

All models feature an automatic power saving circuit which reduces dissipation by selecting a lower ratio transformer output if the output voltage of the unit is below a predetermined level.

All prices include VAT. **H** indicates an additional carriage charge, see end of catalogue for details.

INSTEK

Power Supplies available from

Maplin

UK AGENTS FOR INSTEK

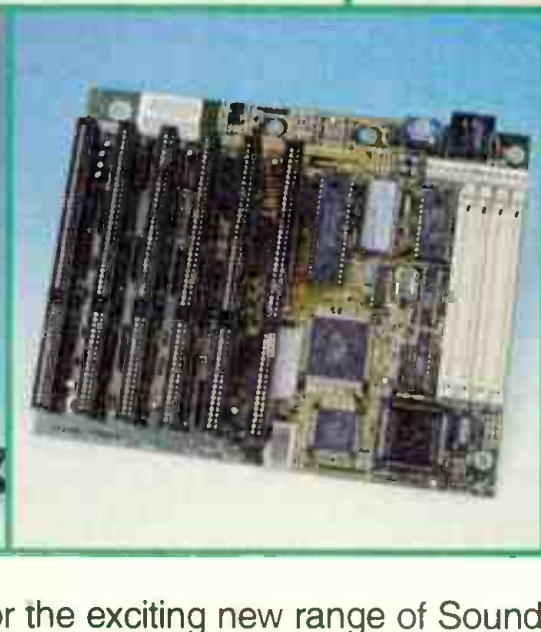
268 • COMPUTERS

21 COMPUTERS

22 COMPUTER ACCESSORIES

23 COMPUTER LEADS & CABLES

24 CALCULATORS & DATABANKS



Look out for the exciting new range of Sound Blaster products, multimedia speakers, Panasonic CD-ROM drive and the ever popular Casio calculators and databanks

COMPUTERS

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Build Your Own Personal Computer

NEW

It has never been easier to build your own powerful and professional looking Personal Computer using our step-by-step instruction booklet. The guide helps you to design your own computer using the parts shown in this section, and no special tools or computer knowledge is needed to assemble and set up the machine. With just the guide and a couple of screwdrivers, you can build your new computer to your own specification in just a few hours, as simply as putting together flat-pack furniture from your local DIY store. You can choose any configuration ranging from a basic 386 SX up to a Multimedia 486 DX machine.

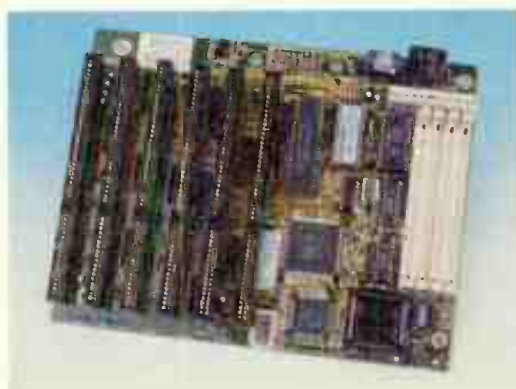


The comprehensively illustrated instruction guide shows you how to choose the motherboard with the processor type you require, the size of memory and the support ancillaries, such as video card, I/O and controller cards and hard and floppy disk drives; the size and style of case to enclose it all in, and then how to actually install the various items into the case and connect them together correctly. In addition you will have the technical back up and experience of Maplin, so if you do have any problems, or are at all uncertain about making the right choices after reading our booklet, you only need to call one of our computer helpline staff on (0702) 552911 (will change to (01702) 552911 as from Sunday 16th April 1995). We will help you to make the best choices for a system that will meet your needs now and in the future, either at home or in the office.

Order Code	Type	Price each
XL73Q	Computer Guide	£1.99 NV

INDIVIDUAL HARDWARE MODULES

System Motherboards



All boards are supplied with licensed AMI BIOS ROM and manufacturer's handbook, memory is expandable using 256K, 1M or 4M SIMMs up to 16 or 32Mb. Some of the motherboard options have a secondary write back cache of either 64K expandable to 128K or 256K. This has an access time of 20ns and reduces bottlenecks between CPU and main memory.

Please note that all motherboards are supplied complete with processor (except ZG13P) but will require the addition of SIMM memory modules. These should be 1M x 9 or 4M x 9 SIMMS and will need to be fitted in pairs or fours, depending on the bank size of the motherboard concerned. None of our motherboards will operate with just a single SIMM module e.g. a 4M configuration will require four 1M x 9 SIMMs NOT one 4M x 9 SIMM module.

New motherboards will require the CMOS set-up program to be run before they will allow normal operation - the board will need to be configured to accept all connected peripherals such as hard drive, floppy drives, monitor etc. Most motherboards have a number of adjustable links which may be used to set processor type and speed, cache memory configurations etc. Please consult the motherboard booklet if you wish to alter configuration or if the board does not seem to function as expected (link changes are not normally required when adding SIMMS).

Code	CPU	Speed	Cache
ZG05F	386SX	33MHz	-
ZG07H	386DX	40MHz	64 to 128K
AJ67X	486SX	25MHz	-
AJ68Y	486SX	25MHz	256K
AJ69A	486DX	33MHz	256K
AJ70M	486DX	50MHz	256K

Code	CPU	Speed	Cache
AJ71N	486DXII	50MHz	256K
AJ76H	486DXII	66MHz	256K

In addition, ZG13P is an upgradable motherboard for 386DX, 486DX and 486DXII processors, providing a low-cost upgrade path by merely replacing the microprocessor (a different clock crystal may also be required).

Order Code	Type	Price each
ZG05F	A1 386SX 33MHz MBoard	£74.99
ZG07H	A1 386DX 40MHz MBoard	£119.99
AJ67X	A 486SX 25MHz M/Board	£175.00
AJ68Y	A 486SX 25MHz + Cache	£199.99
AJ69A	A 486DX 33MHz M/Board	£349.99
AJ70M	A 486DX 50MHz M/Board	£399.99
AJ71N	A 486DX2 50MHz M/Board	£364.99
AJ76H	A 486DX2 66MHz M/Board	£429.99
ZG13P	A1 Upgradable MBoard	£134.99

IMPORTANT NOTE

The prices of the products in this section were correct as of September 1994. However, owing to the volatile nature of the computer industry, we cannot guarantee these prices during the lifetime of this catalogue. We therefore urge you to telephone the sales line for the latest pricing information.

VESA Standard Motherboard and Computer Cards

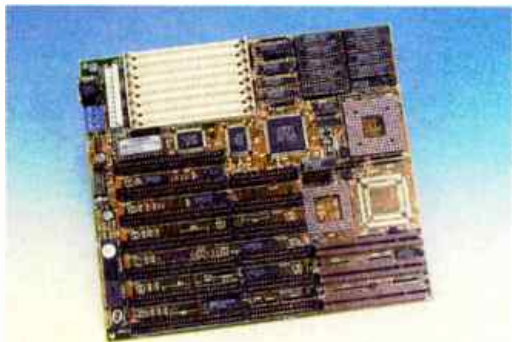
Modern systems make it possible to develop a very high performance personal computer system because of the high-frequency of operation of modern microprocessors. Although memory designs can cope with the high-speed accesses, the currently standard peripherals are still very slow due to the limited speed of ISA buses.

A new system has now been developed which enables high-speed peripheral controllers to be used to achieve maximum throughput. On a standard IBM/AT or compatible, ISA bus speed is limited to 8MHz, requiring a 250ns wait state on the bus for each peripheral access by the CPU. But with high-speed systems this access does not actually take place; some peripheral controllers are able to complete the cycle in much less time. By putting these controllers on to the CPU local bus, a tremendous performance improvement can be achieved.

VESA is a local bus standard for the hardware interface of peripherals connected directly to a processor local bus. A uniform interface, architecture, timing, electrical and physical specification allows VESA based products from various sources to be completely interchangeable.

VESA Motherboard

The OPTi VESA 486 system main board is a 'half size', fully IBM AT compatible PC motherboard, conforming to latest VESA specifications to allow expansion cards to run using a full 32-bits wide bus at CPU clock speed. As well as having VESA local bus slots, it also features 16 and 8-bit slots, internal clock generator, OPTi chip set, genuine AMI-BIOS, 256K cache and room for up to 32Mb of SIMMs. The board is designed for running a 486 system at 16, 20, 25 and 33MHz, or CYRIX 486DLC at 33 and 40MHz. The board also needs a suitable 486 microprocessor, SIMMs and peripheral cards selected from the VESA range.



Order Code	Type	Price each
AJ72P	VESA Motherboard	£129.99

VESA Local Bus Graphics Card



To make full use of any graphic intensive applications, this high-speed card is a must for any VESA system. Based around the Cirrus Logic AVGA3 (Advanced VGA), it features 1Mb of RAM which can be upgraded to 2Mb, and is capable of displaying 16.7 million colours. Software supplied on 3 1/2 in. disks.

Order Code	Type	Price each
AJ73Q	VESA VGA Card	£84.99

VESA Local Bus HDD Cache Controller



Experience lightning hard disk performance with this IDE cache controller. Compared to the standard ISA HDD controller, you can experience up to 13M-bits per second data transfer rate with access times down to less than 0.3ms. On-board cache is fully expandable to 16Mb using standard SIMMs (note: SIMMs are not supplied with the card but must be purchased also), and capable of supporting two hard drives and two floppy drives.

Order Code	Type	Price each
AJ74R	A1 VESA Controller Card	£139.99

VESA Local Bus Multi I/O Controller



An ideal complement to the VESA motherboard, this interface card can support two hard drives, two floppy drives, two serial ports and one parallel port. Once fitted, it instantly improves hard drive performance by transferring data at the full bus width of 32-bits at the CPU clock speed.

Order Code	Type	Price each
AJ75S	VESA Multi I/O Card	£29.99

Microprocessors

A range of 386 and 486 microprocessors, in speeds from 25MHz to 50MHz.

The 486 SX CPU is supplied with the same one clock cycle per instruction integer core as the 486 DX microprocessor, complete with on-chip cache, memory management unit and 32-bit burst bus.

Order Code	Manufacturer	CPU	Speed
ZG17T	Intel	386DX	33MHz
ZG18U	Intel	486SX	25MHz
ZG19V	Intel	486DX	33MHz
ZG20W	Intel	486DX	50MHz

Order Code	Type	Price each
ZG17T	I386DX 33MHz	£79.99
ZG18U	I486SX 25MHz	£79.99
ZG19V	I486DX 33MHz	£289.99
ZG20W	I486DX 50MHz	£399.99

Co-processors

A range of 386 co-processors with speeds ranging from 25MHz to 50MHz and must match the microprocessor's clock speed.

Order Code	Manufacturer	Type	Speed
ZG22Y	Cyrix	387SX	25MHz
ZG24B	Cyrix	387DX	33MHz
ZG25C	Cyrix	387DX	40MHz

Order Code	Type	Price each
ZG22Y	387SX 25MHz CoProc	£69.99
ZG24B	387DX 33MHz CoProc	£79.99
ZG25C	387DX 40MHz CoProc	£94.99

Memory Modules

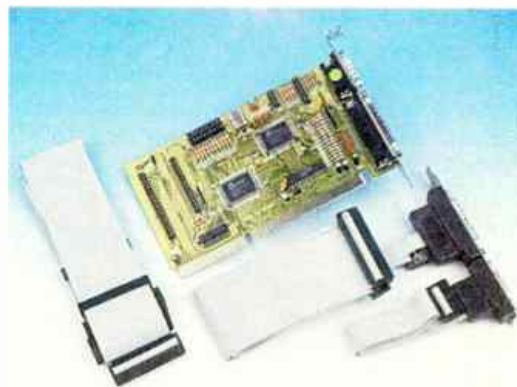
A range of DRAM modules for use as memory expansion in computers, including PC's, Apple Mac, Amiga, etc. The range offers the latest high speed technology at the lowest possible cost. Modules are available in SIMM (edge connection type) and SIP (with pins) to suit the different types of sockets found on mother boards in computers. The following types are available.

Please note that most modern motherboards require that each memory bank in use is completely filled with SIMMs. Memory banks are usually configured in blocks of two or four SIMM sockets. It is not usually possible to fit a single SIMM, or an odd number of SIMMs to a motherboard. Most modern motherboards will only accept 9-bit SIMMs, although some of the latest boards do require 36-bit SIMMs, which have 72 pads on the edge connector. It is advisable to use faster SIMM modules on PCs running at 50MHz or above. Please check your motherboard booklet before ordering SIMMs for memory expansion.

Code	Size	Package	Speed
UR61R	256 x 9	SIMM	70ns
UR62S	256 x 9	SIP	80ns
UR63T	1M x 8	SIMM	80ns
UR64U	1M x 8	SIP	80ns
ZG53H	1M x 9	SIMM	60ns
UR59P	1M x 9	SIP	80ns
UR58N	1M x 9	SIMM	70ns
UR60Q	1M x 9	SIP	70ns
ZG55K	4M x 9	SIMM	60ns
UR65V	4M x 9	SIMM	70ns
AR19V	1M x 32	SIMM	70ns
AR20W	2M x 32	SIMM	70ns
AD98G	1M x 36	SIMM	70ns
AR17T	2M x 36	SIMM	70ns
AR18U	4M x 36	SIMM	70ns

Order Code	Type	Price each
UR61R	70SIMM 256K	£15.99
UR62S	70SIP256K	£19.99
UR63T	80SIMM 1Mx8	£44.99
UR64U	80SIP 1Mx8	£44.99
ZG53H	1Mx9 SIMM 60ns	£52.99
UR59P	80SIP 1M	£49.99
UR58N	70SIMM 1M	£44.99
UR60Q	70SIP 1M	£49.99
ZG55K	4Mx9 SIMM 60ns	£179.99
UR65V	70SIMM 4Mx9	£154.99
AR19V	1M X 32 - 70n/s	£139.99
AR20W	2M X 32 - 70n/s	£265.00
AD98G	1M X 36 - 70n/s	£169.99
AR17T	2M X 36 - 70n/s	£275.00
AR18U	4M X 36 - 70n/s	£565.00

Disk Controller Cards



A range of two disk controller cards, conforming to the IDE standard. ZG82D is a 16-bit IDE controller with I/O ports. The card supports 2 hard disk drives, 2 floppy disk drives, 2 serial ports (COM1-2), 1 parallel port (LPT1-2) and a games port. Jumper pins allow

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flexibility in the configuration of the card. ZG29G is a cached IDE controller supporting up to 16Mb of cache RAM. By using advanced caching algorithms disk access time can be reduced to less than 0.3ms, ideal for applications involving repeated disk access such as sorts and searches. The card does not have any I/O ports and is supplied with 0K RAM. It can be fitted with 1Mb or 4Mb SIMM modules.

Order Code	Type	Price each
ZG82D	A1 IDE Controller Card	£16.99
ZG29G	A1 IDE Cache Controller	£149.99

Hard Disk Drives

IDE (Integrated Drive Electronic) hard disk drives are the current industry standard being extremely rugged, compact and reliable. Since IDE drives come prepared with a low-level format, they can be quickly and easily interfaced to a computer using one of the IDE controllers listed above. SCSI (Small Computer Systems Interface) drives are normally supplied where there is a demand for large drive capacities providing faster disk access times.

IDE 3.5in. Low-Profile (1in. High) Internal Types



Order Code	M-facturer	Type	Capacity	Access Time
ZG33L	Seagate	ST3144A	130M-byte	16ms
ZG38R	Western	WD212	212M-byte	12ms
AY06G	Seagate	ST3243A	214M-byte	16ms
ZG37S	Connor	CP32054	250M-byte	17ms
AY08J	Seagate	ST3290A	260M-byte	16ms
AY09K	Seagate	ST3390A	340M-byte	12ms

Order Code	Type	Price each
ZG33L	C3 ST3144A 130M Drive	£159.99
ZG38R	C3 WD212 212M Drive	£219.99
AY06G	C3 ST3243A 214Mb HD	£184.99
ZG37S	C3 CP32054 250M Drive	£199.99
AY08J	C3 ST3290A 260Mb HD	£199.99
AY09K	C3 ST3390A 340Mb HD	£249.99

SCSI 3.5in. Half-Height (Front Panel Slide-In) Types

Order Code	Manufacturer	Type	Capacity	Access Time
ZG41U	Seagate	ST3390N	343M-byte	12ms
ZG42V	Seagate	ST3500N	426M-byte	10ms

Order Code	Type	Price each
ZG41U	C3 ST3390N 343M Drive	£399.99
ZG42V	C3 ST3500N 426M Drive	£524.99

Hard Disk Drive Fixing Kit

A fixing kit and slide-in frame enabling a 3.5in. 'internal' hard drive to be installed in a conventional half-height 5.25in. floppy drive front panel slot

Order Code	Type	Price each
ZG43W	HD to Fixing Kit	£5.99

Floppy Disk Drives



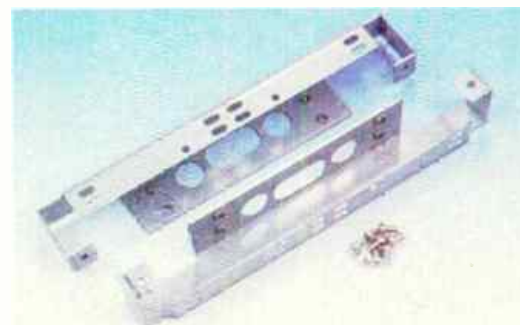
A range of three different floppy disk drives to cater for all capacities and disk types. Type MF504C is a standard slide-in, half-height 5.25in. floppy drive which is able to handle both Double Density (DD, 360K) and High Density (HD, 1.2M) floppy disks. Type OSDA-20C is a slim-line 3.5in. floppy drive, again able to take DD (720K) and HD (1.44M) disks. A slide-in adaptor frame is available to enable the 3.5in. type to be used in a half-height slot, see below.

The MD5501 is a versatile dual floppy drive with two disk slots, packing two disk drives into an unbelievable half-height standard sized unit. It is able to read and write both 5.25in. and 3.5in. disks of both DD and HD capacities, supporting 360K and 1.2M as well as 3.5in. 720K and 1.44M formats. It only utilises one half-height front panel slot and one power connector, leaving the other free.

Please note that this range of floppy drives are designed primarily to fit IBM compatible AT computers. Although it may be possible to fit these drives to some other computer types, we cannot provide support or configuration information for anything other than IBM AT compatibles. We are unable to support expansion of Amstrad PCs and do not recommend the use of these floppy drives in Amstrad machines.

Order Code	Type	Price each
ZG44X	C3 OSDA-20C 3.5 Drive	£39.99
ZG45Y	C3 MF504C 5.25 Drive	£49.99
ZG46A	C3 MD5501 Dual Drive	£109.99

3.5in. Drive Adaptor Fixing Kit



A fixing kit and slide-in frame enabling a slim-line 3.5in. floppy drive to be installed in a conventional half-height, 5.25in. floppy drive front panel slot.

Order Code	Type	Price each
ZG47B	3.5 Inch Fixing Kit	£7.99

SVGA Video Card

A state-of-the-art, Super Video Graphics Adaptor that offers features and functions equal to, if not beyond, any other VGA card in its class. A comprehensive chip, developed by Tseng Labs, combines with register and BIOS compatibility with the IBM VGA adaptor. Extended graphics resolution modes provide 640 x 480, 800 x 600 and 1024 x 768 high resolution modes of operation when used with multi-frequency (multi-sync) colour analogue monitors. It supports 72Hz refresh rate in all high resolution modes and for VESA standard.

A 'Hi-Color' graphics mode (with appropriate hardware support) produces 640 x 480 and 800 x 600 resolution with 32,768 or 65,535 simultaneously displayed colours, and a 'Tru-Color' mode (again with suitable hardware) can produce 640 x 480 with 16.7 million simultaneously displayed colours. There is also a 'Turbo Video Memory Access' option enabling a zero wait-state operation for maximum speed. Extended text modes can provide 132 x 25, 132 x 28, 132 x 44, 132 x 60, 100 x 40 and 80 x 60 character resolutions that let your computer emulate the displays of many widely used terminals.



Supplied on two 3 1/2 in. floppy disks are drivers for running extended text modes in Lotus 1-2-3 and Symphony, and extended graphics mode drivers for Autodesk, AutoCAD, GEM, Windows, WordPerfect, Ventura Publisher and OS/2 Presentation Manager. Font editing and font loading software is included for design and custom character sets, ideal for scientific and foreign language applications.

VGA, SVGA and Enhanced VGA Resolutions:

Pixels	No. of Colours	Frame rate
640 x 480	16, 256, 32K, 64K	60, 72Hz
640 x 480	16.7M	60Hz
800 x 600	16, 256	56, 60, 72Hz
800 x 600	32K, 64K	56, 60Hz
1024 x 768	16, 256	60, 72Hz & interlaced
1280 x 1024	16	Interlaced

Order Code	Type	Price each
RZ09K	A SVGA Video Card	£77.99

VGA Cards



The VGA (Video Graphics Array) and Super VGA video standards supersede the old CGA and EGA standards supporting greater image resolution and faster screen handling.

ZG48C has a basic VGA capability, supporting an image of 640 x 480 in 256 colours using 256K RAM on board.

Continued on next page.

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ZG49D will support the Super VGA standard of 800 x 600 in 256 colours. ZG50E extends the SVGA capability to the so-called X VGA standard of 1024 x 768 images in 256 colours (use of a non-interlaced monitor is recommended in this mode – see monitors).

Basic VGA Card Specifications

Code	Format	Colours	Refresh Rate	Memory
ZG48C	800 x 600	16	43.5/56Hz	256K
ZG49D	1024 x 768	16	43.5/60/70Hz	512K
ZG50E	1024 x 768	256	43.5/60/70Hz	1M

S3 Windows Accelerator Card (ZG51F)

This card is highly recommended where WINDOWS is used heavily. Built around the renowned 'S3' chipset, the card will allow speed increases of up to 14 times in the handling of WINDOWS screen images over normal VGA cards. Supplied with 1Mb of RAM, the card will support the highest resolution mode of 1024 x 768 in 256 colours.

Order Code	Type	Price each
ZG48C	A 256K VGA Card	£29.99
ZG49D	A 512K VGA Card	£33.99
ZG50E	A 1M VGA Card	£54.99
ZG51F	A Accelerator Card	£119.99

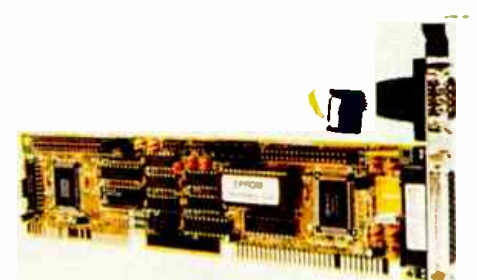
Keyboard



A conventional, 'cherry type' (tactile response) 102 key, extended AT style keyboard with 12 function keys and cursor move keys separate from the numeric keypad.

Order Code	Type	Price each
ZG57M	C3 102 AT Keyboard	£29.99

Input/Output Card



An I/O card for plugging into expansion slots that offers basic serial and parallel I/O, with 2 serial ports, 1 parallel port, and 1 games port for one joystick. All functions can be enabled or disabled.

Order Code	Type	Price each
ZG67X	A1 Short I/O Card	£14.99

Computer Cases

A range of four PC computer cases, each provided



with a power supply incorporating all internal and mains connectors and an extractor cooling fan.

Slim-Line Type

Construction:	Slide-In
Dimensions:	42cm wide x 11cm high x 40.7cm deep
Drive Capacity:	2 x 5.25in. and 2 x 3.5in.
Expansion Cards slots:	5
Power Supply:	MPS-200P 200W

Desk-Top Type

Construction:	Slide-In
Dimensions:	38cm. wide x 18cm. high x 41.5cm deep
Drive Capacity:	3 x 5.25in. and 1 x 3.5in.
Processor Speed Display:	7-segment LED, 2 digits
Expansion Cards slots:	8
Power Supply:	MPS-200P 200W

Mini-Tower

Construction:	Slide-In
Dimensions:	20cm. wide x 33cm. high x 42cm deep
Drive Capacity:	2 x 5.25in. and 2 x 3.5in.
Processor Speed Display:	7-segment LED, 2 digits
Expansion Cards slots:	8
Power Supply:	MPS-200P 200W

Full-Tower

Construction:	Slide-In
Dimensions:	20.5cm. wide x 62.3cm. high x 39cm deep
Drive Capacity:	3 x 5.25in. and 1 x 3.5in.
Processor Speed Display:	7-segment LED, 3 digits
Expansion Cards slots:	6
Power Supply:	MPS-220P 220W

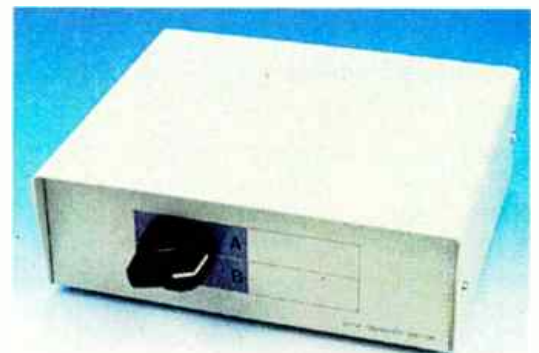
SWITCH BOXES

Screened Data Switching Boxes

A range of fully screened data switching boxes available as 2 or 4 channels with either 25-way D-type or 36-way Centronics connectors. A high quality rotary switch connects all 25 or 36 connections between the main input/output and any one of the other sockets (female sockets are used on all versions). Positions are marked A, B (and C, D, 4-way types). No power supply required. All connectors have gold-plated contacts, and the steel case provides full electrical shielding with anti-skid feet. Colour cream with black knob. A front panel legend identifying 'A, B' etc. includes an empty panel for writing further identification or sticking a small label.

Dimensions of Case	155 x 132 x 57mm
2-way types:	155 x 132 x 57mm
4-way types:	195 x 152 x 67mm

Below, versions 'AB' are 2-way switching, 'ABCD' 4-way switching.



Order Code	Type	Price each
ZA62S	A1 Data Sw Box 25AB	£12.99
ZA63T	A1 Data Sw Box 25ABCD	£19.99
ZA64U	A1 Data Sw Box 36AB	£14.99
ZA65V	A1 Data Sw Box 36ABCD	£21.99

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Monitors



All the following monitors are colour Super-VGA and compatible with the aforementioned VGA graphics cards, except ZH38R which is a mono monitor.

Four 14in types are available as follows:

Code	Low Emission	Dot Pitch	Resolution	Non-Interlaced	Price each
ZG59P	-	0.28mm	1024 x 768	-	£229.99
ZG60Q	-	0.28mm	1024 x 768	1024 x 768	£249.99
ZG62S	yes	0.28mm	1024 x 768	1024 x 768	£269.99
ZH38R	-	0.3mm	800 x 600	-	£99.99

Order Code	Type	Price each
ZG63T	H12 Slim-Line Case	£74.99
ZG64U	H13 Desk-Top Case	£74.99
ZG65V	H13 Mini-Tower Case	£74.99
ZG66W	H23 Full-Tower Case	£99.99

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An elegant clock, radio and telephone that would not be out of place in any bedroom. Features AM/LW/FM radio with 12 hour LED clock, snooze button, variable sleep countdown timer and selective radio or sounder alarm. The telephone features last number redial, recall for access to 'star services', reset button, adjustable ringer/volume, time break recall, and automatic radio mute on outgoing and incoming calls.

Audioline



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BT39N
[E1]

Compact 2-Way Data Switch Boxes



A pair of compact, quality, 2-way data switch boxes housed in high impact plastic. The switch boxes allow either two computers to use one device or two devices to use one computer. A typical device may be a printer for instance. The boxes are available with either 25-pin D-type RS232 connectors or 36-pin Centronics connectors. All the connectors on either version are female. The switch boxes feature a high quality PCB, and the change-over switch has a life of more than 15000 operations and includes a visible in-service indicator.

Order Code	Type	Price each
BZ39N	B1 Switch RS232	£14.99
BZ40T	B1 Switch Centronic	£14.99

input port and direct this to the printer. A range of LEDs indicate which computer is using the part at any time.

The parallel switch boxes all use the standard male 25-way D-range connectors as a parallel interface. Time-out is 12 seconds. 2 into 1 and 4 into 1 versions are available.

Order Code	Type	Price each
ZG73Q	A2 2 to 1 Parallel Box	£24.99
ZG74R	A2 4 to 1 Parallel Box	£49.99

Automatic Parallel and Manual Serial Switch Boxes

Primax



A range of switch products to enable PC users to connect with the minimum of interruption, to a range of peripheral devices. The range consists of both serial and parallel switch boxes. The serial switch boxes are manual and can simply be switched between the peripherals/computers required. The parallel switch boxes are automatic and have a number of features. Add a bidirectional two or four way switch box to your PC system to allow up to four users to share one printer or any other parallel or serial peripheral. Alternatively one user send data to one of two or four different peripherals. The unit is designed to operate without a special external power supply in most cases, since it can draw power from the host PC's signal lines, but a 6V power jack is also provided so that a mains adaptor can be connected in the event that the host computer or peripheral is unable to deliver enough power.

On parallel switches various built-in functions are accessible via the function control panel at the end of the switch box case. The reset button allows you to reset the unit to its default state. The 'SEL' (SElect)

button gives you the option to manually select the connection channel for the specific computer or peripheral (depending on how the box is connected and used). repeated operation of the button will 'poll' around the available ports. A DIP switch sets the basic operating modes. Printer time-out can be set to 5, 10, 20 or 40 seconds, and automatic form-feeding can be enabled or disabled. In addition the data direction can be determined as 2 or 4 PCs to 1 peripheral, or 1 computer to 2 or 4 peripherals. (In this latter mode time-out and form-feed functions are not available.) In auto mode operation the 'AUTO' indicator flashes, and any transmission request from any computer will be accepted following the rule of 'first come, first served'. As soon as one of the computers start to send data, the control unit will lock into that channel and the corresponding in-service indicator will flash. After the transmission stops and the time-out period elapses, the in-service indicator will go out and the switch will be ready to accept any other transmission request. Manual selection mode operation is possible to temporarily lock into a specific input port. To select, the 'SEL' button is pressed repeatedly and the 'AUTO' indicator will go out and each in-service indicator will light in turn until the desired input port indicator is flashing. To return to 'AUTO' mode, the process is repeated until the 'AUTO' indicator lights once more or the reset button is pressed. Data from each computer can be sent to the common peripheral in exactly the same manner as though the peripheral were directly connected to the PC. If the auto switch box is busy transferring another computer's data at the time a 'busy' signal will be received by the PC, causing it to wait or indicate a busy state if the supplied software is loaded.

Four types are available, 1 into 2-way and 1 into 4-way automatic parallel port switches, and 1 into 2-way and 1 into 4-way manual serial port switches. Each type has the appropriate 25-way, D-range sockets for conventional serial or parallel connecting cables, and is supplied with a user guide. The parallel version also comes with a 3.5in disc containing printer TSRs and other utilities, (used for interrogating the printer channel when PC users share one peripheral).

Order Code	Type	Price each
RT53H	A2 Parallel 1-2 SwBox	£29.99
RT55K	A2 Parallel 1-4 SwBox	£39.99
RT54J	A2 Serial 1-2 SwBox	£34.99
RT56L	A2 Serial 1-4 SwBox	£49.99

PrinterNET Parallel Peripheral Networking System

A simple but effective system which allows up to 16 PCs to share up to 6 printers, and each PC user can select which printer to use. Selection can be done via software in the PC, or manually by using the Hand Controller unit. Only one PC can download to one printer at any given moment.



Basically the system is made up from two units. The first of these is the Transmitter which plugs into a PC's parallel printer port and has the corresponding 25-way D-range plug. The Transmitter is approximately the same size as a gender changer or similar unit. The Receiver is a similar unit which plugs into the printer (or equivalent peripheral) to be included in the system, and this has the centronics standard 36-way plug

Continued on next page.

Auto Parallel Switching Boxes



A pair of data switch boxes which do not need any manual intervention. The auto data switch allows you to automatically share a printer between 2 to 4 PCs. It operates by connecting the first PC to begin transmitting through to the destination channel. While the printer is active, other computer ports are held in the busy state until the current job is finished, whereupon the switch box will look for the next active

Continued from previous page.

connector. Each Transmitter and Receiver has a pair of identical telephone type connecting sockets, and thus a 'network' is made by daisy-chaining Transmitters and Receivers together.

Each unit (whether Transmitter or Receiver) is provided with a 7.5m long length of 4-way flat telephone cord with plugs on each end. The plugs are wired 'straight-through', that is, pin 1 at one end connects to pin 1 at the other end. Whenever a further Transmitter or Receiver is added to the system a further connecting cable is always provided to extend the system. The Transmitter has DIP switches to configure time-out (1, 10 or 20 seconds), and auto form-feed enable or disable. The Receiver has a rotary preset switch which is used to set the Receiver's identity number; all numbers in the chain of connected receivers must be unique.

Total transmission distance can be up to 1,200 feet (360m), with a high-speed transfer rate up to 128K-bps, suitable for most transmission speeds between a PC and a parallel peripheral. Normally each unit is powered from the parent PC or peripheral to which it is connected, but in the event that it is unable to obtain a satisfactory power supply from the machine, a 6V power jack allows a mains adaptor to be connected to the unit.

The Transmitter package includes utility programs on both 5 1/4 in. and 3 1/2 in. floppy disks, used to control the PrinterNET functions from the computer. This allows you to carry out operations such as select a printer in the network to print to, define the logical names of the printers in the network, select the printer port on your PC, show the current status of the PrinterNET network, and reset the PrinterNET transmitter unit during time-out to abort the current printing job and release the system if the network is locking up. The software can be run either from the command line, or stored in memory as a TSR which can be called up as required. A Windows 3.0 version of the PrinterNET utility is also provided.

In addition a Hand Controller Unit enables printer selection to be performed manually. The controller is plugged into the rear of the Transmitter and has a rotary selector switch to select the required device, with LED indicators to show which numbered device is chosen. This method provides an alternative to the software, which need not be loaded, thus releasing computer memory.

Order Code	Type	Price each
RT45Y	PrinterNET Tx Unit	£49.99
RT44X	PrinterNET Rx Unit	£49.99
RT43W	PrinterNET Controllr	£29.99

Internal PC Fax Card

An internal facsimile card supporting group 3 CCIT with auto answer/auto dial, call scheduling and which supports all popular word processors and printers.

Order Code	Type	Price each
ZG81C	A1 PC Fax Card	£220.00

MULTI-MEDIA PRODUCTS

CD ROM Player

Panasonic

NEW



- ★ Uses computer's internal power supply
- ★ Horizontal mounting in standard 5 1/4 in. floppy mounting bay
- ★ Uses a disc tray
- ★ Normal velocity and Double Velocity modes
- ★ Data Transfer Rate up to 2.3MBytes/S
- ★ Stereo headphones socket and volume control for listening to audio CD's.

A high quality CD-Rom player that fits a standard 5 1/4 in. floppy drive horizontally mounting bay and use the computer's own internal power supply. There is no need for bulky caddy system, as a disc tray is utilised. 'Normal Velocity' (NV) and 'Double Velocity' (DV) i.e. double speed and an internal 64kByte buffer is capable of providing a Data Transfer Rate of up to 2.3MBytes/s. Audio line outputs are provided by the use of the separately available Interface card (AQ55K) which includes a connector lead. Certain other cards such as Soudblaster Pro, may also be used.

A 3 1/2 in. utility disk is included containing CD ROM drivers for DOS, and an Audio Playback Utility TSR program which has all the features of a good audio CD player, i.e. Playback, shuffle, memories, FF, FR, Search, Repeat.

Microsoft Windows users can use the Audio CD drivers and Media Player for playing Audio CD's. The TSR program and Media Player both allow the playing of Audio CD's in the background whilst carrying out other tasks on the computer.

Stereo headphones socket and volume control are available for listening to audio CD's.

Order Code	Type	Price each
AQ16S	H4 CD ROM Player	£149.99

CD-ROM Interface Card

NEW

A MKE bus interface card for CD ROM drives that provides stereo audio line out via two phono sockets. An interface cable and audio cable are included to connect the CD ROM drive. Suitable driver software is normally supplied with the CD ROM drive.

Order Code	Type	Price each
AQ55K	CD-ROM Interface Kit	£29.99

Internal CD-ROM Kit

An internal CD-ROM kit option which includes a fast CD-ROM chassis with automatic pick-up, lens cleaning and audio capability, interface card, interconnecting cables and installation and DOS extension software.

Order Code	Type	Price each
ZG84F	H2 Internal CD-ROM Kit	£139.99

Image Grabber

A 24-bit video frame grabber capable of producing DTP quality colour or black and white images from a 'still' video source such as a digital freeze frame VCR, TV camera, CD-ROM etc. Grabbing in black and white will result in 256 shades of grey. The software can save the grabbed images in 24-bit form or merged palette colour for use in slide presentations. The popular TIF, BMP, PCX and LBM format are all supported. The software includes a windows application to allow the grabber to run from windows. Minimum requirements are a 286 PC with 640Kb of RAM and a hard disk.

Order Code	Type	Price each
ZG85G	A1 Image Grabber Card	£229.99

PC to TV Conversion Card



This card enables a VGA signal to be converted to a composite PAL video signal or S-VHS signal, which will allow you to record the VGA on a suitable VCR. The card occupies one slot in an IBM or compatible PC (XT/AT/386). The card is connected to the existing VGA card via the 'feature connector', and it allows you to monitor the display on your VGA monitor as well as the TV monitor or other video equipment. Two versions are available, an internal plug-in card or an external stand-alone module.

Order Code	Type	Price each
ZG86T	A1 Internal TV Card	£159.99
ZG87U	A1 External TV Module	£129.99

Video Converter Card



Displays VCR, TV Games, CD-ROM images or live TV pictures (with the tuner card above) on a PCs VGA monitor. Stereo sound output. Full picture and audio control from the keyboard. Supplied with frame capture, integral animated and live video, imaging and multimedia presentation software.

Order Code	Type	Price each
ZG89W	A1 Video Converter Card	£249.99

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Grey-Scale Scanner



A high resolution grey-scale scanner which handles 256 grey scales at 100 to 400DPI. Comes with Image 256, Image 72 and OCR software and manual.

Order Code	Type	Price each
ZG91Y A1	Grey Scale Scanner	£99.99

Small Passive Multimedia Loudspeakers



A pair of shielded loudspeakers that are suitable for use near computer monitors. The attractive, light grey plastic case houses a full range 3in speaker. The wide frequency response and low distortion makes the speakers ideal for use in multimedia applications. The speakers are connected via a 1m length of cable to a 3.5mm stereo jack plug which can be used to plug into a computer sound generator card. The maximum input power to the speakers is 2W, and the input impedance is 8Ω. Overall dimensions of each case 114 x 95 x 76mm.

Order Code	Type	Price each
DK32K A1	Passive M/M L/Spkrs	£6.99

Large Passive Multimedia Speakers



A pair of passive 3 1/2 in loudspeakers enclosed in an attractive ivory plastic case with a matching metal grill. The loudspeakers are magnetically shielded and are suitable for use with personal computers (with suitable output) and in particular multimedia applications. The speakers offer excellent sound quality and have a smooth frequency response. The speakers are connected to a miniature stereo jack plug by approximately 1.8m of cable.

Specification
 Nominal impedance: 8Ω
 Frequency response: 100Hz to 15kHz
 Power rating: 5W (PMPO)
 Dimensions: 137 x 98 x 92mm

Order Code	Type	Price each
ZC99H	Ivory Passive Spkrs	£12.99

PORTABLE ACTIVE SPEAKERS

NEW



GREAT VALUE!
£14.99
 RJ94C
[A1]

A compact pair of 7W extension speakers, designed for use with personal stereos, portable CD players and multimedia PC systems. Each speaker has a separate volume control and power switch, to allow each speaker to be controlled totally independently. Power can be supplied from a 6V DC mains adaptor (not supplied), or from four AA batteries, two in each speaker. A dynamic bass boost system automatically boosts low-frequency audio, giving a spacious, full sound. The speaker dimensions are 125 x 85 x 70mm (H x W x D)

Active Multimedia Loudspeakers

NEW



A pair of shielded active loudspeakers which are intended for use with computer sound cards etc. and can operate from either batteries or a suitable mains adaptor. Each high quality loudspeaker has a 1 1/2 in tweeter and a 3in bass and mid-range unit. A level control and two boost switches are incorporated, one switch is used to increase the bass output and the other treble. Each speaker has an on/off switch and an LED which illuminates when the loudspeakers are powered. A battery compartment is built-in to each speaker which requires 2 x 1.5V 'C' cells (Four in total, JY47B). Because the speakers are shielded, they can be mounted near to colour monitors, and the supplied interconnecting cable allows the speakers to be placed upto 1m (approx.) apart. The speakers are connected to the sound source by 1m of cable, which is terminated in a 3.5mm gold plated stereo jack plug. A 6V DC adaptor (YM85G) can be used to power the speakers. Finished in an attractive light beige plastic, overall dimensions of each case: 81 x 104 x 186mm.

Order Code	Type	Price each
DK31J A1	Active M/M L/Spkrs	£19.99

MAPLIN
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SOUND CARDS

Sound Blaster™ Deluxe



Sound Blaster is the industry PC sound standard for hundreds of software products including entertainment, education, music, productivity and multimedia and this latest version is full of advanced features. The FM synthesiser chip produces realistic instrument sounds which are used by synthesiser keyboards. Sounds are produced in two modes - six melodic with five percussion or 9 melodic sounds. The digitised voice playback incorporates an 8-bit digital-to-analogue converter which allows real world sounds to be easily reproduced for multimedia presentations, education and entertainment applications. A digitised voice input allows a microphone to be plugged into the board to record sounds and includes built-in automatic gain control (AGC). A line-in jack is also provided to connect other devices such as a cassette player etc. In addition there is a built-in joystick port and MIDI interface. Finally, the 4W (PMPO) per channel quality amplifier will drive any speakers, headphones or domestic stereo system, and includes a volume control. Complete with assorted Windows, entertainment and multimedia software to demonstrate the Sound Blaster card as well as 'Indianapolis 500', and 'Lemmings' and SoundBlaster software, all on 3 1/2 in disks.

System Requirements
 IBM PC/XT, AT, PS/2 (25 and 30) or 100% PC compatibles.

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MS-DOS 3.1 or higher.
EGA or VGA (VGA recommended).
Microsoft Windows 3.1 is required to run the Windows applications supplied.

Order Code	Type	Price each
ZF18U A2	Sound Blaster Deluxe	£69.99

Sound Blaster™ Pro Deluxe



Sound Blaster Pro is the preferred choice of sound board. It is an enhanced sequel to the original Sound Blaster, and has a host of extra features, including 8-bit stereo digitised recording and playback, an MPC-compatible CD-ROM interface, and a multimedia mixer. This product is completely compatible with Sound Blaster™, and comes complete with all necessary DOS and Windows applications software, voice and music utilities, and two games ('Indianapolis 500' and 'Lemmings'). A 'Multimedia Encyclopedia' CD-ROM is included for free! Also included is 'Monologue for windows'- this software will translate almost any text into speech, and is thus ideal for proof-reading documents, and electronic mail. It would also be of invaluable use to the blind or visually impaired. Sound Blaster Pro represents excellent value for money, and is ideal for recreational or educational use.

Features

- Digitised mono or stereo playback/recording.
- Enhanced OPL3 stereo FM synthesiser.
- Stereo digital/analogue mixer.
- CD-ROM interface.
- Joystick port (standard).
- MIDI interface.
- 4 Watts per channel output power amplifier.
- Microphone input with AGC (Automatic Gain Control) amplifier.
- Configurable jumper selections.
- Manual volume control.

Software Includes:

- 'JukeBox' lets you play background MIDI music whilst you work.
- 'Sound Blaster Pro Mixer' allows you to control sound sources from Windows.
- 'Creative Talking Scheduler' will orally remind you of your appointments.
- 'CD Player' allows you to play audio compact discs.
- 'FM Intelligent Organ' transforms your PC keyboard into an organ.
- Plus many others!

Note that all software is supplied on 3.5in. disks.

System Requirements

- IBM PC/XT, AT, PS/2 (models 25 and 30), or 100% PC compatibles.
- MS-DOS 3.1 or higher.
- 640K Memory for DOS software.
- 2.1Mb Memory for Windows 3.1 software (Microsoft Windows 3.1 is required for Windows software).
- EGA or VGA (VGA recommended).

Order Code	Type	Price each
ZF19V B3	Snd Blast Pro Deluxe	£89.99

Sound Blaster™ 16 (Basic Edition)

The Sound Blaster 16 (Basic Edition) sound board uses the latest in audio technology to provide true 16-bit CD-quality sound; selectable sampling rates and auto dynamic filtering are utilised, during recording and playback, to equip your PC with professional quality sound. This product is completely compatible with Sound Blaster™ (it supports 8-bit recording/playback), and provides the upgrade option to add the Advanced Signal Processor chip, which can perform high speed mathematical algorithms on waveforms for surround sound effects, and data compression, etc. Sound Blaster 16 comes complete with all necessary DOS and Windows applications software, together with voice and music utilities. Also included is 'Monologue for windows'- this software will translate almost any text into speech, and is thus ideal for proof-reading documents, and electronic mail. It would also be of invaluable use to the blind or visually impaired. Sound Blaster 16 (Basic Edition) represents excellent value for money, and is ideal for boardroom presentations, and recreational or educational use.



Features

- True 16-bit CD-quality stereo playback/recording.
- Enhanced 20-voice, 4 operator OPL3 FM synthesiser.
- Improved stereo digital mixer.
- CD-ROM interface.
- Joystick port (standard).
- MIDI interface.
- 4 Watts per channel output power amplifier.
- Microphone input with AGC (Automatic Gain Control) amplifier.
- Manual volume control.
- Bass and Treble control.
- Input/Output gain control.
- Optional Advanced Signal Processor, and Wave Blaster™ Upgrades.

Software Includes:

- 'JukeBox' lets you play background MIDI music whilst you work.
- 'Windows Mixer' allows you to control sound sources from windows.
- 'Creative Talking Scheduler' will orally remind you of your appointments.
- 'FM Intelligent Organ' transforms your PC keyboard into an organ.
- Plus many others!

Note that all software is supplied on 3.5in. disks.

System Requirements

- IBM PC/XT, AT, PS/2 (models 25 and 30), or 100% PC compatibles.
- MS-DOS 3.0 or higher.
- 640K Memory for DOS software.
- Microsoft Windows 3.1 is required for Windows software.
- EGA or VGA (VGA recommended)

Order Code	Type	Price each
ZF20W A2	Sound Blaster 16	£114.99

Sound Blaster™ 16 MultiCD



The Sound Blaster 16 MultiCD sound board uses the latest in audio technology to provide true 16-bit CD-quality sound; selectable sampling rates and auto dynamic filtering are utilised, during recording and playback, to equip your PC with professional quality sound.

One of the most useful features of this product is 'Voice Assist™'; this is a speech recognition system which, by simply running in the background, allows users to activate and control almost any Windows application by voice commands. The system is easy to train, and can support multiple users (training is required for each voice). A maximum of 29,792 commands are supported for a single user! Note that 'Voice Assist™' requires a 386SX-25MHz machine with 4Mb of RAM, which must be running Windows 3.1. A microphone is supplied with this product. This product is completely compatible with Sound Blaster™ (it supports 8-bit recording/playback), and provides the upgrade option to add the Advanced Signal Processor chip, which can perform high speed mathematical algorithms on waveforms for surround sound effects, and data compression, etc. Sound Blaster 16 comes complete with all necessary DOS and Windows applications software, together with voice and music utilities. A 'Multimedia Encyclopedia' CD-ROM is included for free! Also included is 'Monologue for windows'- this software will translate almost any text into speech, and is thus ideal for proof-reading documents, and electronic mail. It would also be of invaluable use to the blind or visually impaired. Sound Blaster 16 MultiCD comes with professional multimedia software, and represents exceptional value for money. It is ideal for boardroom presentations, and recreational or educational use.

Features

- True 16-bit CD-quality stereo playback/recording.
- Audio compression system (16-bit audio compression/decompression ratio of 16:4).
- Enhanced 20-voice, 4 operator OPL3 FM synthesiser.
- Improved stereo digital mixer.
- Three CD-ROM interfaces.
- Joystick port (standard).
- MIDI interface.
- 4W per channel output power amplifier.
- Microphone input with AGC (Automatic Gain Control) amplifier.
- Manual volume control.
- Bass and Treble control.
- Input/Output gain control.
- Optional Advanced Signal Processor, and Wave Blaster™ Upgrades.

Software Includes:

- 'JukeBox' lets you play background MIDI music whilst you work.
- 'Windows Mixer' allows you to control sound sources from windows.
- 'Creative Talking Scheduler' will orally remind you of your appointments.
- 'FM Intelligent Organ' transforms your PC keyboard into an organ.
- 'PC Animate Plus™' allows you to create your own animations.

'HSC Interactive™' lets you create interactive multimedia presentations. Plus many others!

Note that all software is supplied on 3.5in. disks.

System Requirements

IBM PC/XT, AT, PS/2 (models 25 and 30), or 100% PC compatibles.

MS-DOS 3.0 or higher.

640K Memory for DOS software.

Microsoft Windows 3.1 is required for Windows software.

EGA or VGA (VGA recommended).

Order Code	Type	Price each
ZF21X	B3 Snd Blaster MultiCD	£169.99

Sound Blaster PC System IV



Amazing music and sound effects can be yours in an instant with the Sound Blaster all-in-one sound card. This complete package is based around the Sound Blaster version 2.0 card, now recognised as the number one PC sound card worldwide, which is easy to install with no wiring or soldering necessary. It has Adlib compatible FM sound generation producing authentic sounding instruments comparable to an expensive synthesiser. A digitised voice channel is able to sample sounds in the real world; speech, animal calls, special effects, machine noises, thunderstorms and more can be easily reproduced for presentations, educational lectures and games. Simply connect a good quality dynamic or condenser microphone into the built-in mic jack and amplifier to sample sounds. There is also a line input jack to connect to other sources such as tape recorders, and a mechanical volume control to set the basic overall level. All these are mounted on the backplate of the Sound Blaster card. The proprietary voice compression software reduces hard-disk storage requirements.

A built-in games port accepts any PC compatible analogue joystick, and a full duplex, built-in MIDI interface, featuring 64-byte FIFO and time stamping, allows MIDI instruments and keyboards to be connected if a suitable adaptor is used at the games port. A built-in, 4W per channel stereo power amplifier is provided for driving any speakers or headphones, stereo connecting cables are also included.

Free software includes SB Talker, a memory resident program which turns your computer into a talking machine capable of reading ASCII text files. SB Talker also comes with the AI (Artificial Intelligence) software 'Dr. Sbaitso', your personal consultant. The FM Intelligent Organ is powerful, easy to use organ software which lets you play, and learn to play, orchestra-like music using one finger on the PC keyboard. Background accompaniments and rhythms are added automatically. No prior music knowledge necessary, but more experienced musicians can also play from their MIDI keyboards.

Talking Parrot is a mischievous parrot who mimics your speech, talks back, lets loose with outrageous remarks and screams when tickled! (AT 286 required to run properly). With this you can customise or create your own talking animations.

VOXKIT is a voice development toolkit to record, play, compress and store digitised sounds. Also included with this is Jukebox, a Windows 3.0 application to give you some idea of what the future holds for Sound Blaster applications. In fact the Sound Blaster card is supported by a very large library of software from various sources.

The remainder of this comprehensive package includes the new Mach 1 joystick, perfect for the active game player. High performance, easy to use features are combined with superb precision and reliability, with extra large, dual fire buttons located on the control deck, and a newly patented gimble design for dependable performance and longer life. Dual X and Y linear trim controls are provided for precise cursor centring, and the connectors have plug locks for more secure attachment.

Finally a pair of superior quality, monitor type, mountable stereo speakers are also included, which can either stand alone or be hung from the sides of the video monitor using the supplied brackets. Each speaker pod has its own amplifier capable of 2.5W of output power, which can either be powered by internal batteries (4 x AA cells, not supplied), or by an external AC adaptor supplying 6V DC. A switch at the rear of each pod selects either internal amplifier OFF (and the signal is routed direct to the speakers themselves), or ON using battery power, or ON using external 6V DC. Each pod has its own volume control, 'Bass' enhancement push-button switch and power on LED. The pods have magnetic shielding to prevent interference to the monitor display and also have audio/video system protection. A dual phono to single 3.5mm stereo jack adaptor lead is included for line input sampling. All items supplied in one pack.

Order Code	Type	Price each
RT35Q	H5 SoundBlaster Pack 1	£81.99

Sound Blaster Pro Pack



Virtually identical to the Sound Blaster System IV pack, also having the Soundblaster Pro card and stereo speaker pods, but having the 'Flightstick' joystick controller (as RT39N shown elsewhere in this section), and microphone. Software includes 'Comanche-Maximum Overkill', one of the most realistic helicopter combat simulators ever made, fully utilising the digital speech and stereo sound capabilities of Soundblaster Pro. It unleashes unprecedented speed, fluid cinematic animation (voxelspace graphics) and breathtaking action never before experienced on PC. Dive through mountain peaks and desert canyons, unleashing a huge array of hi tech, destructive weaponry from the world's most deadly fighting bird.

Order Code	Type	Price each
RT36P	H7 Soundblaster Pro Pk2	£159.99

FOR CASHTEL
Phone 01702 552941

Sound Fantasy Card

Includes an 11 voice, stereo FM music synthesiser with digitised voice input and output, DMA and hardware decompression, and 4 watts per channel output. Accepts a PC joystick, MIDI interface, speech and CD-ROM.

Order Code	Type	Price each
ZG98G	A1 Sound Card	£59.95

SOFTWARE

MS-DOS Version 6.2



Version 6.2 of Microsoft's very popular operating system for PCs, now with more enhanced tools. If you have used earlier versions of MS-DOS, you will find many improvements in version 6.2. These improvements include new commands and programs that make using your computer easier and more efficient.

MS-DOS 6.2 includes the following new, or improved, features:

'DoubleSpace', an integrated disk compression system that increases your available disk space by compressing files. It will operate on both hard and floppy disks. A new '/c' switch for the 'DIR' command that displays information about file compression ratios if 'DoubleSpace' is in use.

'MemMaker', which is a memory optimisation program that makes it easy to move device drivers and memory resident programs from conventional memory into the upper memory area (only suitable for 386 processors and higher).

Enhanced 'EMM386.EXE' device driver which provides access to more upper memory blocks and uses extended memory to simulate expanded memory.

Enhanced 'MEM' transient command that provides more information about computer memory.

Enhanced 'LOADHIGH' and 'DEVICEHIGH' which allow specific high memory regions to be specified into which a DOS driver or TSR is loaded.

Improved 'BACKUP' commands, with both DOS and Windows versions for simple and safe backing up of data.

An AntiVirus program that can identify and remove more than 800 different computer viruses from the system. Improved 'UNDELETE' command, with which you can choose one of three levels of protection in case you accidentally delete a file.

Abilities to define more than one configuration in which it set up differently; plus the facility to bypass 'CONFIG' startup commands.

'Defragmenter' is a program which reorganises files on your hard disk to minimise access time due to various clusters belonging to one file being scattered all over the disk. Defragmenting is a process of recombining files so that each uses only local sectors.

A 'HELP' instruction provides on-line reference to MS-DOS commands. In addition there is an enhanced 'SMARTDrive' caching device driver, a diagnostics program, 'Interlnk' which enables you to easily transfer

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files between machines; a power saving program for laptops, a genuine, between disks or directories file moving command; 'choice', which (at last!) allows user input for batch files, displaying the required prompt and pausing for user action and returning an 'errorlevel' parameter that the batch file can act on conditionally. And not least 'DELTREE' which can erase an entire directory and its contents, including lower level subdirectories, at one stroke – extremely useful. MS-DOS 6.2 is supplied on three, 1.44Mb high-density floppies, and comes with a 279 page manual.

Order Code	Type	Price each
RT31J	MSDOS 6.2 for IBM PC	£54.99

COMPUTER ACCESSORIES

3-Button Serial Mouse



A neatly styled mouse for use with IBM PC, XT, AT and IBM compatible computers. The mouse produces a serial output signal, which is connected to the serial (RS232C) port of the host computer, thus no extra hardware is required. Mouse 'tail' is 1.8m long and terminated in a 9-way D-type socket. The mouse is supplied complete with instruction manual driver software on 5 1/4 inch floppy disk. The software consists of a test program, mouse driver and pop-up menu and the driver programs may be invoked from batch files and can also be installed on hard disk. The mouse is compatible with most software intended to be mouse driven, and the pop-up menu allows the mouse to be used with programs that are not normally mouse driven. Note that the serial port on some computers may be fitted with a 25-way D-type plug, in this case use the 9-way adaptor which is provided.

Order Code	Type	Price each
YU10L	A1 Serial Mouse	£17.99

Mouse AM-5E



Microsoft and Mouse Systems compatible AM-5E with a dynamic resolution of 350 to 3500 DPI. Supplied with mouse driver software and manual.

Order Code	Type	Price each
ZG99H	A1 Mouse AM-5E	£14.99

FOR TOP QUALITY & VALUE!

Extra High Resolution Mouse AM5-P



A superb, high quality mouse for use with all IBM PC XT, AT and compatible computers. The mouse produces a serial output, connected to the serial (RS232) port of the host PC, hence no extra hardware is required. Connecting lead is 1.9m long and terminated in a 9-way D-range female connector, and a 9-way to 25-way adaptor is included if your PC does not have a 9-way serial port. The mouse can be configured to use either COM1, COM2, COM3 or COM4 if required. Compatible with 2-button Microsoft and 3-button system mouse modes. The mouse driver supports both modes and you can select between two hardware modes using the mode switch on the left side of the mouse. Most software can use either mode.

High resolution is available by 'switch' instructions following typing of the mouse driver's name: resolution can be 1:1 or double, triple, quadruple and quintuple (ranging from 290 to 1,450dpi). In addition a fast tracking speed of 700m/sec. and upwards is possible. Other hardware included comprises (in addition to the serial adaptor) a mouse holder and mouse mat. Supplied software not only includes the mouse driver and test programs, but also a useful screen saver TSR program and IMAGE72 graphics painting software. IMAGE72 is designed specifically for use with a mouse or mouse assistance, and has abundant editing tools and useful utilities. It is able to support *.PCX, *.TIF, *.IMG, *.MSP and *.PUT file formats and read ASCII files. Editing of scanned images is also possible and Hercules, EGA and VGA high resolution modes are also supported. Images can be processed across EMS and conventional memory with auto-detect functions to improve speed. Supports dot matrix, laser and HP paint jet printers. The numerous editing tools include pencil, lines, circle, rectangle, eraser, air spray, air fill, scissors, text entry, rotate, 'Fabit' edit, full page edit, retrieve, etc. To use IMAGE72 the host machine can be an XT, Hercules or EGA or VGA or compatible video card and monitor and DOS 2.1 or higher. Any other mouse can be used. Supplied complete in a pack with software disks and manuals.

Order Code	Type	Price each
RT33L	AM5P Mouse + IMAGE72	£19.99

High Resolution 3-Button Serial Mouse

A smart mouse for use with IBM PC XT, AT and compatible computers. The mouse produces a serial output, connected to the serial (RS232) port of the host PC, hence no extra hardware is required such as extension cards, etc. The connecting lead is 1.9m long and terminated in the usual 9-way D-range female connector. The mouse can be configured to use either COM1 or COM2 serial ports. If your PC does not have a 9-way port you will also need a 9-way to 25-way adaptor. A switch underneath is provided to select two (Microsoft) or three (System Mouse) operation. The mouse is supplied complete with TSR driver software tailored for six different languages: English, French, German, Italian, Spanish and Dutch. The drivers are supplied on both 5 1/2 in. and 3.5 in. diskettes, and also come with test programs. The mouse is compatible with most software intended to be mouse driven, and

options are selected by the usual DOS command method by adding 'switches' to the transient 'MOUSE' command (the name of the driver). This driver should be added to the existing DOS transient command set, on a directory on a hard drive for example, for easy access by start up batch files, etc. The dynamic resolution is in the order of 350 to 700dpi and is programmable, ranging from 1/10 to 30 times hardware resolution. The default is 1:1 (actual hardware resolution).

Available in a choice of four different colours: Ivory, Gunmetal, Red and Blue. Supplied with user manual.



Order Code	Type	Price each
RT46A	Serial Mouse Ivory	£14.99
RT47B	Serial Mouse Gunmetal	£14.99
RT48C	Serial Mouse Red	£14.99
RT49D	Serial Mouse Blue	£14.99

Hand-Held Trackball Mouse



A Microsoft and PS/2 compatible device for any IBM PC XT, AT and equivalents, which functions as a mouse, for directing the cursor on-screen, but consists of a miniature trackball device which can be operated by finger or thumb while held in the hand or placed on any surface where space is restricted. As a 'stationary mouse' it can be operated from within your hand or, when operated on a desk, only a minimum of table space is needed with no mouse pad required, so therefore it never 'falls off' the edge of the pad which often happens with ordinary mice. More accurate movement of the cursor is possible, and two keys are provided for left or right-handed use, together with a 'drag button' to facilitate icon dragging operations. As it fits comfortably in either hand it is particularly convenient for demonstrations and ideal for laptop and notebook computers whilst travelling. The device can automatically switch between Microsoft and PS/2 modes, and the latest available, officially licensed driver software on both 3.5 in. and 5 1/2 in. disks. An opto-mechanical encoder system is used having 200 to 400dpi hardware resolution, and a dynamic software resolution up to 100 times (20,000dpi). Key switches are of 'micro' type and have a life of 1 million operations.

Order Code	Type	Price each
RT50E	Master Mouse PC	£29.99

**PHONE BEFORE 5PM
FOR SAME DAY DESPATCH
01702 554161**
Access, Visa, American Express

Thumball Cursor Controller



'Thumball' is a palm sized cursor controller which operates in a manner identical to a larger trackball. It is designed to have the same functions as a mouse, but is much more convenient to use while travelling and especially for laptop and notebook computers. A simple slide switch will enable it to be positioned on the left or right-hand side of a laptop computer, with no complicated software reconfiguration. The device can either be operated while held in the hand, or it can be physically attached to the edge of the keyboard. The two 'left and right' mouse buttons are located around the periphery of the body and are duplicated for both one-handed, left or right-hand operation. The Thumball has a 55cm long lead terminated in a 9-way D-range connector for a 9-way serial port (a 9 to 25-way adaptor is also needed if your machine does not have a 9-way port). Suitable for all IBM PC XT/AT and compatible machines. Supplied with driver software on a 3.5in. floppy disk, soft travelling carry case and instructions.

Order Code	Type	Price each
DM98G	Thumball	£35.99

3 Button Serial Track-Ball



A neatly styled track-ball, which provides an ingenious alternative to a mouse when desk space is limited. Designed for use with IBM PC, XT, AT and IBM compatible computers. The track-ball produces a serial output signal, which is connected to the serial (RS232C) port of the host computer, thus no interface card or extra hardware is required. The unit is supplied with 1 1/2m of cable terminated in a 9 way D-type socket, as some computer serial ports are fitted with a 25 way D-type plug, an adaptor is supplied to facilitate connection. The track-ball is supplied complete with instruction manual and driver software on 5 1/4 inch floppy disk. The software consists of a test program, track-ball driver and pop-up menu, driver programs may be invoked from batch files and can also be installed on hard disk. The track-ball is compatible with most software intended to be track-ball or mouse driven and the pop-up menu allows the track-ball to be used with programs that are not normally track-ball or mouse driven.

Order Code	Type	Price each
YU12N B*	Serial Track-Ball	£39.99

MINI THUMBALL

A compact Serial or PS/2 thumbball ideal for use with Laptop computers where it can be used either hand-held or attached to the computer with the bracket provided. Software drivers for DOS, Windows and a pop-up menu utility are included on a 3 1/2" diskette. Suitable connectors are provided for connection to an IBM PS/2 mouse port or any PC compatible computer with a serial port. Supplied complete with a carrying case and full instructions.

GREAT VALUE!
£34.99
DK28F



NEW

Amiga and Atari Mice



Two versions of a mouse with opto-mechanical encoder having a resolution of 350dpi. Two types are available, one developed for use with Atari computers, and the second specifically for the Amiga. Each type has three buttons which can be configured according to the capabilities and requirements of the software on the machine in question. Since, for these machines, mouse operation is most often software dependent, the mice are NOT supplied with driver software, unlike those for a PC.

Order Code	Type	Price each
RT52G	Atari Mouse	£10.99
RT51F	Amiga Mouse	£10.99

Warrior Joystick Controller



IBM compatible joystick with 2 fire buttons, dual axis trim adjusters and high-speed auto-fire selector. Compatible with high-speed PCs (IBM PC, XT, AT, 386, 486 and compatibles). A game card is needed.

Order Code	Type	Price each
ZH08J	Joystick Controller	£9.99

Flightstick Advanced Performance Joystick



The FlightStick joystick is designed to look and feel like a real aircraft joystick. Its ergonomic design and precision engineered parts help you to shoot faster and score higher. The tough construction and long working life will probably make it the last joystick you will buy.

Wrap your hand around the realistic grip of the FlightStick controller and, whether your 'mission' be fast-paced combat or a record breaking flight of fantasy, you'll come to rely on the extra performance advantages built into it. It features superior design, workmanship and materials for more precise cursor control and a longer life compared with many other available joysticks.

The ergonomic pistol-grip design, 360° precision cursor control and outstanding durability make FlightStick one of the best quality joysticks you can buy. Extra features, such as the audible and tactile click effect fire buttons (one on top and another in a trigger position), added throttle control and extra stable base, make this joystick the best choice for all computer games. A rotary auxiliary axis/throttle control wheel to the left of the stick is provided for advanced programs such as Microsoft's 'Flight Simulator' or Chuck Yeager's 'Advanced Flight Trainer'. Rotary X/Y axis trim controls are also provided below and to the right of the stick for centring the cursor on the screen. Since each computer is different you may need to make this adjustment before starting play.

The two fire buttons are actually different, that at the trigger position is the 'normal' button #1, while the button on top of the stick (button #2) may or may not function in a particular program (each time you

THE BEST OF SERVICE

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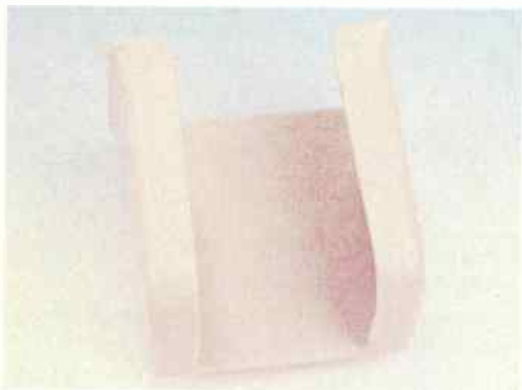
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change between software programs, the exact functions of these buttons may also change, in which case consult the software manual).

The joystick is fitted with 2.3m of connecting lead with a 15-way D-range plug for a PC games port. Compatible with IBM or equivalent PC, XT, AT and PS2 machines.

Order Code	Type	Price each
RT39N A2	FlightStick	£39.99

Mouse Bracket



A useful accessory for anyone who uses a computer with a mouse, the bracket can be attached to a convenient surface, e.g. side of workstation, system unit etc. When the mouse is not in use it can be placed in the bracket, thus preventing it being accidentally damaged. The bracket is moulded in durable plastic and is supplied with a double-sided self-adhesive pad for fixing.

Order Code	Type	Price each
YU11M	Mouse Bracket	£1.49

Mouse Cleaning Kit



The real solution to mouse cleaning. Every mechanical mouse requires some simple maintenance; the three small rollers inside collect dust and grime, and cleaning them is a tedious task with a cotton swab after removing the ball. This mouse cleaner utilises a simple tool, a circular brush on a shaft. One drop of the cleaning solution (supplied) and three twists of the tool is all it takes, (warning: the cleaning solution must not be used to clean the ball). Includes five foam swabs on sticks.

Order Code	Type	Price each
ZA68Y	Mouse Cleaner Kit	£4.99

**MAPLIN
KEY CALL**
Phone 01702 556751

SPIKE PROTECTOR

A 4-way mains socket strip that redirects transients and surges on the mains supply safely to earth, with a response time of less than ten nanoseconds. A built-in neon glows brightly when three conditions are met: the protection unit is intact, the supply fuse is not ruptured and the correct earth is present. Any problems will cause the neon not to glow, or if the earth is not present, the neon will glow with a reduced light output. To help comply with BS 6396 the socket strip is provided with an external earth terminal to ground other desk mounted electronic equipment. The socket strip can be mounted on a wall or desk and comes with two metres of mains cable and a BS plug fitted with a 13A fuse. The socket strip is fitted with an integral 7A fuse.



AMAZING VALUE!

£37.99

KR41U

Mouse Mat

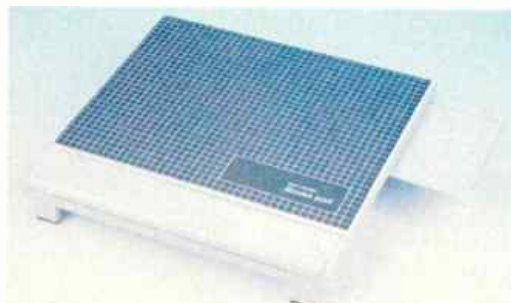


A non-slip foam rubber mouse mat providing a perfect working surface for any mouse. Protects mouse ball against dirt and damp and the special working surface offers precise tracking and accuracy, and is antistatic. Very smooth and comfortable to use. Note however that it must be used on a perfectly flat, hard surface for best results. Size 260 x 215mm.

Order Code	Type	Price each
JY43W	Mouse Mat	£2.99

Mouse Stage

Optum



Suitable for all mice, this working platform consists of a 265 x 200mm mouse mat supported in a rigid, light grey plastic frame. A foldaway leg at each corner, with anti-skid feet, raises the table to a height of 77mm at rear, gently sloping to 57mm at the front. With the legs retracted the height is 25mm overall.

At the front, a hinged lid conceals a compartment measuring 210 x 45 x 15mm for pens and pencils etc. Finally, a flat drawer with ribbed edges can be set in either side (lefthand or righthand), and pulled out to serve as a mouse stand while the mouse is not in use. Colour of mouse mat is blue. Overall dimensions with legs and drawer retracted, 280 x 260 x 25mm.

Order Code	Type	Price each
ZA85G B1	Mouse Stage	£8.99

Surge Protecting Mains Plug

Bowthorpe

A standard 3-pin mains plug incorporating a voltage dependent varistor device which connects between all three pins. Using standard 13A rated pins and connections, the plug is intended to protect computer and other sensitive equipment against voltage spikes and surges on the mains supply. It need not even be fitted onto a cable at all but can simply be inserted into a socket on its own to control the local supply, and has a removable blanking plate to cover the cable entry for this purpose. Fitted with standard size 5A cartridge fuse. Cable connections are identical to those in normal 13A plug. Dimensions are identical to 13A plug except slightly higher at 33mm.



Order Code	Type	Price each
KU20W	Surge Plug	£12.99

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Surge Clock



A device that counts the number of damaging surges on a mains supply. Surges in excess of 700V can create havoc for electronic equipment such as computers etc., this device will register up to nine surges. The clock is operated by simply plugging into the mains: initially the 'clean' green LED will be illuminated. When a potentially damaging surge is detected the clock will change from the 'clean' green LED to a red LED 1, and subsequent surges will cause the indicator to advance one position until '9' is reached. Removal from the mains supply causes the clock to reset. Line-neutral surge voltages that exceed twice the normal peak AC supply will register, surges below 650V will not normally cause damage to electronic equipment so will not be registered. The unit is housed in a flame retardant plastic case with integral pins.

N.B. The Surge Clock does NOT protect equipment from surges.

Size: 100 x 95 x 70mm.

Order Code	Type	Price each
KR42V	Surge Clock	£29.99

3A Filtered Mains Plug

Bowthorpe

A mains plug incorporating a comprehensive noise filter for removing unwanted noise and pulses from the mains supply before entering sensitive electronic equipment such as a computer. The filter includes a double wound toroidal choke, 3-way capacitive decoupling including the earth connection, and a pair of metal oxide varistor surge suppressors. Fitted with a standard mains size cartridge fuse rated at 3A which must not be uprated. Cable connections are to a block of three screw terminals. Dimensions 95mm long x 65mm wide x 58mm high not including pins.



Order Code	Type	Price each
KU19V	Filter Plug	£25.49

13A Pulse Protector

Bowthorpe

These single way 13A pulse protectors are ideal for use with electrical and electronic equipment that is now being supplied fitted with moulded plugs. When plugged into a standard socket the units will provide protection against transients on the mains electrical supply thus preventing electronic equipment from malfunctioning. PP1 is fitted with a multipurpose neon that verifies that the protection unit is intact, power is 'ON' and operation is normal, and that vital earth connection is present.

In the rare event of a high energy strike destroying the internal surge protection, Model PP1 will disconnect power to the associated equipment. Should the light go out, the unit must be replaced to restore power and full protection. This model is ideal for non-essential equipment such as computer games, TVs, VCRs, photocopiers, test equipment, electronic scales etc.



Model PP3 has an audible alarm to announce when the unit needs replacing, should the internal surge protection be overloaded due to severe surge. In such an event, the unit must be replaced to restore surge protection. However, power to the associated equipment will continue WITHOUT surge protection. The unit is ideal for business computers, telephone exchanges, fax machines, modems, or any equipment that must be continually powered. In both models, the internal three mode surge/spike suppressors, have a response time of less than 10ns with a maximum surge rating of 4.5kA. Both models commence clamping below 600V, are noise free in operation and automatically reset after a transient has passed. Incoming and outgoing surges are dissipated so 'no fault found' service calls are reduced and equipment performance improved.

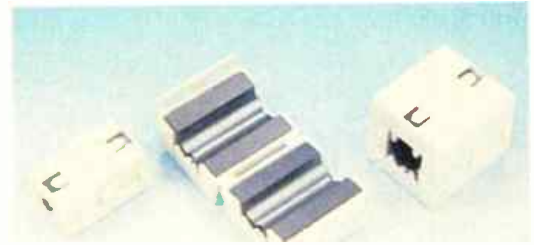
Specification

Protection:	L-N, L-E, N-E
Voltage rating:	220 to 240V AC 50Hz
Maximum current:	13A
Maximum current surge handling 8/20µs:	4500A
Response time:	<10ns
Thermal fuse:	Operates @ 100°C
Housing:	Flame retardant ABS rating UL94 V-O
Plug and socket connections:	Conforms to BS1363

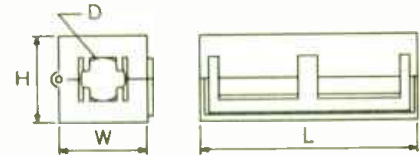
Order Code	Type	Price each
CX64U	Pulse Protector PP1	£13.99
CX65V	Pulse Protector PP3	£18.99

Computer Data Line Noise Filters

An ingenious device to help prevent noise being transmitted along inter-connecting cables between sensitive computer equipment and peripherals. The principle is successfully based on applying effective common-mode countermeasures locally to the cable. The device is hinged to wrap around and grip the single or multi-way cable or bus, and contains a ferrite core which is inductively coupled to the line or lines, and which in turn couples the separate conductors in a common mode rejection arrangement. This can even apply to screened conductors since the screen will not



exclude a magnetic field. Excellent rejection of transmitted or induced electrical noise is possible, protecting central processors and peripherals from random unwanted pulses which might be misinterpreted as data bits. Ideal for long cables which can have a filter at each end to exclude noise induced along the run. The high performance ferrite core removes RF noise in the range of 300MHz and over, but has negligible effect on transmission waveforms, while providing common mode noise countermeasures right at the data line. Can even be used on power leads. Manufactured to UL 94V-0. Effective impedance of cable with filter fitted is 125Ω at 25MHz and 275Ω at 100MHz except round types DK33L and DK34M, which are typically 70Ω at 25MHz and 115Ω at 100MHz. Five types are available for different thicknesses of cable:



Type	L	H	W	D (core dia.)
DK33L	25	14.5	14.5	3.5mm
DK34M	29.5	16	16	5mm
KW37S	32	19	19.5	6.5mm
BZ33L	34	23	25	10mm
BZ34M	34	30	33	13mm

Order Code	Type	Price each
DK33L	Noise Filter 3.5mm	£2.49
DK34M	Noise Filter 5mm	£2.99
KW37S	Noise Filter 6.5	£2.99
BZ33L	Noise Filter 10	£3.29
BZ34M	Noise Filter 13	£3.49

Mains Voltage Inverters



Anyone who has access to a rechargeable 12V car battery can operate mains powered equipment without having to depend on a nearby mains supply or a noisy generator. Essential for any equipment which must be operated in a motor vehicle or isolated place, or during a power cut, these inverters simply and silently convert 12V DC power from a vehicle battery into 230V AC mains equivalent power with very accurate voltage and frequency tolerances. Four models cover almost all conventional, domestic equipment applications ranging from sophisticated devices such as computer equipment, Hi-Fi, TV and VCR through to microwave ovens, power tools, coffee makers and small refrigerators. Each unit draws very

Continued on next page.

Continued from previous page.

little current when offload, and includes low battery, overload and overheating protection. Housed in rugged, lightweight and splashproof diecast cases, they are virtually maintenance free once fitted. Four modules with different power outputs are available and each type is especially suitable to operate the following:

125W TV, computers, recharging of cordless hand tools, Hi-Fi, communications equipment. Supplied with connectors for laptop computers. Dimensions: (H) 40 x (W) 115 x (L) 115mm.

250W As above plus VCRs and small power tools. Supplied with IEC connector. Dimensions: (H) 40 x (W) 115 x (L) 150mm.

800W as above plus microwaves, small refrigerators, toasters, heavy-duty power tools and small vacuum cleaners. Dimensions: (H) 76 x (W) 229 x (L) 254mm.

1500W All the foregoing and also large refrigerators, small freezers, large AC motors and high-power or professional radio/Hi-Fi equipment. Dimensions: (H) 76 x (W) 229 x (L) 381mm.

Specification

General, all units:

Input voltage range: 10 to 15V DC
 Output voltage: 230V AC r.m.s. ±5%
 Output frequency: 50Hz ±0.02%
 Output waveform: Phase corrected quasi-sinusoidal
 Efficiency: Better than 90%

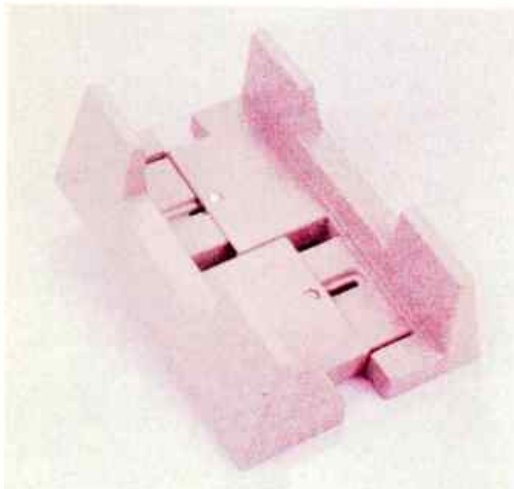
Output power	Continuous	5 min. max.	Surge
125W type	125W	200W	400W
250W type	250W	250W	400W
800W type	800W	1000W	1/2 HP*
1500W type	1500W	2000W	3/4 HP*

* i.e. up to starting capacity for AC motor rated as shown

Type	125W	250W	800W	1500W
No load current:	70mA	150mA	300mA	600mA
Weight:	520g	570g	2.3kg	3.7kg

Order Code	Type	Price each
RC08J	DC-AC Inverter 125W	£99.99
RC09K	DC-AC Inverter 250W	£149.99
RC10L C5	DC-AC Inverter 800W	£399.99
RC11M F8	DC-AC Inverter 1500W	£649.99

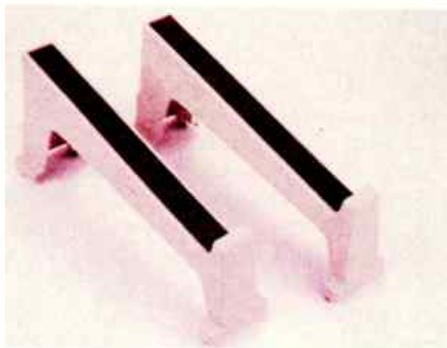
Computer Main Unit Universal Stand



This device saves worktop space by enabling a PC 'main unit' to be stood edgewise and supported securely. Width is adjustable from 98mm to 170mm and locked by two wingnuts underneath. Made in tough injection moulded light grey plastic.

Order Code	Type	Price each
GK31J B2	Universal Stand	£6.99

Universal Type Printer Stands



A very simple yet effective printer stand consisting of a pair of sloping side supports. Each support has a stable base with four non-slip rubber feet, and the top surface has a foam strip attached (these must be assembled by user). The top surfaces are sloped to a height of 90mm at the front, and 150mm at rear, so that the top of the printer is angled gently toward the user for easy access, and leaving plenty of room for fan-fold paper underneath the printer between the supports. Will support a printer of up to 300mm in depth. Paper enters and exits at rear. Colour light grey to match PCs, etc.

Order Code	Type	Price each
GK30H A1	Printer Stand Univ	£4.99

Printer Stand

Optum



A compact printer stand for 80 column printers which permits the paper to be stacked beneath the printer whilst the print-out is deposited automatically in the tray behind the printer. The stand is made of lightweight durable plastic coated steel wire and folds up for storage. This stand is suitable for use with almost all 80 column printers and can support a maximum weight of 60kg. The stand is 330mm wide, 120mm high and 320mm deep when closed and 610mm deep when opened out.

Order Code	Type	Price each
YT33L B3	Printer Stand 80	£8.99

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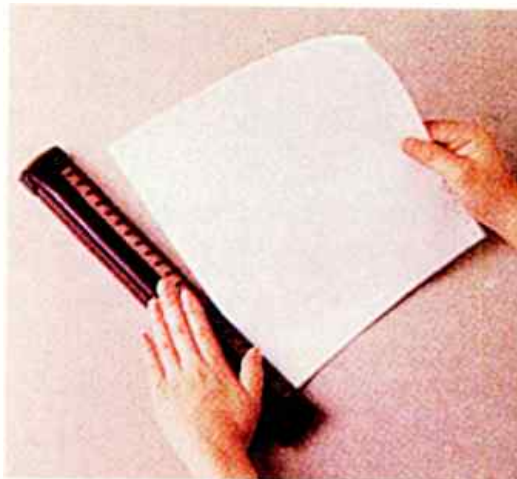
Multi-Purpose Printer Stand



A smart printer stand comprising a base with a transparent cover measuring 380 x 345 x 100mm high, containing a drawer for holding up to 2 inches of fan-fold paper. The drawer is removable from front or rear for replenishment without disturbing the printer itself. The transparent lid will help to keep dust away from paper in situ while not in use. It includes a central slot for printers which draw paper from underneath. In addition a delivery tray is provided for collecting the output, which is stowed flush in the bottom of the base when not in use, but extends to 11 inches, supported by a locking cantilever, to overhang the edge of a table. Only suitable for A4 or 11 x 9 1/2 inch fan-fold paper. Made in light grey ABS.

Order Code	Type	Price each
GK29G D5	Printer Stand Multi	£14.99

Paper Perforation Stripper



At last, a simple tool for removing the sprocket perforations from fan-fold paper quickly and easily without risk of damaging the sheets or leaving bits behind. You probably know how difficult it is to remove these neatly from several sheets of fan-fold all at once. The 'Ripper Stripper' consists of a flat base with sprocket teeth, and a smoked transparent, hinged cover. Simply press the sprocket holes of folded sheets over the teeth, close lid and hold down firmly. For a few sheets, the edge can be removed just by tearing upwards sharply. With more than half a dozen sheets however, don't tear, but begin to separate perforation at top, then pull sideways from top to bottom to guarantee a neat trim. Can cope with up to 15 sheets at a time of 80g/m² paper. If bigger quantity is needed, but sheets must not be separated, then process in batches of a few sheets at a time from one end; remainder simply exit from the 'open' end of the stripper until needed. Two rows of sprocket teeth are in different pitches; 12in. DIN size, and 11in. fan-fold size. Non-slip foam underside to base. Overall size (closed) 325 x 41 x 39mm.

Order Code	Type	Price each
ZA94C	Perf Stripper	£4.99

Monitor Mounting Copy Holder

A simple and ingenious A4 copy holder, which is simply attached to one side of your monitor. To attach, test position the right-angled base to top left or right corner of the monitor. When happy with the position, remove the two protective strips from the self-adhesive velcro pads and press in position. The base is then attached to the monitor via the velcro pads, but can be removed if required. The actual copy holder is attached to the base with a removable hinge, and has a sprung copy clip which slides along the top. Can be folded back out of the way or removed when not in use.



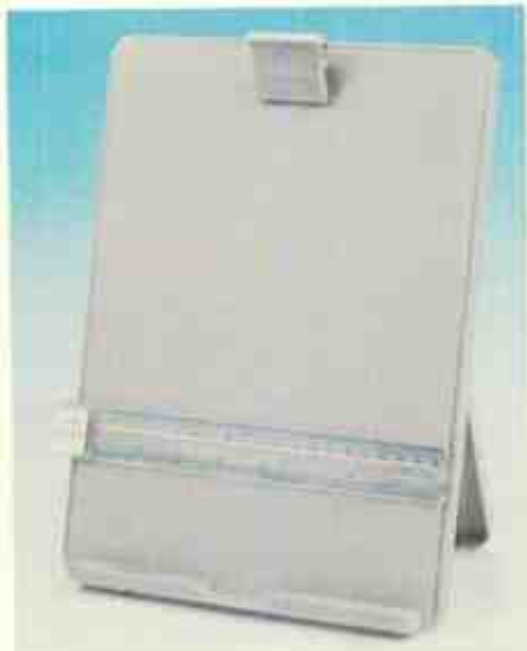
Dimensions

of base: 80 x 80mm angle x 38mm wide
of copy holder: 280 wide x 50mm deep

Order Code	Type	Price each
ZA88V	Copy Holder RT-85	£2.99

Free-standing Copy Holder

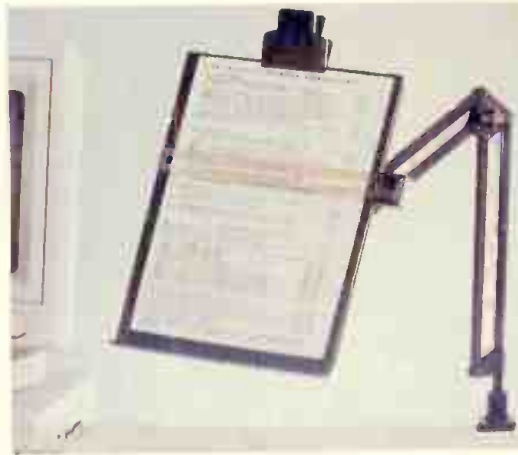
A full A4 size copy holder made in light grey, injection moulded plastic. It is entirely free-standing using a hinged support at rear, which has a degree of adjustment to alter the front angle. The support retracts flush into the back of the holder, when not in use. Copy can be propped on the bottom ledge, or securely held at the top with a sprung clip, which slides along the top runner. A transparent horizontal rule, which is hinged to allow easy access to paper, can be clipped onto left or right runners, and slides vertically to mark the position of each line of copy. The rule is graduated to 20 centimetres and 8 inches. Overall dimensions, assembled: 265(W) x 310(H) x 40(D)mm.



Order Code	Type	Price each
ZA87U A1	Copy Holder RT 75	£5.99

Articulated Desktop Copy Holder

Optum



A 9 1/2 x 11 1/2 in. copy holder with smooth sliding, non-magnetic line guide and removable paper clip at top. The line guide is graduated in mm up to 24cm, and 8ths of an inch up to 9 3/8 inches. The copy holder is supported on a jointed arm and, once installed, copy can be positioned anywhere for best visibility. Can be attached with its G-clamp to the rear edge of a desktop. This type of copy holder occupies virtually no desk space whatsoever. Finished in black. Copy board tilts and tums, maximum reach of arm is 560mm (22in.).

Order Code	Type	Price each
ZA60Q B2	DT Copy Holder	£19.99

Desktop Copyholder with Powered Guide



A 9 1/2 x 11 1/2 in. copyholder with a motorised, non-magnetic line guide and integral paper clip at the top. The line guide is graduated in mm up to 23cm, and in 16ths of an inch up to 9in. Maximum reach of arm is 630mm (25in.), and the copy board tilts and tums. The arm is made of grey painted steel and has sleeved springs. The line guide can be hinged open to access paper on the copy board, and is motor driven along its length, controlled by a foot switch unit intended to sit on the floor. A rubber cover fits over the foot switch to protect it and keep it clean. The foot switch has a rocker action for up and down directions, and movement is continuous for as long as the switch is held down. It also contains the battery supply comprising two AA size cells (not supplied), or an external 3V DC supply from a mains adaptor can be connected via a standard power jack socket on the end of a flying lead. The line guide itself is of perspex and has a transparent centre portion which can be used as a text window to aid copy-typing, while advancing the guide a step at a time with the foot switch.

Order Code	Type	Price each
DM99H C	Auto Copy Holder	£27.99

Computer Screen Anti-Glare Filters



Two sizes of monochrome monitor screen contrast filters, available in non-conductive or earthed conductive options, for 12 inch and 14 inch screens. In the non-conductive versions, the screen is a very fine nylon mesh which eliminates reflected artificial and natural light, glare and ultraviolet light, as well as improving the sharpness and contrast of the display. The earthed conductive types have conductive carbon fibre meshes. All screens have a rigid ABS frame supporting the mesh, which is pale grey on one side and black on the other. You can have either side outermost to suit your particular needs. Universal fittings comprise either four velcro pads, for attaching the corners directly to the front of the monitor (12 inch versions only), or through the use of 'hangers'. For 12 inch versions, these are a pair of steel, right-angled rods which are inserted into the top corners of the supporting frames, and the other ends pressed into two rubber blocks resting on the top of the monitor, or attached with velcro pads. The rods are adjustable in both planes for an exact fit. For 14 inch screens, only the 'hangers' can be used, and the rods attach to a pair of moulded plastic supports (which use adhesive pads), at right-angles over the top of the monitor. The static discharge conductive options include an earthing lead, which plugs into one of the sockets provided on either side of the frame, and is then terminated with an alligator clip at the other end to the computer's chassis.

Dimensions

12 inch frame:	300 x 220mm
12 inch viewing area:	275 x 200mm
14 inch frame:	320 x 265mm
14 inch viewing area:	300 x 227mm
Length of earthing cable:	1.5m (conductive option only)

Conductive options specified as '12C' and '14C' below.

Order Code	Type	Price each
ZA56L A1	Glare Filter 12	£9.99
ZA58N A1	Glare Filter 12C	£11.99
ZA57M A1	Glare Filter 14	£10.99
ZA59P A1	Glare Filter 14C	£13.99



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Monitor Pedestals

Optum



A very attractive oatmeal coloured monitor pedestal which may be tipped front-to-back and rotated on its base. Top of the pedestal has soft pads for the monitor to sit on and the base has four non-slip soft plastic feet.

TV's up to 12 inch:

Dimensions of base: 253 x 231mm.
Dimensions of pedestal: 281 x 260mm.
Nominal height: 57mm approx.

TV's up to 14 inch:

Dimensions of base: 305 x 270mm.
Dimensions of pedestal: 340 x 290mm.
Nominal height: 70mm.

Order Code	Type	Price each
YP39N B3	Monitor Pedestal 12	£9.99
GK38R D4	Monitor Pedestal 14	£12.99

TV Wall Mounting System

Flame



Mount your TV or monitor on a wall anywhere in the home. Ideal for kitchens, bedrooms, 'dens' etc, it keeps the set out of reach of young children or animals. The platform will take a set of up to 49cm (19in.) screen size and weight up to 30kg (66lbs) in complete safety. The platform can be tilted using a knurled adjuster screw, and swivelled horizontally in any direction. The support comprises a double jointed extension arm for total versatility; can be turned round completely and even around corners. Ideal for alcoves and through rooms, etc. Also ideal for computer monitors for the home and office. Quickly and easily installed using the full instructions provided. Six 2in. screws, a spanner and wall plugs maybe required for wall fixing.

Warning This installation depends on a strong and sturdy attachment to a solid brick or block wall. Attaching to board partitioning is not recommended, unless fixing directly to an underlying, vertical timber support. In any event, if in doubt, consult an experienced person.

Made in high grade steel, painted white. Dimensions of platform, 305mm wide x 280mm deep. 20mm raised lip at front. Distance from wall: fully retracted, 305mm; fully extended, 580mm.

Order Code	Type	Price each
GK28F E6	TV Wall Bracket	£19.99

A-to-D Converter with Oscilloscope, Voltmeter and Spectrum Analyser Software



The ADC-10 A-to-D converter plugs into the parallel port of an IBM PC or compatible computer. It is completely self contained, requiring no external power and taking up no expansion slots. Input to the unit is via a BNC connector allowing standard oscilloscope probes to be used.

Software is supplied which allows the device to be used as a single channel digital storage oscilloscope (DSO), spectrum analyser or voltmeter. Displayed waveforms can be saved to disk or sent to a printer. Additionally, the ADC-10 is ideal for general purpose data acquisition. Typical applications include audio sampling and pressure, temperature and strain gauge measurement. For users who wish to develop their own software, C, Pascal and Basic drivers are supplied.

Specification (Hardware)

Input range: 0 to 5V
Resolution: 8-bits
Maximum sampling rate: 10kHz (8088 cpu)
20kHz (286 12MHz cpu)
25kHz (386 33MHz cpu)
1 lsb
Accuracy: ±30V
Overload protection: Standard BNC
Input connector: 25-way D-type to printer port
Output connector:

Specification (Software)

Compatibility: IBM PC/XT/AT or compatible
Display support: Hercules, CGA, EGA, VGA
Printer support: Epson FX and LQ series, HP Laserjet
Oscilloscope functions: Timebase, trigger, multiplier, notes, rulers.
Spectrum analyser functions: Min/Max frequency, averaging, grid, title.
Voltmeter functions: Min/Max value, decimal places, units, title.

Supplied with manual and software on 3.5in disk.

Order Code	Type	Price each
KR40T	ADC 10 Converter	£59.99

PC to Colour TV Interface

Josty



A compact interface that allows an IBM PC, PC-XT or PC-AT computer (or compatible), fitted with a Colour Graphics Adaptor (CGA) card (or multi-mode display adaptor operating in CGA mode), to be connected to a normal Television Set which has a 21-pin Peritel (SCART) input socket supporting RGB input signals. This compact unit has two connecting cables, one connects to the 9-way D-type video connector on the host computer and the other connects to the 21-pin Peritel (SCART) connector on the TV to be used. A 3.5mm power input jack socket accepts a DC input of between 9 to 12V DC at 300mA, a suitable mains adaptor is XX09K (not supplied). The unit is fitted with three controls, picture shift, brightness and contrast; which allow the TV picture to be optimised.

Please Note:

This unit cannot be used with some early Amstrad PC1512 and PC1640 machines, this can be determined by examining the video output connector, if it is a DIN connector then this interface cannot be used. However if the video connector is a 9-way D-type, then the unit may be used. Please check compatibility before purchasing this unit.

Order Code	Type	Price each
YZ49D A	PC to TV Interface	£39.99

FLOPPY DISKS AND ACCESSORIES

Maxell Disks

This range of high quality floppy disks includes 5 $\frac{1}{4}$ and 3 $\frac{1}{2}$ in. in all density sizes.

5 $\frac{1}{4}$ in. diskettes:	TPI	Storage Capacity (unformatted)
Double-sided Double-density	48	500,000
Double-sided Double-track		
Double-sided High-density	96	1,400,000
3 $\frac{1}{2}$ in. diskettes		
Double-sided Double-density	135	1,000,000
Double-sided High-density	135	2,000,000



These 5 $\frac{1}{4}$ and 3 $\frac{1}{2}$ in. disks are tested and certified 100%. All types are available singly or in boxes of ten.

means fast service and **LOW prices!**

Order Code	Type	Price each
KC64U	D/S D/D Disk 5.25	80p
BA55K	10 D/S D/D Disk 5.25	£6.49
KC66W	D/S H/D Disk 5.25	£1.36
BA51F	10 D/S H/D Disk 5.25	£9.99
KC62S	D/S D/D Disk 3.5	99p
BA53H	10 D/S D/D Disk 3.5	£8.99
KC63T	D/S H/D Disk 3.5	£1.69
BA54J	10 D/S H/D Disk 3.5	£12.99

Low Cost Floppy Disks



A range of low cost quality floppy disks available in 5 1/4 in. and 3 1/2 in. sizes, and in double-sided, double-density and high-density disks. Both sizes are supplied with labels, and the 5 1/4 in. size are also supplied with envelopes. Supplied in packs of 10.

Order Code	Type	Price each
CK09K	10Pk DSDD 5.25	£3.99
BZ88V	10Pk DSHD 5.25	£6.79
BZ89W	10Pk DSDD 3.5	£5.99
BZ90X	10Pk DSHD 3.5	£8.99

Library Cases



A plastic library case for 5 1/4 in. or 3 1/2 in. diskettes. Cases may be stored vertically, but open from a flat position, and the internal part holding the disks then hinges forward locking the case open and holding the disks vertically for ease of selection. Each box will hold 10 disks. Overall size: 165 x 169 x 39mm.

Order Code	Type	Price each
YM84F	3.5in. Library Case	£2.99
YM83E	5.25in. Library Case	£3.75

Expanding 3 1/2 in. Disk Box

A plastic disk box capable of holding up to 10, or when expanded, 13 3 1/2 in. disks. The main body of the case is pulled apart, thus increasing its capacity by up to three disks. The box is finished in grey and charcoal and has two transparent lids that overlap thus keeping the disks secure in transport. Dimensions are 105 x 105 x 40mm unexpanded and 105 x 105 x 50mm expanded.



Order Code	Type	Price each
DK30H	Expanding Disk Box	£1.99

3 1/2 in. Disk Box with Integral Flap

A clear acrylic 3 1/2 in. disk box with a flip-top lid and an integral spring loaded flap that will hold the disks securely. Holds from 1 to 10 disks.



Order Code	Type	Price each
RJ93B	3.5in Disk Box&Flap	£1.99

3 1/2 in. Disk Box with 'Scissor' Action Lid

A blue 3 1/2 in. disk box with a clear acrylic scissor-action lid, that will hold 10 disks. The lid is in two parts, which are geared together, and when open ensure the box is stable, and will not topple over on a flat surface.



Order Code	Type	Price each
RJ92A	3.5in Scissor Dk Box	£1.99

Lockable Storage Boxes

Optum



Storage boxes for 3 1/2 in. and 5 1/4 in. diskettes. The units are manufactured in an attractive light-beige anti-static plastic with hinged anti-static smoked acrylic lids. The lids can be locked and two keys are supplied. All boxes are supplied with dividers. The following sizes are available:

Max no. of disks	Disk size	Overall size (mm)		
		w	d	h
40	3 1/2 in.	127	252	126
80	3 1/2 in.	232	252	126
50	5 1/4 in.	180	248	150
100	5 1/4 in.	180	386	150
50+50	5 1/4 in.	338	214	150



Order Code	Type	Price each
YT30H	A1 40 Dsk Box 3.5	£7.99
YT31J	A1 80 Dsk Box 3.5	£8.99
YP69A	A1 50 Dsk Box 5.25	£8.99
YP68Y	A2 100 Dsk Box 5.25	£9.99
YT32K	A2 100 Dsk Box 5.25 Dbl	£9.99

Large Disk Storage Boxes

Optum



Drawer type disk storage boxes similar in operation to the drawers of a filing cabinet. The boxes can be stacked and have positive locating tongue and groove guides and special clips to join two cases together. The boxes are not portable carrying type, but are intended to be sited on a desk or work station. Two types are available to cater for both 5 1/4 and 3 1/2 inch size disks. Type 180 can accommodate 180 x 5 1/4 inch floppy disks in two rows, and is provided with 16 dividers, while type 150 can hold up to 150 x 3 1/2 inch disks, and has 14 dividers. Both are lockable and provided with two keys. Dimensions are identical: width 340mm, height 180mm, depth 285mm. Drawer withdraws to 235mm. Made entirely of tough light grey injection moulded plastic with a smart black fascia 1 in. deep which incorporates a recessed handle, barrel lock and two small recessed panels for labels.

Order Code	Type	Price each
ZA89W	D6 Box 150	£19.99
ZA90X	D6 Box 180	£19.99

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Disk Drive Cleaners



Disk drive head cleaners for use with 5 1/4 in., 3 1/2 in. and 3 in. disk drives. The cleaners utilise a 'wet' system to prolong the life of the head and avoid damage to the critical head gap. Each cleaner contains one diskette with fibre 'disk' and a bottle of specially formulated cleaning fluid. The 5 1/4 in. kit can be used with either single sided or double sided drives, by inserting the diskette the appropriate way round. The 3 in. type is for the 3 in. Amstrad drives as featured on the CPC464, 664, 6128 and 8000 and 9000 series word processors etc. Full instructions for use are supplied, and a chart is printed on each disk for you to keep a record of the number of cleaning operations.

Order Code	Type	Price each
JY42V	Disc Drv Clnr 3"	£3.99
YT08J	Disc Drv Clnr 3.5"	£2.99
YT09K	Disc Drv Clnr 5.25"	£2.99

Handy Mini Vacuum Cleaner



A miniature vacuum cleaner ideal for removing dust and fluff from between keyboard keys, PCBs etc. The vacuum cleaner is supplied with two heads: a long reach nozzle and a brush. The dust compartment is attached to the body with a bayonet type connector for emptying, and the inlet has a diaphragm valve to prevent contents spilling out. Powered by four AA cells (not supplied).

Order Code	Type	Price each
ZA83E	Mini Vacuum Cleaner	£5.99

Computer Accessory Starter Kit



A selection of very useful computer accessories, ideal for the first time computer user, that offers a saving over the individual prices. All items in the kit except the monitor cover, mouse and mouse mat are in an attractive light beige colour. The kit contains the following:

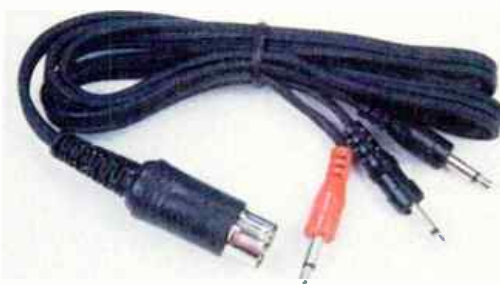
1. **Anti-glare filter.** This has a non-conducting mesh with a viewing area of 290 x 220mm, and is suitable for monitors up to 14in. Supplied with self-adhesive velcro fixing pads and two hangers.
2. **Mouse mat.** A light-grey mat with a black rubber backing measuring 222 x 198mm.
3. **3 1/2 in. lockable disk box.** Holds 100 3 1/2 in. floppy disks and measures 270 x 232 x 115mm, has a clear acrylic top and is supplied with 12 dividers, non-slip rubber feet and two keys.
4. **Printer stand.** A slanting stand measuring 65mm high at the front and 113mm at the rear, with an overall depth of 285mm. Supplied with self-adhesive non-slip neoprene strips. Suitable for a wide range of printers.
5. **Ripper ruler.** A combined 12in./300mm ruler and fan-fold paper perforated edge stripper. Supplied with three self-adhesive non-slip neoprene pads.
6. **A4 Copy Holder.**
7. **14in. monitor dust cover.** A translucent soft plastic dust cover suitable for most 14in monitors up to 400mm deep and 360mm wide. The cover will not scratch the monitor screen, or housing, and must not be used when the monitor is switched on.
8. **3 1/2 in disk cleaning kit.** A 'wet' 3 1/2 in. floppy drive cleaning system.
9. **Mouse holder.** A rectangular bracket to hold a mouse. Supplied with a slot-in partition and a double-sided sticky pad for fixing.
10. **3-Button serial mouse.** MicroSoft & Mouse Systems compatible. Complete with driver software, pop-up menu utility and mouse test program, supplied on a 3 1/2 in. floppy disk. Finished in white

Order Code	Type	Price each
DK29G	B4 Accessory Start Kit	£29.99

COMPUTER LEADS

Computer Lead 1

Union Brothers



7-pin DIN plug to 2 x 3.5mm jack plugs and a 2.5mm jack plug. Length: 1m (approx).

Order Code	Type	Price each
FG18U	Computer Lead 1	£2.99

Computer Lead 4



5-pin DIN plug to 2 x 3.5mm jack plugs and 2.5mm jack plug. Length: 1m (approx.)

Order Code	Type	Price each
FG21X	Computer Lead 4	£2.49

Computer Lead 5



A metre of 50 way IDC cable having a 50 way IDC edge connector at one end, and a 50-way transition header at the other end. Particularly suitable for use with the Amstrad CPC 464.

Order Code	Type	Price each
FT66W	Computer Lead 5	£5.99

RS232C to Centronics



A fully screened 25-way computer cable having a 25-way D range plug at one end and a Centronics-type 36-way male plug at the other. Cable is 1.8m long. Suitable for interfacing IBM PC, Apple III etc. to parallel printers etc. The following pins are connected.

D-type	Centronics	D-type	Centronics	D-type	Centronics
1	1	9	9	17	36
2	2	10	10	18	33
3	3	11	11	19	19
4	4	12	12	20	21
5	5	13	13	21	23
6	6	14	14	22	25
7	7	15	32	23	27
8	8	16	31	24	29
				25	30

Other pins in the 36-way plug are not connected.

Order Code	Type	Price each
JC11M	Cent36P/D25P Lead	£6.99

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RS232C to RS232C M/M



A fully screened 25-way computer cable having 25-way D-range plugs at both ends. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc. All 25 pins are connected.

Order Code	Type	Price each
JC12N	D25P/D25P Lead	£6.99

RS232C to RS232C M/F



A fully screened 25-way computer cable having 25-way D-range plug at one end and 25-way D-range socket at the other. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc. All 25 pins are connected.

Order Code	Type	Price each
JC13P	D25P/D25S Lead	£6.99

RS232C to RS232C M/F IDC



A flat 25-way IDC ribbon cable having a polyester 25-way D-range plug at one end and a polyester 25-way D-range socket at the other. Cable is 1.8m long.

Order Code	Type	Price each
JC17T	IDC D25P/D25S Lead	£6.49

Centronics to Centronics M/M



A fully screened 25-way computer cable having 36-way Centronics-type male plugs on both ends. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc., but pins 15, 16, 17, 18, 20, 22, 24, 26, 28, 34 and 35 are not connected.

Order Code	Type	Price each
JC14Q	Cent36P/Cent36P Lead	£7.99

Centronics to Centronics M/F



A fully screened 25-way computer cable having a 36-way Centronics-type male plug at one end and a 36-way Centronics-type female socket at the other. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc., but pins 15, 16, 17, 18, 20, 22, 24, 26, 28, 34 and 35 are not connected.

Order Code	Type	Price each
JC15R	Cent36P/Cent36S Lead	£6.99

Centronics to Centronics M/F IDC

Union Brothers



A flat 36-way IDC ribbon cable having a polyester 36-way male Centronics plug at one end and a 36-way female Centronics socket at the other. Cable is 1.8m long.

Order Code	Type	Price each
JC16S	IDC Cent36P/36S Lead	£8.99

Printer Cable 26-Way



A 26-way ribbon cable, connected to a 26-way (2 x 13) way IDC socket at one end and a Centronics type plug at the other. Ideal for use with the BBC Micro. Length 1 metre.

Order Code	Type	Price each
FG30H	Printer Cable 1	£5.99

MSX Printer Cable

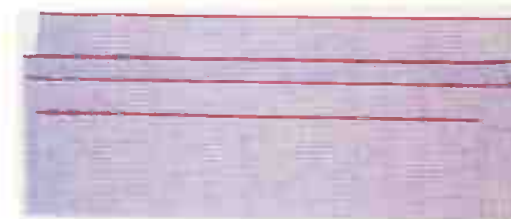


This cable comprises a cable 1 metre in length, and terminated in a 14-way Centronics type connector at one end and a 36-way Centronics type connector at the other end.

Order Code	Type	Price each
FV93B	MSX Printer Cable	£11.99

DATA CABLE

Insulation Displacement Cable 0.05in Spacing



Flat Cable for the 0.05in spacing IDC connectors in the Connectors Section of this catalogue, available in 16, 20, 26, 34, 40 and 50-way. The grey insulation has a red identifying strip along one edge. Sold per 30cm (approx 12in). Max. length in one piece 30m. Also available on 30m reels.

Order Code	Type	Price each
XR73Q	Flat IDC Cable 16way	26p
PA22Y	A2 30m Flat IDC 16way	£15.99
XR74R	Flat IDC Cable 20way	30p
PA23A	A2 30m Flat IDC 20way	£18.99
XR75S	Flat IDC Cable 26way	38p
PA24B	A3 30m Flat IDC 26way	£23.99
XR76H	Flat IDC Cable 34way	45p
PA25C	B4 30m Flat IDC 34way	£31.99
XR77J	Flat IDC Cable 40way	56p
PA26D	B4 30m Flat IDC 40way	£37.99
XR79L	Flat IDC Cable 50Way	72p
PA27E	D5 30m Flat IDC 50way	£44.99

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Colour Coded IDC Cable



Flat IDC Cable, colour coded as our Ribbon Cable. Available in 16-way, 20-way, 26-way, 34-way, 40-way and 50-way. Each wire has a coloured sheath and is spaced on a 0.05 inch pitch. Stranded cores are 7 x 0.127mm. The cable is manufactured to UL2697. Sold per 30cm (approx. 12in.) Max. length in one piece 30m. Also available on 30m reels.

Order Code	Type	Price each
XR80B	Clr Cd IDC Cable 16W	38p
PA39N	A2 30m Clr Cd IDC 16W	£29.99
XR81C	Clr Cd IDC Cable 20W	48p
PA40T	A2 30m Clr Cd IDC 20W	£36.95
XR82D	Clr Cd IDC Cable 26W	63p
PA41U	A3 30m Clr Cd IDC 26W	£46.99
XR83E	Clr Cd IDC Cable 34W	75p
PA42V	B4 30m Clr Cd IDC 34W	£59.99
XR84F	Clr Cd IDC Cable 40W	92p
PA43W	C5 30m Clr Cd IDC 40W	£69.99
XR85G	Clr Cd IDC Cable 50W	£1.16
PA44X	D6 30m Clr Cd IDC 50W	£84.99

4-Pair LAN Data Cable (20Mbps/s)

NEK Cables

This 4-pair cable is intended for use on high-speed LAN applications up to 16Mbps/s. The cable complies with the electrical characteristics of EIA/TIA TSB 36 Category 4, Nov. 1991. Each solid 0.51mm conductor has a polyolefin insulation, with all the pairs housed in a PVC jacket (4.8mm OD). There is no screening. **Manufacturer's Code 700508**



MHz	Attenuation dB/100m	Near end crosstalk dB
1	2.1	56
4	4.3	47
10	7.2	41
16	8.8	38
20	10.2	36

Characteristic impedance: 100Ω ±15
Mutual capacitance: 46pF/m
Available per metre or on 100m reels.

Order Code	Type	Price each
CW44X	20Mb LAN Cable Metre	42p
PB74R	E8 20Mb LAN Cab 100m	£34.99

4-Pair LAN Data Cable (100Mbps/s)

NEK Cables

This 4-pair cable is intended for use on high-speed LAN applications up to 100Mbps/s. The cable complies with the electrical characteristics of EIA/TIA TSB 36 Category 5, Nov. 1991. Each solid 0.51mm conductor has a polyolefin insulation, with all the pairs housed in a PVC jacket (4.8mm OD). There is no screening. **Manufacturer's Code 703108**



Electrical Properties @ 20°C

MHz	Attenuation dB/100m	Near end crosstalk dB
1	2.1	62
4	4.3	53
10	6.6	47
16	8.2	44
20	9.2	42
31.25	11.8	40
62.5	17.1	35
100	22.0	32

Characteristic impedance: 100Ω ±15
Mutual capacitance: 46pF/m
Available per metre or on 100m reels.

Order Code	Type	Price each
CW45Y	100Mb LAN Cabl Metre	45p
PB75S	100Mb LAN Cab 100m	£39.99

RS232 Multi-Pair Network Cable

NEK Cables

A range of flexible (stranded), multi-pair cables that are suitable for the interconnection of peripheral equipment and host computers, where local area networks are not in use e.g., low-speed data transfer.

Electrical Properties at 20°C

Pair conductance:	98pF/m @ 1kHz
Capacitance @ 1kHz:	164pF/m (between 1 cond. and other cond. connected to screen)
Attenuation 100kHz:	1.3dB/100m
Attenuation 1MHz:	7.3dB/100m

Mechanical Properties

Conductors stranded:	0.22mm ² TC
Insulation type:	SR-PVC
Overall screening:	Foil
Drainwire stranded:	0.22mm ² TC
Jacket type:	PVC
Temperature range:	-20°C to +80°C
Minimum bending radius:	8 x ODmm



Manufacturer's Code	No. of pairs	OD (mm)	Length	Order Code
49520	2	5.5	Metre	CW41U
49520	2	5.5	Reel	PB82D
49530	3	5.8	Metre	CW42V
49530	3	5.8	Reel	PB72P
49540	4	6.5	Metre	CW43W
49540	4	6.5	Reel	PB73Q

Available per metre or on 100m reels.

Order Code	Type	Price each
CW41U	2 Pair RS232 Metre	80p
PB82D	H15 2 Pair RS232 100m	£59.99
CW42V	3 Pair RS232 Metre	£1.10
PB72P	H15 3 Pair RS232 100m	£74.99
CW43W	4 Pair RS232 Metre	£1.20
PB73Q	H15 4 Pair RS232 100m	£89.99

Note for Network Users

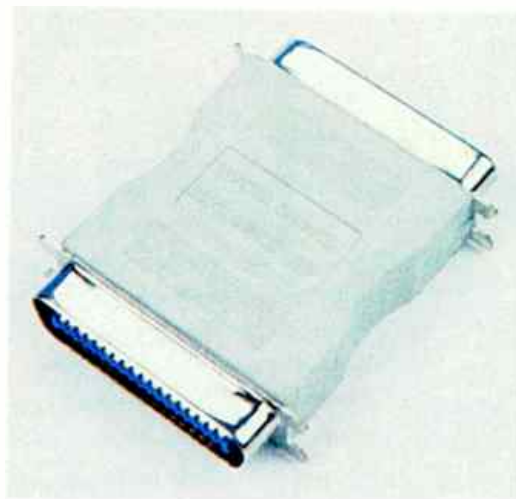
Don't forget that Maplin can also supply all the cable and connectors you need to make a 50Ω coaxial network link. The network comprises a common, continuous 50Ω feeder into which each network card connects by tapping-in using BNC connectors. The feeder must have a 50Ω terminator at each end to prevent reflections; the network card connections are NOT 50Ω impedance. Suitable items can be found in the Cables and Connectors sections.

These are:

PB15R	Low Loss Coax UR76H
CK06G	50Ω Terminator
JC23A	BNC Crimp Plug
YW03D	BNC-T Connector
HH18U	BNC Round Socket
CK05F	Insulated BNC Socket
CK08J	Insulating Boot
CK07H	Insulating Hood
CK01B	BNC 'Y' Connector

CONVERTERS AND TESTERS

36-way Centronics Gender Changers



Gender changers which allow quick conversion from a female 36-way Centronics to a male 36-way Centronics (M/M) or male 36-way Centronics to female 36-way Centronics (F/F).

Order Code	Type	Price each
JM51F	Cntrnx M/M Genchange	£4.99
JM52G	Cntrnx F/F Genchange	£4.99

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RS232 to RS422/RS485 Interface Converters



Two interface converters which individually provide full duplex interface conversion from RS232 to RS422 or RS485 standards respectively. All baud rates from 1200 up to 115,500 are also supported. Very low power, surface-mount CMOS circuitry is used and is powered entirely from the RS232 (host) interface. An external power supply is not required in most situations.

In use, each unit provides full-duplex (bidirectional) conversion between the conventional RS232 interface on one side, and the RS422 or RS485 interface on the other. Both RS422 and RS485 conventions use a twisted-pair of wires for each signal. RS422 provides full-duplex communication using two separate twisted pairs. This means that data can flow in both directions simultaneously. However, it is strictly intended for point-to-point communication only and cannot, in general be used for interconnecting more than two devices.

RS485 however, makes it possible to interconnect up to 32 devices, but it supports half-duplex communication only, i.e. data can flow in either direction, but only one direction can be used at any instant. It requires only one twisted pair and, to avoid contention, the driver of an RS485 interface must be specially designed to ensure that the driver can be enabled to transmit, or disabled to listen. Any apparatus which controls an RS485 interface must be able to enable the driver only at the correct time. Conversion between RS232 and RS485 is straightforward with this converter but requires the correct use of the RS232 RTS signal to control the RS485 driver. This means that, in order to properly use the RS485 converter unit, you must have a means of controlling the RTS output signal of your RS232 device.

Each unit will plug directly into an IBM PC 25-way serial port, and presents a 9-way, D-range male socket at the other end for the RS422/RS485 connection. Each unit is no larger than any other gender changer or adaptor.

Order Code	Type	Price each
RC06G	RS232-RS422 Convtr	£59.99
RC07H	RS232-RS485 Convtr	£59.99

Gender Changers 25-Way D-Type

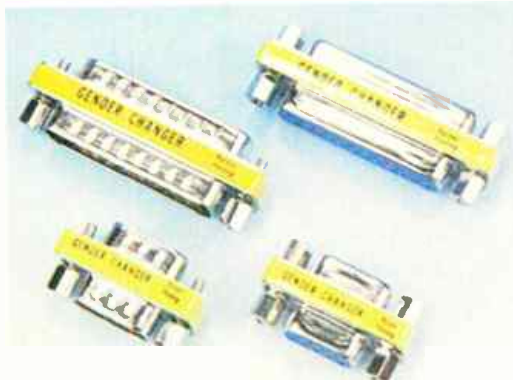
A gender changer which allows quick conversion from a female 25-way D-type socket to a male 25-way D-type plug (M/M type) or a male 25-way D-type plug to a female 25-way D-type socket (F/F type). Overall



Order Code	Type	Price each
YP87U	GenChange M/M RS232	£5.99
YP86T	GenChange F/F RS232	£5.99

Low Profile D-type Gender Changers

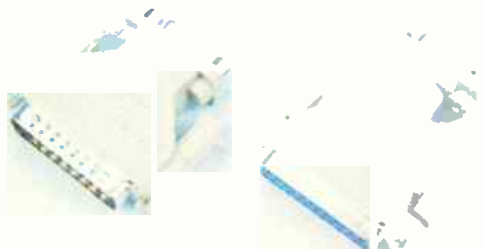
Gender changers which allow quick conversion from a female 25-way D-type to a male 25-way D-type (M/M) or male 25-way D-type to female 25-way D-type (F/F), including 9-way D-type M/M and F/F versions. These gender changers are extremely low profile, overall length 17.5mm (as opposed to 61mm for normal gender changers).



Order Code	Type	Price each
JM48C	L Prfl M/M 25W Gend	£3.99
JM49D	L Prfl F/F 25W Gend	£3.99
JW57M	L Prfl M/M 9W Gend	£3.49
JW58N	L Prfl F/F 9W Gend	£3.49

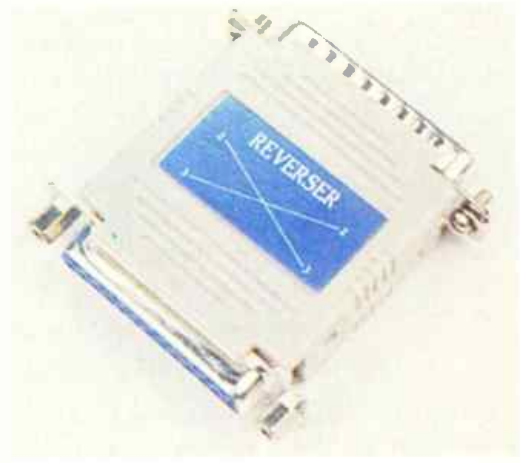
RS232 25-way D-type to 9-way D-type

Converters for use with serial RS232 equipment to allow connection between devices using 9-way and 25-way D-type connectors, e.g. IBM AT series machines. Two versions are available: 9-way female to 25-way female and 9-way female to 25-way male.



Order Code	Type	Price each
JM08J	9F/25M Changer	£4.99
JM50E	9F/25F Changer	£4.99

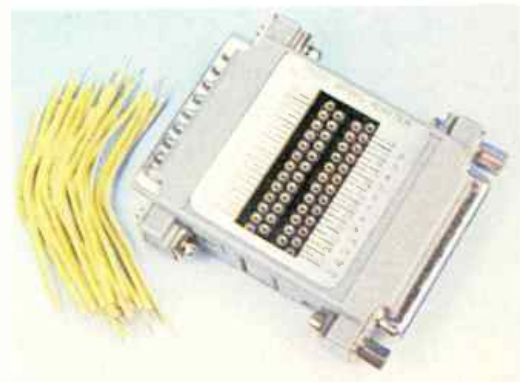
Reverser



An adaptor which links each pin with the exception of pins 2 and 3 (the transmit and receive data lines) which are reversed. The unit has a 25-way D plug on one end and a 25-way D socket on the other.

Order Code	Type	Price each
YP82D	Reverser RS232	£5.99

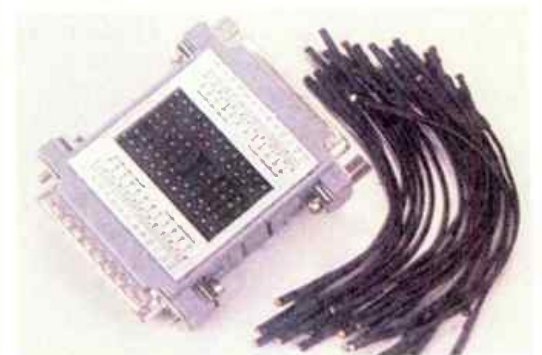
Wiring Box



The wiring adaptor permits any pin on one side to be connected to any pin on the other side of the adaptor (except protective ground, pin 1). The 48 patching sockets are gold-plated and 25 insulated wire links with stripped ends are supplied. The wire links are each approx. 50mm long. The unit has a 25-way D plug on one end and a 25-way D socket on the other.

Order Code	Type	Price each
YP79L	RS232 Wiring Box	£10.25

Wiring Adaptor



A 25-pin D-type, male to female wiring adaptor, enabling any one or more connections on one side to be connected to any one or more connections on the other side of the adaptor. Each connection is terminated at a pin with which socket-ended jumper leads can be used. In addition, four commoning strips of pins are provided for tying up to four separate connections together, from either side. Supplied with 25 jumper leads 90mm long. The unit has a 25-way D-type plug at one end and a 25-way D-type socket at the other.

Order Code	Type	Price each
JY39N	Wiring Box	£10.25

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Jumper Box

Optum



Contains a 25-way D plug at one end and a 25-way D socket at the other joined by a fibre glass pcb. Each line is connected to solder pads which may be linked together as required. Pin 1, protective ground, is connected to solder pads and linked through. 25 insulated wire links, each 50mm approx. long with stripped ends, are supplied. The unit is housed in a snap-shut plastic box.

Order Code	Type	Price each
YP78K	RS232 Jumper Box	£5.99

Null Modem



May be connected directly to equipment ports or between two cables to enable communication where a modem is not required, but equipment will not operate without the control of the modem. The unit has a 25-way D plug on one end and a 25-way D socket on the other. Pins 1 and 7 are connected straight through, pins 2 and 3 cross over, pin 4 is linked to pin 5 and crosses over with pin 8, and pins 6 and 20 cross over.

Order Code	Type	Price each
YP85G	Null Modem RS232	£5.99

Surge Protector

This unit protects your RS232 ports from the power surges and spikes generated by motors starting, lightning etc. Varistors protect pins 2, 3 and 7. The unit has a 25-way D plug on one end and a 25-way D socket on the other.



Order Code	Type	Price each
YP84F	Surge Protectr RS232	£6.99

Loopback Tester

A tester which links together pins 2 and 3, 4 and 5, 6 and 20, and 15 and 17. A bicolour LED is connected between each of the four loops and ground and they light to indicate the presence of positive or negative (or both) signals on each loop. The unit has a 25-way D plug on one end and a 25-way D socket on the other.

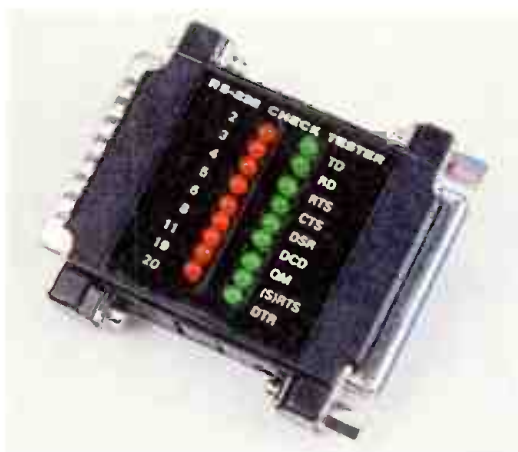


Order Code	Type	Price each
YP83E	Loopback Testr RS232	£7.99

Quick Tester

Optum

The tester has 9 red and 9 green LED's. The LED's light up red for positive and green for negative on each of 9 lines: pins 2, 3, 4, 5, 6, 8, 11, 19 and 20. Both LED's light if data signals are passing. The unit has a 25-way D plug on one end and a 25-way D socket on the other.



Order Code	Type	Price each
YP81C	Quick Tester RS232	£14.99

Mini Tester



The tester has seven bi-colour LED's connected to pins 2, 3, 4, 5, 6, 8 and 20. They light to indicate the presence of positive or negative (or both) signals on each line. The unit has a 25-way D plug on one end and a 25-way D socket on the other.

Order Code	Type	Price each
YP80B	RS232 Mini Tester	£9.99

RS-232 Break-Out Box



A portable, pocket sized, test set which provides access to all 25 conductors of the RS-232/V-24 interface between the data terminal and the data modem or other destination. Twenty four miniature (DIL) switches allow all interface conductors, except frame ground, pin 1, to be individually interrupted, allowing isolated testing and observation of data or control signals. Sockets on either side of each switch provide cross-patching and monitoring of signals via the small jumper cables, which can be stored under the cover. 50 signal powered LEDs show RS-232 polarity and permanently monitor all connections. No extra power required. Supplied with 20 jumper leads. The unit has one male and one female 25-way D-type connector, and comes in a tough, black plastic case with hinged lid. Dimensions closed: 90 x 83 x 25mm.

Order Code	Type	Price each
JY40T	Break Out Box	£29.99

CALCULATORS

Pocket Solar

Casio



A large 8-digit LCD, solar powered basic four function calculator. Includes three key independent memory, percentages, square roots, time calculation and a large + key. Complete with a handy wallet. Size: 109.4 x 66.4 x 6.9mm. Weight 35g.

Order Code	Type	Price each
BT11M	Casio SL300L	£5.25

Desktop Solar

Casio

Basic four-function calculator with large keys and an angled sloping display for desk-top use. The calculator operates from a solar cell which works perfectly in normal room light, or anywhere there's enough light to read by. Features include memory function, square root and percentage, and constant calculations, add-ons, discounts and mark-ups can be carried out. The 8-digit LCD display indicates the function in use as well as all usual functions. No batteries are required.

Size: 129.5 x 106 x 27mm.
Weight: 90g.



Order Code	Type	Price each
JK54J	Casio MS-70L	£8.99

Printing Portable

Casio



A compact printing calculator with a 10-digit LCD display. In addition to the four basic functions the calculator has a memory and percentage key for add-ons, discounts, mark-ups etc. There is a switch for floating decimal point, cut off or round off at 2 decimal places. The calculator has a flip-out print roll which enables you to switch from internal to external roll, and uses standard 58mm plain paper rolls and operates from an AC adaptor 4.5V DC, available separately, or four AA cells (supplied).

Size: 188 x 98 x 40mm excluding roll holder.
Weight: 298g including batteries.

Order Code	Type	Price each
YT53H	Casio HR-82LB	£22.99

AC Adaptor for Printing Calculators

A 4.5V DC mains adaptor suitable for use with YT53H and AG03D.

Order Code	Type	Price each
YT56L	Print Calc Adaptor	£6.99

Scientific FX-82LB

Casio



A 78-function scientific calculator with true algebraic logic (i.e. the formula can be entered in the same sequence as it is written) and up to six levels of parenthesis. Other features include a single key for display of kilo, mega, micro etc, fluent conversion between polar and rectangular coordinates, easy statistics through standard deviation function, and 3-mode angular measurements (degree, radian and grad). The calculator can perform fraction calculations, has keys for trigonometric and hyperbolic functions, logarithms, square and cube roots, squares, reciprocals and factorials, and there is a random number generator. There are 6 constant memories as well as the normal memory.

The liquid crystal display shows 8 digits with a 2 digit exponent. The calculator gives 9000 hours continuous operation from two alkaline AA cells supplied.

Size: 153 x 76 x 21.5mm.
Weight: 121g.

Order Code	Type	Price each
JK57M	Casio FX-82L	£7.99

MS-270L Desktop C-Power

Casio

NEW



Basic four function calculator with square root, percentage key and memory function. Large keys and an angled sloping 12 digit display make this calculator ideal for desk-top use. The calculator operates from a solar cell, which can power the calculator in normal room light. Should the available light level fall, then an internal battery provides sufficient power, and maintains the memory.

Power: Solar cell, with back-up battery(LR44)
Auto Power-Off: After approx 6 mins
Dimensions: 30(H)x110(W)x133(D)mm
Weight: 110g

Order Code	Type	Price each
AG05F	MS270LBK Calculator	£15.99

Printing Calculator HR-150LA

Casio

NEW



A slim-line printing calculator for desk-top use with a 10-digit display. In addition to the four basic functions, the calculator has a memory function and percentage functions for add-ons, discounts, ratios, mark-ups, mark-downs, profits etc. A switch is provided for floating or fixed 0, 2 or 3 decimal places with round-off. There is also an item counter, repeat function and an instant print key for use when the printer is switched off. The calculator uses standard 58mm plain paper rolls and operates from an AC adaptor 4.5V DC, available separately, or four AA cells (supplied).

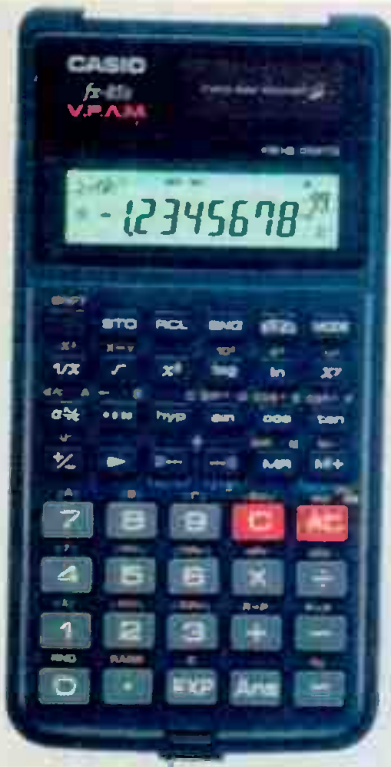
Dimensions: 53(H)x162(W)x214(D)mm
Weight: 464g

Order Code	Type	Price each
AG03D	HR150LA Printing Cal	£36.99

FOR CASHTEL
Phone 01702 552941

Scientific C-Power FX-85V

Casio



A 129-function scientific calculator with true algebraic logic (i.e. the formula can be entered in the same sequence as it is written) and up to six levels of parenthesis. Other features include a single key for display of kilo, mega, micro etc, fluent conversion between polar and rectangular coordinates, easy statistics through standard deviation and regression analysis, and 3-mode angular measurements (degree, radian and grad). The calculator can perform fraction calculations, has trigonometric and hyperbolic functions, logarithms, square and cube roots, squares, reciprocals and factorials, and there is a random number generator. There are 6 constant memories as well as the normal memory. The liquid crystal display shows 8 digits with a 2 digit exponent. The C-Power system combines solar power with battery back-up, allowing full operation (including memory retention) in any lighting conditions. Battery life is around 7 years in normal use (lithium battery GR927 included).

Size: 140 x 73 x 17.5mm.
Weight: 64g.

Order Code	Type	Price each
JK58N	Casio FX-85V	£13.99

Scientific C-Power FX115S

Casio

The latest version of this 252 function, scientific calculator operates at speeds up to 2.5 times faster than previous models. Binary, octal and hexadecimal calculations and conversions can be performed. The calculator uses true algebraic logic, where the formula can be entered in the same sequence as it would be written. Recall is possible from an independent memory and six constant memories, plus fast compounding and direct acceptance of all four basic functions. Parenthesis calculations up to six levels can be handled with ease. Also possible is fluent calculation between polar and rectangular coordinates, statistics from standard deviation function and regression analysis, and 3-mode angular measurements in degrees, radians and grads. The calculator can also produce a display in kilo, mega, micro etc. Unlike conventional solar calculators, C-Power models can be used even in total darkness. While solar powered in sunlight, a 6-year lithium battery GR927 is used where light is insufficient.

Weight: 114g.
Size: 24 x 77 x 153mm.



Order Code	Type	Price each
JK59P	Casio FX-115S	£14.99

Scientific Formulae FX5000F

Casio

A 288-function calculator including 128 scientific formulae built in. Formulae include resonant frequency, parallel resistance, time constant in RC circuit, power factor, voltage and current gain, Coulomb's law, power laws, magnetic force etc. After accessing the desired formula, alphabetic prompts appear on the display to let you know what variables require values.

The impedance calculation function permits composite impedance for AC circuits with parallel, serial or mixed resistors, coils and capacitors to be calculated along with deviation angle of composite impedance.

This unit has in addition to the 27 electronic and electrical formulae, 40 mathematical formulae, 9 statistical formulae and 17 mechanics formulae. A programming function allows you to enter up to 12 other formulae for long-term retention and built-in formulae can be copied to this memory area for editing into a different configuration.



The basic functions include trigonometric, hyperbolic, logarithmic, reciprocals, square cube and n roots, powers. Statistical functions include population standard deviation, sample standard deviation, arithmetic mean, etc. The calculator has 6 levels of

parenthesis with true algebraic logic. In addition the calculator has ten constant memories and 13 physical constants, and the statistics section includes regression analysis. A rounding function where you can set the number of significant digits is also included.

The liquid crystal display has two lines. The upper line is a 14-column dot matrix display for formulae and messages. The lower line has two dot matrix characters and a 10 digit mantissa and 2 digit exponent display. During formula execution the two dot matrix characters are used to form an interactive input system.

The calculator gives around 790 hours use from the CR2032 lithium battery included.

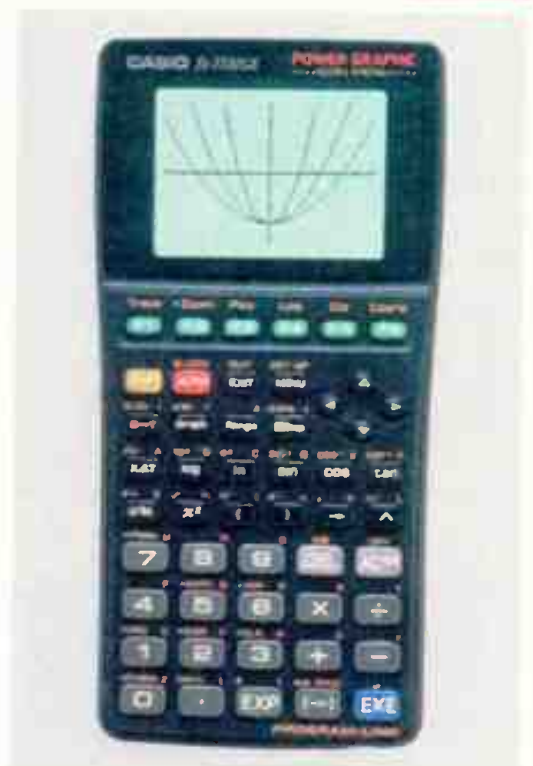
Size: 131 x 72 x 9.2mm.
Weight: 93g.

Order Code	Type	Price each
JK61R	Casio FX-5000F	£46.99

Power Graphic FX-7700GE

Casio

NEW!



The Casio FX-7700GE is a powerful scientific calculator featuring a 16 character by 8 line display, 475 functions, 38 programs and 528 memories.

Features include:

- ★ Icon menu mode selection
- ★ Graphic functions and graph mode
- ★ Graph analysis tools
- ★ Differentials and integrations
- ★ Simultaneous and Quadratic equations
- ★ Matrix operations
- ★ Base conversions/calculations
- ★ Standard deviation, Regression analysis
- ★ Data communications with Power Graphic or PC

Battery Life: 200 Hours on 4xAAA Batteries
Dimensions: 30(H)x91(W)x176(D)mm

Order Code	Type	Price each
AG06G	FX7700 Scientific Calc	£69.99

**PHONE BEFORE 5PM
FOR SAME DAY DESPATCH
01702 554161**
Access, Visa, American Express

Student Graphic Scientific Calculator FX-6300G

Casio

This model contains basic scientific functions and graphing capabilities that were selected to meet the needs of students. It provides students with the means to view actual graphs of formulas and equations, and additionally comes with fraction, Base-n and statistical capabilities. The calculator can be programmed to perform complex calculations at the touch of a key and once a calculation is performed, it can be recalled at the press of a key for modification or for input of new values. Formulas and functions can be entered just as they are written – the calculator automatically assigns priority according to the locations of arithmetic operations, exponents, functions and parenthesis. The calculator comes complete with 20 built-in scientific graphs that can be drawn at the touch of a key, and user generated graphs can be drawn simply by entering the function (formula) after pressing the 'graph' key. Four graphic analysis tools (trace, zoom, plot/line and graph scroll), help to pinpoint exactly the required information, right on the graph itself. Bar graphs and normal distribution curves for single-variable statistical calculations, and regression lines for paired-variable statistical can also be displayed. A 400-step program area provides plenty of room for storage of often repeated programs. Formulas are input just as they are written, without any special programming language. Up to 10 programs can be stored in memory simultaneously. The basic functions include negative numbers, exponents, parenthetical addition/subtraction/multiplication/division, trigonometric/inverse trigonometric functions (units of angular measurement: degrees, radians, grads), hyperbolic/inverse hyperbolic functions, logarithmic/exponential functions, reciprocals, factorials, square roots, cube roots, powers, roots, squares, decimal-sexagesimal, π , random numbers, absolute values, integers and fractions.



General Specification

Power supply: 2 x lithium batteries (CR2032)
 Battery life: 350 hours approx.
 Auto power off: 6 mins approx. after last key operation
 Dimensions: 142 x 73 x 10mm
 Weight: 84g.

Supplied with a slide-on hard case that fits over the back or front, for protection.

Order Code	Type	Price each
BT18U	FX-6300G	£34.99

Programmable Scientific Calculator FX-3900P

Casio



The FX-3900P is a powerful programmable scientific calculator that allows the user to perform calculations many times over with a range of values, by recording the keystrokes that are necessary to make up the calculation. The calculator has a two line dot matrix screen that allows programming, and editing of previously entered programs, to be viewed. Thus previously entered formulae, stored in the six constant memories, can be recalled after execution for viewing and editing and re-used at any time or programmed to be repeated over and over as often as is required. This is a full function unit with operators shown on the display and will calculate averages and standard deviation, logarithms, polar and rectangular conversions and register exchange, using engineering notation to display results. All trigonometric functions are supported, including hyperbolic and arc of all functions, operating in degrees, radians or gradients. The results can be converted to and from decimal, degrees, minutes and seconds. The unit supports calculations using up to 18 sets of parentheses over six levels with permutations and combinations; maths functions include square, square root, cube root, reciprocal, sign change, factorial and powers with Pi(π) held as a constant. Other features include: Linear regression; numerical integration using Simpson's rule; conditional jumps; memory retention when power is switched off; generation of random numbers; a rounding function that allows the fixing of the number of significant digits.

Specification

Power supply: 1 x CR2025 lithium battery (supplied)
 Battery life: 6,000 hours average
 Dimensions: 141 x 74 x 8.2mm
 Weight: 65g

Order Code	Type	Price each
RZ17T	Casio FX-3900P	£21.99

DATABANKS

Credit Card Data Calculator

Casio



A small data calculator with a Qwerty typewriter style key layout, that can store up to 50 items. Each item can be 8 characters and 24 numbers, maximum. Private information can be password protected. As well as normal calculator functions, there are conversion function memories that can be used for metric to imperial or currency conversions. Powered by one CR2025 lithium battery.
 Size: 100 x 64 x 7.7mm. Weight: 32g.

Order Code	Type	Price each
BT16S	Casio DC-200	£8.99

Pocket Size Data Bank

A pocket size LCD data bank with clock, telephone, directory with secret data area, and calculator mode. The upper line of the 2 x 12 character display consists of 5 x 5 dot matrix, and the lower line consists of 7 segment numeric characters. The internal memory of 445 characters allows approximately 26 data entries if 8 characters for name and 12 digits for telephone number are entered. The names and telephone numbers can be recalled by direct, sequential and repeat data search methods. Additional features include: 'secret' feature (up to eight characters) for security protection, 12/24 hour selectable time format, 10 digit calculator with single memory, 200 year calendar (1901-2099), and auto power off after 3 mins.

Specification

Power source: 1 x type 2016 3V lithium
 Battery life: Minimum 1 year
 Size: 106 x 63 x 8mm



Order Code	Type	Price each
CK60Q	Pocket Data Bank	£9.49

PHONE BEFORE 5PM FOR SAME DAY DESPATCH

Access, Visa **01702 554161** American Express

3-Line LCD Pocket Size Data Bank

A compact pocket size 3 line LCD data bank and organiser. The upper line consists of twelve 5 x 5 dot matrix, the middle line of twelve 8 segment numeric characters, and the bottom line of twelve 7 segment numeric characters. The 10k of memory stores over 200 names and numbers or over 100 appointments. The telephone and address directory stores name, company, address and two telephone numbers. Names and telephone numbers can be recalled by direct, sequential, or repeat data search methods. This feature packed data bank includes: appointment reminder with alarm (schedule), home date and time feature, daily alarm, world time for 32 cities, 'secret' feature for security protection of telephone data, 12/24 hour selectable time format, 10 digit calculator with single memory, direct or sequential search by name or company information, available memory feature and 'memory full' indication, selectable on/off key tone output, and auto power off after 6 minutes.



Specification
 Power source: 2 x 3V lithium battery
 Battery life: Minimum 1 year
 Back-up battery: 1 x 3V lithium battery
 Back-up battery life: Minimum 6 months
 Size: 113 x 73 x 8mm

Order Code	Type	Price each
CK61R	Pocket Organiser	£24.99

High Capacity Data Bank DC-7500

Casio



The DC-7500 is a personal data bank with a big, easy to read 3-line display and a keyboard layout identical to that of a standard typewriter. Press a key and you get access to a telephone directory, schedule keeper, world time, alarm function, a conversion function and a calculator. The telephone directory can hold approximately 500 entries. Data can be recalled either by scrolling through the data items, or by entering the first letters of the text entry required. A combined total of approximately 112 items may be stored in telephone

directory mode and schedule keeper mode. The conversion function can convert between two units of measurement or two monetary units. Eight data items are programmed in the memory of the unit, and user conversion memories are provided to let you program your own conversion units. The world time function shows the current time in any one of 29 time zones around the world. The home time zone includes both an hourly time signal and daily alarm.

A further feature is a 'Secret Area' that protects data from unauthorised access and requires a password to gain access.

Additional facilities include low battery indicator function; 12-digit arithmetic calculations; constant calculations, memory calculations; 24-digit approximations; percentage calculations; function command signs.

Specification		
Power supply:	Two lithium batteries (CR2032)	
Battery life:	Main and back-up Main battery 2 years approx. Back-up battery 1 year approx.	
Auto power off:	6 minutes approx. after last key operation	
Dimensions		
Unfolded:	151x118 x9.4mm	
Folded:	118 x 77.5 x 13mm	
Weight:	86g including batteries	
Order Code		
BT15R	Casio DC-7500	Price each £29.99

Pocket Digital Diary SFA10

Casio



The SFA10 is in the latest style of folding digital diaries, providing a large range of facilities in a compact, pocket-sized case. This digital diary is provided with a positive click-effect QWERTY keyboard, a large LCD and on-screen icons for ease of mode selection. Data management is easy with the integral search facilities that help to maintain schedules, memos and a telephone directory. Other features include six currency conversion memories and world time selectable from 29 zones for the world traveller, a daily alarm, a reminder facility and schedule alarm for those at the leading edge of business. This diary also has a communications link facility that allows it to communicate with other SFA10's.

Specification		
Display:	16 columns x 4 lines	
Memory capacity:	28,668 bytes	
Power supply:	2 x CR2032 lithium batteries (supplied)	
Battery life:	100 hours	
Dimensions folded:	120 x 82.5 x 12.7mm	
Weight:	88g	
Order Code		
RZ13P	A1 Casio SFA10	Price each £46.99

Pocket Digital Diary SF-4300A

Casio



- ★ Telephone directory
- ★ Schedule
- ★ Memorandum
- ★ Calendar
- ★ Reminder
- ★ Home and world time
- ★ Data transfer

The Casio SF-4300 is a truly pocket sized digital diary, packed with powerful useful features to help organise your day.

In addition to the standard diary functions, the unit features a Reminder Mode to help you keep track of events that occur once a year, month, or day. Simply input a reminder message, and you can program it to appear at any preset time.

Additional features include a tactile 'qwerty' keyboard, a confidential Secret function and a data transfer capability, enabling the SF-4300 to transfer data between two SF units or a personal computer.

Specification		
Display:	16 column x 4 lines LCD	
Memory Capacity:	32kB	
Battery Type:	3xCR2032	
Battery Life:	280 Continuous(Approx)	
Dimensions (folded)	12.4(H)x141(W)x80.5(D)mm	
Weight:	110g	

Order Code		
AG02C	SF-4300A Diary	Price each £56.99

Palm Top Digital Diary with Spreadsheet SF4600

Casio



The SF4600 is the very best in personal data management and features a positive click-effect QWERTY keyboard with a large easy-to-read LCD. Data management is simplified by the versatile search functions that can display the information you need in an instant. In addition to the telephone directory and

schedule keeper, this diary features calendar, world time, reminder, memo and calculator functions, plus the ability to exchange data with a personal computer or another diary. Six user-definable items allow you to record such things as birthdays, hobbies, or any other information, under separate search headings for quick recovery of the desired data. A 'secret' function, allowing data access only to those with the correct password, is available to protect private information. The world time function provides access to the current time in 29 time zones.

Specification

Display: 16 column x 4 line
 Memory capacity: 64Kb
 Main component: LSI
 Power supply: 3 lithium batteries (CR2032) (supplied)
 Power consumption: 0.05W
 Battery life: 240 hours approximately
 1 year for memory back-up
 Auto power off: If unused for 6 minutes

Dimensions

Unfolded: 141 x 157 x 8.9mm
 Folded: 141 x 80.5 x 12.4mm
 Weight: 110g

Order Code	Type	Price each
RZ16S	Palm Top SF-4600	£59.99

Fax your orders to:
01702 553935

Digital Diary and Personal Organiser SF9600

Casio



This unit features 64kB of on-board memory, and a 32-column by 6-line liquid crystal display allows information to be easily viewed and edited. The Digital Diary provides a business card library, storing company name, personal name, position, telephone number, etc. Data is automatically sorted into alphabetical order for easy reference. Another feature is the telephone directory, providing apart from the usual name, telephone number and address information, data on birthdays, hobbies, etc., can also be stored. A memo function allows all types of information to be entered with speed for ready access, the information held can be easily recalled, edited and updated. The large screen displays two calendars simultaneously, and days that have been scheduled using the schedule keeper function are automatically marked. Timetables can be displayed to show schedules for particular week or day. Schedule alarms can be preset to warn of the approach or arrival of an appointment, each item can be preset with its own independent alarm. Home time and world time can be displayed in the time function mode. Personal and private data can be stored under the protection of a password to ensure only you can access it.

DIGITAL DIARY SF-8500 WITH 3D SPREADSHEET Casio **NEW**

- Spreadsheet
- Telephone directory
- Business card
- Schedule keeper
- Memorandum
- Calendar
- Home and world time
- Data communication



The Casio SF-8500 is a powerful personal organiser with many features to help you organise your day. Apart from the normal calendar and business card, the SF-8500 features world time and a powerful spreadsheet. Now complex data, previously the domain of a desktop PC can be carried in the palm of your hand, since the Lucid 3-D® spreadsheet is Lotus 1-2-3® compatible. Data can be transferred between the SF-8500 and any other SF unit or, using the optional interface unit, a PC.

The SF-8500 has a fast, easy to use tactile keyboard, and large 32 column by 6 line LCD display. The case is attractively contoured and will easily fit the slimmest pocket. Supplied with batteries, and comprehensive instruction manual.

Specification

Display: 32-Column x 6-Line LCD
 Memory capacity: 64kB for spreadsheet
 Battery type: 2 x CR2032, 1 x CR2032 as backup
 Auto power off: Approx 6 mins after last operation
 Dimensions: 18 x 154 x 78mm
 Weight: 152g

SUPERB VALUE!
£129.99 AG04E

Specifications

Display: 32-column by 6-line LCD
 Memory Capacity: 56,006 bytes
 Power Supply
 Main: 2 x CR2032 lithium batteries
 Backup: 1 x CR2032 lithium battery
 Battery Life
 Main: 85 hours
 Backup: 12 months
 Auto Power Off Time: 6 mins after last key operation

Dimensions

Unfolded: 172 x 167 x 10mm
 Folded: 85 x 167 x 20mm
 Weight: 164g with batteries

Order Code	Type	Price each
YZ57M	Digital Diary SF9600	£129.99

Did You Know?

Charles Babbage (1791 to 1871) was a prolific writer, inventor, mathematician, philosopher, scientist, mechanical engineer and industrial manager. The Government of the day gave him money to build his 'difference engine' - the first computer. However, he lost interest in the machine, and started work on a better machine - the 'analytical engine'. Unfortunately, he failed to complete this machine as well, and died a disappointed man.

COMPARE OUR PRICE & QUALITY – SAVE MONEY TODAY!

Palm Top Digital Diary with Spreadsheet SFR20

Casio



The SFR20 is a digital diary that puts computer processing power into the palm of your hand. The big 40 column by 10 line display allows you to view more of your data at a glance and, of all the functions provided on this unit, you will find this most useful with the spreadsheet. This function puts the diary streets ahead of its rivals and is data compatible with the popular LOTUS 1-2-3 PC Spreadsheet. Data can be transferred between an IBM compatible computer and the digital diary, or any digital diary, using the comprehensive data communication facilities provided. The spreadsheet size is 9,999 rows by 254 columns maximum, and is 3-dimensional with any cell in any file. There are eight built-in templates, including balance sheet and amortisation table, plus a wide selection of mathematical and data processing functions. Other features of the diary include: telephone directory; business card file with auto sort; schedule file; schedule alarm; a 199 year calendar; memo file; free file; 'to do' list; reminder with alarm; home and world time; secret password protection.

Specification

Display: 40 column x 10 line
 Memory: 256Kb
 Power supply – main: 2 x AAA batteries (R03 or LR03)
 – back-up: 1 x lithium battery (CR2032) (supplied)
 Battery life – main: 120 hours
 – back-up: 200 hours
 Auto power off: If unused for 6 minutes

Dimensions

Unfolded: 180 x 180 x 11.6mm
 Folded: 180 x 97.3 x 20.9mm
 Weight: 280g

Order Code	Type	Price each
RZ15R A1	Casio SFR-20	£199.99

Digital Diary with Icon Display SF8350

Casio

A feature packed digital diary with a wide 32 x 6 line display, and a 64k memory that allows approximately 2700 telephone numbers to be stored. A unique feature of this digital diary is the multi lingual message capability. All display messages can be produced using any one of nine different languages (English, German, French, Italian, Spanish, Swedish, Polish, Czech, Hungarian). Built-in functions include: business card management function for storage of company name, title, fax number etc.; schedule function with timetable display, and any two month calendar display (between Jan. 1901 - Dec. 2099) with any day's schedule being recalled from calendar display; a clock with world time function and scrolling world map to fix world time location; a daily alarm and schedule alarm; reminder function for anniversaries etc.; telephone



function, memo function, letter memory, secret function, edit function, and auto display. A novel feature is the use of graphic icon symbols which make operations easier to understand and use. The diary uses two CR2032 lithium batteries for the main power source and one CR2032 for memory back-up.

Size
 Unfolded: 155 x 152 x 10.5mm
 Folded: 152 x 78 x 18mm
 Weight: 153g

Order Code	Type	Price each
BT09K	Casio SF-8350	£99.99

MINIATURE FM RADIO

This miniature, auto-tuning, FM radio receiver is a product of state of the art miniaturisation and produces a quality of reception that is normally only expected from radios many times its size. This little radio is provided with an 'on/off' switch, a 'seek' button and a 'reset' button and a pair of earphones, attached to 800mm of cord, that also doubles as the aerial. The 'seek' and 'reset' buttons are used for tuning. To operate, the 'reset' button is pressed once. This sets the frequency at the low-end of the tuning range (i.e. 88MHz).

Then the 'seek' button is pressed once for each station that is automatically tuned in to, until the desired station is found. If you have a favourite station, then tuning in is not required every time the radio is switched on, as the last station selected is always remembered when the power is switched off.



GREAT VALUE!
£14.99
 CJ05F

Specification

Frequency range: 88MHz to 108MHz (FM)
 Power source: 1 x 3V lithium button cell Type CR2032 or equivalent (supplied)
 Dimensions: 36 x 26 x 10mm
 Weight: 23g

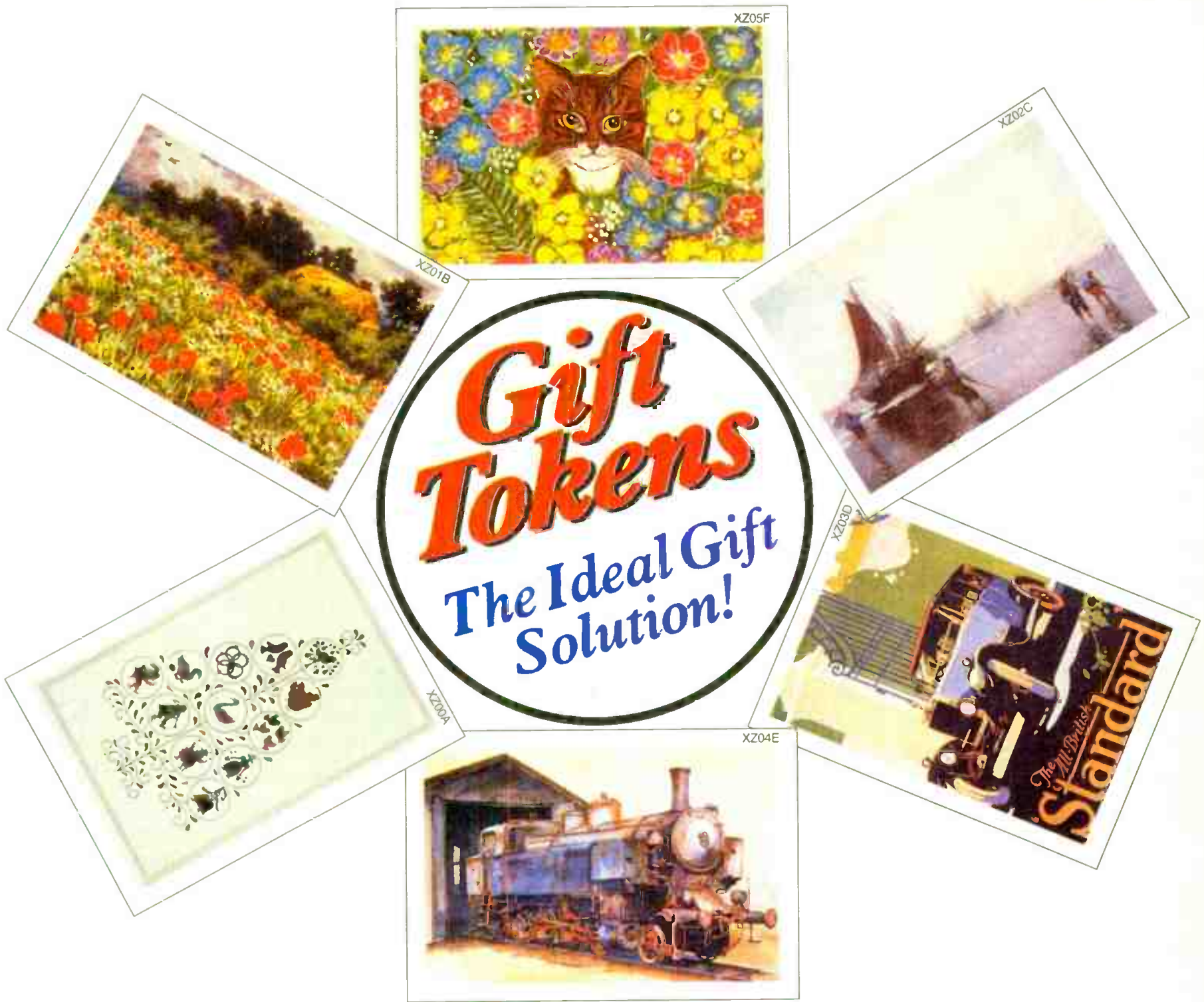


BS 5750 Part 2 1987
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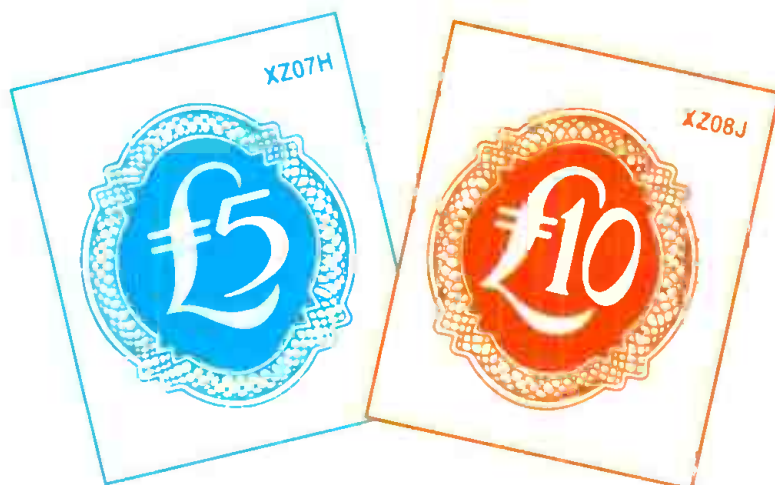
Each Gift Card is approximately 15cm (6in.) x 20cm (8in.) and is printed in full colour and costs just 30p each (with envelope). Maplin GIFT TOKENS are available in £5 and £10 denominations and can be ordered by mail or purchased direct from one of our many shops.

Please Note: There is no handling or

postage charge when ordering cards or tokens. normal charges apply when tokens are redeemed.

Maplin GIFT TOKENS cannot be refunded for cash. The voucher is not transferable to any other retail outlet other than Maplin Electronics.

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298 • TEST GEAR

25 METERS & MULTIMETERS

27 OSCILLOSCOPES

26 ELECTRICAL & TEST EQUIPMENT

28 BENCH POWER SUPPLIES



The Test Gear section is packed with the most advanced equipment, including the highly regarded Precision and White Gold ranges of multimeters. From highly specified oscilloscopes to robust, high current power supplies, Maplin can supply all your test equipment needs.

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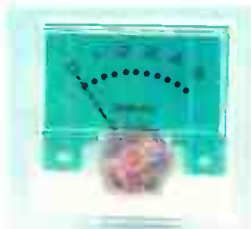
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MOVING COIL METERS

Signal Strength Meter

A square-faced signal strength meter which may be back-lit to show up a green scale. Scale is marked 'Signal' and 0 to 5 for calibration.



Sensitivity: 250µA FSD
Internal resistance: 675Ω ±5%
Dimensions: 40 x 40 x 29mm

Order Code	Type	Price each
LB80B	Sig Strength Meter	£3.49

Dual VU Meter



Two VU meters marked 'R' and 'L' for use with stereo equipment. The meter may be back-lit to illuminate green and red scale. Scale is marked from -20 to 0dB in green, then 0dB to +3dB in red.

Sensitivity: 150µA at 0dB,
280µA at FSD
Internal resistance: 100Ω
Dimensions:
Overall: 80 x 40 x 23mm deep
Scale: 45 x 36mm
Scale is raised by 2mm

Order Code	Type	Price each
YQ47B	Dual VU Meter	£6.99

5A DC Meter

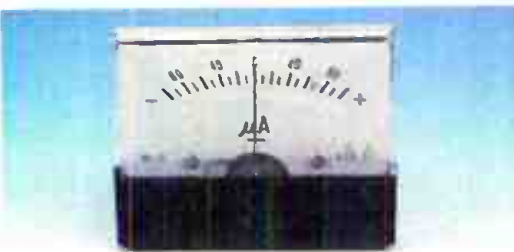
A neat, clear 5A DC meter, ideal for car battery chargers, or high current power supplies. The scale is colour graded for easy reading; blue from 0 to 2.5A, green from 2.5 to 3.5A and red from 3.5 to 5.5A. Connections are by 1/2in. Lucar style push-on receptacle (HF10L).
Overall size: 56 x 48 x 35mm.
Scale size: 50 x 28 x 4mm (raised).



Order Code	Type	Price each
BZ32K	5A DC Meter	£2.99

Rectangular Meters

A range of modern styled panel meters with snap-on plastic covers which can be removed to change scales or to fit scale illumination bulbs (please note that we cannot supply alternative scales). Plastic cover has a black lower portion with zero adjuster. The movement is wired to the larger pair of terminals at rear which include solder tags retained by M2.5 screws.



Front face size: 60 x 46mm
Overall depth: 42mm
Panel cut-out: 38mm (1.5in.)
Accuracy: 2%

The following types (full scale deflection: FSD) are available.

FSD	Internal resistance	Scale marked
100-0-100µA DC	2200Ω	In 10µA steps
50µA DC	4300Ω	0 to 50µA in 1µA steps
100µA DC	3750Ω	0 to 100µA in 2µA steps
1mA DC	400Ω	0 to 1mA in 20µA steps
100mA DC	0.8Ω	0 to 100mA in 2mA steps
1A DC	0.1Ω	0 to 1A in 20mA steps

Order

Code	Type	Price each
RW98G	2inPn Mt 100-0-100uA	£5.99
FM98G	2in. Pan Meter 50uA	£5.99
RW92A	2in. Pan Meter 100uA	£5.99
RW94C	2in. Pan Meter 1mA	£5.99
RX33L	2in. Pan Meter 100mA	£5.99
RX350	2in. Pan Meter 1A	£5.99

Scale Illumination Lamps

A pair of wire ended bulbs designed to operate at 6.3V. To use the bulbs with the rectangular or large meters, remove the snap-on front cover. Carefully remove the scale, at all times avoid damaging the needle and do not lose the two small screws.



For 6V Operation

Strip and solder the ends of four short lengths of fine gauge flexible wire of 1mm or less outer diameter, e.g., light duty connection wire. Slide 1 1/4in. lengths of 1mm sleeving over each to insulate the bulb wires. Secure each bulb into one of the holders provided either side of the zero adjuster arm using a drop of adhesive similar to Bostik, Evostik etc. Carefully run each pair of wires from each bulb to the top rear of the meter body, and push them through the hole at each small solder tag at the rear. Trim to length and strip and solder the wires to the centre of each solder tag, make sure both lamps are wired in parallel across the two tags. Make sure the lamps do not foul the needle, meter movement or front cover. Replace front cover. To use, apply 6V AC or DC to the small pair of rear terminals on the meter.

For 12V Operation

Procedure is identical to above except that only two 1mm wires are needed and the bulbs are connected in series across the two solder tags. To use apply 12V AC or DC to terminals.

Current consumption, each bulb: 45mA @ 6V
Dimensions: 10mm x 4mm dia.
Lead length: 20mm

Order Code	Type	Price each
YJ97F	Illuminating Kit	£1.25

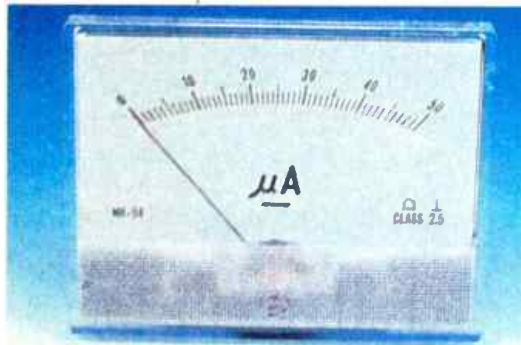


PHONE BEFORE 5PM FOR SAME DAY DESPATCH

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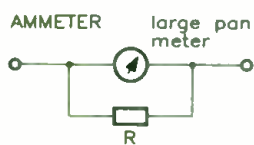
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KEY CALL
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Large Meters



Large moving coil panel micro-ammeters having a 4in scale length. Calibrated 0-50 or 0-100, but front plastic cover unclips to facilitate fitting different scales to your design. (Please note that we do not stock spare scales). Dimensions: 110 x 82 x 46mm deep. Internal resistance 50µA: 4300Ω; 100µA: 3750Ω. To convert these meters to read larger currents use the following formula:

$$\frac{x}{\text{FSD required (in amps)} - (y \times 10^{-6})} = R$$



To convert this meter to a voltmeter use the following formula:

$$\left(\frac{\text{Full scale voltage required (V)}}{y \times 10^{-6}} \right) - r = R_2$$

where R is the resistance required directly across the meter; R₂ is the resistance required in series with either lead; x is 0.215 for the 50µA meter and 0.375 for the 100µA meter; y is 50 for the 50µA meter and 100 for the 100µA meter; and r is 4300 for the 50µA meter and 3750 for the 100µA meter.

Order Code	Type	Price each
RX54J	50uA Lrge Pan Meter	£8.49
YJ96E	100uA Lrge Pan Meter	£8.99



BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750



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MOVING IRON METERS

A range of modern styled panel meters which have a transparent plastic cover and a white base. The coil is exposed at the rear and a set zero adjustment is not provided.



The following types are available.

Range	Internal Resistance	Scale marked
2V to 15V	58Ω	0 to 2V then to 15V in 0.5V steps.
0.5A to 5A	0.028Ω	0 to 0.5A then to 5A in 0.1A steps.
2A to 15A	0.004Ω	0 to 2A then to 15A in 0.5A steps.
4A to 25A	0.0018Ω	0 to 4A then to 25A in 0.5A steps.

Front face size: 69.4 x 53.4mm
Overall depth: 29.1mm
Panel cut-out: 40mm diameter
Accuracy: ±5%

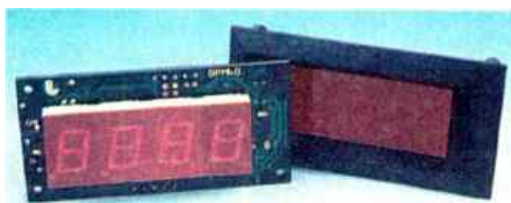
Suitable for AC or DC operation.

Order Code	Type	Price each
RX92A	Meter MI 15V	£12.89
RX90X	Meter MI 5A	£12.89
RX91Y	Meter MI 15A	£12.89
RX93B	Meter MI 25A	£14.49

DIGITAL PANEL METERS

LED Type

A compact low-cost LED Digital Panel Meter having a high brightness display. The meter is fitted with high efficiency 11mm LEDs and is supplied with a circularly polarised red filter and bezel giving a high contrast display. Auto-zero, auto-polarity, programmable decimal points and 200mV fsd are standard features and the meter may be easily programmed by the user to read volts, current etc. May be used in single-ended or differential mode, or to measure floating inputs.



Specification:
Accuracy (±1 count): 0.05% typical (0.1% max.)
Linearity: ±1 count
Sample rate: 3 per second
Temp. stability: 150ppm/°C
Temp. range: 0°C to 50°C
Supply voltage: 5V (5.5V max.)
Supply current: 100mA (200mA max.)
Max. DC input voltage: ±20V
Input impedance: 100MΩ
Overall dimensions: 72 x 36 x 27mm deep
Panel cut-out: 68 x 33mm.

Supplied with connectors, bezel, mounting hardware and full instruction sheet.

Order Code	Type	Price each
FM85G	LED Panel Meter	£33.75

THE BEST
OF SERVICE

10mm LCD Type



A uniquely compact LCD DPM with pins designed to plug directly into a 28-pin DIL socket. The meter may be panel mounted using the separate snap-in bezel (supplied). The low profile bezel incorporates a flat reverse-printed window giving a superb appearance. The meter features auto-zero, auto-polarity, 200mV FSD, 10mm digit height and programmable decimal points. On board solder pads for essential interconnections make selection of operating mode quick and easy with the minimum of external wiring. Very low current consumption allows long battery life. A whole range of useful annunciators are available on separate pins.

Specification:

Accuracy (±1 count): 0.05% (0.1% max)
Linearity: ±1 count
Sample rate: 3 per second
Temperature stability: 100ppm/°C
Temperature range: 0°C to 50°C
Supply voltage: 7.5V to 15V (9V nom.)
Supply current: 150µA
Max DC input voltage: ±20V
Input leakage current: 1pA (10pA max.) (V_{in} = 0V)
Low battery threshold: 7.5V
Overall dimensions: 40 x 20 x 7mm thick
Pin length: 4mm
Display area: 33 x 13mm
Bezel dimensions: 48 x 24mm
Panel cut-out: 45 x 22.2mm

Supplied with detailed instructions.

Order Code	Type	Price each
FD89W	10mm LCD DPM	£26.50

12.5mm LCD Type



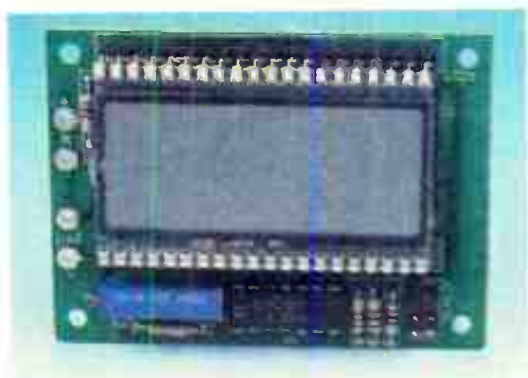
A uniquely compact LCD DPM designed to plug directly into a 40-pin DIL socket. The unit is pin-compatible with the 7106/26/36 range of IC's and can be used to directly replace the separate parts otherwise required. The meter may be panel mounted using the separate snap-in bezel supplied. The low profile bezel incorporates a flat reverse-printed window giving a superb appearance. The meter features auto-zero, auto-polarity, 200mV FSD, 12.5mm digit height and programmable decimal points. On board solder pads for essential interconnections make selection of operating mode quick and easy with the minimum of external wiring. Very low current consumption allows long battery life. A whole range of useful annunciators are available on separate pins.

Electrical specification as 10mm type left except:

Overall dimensions: 52 x 25 x 7mm thick
Pin length: 4mm
Display area: 45 x 16mm
Bezel dimensions: 60 x 30mm
Panel cut-out: 57 x 27mm
Supplied with detailed instructions.

Order Code	Type	Price each
FD88V	12.5mm LCD DPM	£26.50

Digital LCD Volt Meter



A compact, low cost digital volt meter (DVM) which consists of a PCB based module for mounting in existing equipment, behind a front panel or for making a dedicated voltmeter type instrument. The LCD is 3½ digits with a digit height of 13mm. The input is up to 200mV with a full scale at ±199.9mV with an accuracy of ±0.1% +1 digit. The module is capable of performing both digital voltmeter and ammeter functions, depending on how the input is configured with extra resistor chains (examples are shown in the instructions supplied). Applications can include custom power supply monitoring and other specialised voltmeter and ammeter uses. Input power is in the range of 9 to 12V DC and can be from battery or power supply.

The panel meter uses 7106 IC which is a high performance, low power CMOS device and specifically designed as a 3½ digit analogue to digital converter. Input impedance is extremely high, making it very easy to calculate resistor chain values without any danger of neglected input impedance introducing errors. An on-board preset can be used to precisely calibrate the circuit against incoming voltage levels.

Specification

Input impedance:	1,000MΩ
Accuracy:	±0.1% + 1 digit
Measurement range:	±199.9mV
Resolution:	100µV
Indication method:	LCD
Power supply:	9 to 12V DC
Current drain:	1mA typical
Operating temperature range:	0°C to 60°C

The module measures just 70 x 50 x 15mm high and has four M3 fixing holes at the corners on 58 x 39mm.

Order Code	Type	Price each
GW01B	DVM Meter Module	£11.99

PROBES AND TEST LEADS

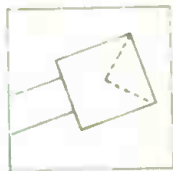
Spring Contact Probes

The CSP contact probes have nickel-plated copper barrel with a gold-plated beryllium copper plunger, extended through the barrel to produce the solder tag. A stainless steel spring provides tension to the plunger enabling the tip to make good contact with the point under test. Current capability is 3A continuous.

Concave Type



The CSP-2A contact probe has a non-slip concave conical tip, ideal for use on solder joints and similar surfaces.

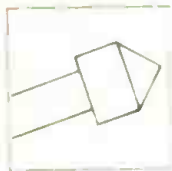


Order Code	Type	Price each
L199H	Concave Probes 2A	80p

Convex Type



The CSP-2E contact probe has a convex conical tip, with a small surface area, ideal for use on fine pcb tracks, solder joints and plated-through holes.



Order Code	Type	Price each
UM00A	Convex Probes 2E	80p

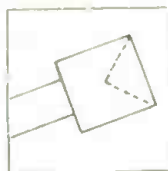
P-Series PCB Test-Jig System Contact Probes

The contact probes are 25mm long, gold sleeved pins which contain a spring loaded tip. When the PCB to be tested is fitted into the jig, the sprung contact tips will press against the preselected PCB solder pads. The range of probes include conical, hollow cylindrical and toothed cylindrical tips. The P-2 series are designed to be mounted into the insulated base board of a test jig which includes the PCB edge securing clamps (see below), and has different pin sizes. Type R-2V-2 is 0.64mm diameter, and the circular pin receptacle type R-2VC has a diameter of 1.46mm. The probes have a current rating of 3A continuous. The contact resistance is less than 50mΩ.

Concave type



Cylindrical tip with a concave centre, used for connection to a soldered component lead on a PCB pad.

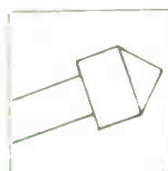


Order Code	Type	Price each
UM01B	Concave Probes	80p

Convex type



Convex cylindrical tip, used for connection to plated through holes, eyelets and open unused pads.



Order Code	Type	Price each
UM02C	Convex Probes	80p

Toothed type



Cylindrical tip with small teeth on top, used for connection to short component leads. The teeth provide positive electric connection.



Order Code	Type	Price each
UM03D	Toothed Probes	80p

Square receptacle



A square pin projection receptacle for holding the above probes. Fits into a 0.5mm hole.

Order Code	Type	Price each
UM04E	Square Receptacle	42p

Circular receptacle



A circular pin projection receptacle for holding the above probes. Fits into a 1.5mm hole.

Order Code	Type	Price each
UM05F	Circular Receptacle	38p

Printed Circuit Board Clamps



A plastic moulded clamp for holding printed circuit boards of up to 3mm max. thickness. The clamp can also be screwed onto a board as part of a jig assembly for testing purposes. The clamp has been designed to be used with the various contact probes, so the PCB sitting on the probes with the clamps holding the board in place. A lever with a thumb platform allows the PCBs to be removed with ease, whilst a wide base enables the user to screw the clamp into the desired position.

Base measures:	34 x 25mm
Height to PCB level:	12mm
Total height:	30mm

Order Code	Type	Price each
KU16S	PCB Clamps	99p

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Miniature Probe Clips



Ideally suited for use with our extra flexible wire, these probe clips feature a spring-loaded wire hooked probe which retracts into the probe moulding. Two types are available. The 43mm type is available in black, blue, green, red, white or yellow and the 57mm type in black, green or red. Probe material is phosphor bronze plate 0.3mm thick on small and 0.4mm thick on larger type. Housing is nylon. Sold individually.

Dielectric strength: 2kV for 1 minute
Insulation resistance: >100MΩ at 500V DC

Dimensions

	43mm	57mm
Length	43mm	57mm
Cap diameter	8mm	13mm
Cap stroke	3.5mm	4mm
Probe tip	2 x 3mm	2.8 x 4.6mm
Wire entry hole	2.2mm	3mm
Probe length	24mm	40mm

Order Code	Type	Price each
FE16S	Sub-Min Probe Black	49p
FE17T	Sub-Min Probe Blue	49p
FE18U	Sub-Min Probe Green	49p
FE19V	Sub-Min Probe Red	49p
FE20W	Sub-Min Probe White	49p
FE21X	Sub-Min Probe Yellow	49p
YX57M	Min Probe Black	60p
YX59P	Min Probe Green	60p
YX60Q	Min Probe Red	60p

Probe Clip Sets



Sets of the sub-miniature and miniature probe clips described above previously. Each set contains twelve probe clips, two of each colour, black, blue, green, red, white and yellow. Each colour pair is connected together by a wire of the same colour such that the set contains six different colour test leads. Leads are 500mm long tip to tip.

Order Code	Type	Price each
FA96E	S-Min Probe Clip Set	£6.99
FE22Y	Min Probe Clip Set	£7.99

Probe Clip

Deltron



Probe with a positive spring-loaded hook grip for use in confined spaces. Fully insulated, with acetal mouldings and gold-plated contact. Screw or soldered connections. One red and one black. Supplied in pairs only. Overall length 83mm.

Order Code	Type	Price each
HF21X	Probe Clips	£1.49

Solderable Test Prods



A pair of test probes with plastic body, one red and one black, which can be unscrewed so that a cable can be soldered into the threaded well of the tip. Together with the required wander plugs or crocodile clips, and using preferably extra-flexible wire, it is possible to make up your own test leads to your own specifications. The prods have 27mm long tips with 100mm long x 10mm diameter handles.

Order Code	Type	Price each
FK32K	Solder Test Prods	99p

Test Probe Leads

Moulded 2mm



A red and black test lead pair. Terminated in 2mm plugs to suit many multimeters etc. Other end terminated in heavy duty moulded PVC test prods. Heavy duty extra-flexible PVC covered wire 750mm long.

Order Code	Type	Price each
HF32K	Moulded Test Probe	£1.29

Moulded 4mm



A red and black test lead pair. Terminated in moulded 4mm plugs with 4mm socket in the plug. Other end terminated in heavy duty moulded PVC test prods. Heavy duty extra-flexible PVC covered wire 850mm long.

Order Code	Type	Price each
HF33L	4mm Test Probe	£1.99

Silicone Rubber 4mm Safety Test Leads



Suitable for use with analogue and digital multimeters the safety lead set comprises black and red test lead assemblies in a plastic wallet. The test prods are permanently attached to silicone rubber covered leads and for added safety the plugs have spring loaded shrouds. The prods have insulation piercing tips with an integral 4mm plug which in addition to normal probe use enables it to be conveniently plugged into a 4mm socket.

Order Code	Type	Price each
FS95D	Safety Lead 4mm	£6.49

Probe to Croc Clip Leads



A red and black pair of test leads with a 57mm probe clip at one end and a 35mm crocodile clip at the other. Each lead is 1m long tip to tip. Crocodile clips have a vinyl sleeve 42mm long red and black to match wire and clip. Sold only in pairs.

Order Code	Type	Price each
FE23A	Probe/Croc Clip Lead	£2.75

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Test Lead Kit



A universal test lead kit comprising one red and one black extra-flexible lead 1m long, and terminated in either a 4mm plug at one end and a test prod at the other, or any combination of terminators; the test prod having a 27mm long tip in a 86mm long x 9mm diameter handle. The 4mm plugs can be plugged into one of three alternative terminations comprising 4mm (minimum) space terminals, 38mm long crocodile clips (maximum gape 8mm), or 20mm long x 2mm diameter needle point plugs, all red/black colour matched pairs.

Order Code	Type	Price each
FK21X	4mm Test Lead Kit	£2.99

Logic Probe



A high quality logic probe for use with TTL, DTL and CMOS IC's. The probe has a memory function which can detect the occurrence of single pulses or logic level. One shot and low repeat rate narrow pulses which are nearly impossible to see even with a fast scope, are easily detectable and visible. The probe has three LED's, red for high logic level, green for low logic level and yellow for pulse. The intensity of the pulse LED is directly proportional to the duty cycle of the signal observed. All single pulses or pulse trains are recognised from 30ns up to 500ms. The probe is supplied with approx. 500mm lead terminated in a red and black probe clip. In use the red clip should be connected to the positive of the circuit under test, and the black to the negative. When making the connection, the yellow LED may blink once or twice, but if it continues to blink, the power supply has excessive ripple. With the switch in TTL position a +5V supply must be used, but in CMOS position voltage may be between +3V and +18V DC.

Pulse Detector: High speed pulse train or single events (+ or - transitions) activate 500ms pulse stretcher. In memory position, first transition lights and latches LED.

Detection Levels

Logic Lights	LED	DTL/TTL	CMOS
1	Red (Hi)	>2.3V ±0.2V	>70% of V_{cc} ±10%
0	Green (Lo)	<0.8V ±0.2V	<30% of V_{cc} ±10%
Bad	No indication	0.8V to 2.3V	30% to 70% of V_{cc}

Detectable Pulse Width: 30ns min
Input Impedance: >1MΩ

METAL & VOLTAGE DETECTOR

A very useful instrument for tracing pipes, detecting nails and screws etc. in walls. In addition to detecting metals it can also detect electric cables that are connected to the mains even if no current is flowing. To distinguish between metal objects and mains cables an LED indicator and buzzer will give a continuous tone and light for metal objects and an intermittent tone and flashing light for mains cable. The detector is housed in a tough plastic case and is powered by one 9V PP3 battery (not supplied).



GREAT VALUE!
£6.99
YP30H

Input Signal
Frequency: >17MHz
Input Overload Protection: ±220V DC/AC for <15s
Probe Power: 25mA to 40mA at 5V to 15V DC

Probe Power
Protection: ±20V max with lead reversal protection

Dimensions: 212 x 26.5 x 18mm
Weight: 65g

Order Code	Type	Price each
FY73Q	Logic Probe	£12.99

Accessories for Logic Probe



An inset plug on the side of the Logic Probe described above permits the connection of one of two accessories. Approximately 250mm of wire terminated in a socket which connects to plug on side of Logic Probe. A red wire terminated at the other end in a red Probe Clip extends the probe. Or a black wire terminated at the other end with a crocodile clip in a black vinyl sleeve extends the ground connection. Sold separately.

Order Code	Type	Price each
FD34M	Logic Probe Clip Extn	£1.49
FD35Q	Logic Probe Grnd Extn	£1.20

Logic Pulser

A handy and simple to use logic pulser designed to inject pulses directly into logic circuits for powered-up circuit tests and fault finding, suitable for use with TTL, DTL, CMOS and various other kinds of ICs. Using the logic pulser you will not only find wiring errors but other component faults. The pulser is simply powered by direct connection to the test circuit's own supply rails using the red and black probe clips attached to the pulser's 580mm long supply cable. The probe generates alternate and very short duration (10µs) positive and negative pulses which can source or sink up to 100mA. As a result the probe can inject pulses into any part of a digital circuit and overcome the output impedance of the previous stage to produce a result, whether the potential at this point is logic high or low, but because of the extremely short duration of the pulse there is only absolute minimum risk to the preceding stage.



Used in conjunction with a logic probe, oscilloscope or similar monitoring instrument, the pulser can be used to 'trace' through a logic system. In order that results can be observed by the human eye using a monostable driven LED indicator or similar the pulse train can be as slow as 0.5 pps (positive or negative), or the rate can be switched to a faster 400 pps. In addition three pins are provided on the outside of the case to which crocodile clips can be attached, providing a square wave output with 50% duty cycle, and a sync. pulse input for synchronisation with oscilloscope, signal generator etc. A third pin serves as a common ground for these if required.

Specification

Supply voltage max: 20V DC
Nominal supply range: 3 to 15V DC
Sync input impedance: 1MΩ
Pulse repetition rate: 0.5 or 400 pps
Pulse width, 100mA load: 10µs

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Continued on next page.

Continued from previous page.

Pulse polarity: both 1 positive and 1 negative each cycle
 Output current capability: 100mA source or sink, pulse o/p 5mA source or sink, square o/p 212 x 26.5 x 18mm
 Dimensions: 212 x 26.5 x 18mm
 Weight: 65g
 Supply input overload protected to $\pm 25V$ for 15s, pulse output to $\pm 35V$ for 15s, sync. input to $\pm 120V$ for 15s.

Order Code	Type	Price each
YU56L	Logic Pulser	£14.99

IC Test Clips



A comprehensive range of double row clips for gaining access to the connector pins of dual-in-line ICs, from 8 pin DIL devices up to 40 pin DIL. Simply clip the spring loaded tool over the IC while in situ and connect the test probes, clips etc. to the pins at the top.

Order Code	Type	Price each
JM28F	IC Test Clip 8	£3.99
JM27E	IC Test Clip 14	£4.25
FY74R	IC Test Clip 16	£3.99
JB70M	IC Test Clip 20	£5.49
JB71N	IC Test Clip 24	£6.99
JB72P	IC Test Clip 28	£6.99
JB81C	IC Test Clip 40	£9.99

Hand Held Transistor Tester



A transistor tester that will indicate the condition of a PN or NP junction of a semiconductor device whether it be in or out of a circuit. Provided that the circuit equivalent parallel resistance is greater than 330Ω , or the shunt capacitance is less than $47\mu F$, then the tester will determine the integrity of the semiconductor under test. As well as all transistors diodes, rectifiers, LED's and SCR's can be tested. The tester uses only two probes, and a flashing LED indicates an operational, open or short circuit junction as well as the polarity. Uses one PP3 style battery (not supplied). Size 120 x 61 x 20mm. Fitted with red and black test leads 850mm long, terminated with probes.

Order Code	Type	Price each
FK50E	Handheld Trans Testr	£34.99

SENSORS

Gas Sensor

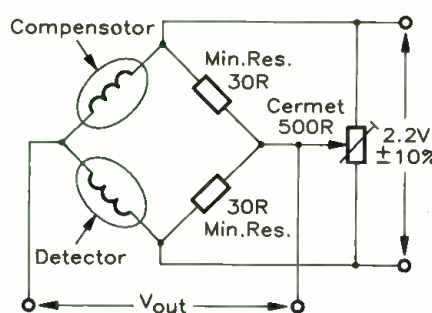
The hot wire gas sensor comprises a matched pair of sensor and compensator both containing heaters made of coils of very fine platinum wire covered with high temperature oxides and a special catalyser. This is housed in an explosion-proof stainless steel double mesh. The catalyser on the sensor consists of several metal elements, whilst the compensator has fine metal oxides, sintered and treated so as to keep the bridge in balance when exposed to changes in temperature or humidity or to the effects of alcohol and other nuisance gases.

The platinum heaters stay at $350^\circ C$ in air, but in the presence of combustible gases, the special catalyser on the sensor promotes oxidation (burning) of the gas around the heater which causes the temperature to rise above $350^\circ C$. This causes a change in the electrical resistance and unbalances the bridge, which can be detected by a suitable electronic circuit.



Specification

Detection method	Hot wire
Gases detected	All fuel gases
Rated voltage	$2.2V \pm 10\%$ across bridge
Response time	Within 10 seconds
Initial stabilisation time	Within 10 seconds
Ambient temperature range	$-10^\circ C$ to $50^\circ C$
Alarm set point	$23.8mV \pm 5mV$



The difference voltage is directly proportional to gas concentrations. With the alarm point set at $23.8mV$, the following concentrations of gas will trigger the alarm:

Iso-butane (butane, propane, LPG etc.)	
iso- C_4H_{10} :	$2000 \pm 120ppm$
Methane (natural gas, town gas etc.)	
CH_4 :	$4080 \pm 210ppm$
Hydrogen gas H_2 :	$3300 \pm 200ppm$
Ethanol (alcohol)	
C_2H_5OH :	$4800 \pm 530ppm$

Rated output 1400ppm:

CH_4 =	6 to 9mV
iso- C_4H_{10} =	14 to 19mV
H_2 =	7 to 12mV
C_2H_5OH =	<10mV

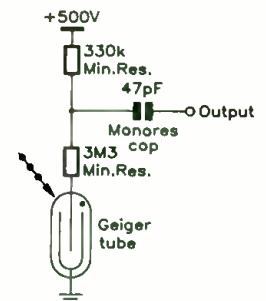
Size: 16mm diameter, 22.5mm high
 Weight: 2.8g

The compensator is marked with a dark blue spot, otherwise the two parts are identical.

Order Code	Type	Price each
FM87U	Gas Detector Sensor	£10.99

Geiger-Müller Tube

An end-window, halogen quenched Geiger tube which will detect alpha and beta particles and gamma radiation. Do not touch the mica window, bend the anode pin or solder directly to the tube body or pin. Solder only to the cathode strap and anode clip supplied.



Specification

Radiation detected:	α, β, γ
Filling:	Neon, argon, halogen
Window areal density:	1.5 to $2mg/cm^2$
effective diameter:	9mm
material:	Mica
Cathode thickness:	0.3mm
areal density:	$250mg/cm^2$
effective length:	38mm
effective diameter:	14.4mm
material:	Chrome-iron
Tube overall length:	54mm
diameter:	15mm
Starting voltage:	325V max
Operating voltage:	500V (450V to 600V)
Plateau slope:	0.06%/V max
Dead time:	90 μs min
Background (shielded with 50mm Pb and 3mm Al):	10 counts/minute max
Weight:	8g
Operating temperature range:	$-40^\circ C$ to $+70^\circ C$
Dose rate range:	10^{-3} to $10^2 mGy/h$ 10^{-4} to $10R/h$
Life at $25^\circ C$:	5×10^{10} counts

Order Code	Type	Price each
FP96E	A1 Geiger Tube	£49.99

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ANALOGUE MULTIMETERS

A range of quality multimeters having some models designed for home/hobbyist use and some for the professional. The meters in the range offer truly excellent quality at the price.

Pocket Multimeter

Precision Gold

A rugged, easy to operate, general purpose multimeter having a sensitivity of 2000Ω/V for DC and AC voltage ranges. Its compact size and ease of portability makes it ideal for those situations where fast, accurate measurements are required. Ideal for use in the house, boat, car etc.



Ranges:
 DC volts: 10, 50, 250, 500V at 2000 ohms per volt
 AC volts: 10, 50, 250, 500V at 2000 ohms per volt
 DC current: 0.5, 50, 250mA
 Resistance: 0 to 1MΩ (5kΩ at centre of scale) (Minimum reading: 200Ω)
 Decibels: -20 to +56dB, using AC volts ranges

The meter has an accuracy of 4% at full scale deflection for DC and AC voltage ranges, and resistance measurements are accurate to 4° of scale arc. The two-colour mirrored scale has a total arc of 90°. Supplied complete with operating instructions, one red and one black test lead with probes and one battery (replacement type AA size). Dimensions 90 x 60 x 30mm. Weight: 110g.

Order Code	Type	Price each
YJ06G	Pocket Multimeter	£7.99
YN65V	Case CB2K	£1.50

Pocket Multimeter PG108

Precision Gold



The PG108 is a rugged, accurate, easy to operate, pocket sized multimeter with a sensitivity of 2000 ohms per volt for both AC and DC ranges. The linear meter movement offers accurate readings of measurements on all ranges through a 90° arc mirrored scale. The functions included are AC and DC voltage, DC current, resistance, battery check, and decibels. The meter has an accuracy

of 5% of full scale deflection on the AC voltage range and 4% on the DC voltage and current ranges. Resistance measurements are accurate to within a 4° arc of scale length. Zero adjustment is provided for the resistance function. Its compact size and eleven ranges make this multimeter attractive for use in the field as a general purpose instrument or for use in the home by the DIY enthusiast. Supplied with operating instructions, a pair of test leads with probes and a battery (size AA).

Ranges:
 DC volts: 0 to 50, 250, 1000V at 2000Ω/V
 AC volts: 0 to 50, 250, 1000V at 2000Ω/V
 DC current: 0 to 50, 250mA
 Resistance: 0 to 1MΩ (5kΩ at scale centre, minimum useful reading 200Ω)
 Decibels: -20dB to +62dB (on AC voltage range)
 Battery check: 1.5V cells, 9V batteries
 Power supply: 1.5V DC Size AA cell for resistance measurements

Order Code	Type	Price each
GW00A	Multimeter PG108	£12.99
YN65V	Case CB2K	£1.50

Hobby Multimeter

Precision Gold



This analogue Multimeter is a rugged, easy-to-operate instrument offering 10,000Ω/V DC and 4000Ω/V AC sensitivity, with a linear meter movement which provides for accurate measurement of DC and AC voltages, direct currents, resistance and decibels on a 90° arc mirrored scale. The meter uses the most modern components and circuit techniques in a high impact case.

Ranges: 18
 DC volts 0 to 2.5, 50, 250, 1000V
 AC volts 0 to 10, 50, 250, 1000V
 DC current 0 to 10, 250mA
 Resistance R x 10, R x 1k
 Decibels -20dB to 62dB on AC volt ranges

The meter has an accuracy of 4% of full scale deflection for DC voltage ranges and 5% for AC voltage ranges. Resistance readings are accurate to 4% of scale arc. The 18 measuring ranges provided make this meter an ideal instrument for general purpose applications, or for a beginner to electronics who needs an instrument that is not too difficult to operate but at the same time must have most of the basic functions. Also provided with two special 'BAT' test functions for both 1.5V cells and 9V PP3 type batteries. Supplied complete with operating instructions, one red and one black test lead with probes and one battery (replacement type AA size).

Dimensions: 146 x 64 x 32mm.
 Weight: 136g.

Order Code	Type	Price each
YJ76H	Hobby Multimeter	£9.99
YN66W	Case CB10K	£1.36

Multimeter M-102BZ

Precision Gold

A wide range multimeter having a 90° three colour mirrored scale and 40μA F.S.D sensitivity, with a double jewelled precision moving coil movement. A dual silicon diode overload protection system is included with a 1 Amp fuse. The meter has a



sensitivity of 20,000Ω/volt DC, and 8,000Ω/volt AC. There are 23 measuring ranges.

Ranges:
 DC volts: 2.5, 10, 50, 250, 1000V
 AC volts: 10, 50, 250, 1000V
 DC current: 5, 50, 500mA and 10A
 Resistance: 0 to 10kΩ (50Ω at centre of scale) 0 to 100kΩ (500Ω at centre of scale) 0 to 10MΩ (50kΩ at centre of scale) (Minimum reading: 1Ω)
 Decibels: -8dB to +62dB using AC V ranges

The M-102BZ has the additional facilities of a battery test function, for 1.5V cells and 9V power packs, and an audible buzzer so that the meter can be used as a continuity tester. It also has a separate audio input for decibel measurements with an impedance of 600Ω. During the battery testing functions the cells are loaded for a realistic result; the 1.5V cell under test is loaded with 75Ω for 20mA, and the 9V battery under test is loaded with 450Ω for 20mA.

The scale has an accuracy of 4% F.S.D for measuring DC volts, and 5% F.S.D measuring AC volts. When measuring ohms it is accurate to 4° of arc. A full instruction manual is included. The meter incorporates a rugged carrying handle that can also be used as a bench stand. Supplied complete with operating instructions, one red and one black test lead with probes, and batteries (two size AA). Dimensions 133 x 89 x 38mm, not including handle. Weight: 255g.

Order Code	Type	Price each
YJ07H	Multimeter M-102BZ	£15.99
YN67X	Case CB20K	£2.35

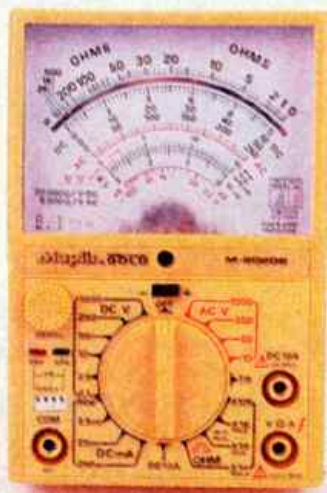
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Multimeter M-2020S

Precision Gold

A quality, comprehensive multimeter having a 90mm, full 90° arc mirrored two-colour scale with a knife edge pointer needle. It features a sensitivity of 20,000Ω/volt DC and 8,000Ω/volt AC, with a rated accuracy of 3% of F.S.D for all ranges.

In addition to the usual multimeter functions this instrument also has a transistor and diode checking facility, which can determine transistor type (npn/ pnp) and operational integrity, by means of one green and one red alternately flashing LEDs, which are very easily interpreted. The green LED flashes if the transistor is an npn type that functions correctly, and the red flashes if it is a working pnp type. If the transistor is open circuit, both flash. If there is a collector-to-emitter short circuit neither LEDs will light.



A front panel 4-pin socket is provided into which the transistor to be tested is inserted. The leakage current of the transistor can also be measured and the scale is marked to show defective types. The diode and LED testing facility uses the resistance ranges, with the added ability to test for reverse leakage current, and measure forward voltage drop.

Ranges:

DC volts: 0.1, 2.5, 10, 50, 250, 1000V
 AC volts: 10, 50, 250, 1000V
 DC current: 50μA, 2.5, 25, 250mA, 10A
 Resistance: 0 to 2kΩ (20Ω at centre of scale)
 0 to 20kΩ (200Ω at centre of scale)
 0 to 2MΩ (20kΩ at centre of scale)
 0 to 20MΩ (200kΩ at centre of scale)
 (Minimum reading: 0.2Ω)
 Decibels: -10dB to +22dB (10VAC range)
 +4dB to +36dB (50VAC range)
 +18dB to +50dB (250VAC range)
 +30dB to +62dB (1000VAC range)

Transistor Tester: I_{CEO}: 15mA, 150mA
 Diode and LED Tester: 150μA, 15mA
 Dimensions: 150 x 100 x 45mm.
 Weight: 365g.

The multimeter includes a polarity reversal switch, overload protection with 2A fuse, and a bench stand. Also has two non-slip rubber feet. Uses 2 x 1.5V AA and a 9V PP3 type battery, supplied. Full operating instructions and one red and one black test lead with safety probes and fully shrouded plugs are included.

Order Code	Type	Price each
YJ08J	A Multimeter M-2020S	£21.99
YN68Y	Case CB25K	£2.99

Multimeter PG102

Precision Gold



The PG102 is a quality rugged, accurate, bench analogue multimeter that has a high sensitivity of 20,000 ohms per volt on its DC range and a sensitivity of 8,000 ohms per volt on its AC range. The linear double-jewelled precision meter movement offers accurate readings on all of its ranges with its 90° arc mirrored scale. The moving-coil movement is protected by a dual diode and a one amp fuse. The functions included are AC and DC voltage, DC current, including a 10A position, resistance, decibel, battery check and audio power level; all selected with a single rotary switch. This multimeter has an accuracy of 5% on the AC voltage range and 4% on the DC voltage and current ranges. Resistance measurements are accurate to within a 4° arc of scale length. Zero adjustment is provided for the resistance function. Three jack sockets labelled 'COM', 'V-Ω-A', and 'DC10A' are provided. With its high sensitivity and range selection this meter would prove to be a useful addition to anyone's workshop. Supplied with operating instructions, test leads with probes, and batteries.

Ranges:

DC volts: 0 to 2.5, 10, 25, 50, 250, 1000V at 20,000Ω/V
 AC volts: 0 to 10, 25, 50, 250, 1000V at 8,000Ω/V
 DC current: 0 to 0.5, 5, 50, 500mA, 10A
 Resistance: 0 to 10k (50Ω at scale centre) 0 to 100k (500Ω at scale centre) 0 to 1M (5kΩ at scale centre) 0 to 10M (50kΩ at scale centre)
 Decibel: -20dB to +22dB on all AC V ranges
 Battery test: 1.5V cells, 9V batteries
 Audio power level: -20dB to +22dB on a 600Ω line
 Power supply: 2 x 1.5V AA cells
 Dimensions: 150 x 100 x 38mm
 Weight: 273g

Order Code	Type	Price each
CJ99H	A1 Multimeter PG102	£25.99



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DIGITAL MULTIMETERS

Calibration Service

Please note that our range of digital multimeters (except ZA37S and YU50E) is now available with a calibration certificate satisfying the requirements of customers having BS5750 registration. The range of digital meters are available, upon request, with either a Standard calibration certificate stating conformance on test, or with a very comprehensive NAMAS calibration certificate detailing all test measurements and uncertainties of Standards used.

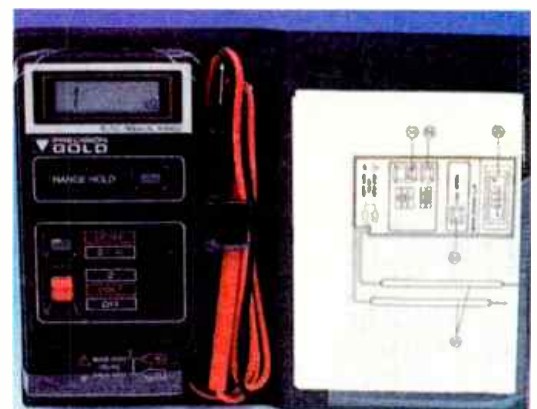
All calibrations are traceable to National Physical Laboratory standards and are carried out by a NAMAS accredited laboratory.

Please ring our enquiries line if you require further information regarding ordering or charges for this service.

DIGITAL MULTIMETERS

Pocket Digital Multimeter

Precision Gold



A calculator sized, auto-ranging digital multimeter in a plastic wallet and featuring a 3½-digit LCD readout, continuity test and range hold facility. The leads are permanently connected and fold up into the wallet. In addition to the display and range indication, there is a 'low battery' warning on the LCD panel. The meter is supplied with batteries (replacement type SG13), test leads and instruction manual.

Specification

Display: 3½ Digit LCD

DC volts

Range:	1mV to 200V
Accuracy:	±(2% rdg ±2 digits)

Max. input voltage: ±400V

AC volts

Range:	1mV to 400V
Accuracy:	±(3% rdg ±5 digits)

Max. input voltage: ±400V

Resistance

Range:	0.1Ω to 2MΩ
Accuracy:	±(2% rdg ±2 digits)

Overload protection: 400V RMS

Continuity test: Buzzer sounds if resistance under 200Ω.

Order Code	Type	Price each
ZA37S	A1 Pocket DMM	£19.99



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921 Digital Probe Multimeter

Precision Gold



A very compact autoranging multimeter with three comprehensive ranges for measuring DC and AC voltage and resistance. The instrument is designed for one handed operation where a standard short or a long reach probe on the instrument is applied to the test point, the circuit being completed by a flying lead terminated in a second probe to which an insulated crocodile clip can be attached. As well as being autoranging the meter also has auto polarity and will show a minus sign for negative values. The 3½ digit LCD display also includes indicators for selected function and low battery warning. The two position thumb switch selects the mode and if held down acts as a continuity tester. In this mode a bleep is sounded if the resistance is approximately 500Ω. At any time the current display can be frozen and retained by a data hold function, very useful while making measurements in awkward places or high voltage situations. All ranges include overrange indication. Supplied with extra long probe tip, negative lead with probe and alligator clip adaptor, batteries (replacement type LR44), carrying case and instruction manual.

Specification

Display: 3½ Digit LCD

DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% + 2 digits)
2V	1mV	±(0.7% + 2 digits)
20V	10mV	±(0.7% + 2 digits)
200V	0.1V	±(0.7% + 2 digits)
500V	1V	±(0.7% + 2 digits)

Input impedance = 10MΩ for 20V to 500V, 11MΩ for 2V and >100MΩ for 200mV range. Max. input, 700V DC or peak AC.

AC Voltage

Range	Resolution	Accuracy
2V	1mV	±(1.2% + 5 digits)
20V	10mV	±(1.2% + 5 digits)
200V	0.1V	±(1.2% + 5 digits)
500V	1V	±(1.2% + 5 digits)

Input impedance = 10MΩ for 20V to 500V, 11MΩ for 2V range. Max. input, 700V DC or AC peak (40~500Hz).

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.7% + 3 digits)
2kΩ	1Ω	±(0.7% + 2 digits)
20kΩ	10Ω	±(0.7% + 2 digits)
200kΩ	100Ω	±(0.7% + 2 digits)
2MΩ	1kΩ	±(1% + 2 digits)
20MΩ	20kΩ	±(2% + 4 digits)

Overload protection: ±250V DC or peak AC.

Continuity tester

2kΩ range, buzzer sounds at 400Ω approx. Test current = 10μA, max. open circuit voltage ≈ 0.43V. Dimensions: 161 x 30 x 22mm.

Order Code	Type	Price each
YU50E A1	Probe Meter M921	£29.99

POCKET DIGITAL DIARY SFA10

Casio

The SFA10 is in the latest style of folding digital diaries, providing a large range of facilities in a compact, pocket-sized case. This digital diary is provided with a positive click-effect QWERTY keyboard, a large LCD and on-screen icons for ease of mode selection. Data management is easy with the integral search facilities that help to maintain schedules, memos and a telephone directory. Other features include six currency conversion memories and world time selectable from 29 zones for the world traveller, a daily alarm, a reminder facility and schedule alarm for those at the leading edge of business. This diary also has a communications link facility that allows it to communicate with other SFA10's.

Specification

Display:	16 columns x 4 lines
Memory capacity:	28,668 bytes
Power supply:	2 x CR2032 lithium batteries (supplied)
Battery life:	100 hours
Dimensions folded:	120 x 82.5 x 12.7mm
Weight:	88g



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RZ13P
[A1]

Talking Digital Multimeter

This ingenious 'talking' digital multimeter provides additional safety and convenience when working on mains or high voltage equipment, or in conditions where positioning of the test probes makes reading a meter difficult or impossible. Housed in a slim and easy to hold case, the probes are not detachable, but when not in use, are wrapped round the outside of the case and held in a recess. The probe tips are held in two receptacles on the side of the case for safety. Because of its slim size, the meter can conveniently be slipped into a pocket or toolbox. A 3-position 'voice' switch selects either off, single or auto. In single mode, an announcement is made only when a 'talk' button on the positive probe is pressed, or when there is a change of range in manual mode or change of function. In auto mode, an announcement is made whenever a new reading is captured. Another handy feature is the 'memory' switch, which is used to record the measured data and recall the last memory entry. The 'mem' button is pressed once to record the data, and voice confirmation of the recorded data will follow. To recall the last record, the 'mem' button is pressed and held for two seconds. The meter will hold the current displayed data and speak out the last memory entry. The meter is very easy to use having bright 'easy to read' buttons and switches. The function switch selects off, voltage, ohms and diode check, and a push button selection switch changes from DC to AC, in the voltage measuring mode, or changes to continuity check in the resistance measurement



mode. When the meter is switched on, autoranging is automatically selected, to switch to the manual ranging mode press the 'range hold' button - 'R' is displayed and if voice is on, the meter will speak "RANGE". Pressing the button a second time switches the instrument to the lowest range, and with subsequent button pressing operations the ranges are cycled through. Holding the 'range hold' button down for more than one second reverts to autoranging mode. Additional features include a visual low battery indicator and automatic polarity function, which displays '-' on the display for negative polarity and no indication for positive polarity. The case has a built-in fold-away stand and retractable hook for 'hands-off' operation. Instruction manual supplied.

Specification:

Measuring method:	Dual integration mode
Display:	3.5 digit LCD, max reading of 1999 with auto polarity 2 times/second
Sampling:	
Voltage Range,	
DC:	2V, 20V, 200V, 400V (max)
AC:	2V, 20V, 200V, 400V (max)
Resistance:	200Ω to 2MΩ
Continuity check:	200Ω (max)
Diode check:	0 to 2V
Accuracy,	
DC:	±1.6% rdg ±2 dgts.
AC:	±2.3% rdg ±5 dgts.
Resistance:	±2% ±2 dgts.
Diode check:	±10% rdg ±2 dgts.
Power requirements:	4 x AAA size batteries
Power consumption:	20mW typical (no voice)
Size:	148.5 x 73 x 25.4mm
Weight:	240g approx. (without batteries)

Order Code	Type	Price each
BU88V A1	Talking Multimeter	£39.95

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Digital Multimeter with Test Signal Output PG010



A quality, cost-effective handy multimeter providing measurements over a number of different ranges, and test facilities for diodes, LEDs and transistors. The meter is ideal for the beginner and student working on a budget. The ranges are selected by a single rotary switch and include AC and DC voltage, resistance and a signal source. The switch also selects the test facilities. A 3½-digit LCD screen displays the reading and the polarity indicator. Also shown are the battery low and range overload indicators. With the exception of the 200Ω range, all the resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform these measurements on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. Readings on all ranges are sampled at the rate of x2½ per second. Conforms to IEC 1010-1 Standards.

Specification

DC Voltage

Range	Resolution	Accuracy
2V	1mV	±(1.5% rdg + 1dgt)
20V	10mV	±(1.5% rdg + 1dgt)
200V	100mV	±(1.5% rdg + 1dgt)
600V	1V	±(1.5% rdg + 1dgt)

Input impedance: 1MΩ
Overload protection: 600V DC or 500V AC rms

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±(2.9% rdg + 4dpts)
500V	1V	±(2.9% rdg + 4dpts)

Frequency range: 50Hz to 500Hz
Input impedance: 450kΩ
Overload protection: 600V DC or 500V AC rms

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1.5% rdg + 3dpts)
2kΩ	1Ω	±(1.5% rdg + 1dgt)
20kΩ	10Ω	±(1.5% rdg + 1dgt)
200kΩ	100Ω	±(1.5% rdg + 1dgt)
2MΩ	1kΩ	±(1.5% rdg + 1dgt)

Open circuit voltage: 3.0V DC on 200Ω range
0.3V DC on all other ranges
Overload protection: 600V DC or 500V AC rms

Signal Output

Voltage: +3.0V -0.5V
Type: square wave

SELECTION CHART FOR ACADEMY RANGE					
FUNCTION	PG010	PG10B	PG011	PG012	PG013
DIGITS	3½	3½	3½	3½	3¾
ACCURACY	1.5%	1.5%	1.5%	0.9%	0.9%
DC VOLTS	4	5	3	5	5
AC VOLTS	2	2	2	5	5
DC CURRENT	-	4	-	-	-
AC CURRENT	-	-	-	-	-
RESISTANCE	5	6	5	7	7
MAX. RES.	2MΩ	20MΩ	2000MΩ	2000MΩ	400MΩ
LED TEST	✓	-	-	-	-
DIODE TEST	✓	✓	✓	✓	✓
h _{FE}	✓	✓	-	✓	✓
BATT. TEST	-	✓	-	-	-
CONTINUITY	-	✓	✓	✓	✓
CAPACITANCE	-	-	4	5	5
MAX. CAP.	-	-	20mF	20μF	40μF
FREQUENCY	-	-	1	5	4
MAX. FREQ.	-	-	200Hz	20MHz	1MHz
PHASE	-	-	✓	-	-
SIGNAL O/P	✓	-	-	-	-
	PG014	PG015H	PG017	PG018	PG019
DIGITS	3½	3½	3½	3¾	3¾
ACCURACY	1.5%	0.5%	0.9%	0.9%	1.2%
DC VOLTS	5	-	5	5	5
AC VOLTS	2	-	5	5	5
DC CURRENT	4	-	4	4	5
AC CURRENT	-	-	4	4	5
RESISTANCE	6	-	6	6	6
MAX. RES.	20MΩ	-	20MΩ	40MΩ	32MΩ
LED TEST	-	-	-	-	-
DIODE TEST	✓	-	✓	✓	✓
h _{FE}	✓	-	✓	✓	-
BATT. TEST	✓	-	-	-	-
CONTINUITY	✓	-	✓	✓	✓
CAPACITANCE	-	9	5	5	-
MAX. CAP.	-	20mF	20μF	40μF	-
FREQUENCY	Auto	-	Auto	Auto	-
MAX. FREQ.	15MHz	-	15MHz	1MHz	-
PHASE	-	-	-	-	-
SIGNAL O/P	-	-	-	-	-

Where appropriate the table shows the number of ranges for each function. The accuracy stated applies to the basic DC voltage function.
All multimeters are supplied with test leads, battery and full instruction manual.
All the digital multimeters in the Academy Range conform to IEC 1010-1 standards.
PG015 is a capacitance meter see page 313

Duty: 50%
Frequency: 50Hz approx
Output impedance: 120kΩ
Input protection: 500V DC or AC rms

LED Test
Accuracy: ±(3% rdg + 3dpts)
Resolution: 10mV
Test current: 10mA ±6mA
Test voltage: <3.5V

Diode Test
Accuracy: ±(3% rdg + 3dpts)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.3V DC typical
Overload protection: 500V DC or AC rms

Transistor hfe
Ranges: 0 to 1000
Base current: 10μA DC approx
V_{ce}: 3.0V DC
Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code	Type	Price each
GW17T A1	Model PG010 Digi M/M	£19.99

Digital Multimeter with Continuity and Battery Test Functions PG010B

A cost-effective general purpose multimeter providing measurements over a number of different ranges, with test facilities for diodes, transistors and batteries, and a continuity buzzer. The ranges are selected by a single rotary switch and include AC and DC voltage, DC current and resistance which includes the continuity buzzer that sounds if the resistance is less than 40Ω. The switch also selects the test facilities. A 3½-digit LCD screen displays the reading and the polarity indicator. Also shown is the battery low and range overload indicators. With the exception of the 200Ω range, all the resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Readings on all ranges are sampled at a rate of x2½ per second. Current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.



Battery test

Range	Resolution	Load current	Accuracy
1.5V:	1mV	150mA	±(3% rdg + 3dgt)
9V:	10mV	6mA	±(3% rdg + 3dgt)

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.0V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
Base current: 10µA DC approx
V_{ce}: 3.0V DC
Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and a full instruction manual.

Order Code	Type	Price each
GW18U A1	Model PG10B Digi M/M	£24.99

MAPLIN KEY CALL Phone 01702 556751

Digital Multimeter with Autoranging Frequency Function PG014

A quality, cost-effective multimeter providing measurements over a number of different ranges, test facilities for diodes, transistors and batteries, and a continuity buzzer. The ranges and test facilities are selected by a single rotary switch and include AC and DC voltage, DC current, frequency and resistance. The frequency function is autoranging and the resistance range includes the continuity buzzer which sounds if the resistance is less than 40Ω. A 3½-digit LCD screen displays the reading and the polarity indicator. Also shown are the battery low, frequency range, and range overload indicators. With the exception of the 200Ω range, all the resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with



other devices. Useful for finding matched pairs, for example. The battery test function is for checking 1.5V and 9V batteries. This loads the battery with a realistic load, to get a true, 'in-service', reading. Readings on all ranges are sampled at a rate of x2½ per second. Current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.

Specification

DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(1.5% range + 1dgt)
2V	1mV	±(1.5% range + 1dgt)
20V	10mV	±(1.5% range + 1dgt)
200V	100mV	±(1.5% range + 1dgt)
600V	1V	±(1.5% range + 1dgt)

Input impedance: 10MΩ
Overload protection: 600V DC or AC rms

DC Current

Range	Resolution	Accuracy
2mA	1µA	±(2% rdg + 1dgt)
20mA	10µA	±(2% rdg + 1dgt)
200mA	100µA	±(2% rdg + 1dgt)
10A	10mA	±(3% rdg + 1dgt)

Voltage burden
Milliamp ranges: 0.7V
Amp range: 1.2V
Input protection: 0.5A/250V quick-blow fuse
10A/250V quick-blow fuse

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±(2.9% rdg + 4dgt)
600V	1V	±(2.9% rdg + 4dgt)

Input impedance: 4.5MΩ
Overload protection: 600V DC or AC rms

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1.5% rdg + 3dgt)
2kΩ	1Ω	±(1.5% rdg + 1dgt)
20kΩ	10Ω	±(1.5% rdg + 1dgt)
200kΩ	100Ω	±(1.5% rdg + 1dgt)
2000kΩ	1kΩ	±(1.5% rdg + 1dgt)
20MΩ	10kΩ	±(3.0% rdg + 3dgt)

Open circuit voltage: 3.0V DC on 200Ω range
0.3V DC on all other ranges
Overload protection: 500V DC or AC rms

Battery test

Range	Resolution	Load current	Accuracy
1.5V	1mV	150mA	±(3% rdg + 3dgt)
9V	10mV	6mA	±(3% rdg + 3dgt)

Input protection: 0.5A/250V fuse
500V DC or AC rms

Frequency (autoranging)

Range: 2kHz to 15MHz
Accuracy: ±(0.5% rdg + 1dgt) (10Hz to 15MHz)

Sensitivity:
Trig Lo: 1V rms
Trig Hi: 2V rms
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Test current: 1.0mA ±0.6mA
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 2V DC typical
Overload protection: 500V DC or AC rms

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Transistor h_{fe}
 Ranges: 0 to 1000
 Base current: 10 μ A DC approx
 Vce: <3.5V DC
 Dimensions: 151 x 70 x 38mm
 Weight: 200g including battery
 Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code	Type	Price each
GW22Y A1	Model PG014 Digi M/M	£29.99

Digital Multimeter with Capacitance and Autoranging Frequency Functions PG012

A quality, sensitive multimeter providing measurements over a number of different, very selective, ranges, including plus transistor and diode test facilities and a continuity buzzer. The ranges are selected by a single rotary switch and include voltage, capacitance, frequency, and resistance, which includes the continuity buzzer that sounds if the resistance is less than 40 Ω .



The switch also selects the transistor and diode test facilities. A separate slide switch provides AC/DC selection. The frequency positions are autoranging. A 3 $\frac{1}{2}$ -digit LCD screen displays the reading, the polarity indicator and the frequency ranges. Also shown are the battery low and range overload indicators. With the exception of the 200 Ω and 2000M Ω ranges, all resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1k Ω or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices – useful for finding matched pairs. Readings on all ranges are sampled at a rate of $x2\frac{1}{2}$ per second. Conforms to IEC 1010-1 Standards.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
2V	1mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
20V	10mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
200V	100mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
600V	1V	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$

Input impedance: 10M Ω
 Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
2V	1mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
20V	10mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
200V	100mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
600V	1V	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$

Input impedance: 10M Ω
 Frequency range: 50Hz to 500Hz
 Overload protection: 600V DC or AC rms

Resistance

Range	Resolution	Accuracy
200 Ω	100m Ω	$\pm(1.5\% \text{ rdg} + 3 \text{ dgts})$
2k Ω	1 Ω	$\pm(1.5\% \text{ rdg} + 1 \text{ dgt})$
20k Ω	10 Ω	$\pm(1.5\% \text{ rdg} + 1 \text{ dgt})$
200k Ω	100 Ω	$\pm(1.5\% \text{ rdg} + 1 \text{ dgt})$
2000k Ω	1k Ω	$\pm(1.5\% \text{ rdg} + 1 \text{ dgt})$
20M Ω	10k Ω	$\pm(3\% \text{ rdg} + 3 \text{ dgts})$
2000M Ω	1M Ω	$\pm(5\% \text{ rdg} - 10 \text{ dgts}) + 10 \text{ dgts}$

Open circuit voltage: 3-3V DC on 200 Ω and 2000M Ω ranges 0-3V DC on all other ranges
 Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
2000pF	1pF	$\pm(5\% \text{ rdg} + 10 \text{ dgts})$
20nF	10pF	$\pm(5\% \text{ rdg} + 10 \text{ dgts})$
200nF	100pF	$\pm(5\% \text{ rdg} + 10 \text{ dgts})$
2 μ F	1nF	$\pm(5\% \text{ rdg} + 10 \text{ dgts})$
20 μ F	10nF	$\pm(5\% \text{ rdg} + 10 \text{ dgts})$

Test frequency: 400Hz

Frequency (autoranging)

Range	Resolution	Accuracy
2kHz	1Hz	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$
20kHz	10Hz	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$
200kHz	100Hz	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$
2000kHz	1kHz	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$
15MHz	10kHz	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$

Sensitivity: Trig Lo: 1V rms min (TTL signal only) Trig Hi: 2V rms min (TTL signal only)
 Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40 Ω \pm 20 Ω
 Overload protection: 500V DC or AC rms

Diode Test

Accuracy: $\pm(3\% \text{ rdg} + 3 \text{ dgts})$
 Test current: 1-0mA \pm 0.6mA
 Open circuit voltage: 3-3V DC typical
 Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
 Base current: 10 μ A DC approx
 Vce: 3-3V DC
 Dimensions: 151 x 70 x 38mm
 Weight: 200g including battery
 Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code	Type	Price each
GW20W A1	Model PG012 Digi M/M	£34.99

Digital Multimeter with DC/AC Current Ranges PG017

A quality, general purpose versatile multimeter providing measurements over a number of different, very selective, ranges including DC/AC current ranges plus transistor and diode test facilities and a continuity buzzer. The ranges are selected by a single rotary switch and include voltage, current, capacitance, frequency, and resistance. The frequency function is autoranging and the resistance function includes the continuity



buzzer which sounds if the resistance is less than 40 Ω . The switch also selects the transistor and diode test facilities. A separate slide switch provides AC/DC selection. A 3 $\frac{1}{2}$ -digit LCD screen displays the reading, the frequency range indicator and the polarity indicator. Also shown are the battery low and range overload indicators. With the exception of the 200 Ω range, all resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1k Ω or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. Readings on all ranges are sampled at a rate of $x2\frac{1}{2}$ per second. The current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
2V	1mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
20V	10mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
200V	100mV	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$
600V	1V	$\pm(0.9\% \text{ rdg} + 1 \text{ dgt})$

Input impedance: 10M Ω
 Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
2V	1mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
20V	10mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
200V	100mV	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$
600V	1V	$\pm(1.9\% \text{ rdg} + 4 \text{ dgts})$

Input impedance: 10M Ω
 Overload protection: 600V DC or AC rms

DC Current

Range	Resolution	Accuracy
2mA	1 μ A	$\pm(2\% \text{ rdg} + 1 \text{ dgt})$
20mA	10 μ A	$\pm(2\% \text{ rdg} + 1 \text{ dgt})$
200mA	100 μ A	$\pm(2\% \text{ rdg} + 1 \text{ dgt})$
10A	10mA	$\pm(3\% \text{ rdg} + 1 \text{ dgt})$

Voltage burden: 10M Ω
 Milliamp ranges: 0-7V
 Amp range: 1-2V
 Input protection: 0.5A/250V quick-blow fuse
 10A/250V quick-blow fuse

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AC Current

Range	Resolution	Accuracy
2mA	1µA	±(2.5% rdg + 4dgt)
20mA	10µA	±(2.5% rdg + 4dgt)
200mA	100µA	±(2.5% rdg + 4dgt)
10A	10mA	±(3.5% rdg + 4dgt)

Voltage burden
 Milliamp ranges: 0.7V
 Amp range: 1.2V
 Input protection: 0.5A/250V quick-blow fuse
 10A/250V quick-blow fuse

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1.5% rdg + 3dgt)
2kΩ	1Ω	±(1.5% rdg + 1dgt)
20kΩ	10Ω	±(1.5% rdg + 1dgt)
200kΩ	100Ω	±(1.5% rdg + 1dgt)
2000kΩ	1kΩ	±(1.5% rdg + 1dgt)
20MΩ	10kΩ	±(3% rdg + 3dgt)

Open circuit voltage: 3.0V DC on 200Ω range
 0.3V DC on all other ranges
 Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
2000pF	1pF	±(5% rdg + 10dgt)
20nF	10pF	±(5% rdg + 10dgt)
200nF	100pF	±(5% rdg + 10dgt)
2µF	1nF	±(5% rdg + 10dgt)
20µF	10nF	±(5% rdg + 10dgt)

Test frequency: 400Hz at 50mV

Frequency (autorange)

Range: 2kHz to 15MHz
 Accuracy: ±(0.5% rdg + 1dgt) (10Hz to 15MHz)

Sensitivity:
 Trig Lo: 1V rms
 Trig Hi: 2V rms
 Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
 Test current: 1.0mA ±0.6mA
 Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
 Test current: 1.0mA ±0.6mA
 Open circuit voltage: 2V DC typical
 Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
 Base current: 10µA DC approx
 V_{ce}: <3.5V DC
 Dimensions: 151 x 70 x 38mm
 Weight: 200g including battery
 Battery: 9V FP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code	Type	Price each
GW24B A1	Model PG017 M/M	£34.99

Digital Multimeter with Frequency and Phase Indicator Functions PG011

A quality, multi-purpose multimeter that provides measurements over a broad selection of different ranges, has a diode test facility, a continuity buzzer and a unique phase indicator function. This function is for checking that the phases of a 3-phase source are in the correct sequence. The ranges are selected by a single rotary switch and include AC and DC voltage, phase, capacitance, frequency, and resistance, which includes the continuity buzzer that sounds if the resistance is less than 40Ω. The switch also selects the diode test facility. A 3½-digit LCD screen displays the reading, the polarity indicator and the phase indicator. Also shown are the battery low and range overload indicators. With the exception of the 200Ω and 2000MΩ range, all resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. Readings on all ranges are sampled at a rate of x2½ per second. Conforms to IEC 1010-1 Standards.



Specification DC Voltage

Range	Resolution	Accuracy
2V	1mV	±(1.5% rdg + 1dgt)
20V	10mV	±(1.5% rdg + 1dgt)
600V	1V	±(1.5% rdg + 1dgt)

Input impedance: 10MΩ
 Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±(2.9% rdg + 4dgt)
600V	1V	±(2.9% rdg + 4dgt)

Frequency range: 50Hz to 500Hz
 Input impedance: 4.5MΩ
 Overload protection: 600V DC or AC rms

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1.5% rdg + 3dgt)
2kΩ	1Ω	±(1.5% rdg + 1dgt)
20kΩ	100Ω	±(1.5% rdg + 1dgt)
20MΩ	10kΩ	±(3% rdg + 3dgt)
2000MΩ	1MΩ	±(5% rdg + 10dgt) + 10dgt)

Open circuit voltage: 3.0V DC on 200Ω and 2000MΩ ranges
 0.3V DC on all other ranges
 Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
20µF	10nF	±(4% rdg + 10dgt)
200µF	100nF	±(4% rdg + 10dgt)
2000µF	1µF	±(4% rdg + 10dgt)
20mF	10µF	±(4% rdg + 10dgt)

Test frequency: 12.5Hz
 Test voltage: <3.5V
 Input protection: 0.25A/250V quick-blow fuse

Frequency

Range	Resolution	Accuracy
200Hz	0.1Hz	±(2% rdg + 3dgt)

Sensitivity: 10V rms
 Overload protection: 500V DC or AC rms

Phase indicator

Frequency range: 45Hz to 450Hz
 Voltage range: 80V to 450V AC rms

Continuity

Audible indication: <40Ω ±20Ω
 Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
 Test current: 1.0mA ±0.6mA
 Open circuit voltage: 3.3V DC typical
 Overload protection: 500V DC or AC rms

Dimensions: 151 x 70 x 38mm
 Weight: 200g including battery
 Battery: 9V PP3 type

Supplied with a set of test leads, battery and full instruction manual.

Order Code	Type	Price each
GW19V A1	Model PG011 Digi M/M	£39.99

FOR TOP QUALITY & VALUE!

Digital Multimeter with Capacitance and Frequency Functions PG013

A quality, cost-effective, sensitive, multimeter that provides measurements over a wide choice of different, very selective, ranges, plus transistor and diode test facilities and a continuity buzzer. The ranges and test facilities are selected by a single rotary switch and include voltage, capacitance, frequency, resistance, transistor h_{fe} and diode test. The resistance range includes the continuity buzzer which sounds if the resistance is less than 40Ω. A separate slide switch provides AC/DC selection. Two jack sockets marked 'VΩ' and 'COM' are provided for the measurement ranges and a 4-way socket is provided for the test facilities. A 3½-digit LCD screen displays the reading and the polarity indicator. Also shown is the battery low and range overload indicators. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. Readings on all ranges are sampled at a rate of x2½ per second. Conforms to IEC 1010-1 Standards.



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Specification DC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(0.9% rdg + 1dgt)
4V	1mV	±(0.9% rdg + 1dgt)
40V	10mV	±(0.9% rdg + 1dgt)
400V	100mV	±(0.9% rdg + 1dgt)
600V	1V	±(0.9% rdg + 1dgt)

Input impedance: 20MΩ
Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(1.9% rdg + 4dpts)
4V	1mV	±(1.9% rdg + 4dpts)
40V	10mV	±(1.9% rdg + 4dpts)
400V	100mV	±(1.9% rdg + 4dpts)
600V	1V	±(1.9% rdg + 4dpts)

Input impedance: 20MΩ
Frequency range: 50Hz to 500Hz
Overload protection: 600V DC or AC rms

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(1.5% rdg + 3dpts)
4kΩ	1Ω	±(1.5% rdg + 1dgt)
40kΩ	10Ω	±(1.5% rdg + 1dgt)
400kΩ	100Ω	±(1.5% rdg + 1dgt)
4000kΩ	1kΩ	±(1.5% rdg + 1dgt)
40MΩ	10kΩ	±(3% rdg + 3dpts)
400MΩ	100kΩ	±(5% rdg + 10dpts)

Open circuit voltage: 3.3V DC on 400Ω range
2.0V DC on 400MΩ range
0.6V DC on remaining ranges
Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
4000pF	1pF	±(5% rdg + 10dpts)
40nF	10pF	±(5% rdg + 10dpts)
400nF	100pF	±(5% rdg + 10dpts)
4µF	1nF	±(5% rdg + 10dpts)
40µF	10nF	±(5% rdg + 10dpts)

Test frequency: 400Hz

Frequency (autoranging)

Range	Resolution	Accuracy
4kHz	1Hz	±(0.5% rdg + 1dgt)
40kHz	10Hz	±(0.5% rdg + 1dgt)
400kHz	100Hz	±(0.5% rdg + 1dgt)
1000kHz	1kHz	±(0.5% rdg + 1dgt)

Sensitivity:
Trig Lo: 200mV min
Trig Hi: 500mV min
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <math>< 40\Omega \pm 20\Omega</math>
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dpts)
Test current: 0.8mA ±0.3mA
Open circuit voltage: 3.3V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
Base current: 10µA DC approx
Vce: 3.3V DC

Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code GW21X A1 Type Model PG013 Digi M/M Price each £39.99

Autoranging Digital Multimeter with Bar Graph PG019

A superb, general purpose, fully autoranging multimeter which provides measurements over a number of different ranges and functions. The functions are selected by a single rotary switch and include voltage, current, resistance, continuity and diode test. A 'mode' push-button selects the continuity/diode test or AC/DC. The range for each function is selected automatically by the meter, but a 'range' push-button may be used to override the autoranging, to hold a selected range. An LCD screen displays the reading in the form of 3 1/2-digits and a bar-graph display. Readings on all ranges are sampled at a rate of twice per second. The current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.



Specification

DC Voltage

Range	Resolution	Impedance Input	Accuracy
320mV	100µV	>1000MΩ	±(1.2% rdg + 1dgt)
3.2V	1mV	11MΩ	±(1.2% rdg + 1dgt)
32V	10mV	10MΩ	±(1.2% rdg + 1dgt)
320V	100mV	10MΩ	±(1.2% rdg + 1dgt)
600V	1V	10MΩ	±(1.2% rdg + 1dgt)

Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Impedance Input	Accuracy
320mV	100µV	>1000MΩ	±(2% rdg + 4dpts)
3.2V	1mV	11MΩ	±(2% rdg + 4dpts)
32V	10mV	10MΩ	±(2% rdg + 4dpts)
320V	100mV	10MΩ	±(2% rdg + 4dpts)
600V	1V	10MΩ	±(2% rdg + 4dpts)

Frequency: 50/60Hz
Overload protection: 600V DC or AC rms

DC Current

Range	Resolution	Voltage Burden	Accuracy
320µA	100nA	0.2V	±(2% rdg + 1dgt)
3200µA	1µA	2V	±(2% rdg + 1dgt)
32mA	10µA	0.2V	±(2% rdg + 1dgt)
320mA	100µA	2V	±(2% rdg + 1dgt)
10A	10mA	0.2V	±(3% rdg + 2dpts)

Input protection: 0.5A/250V quick-blow fuse
10A/250V quick-blow fuse

AC Current

Range	Resolution	Voltage Burden	Accuracy
320µA	100nA	0.2V	±(2.5% rdg + 2dpts)
3200µA	1µA	2V	±(2.5% rdg + 2dpts)
32mA	10µA	0.2V	±(2.5% rdg + 2dpts)
320mA	100µA	2V	±(2.5% rdg + 2dpts)
10A	10mA	0.2V	±(3.5% rdg + 3dpts)

Frequency: 50/60Hz
Input protection: 0.5A/250V quick-blow fuse
10A/250V quick-blow fuse

Resistance Test

Range	Resolution	Current	Accuracy
320Ω	100mΩ	<math>< 0.7\text{mA}</math>	±(2% rdg + 3dpts)
3.2kΩ	1Ω	<math>< 0.13\text{mA}</math>	±(1.5% rdg + 3dpts)
32kΩ	10Ω	<math>< 13\mu\text{A}</math>	±(1.5% rdg + 3dpts)
320kΩ	100Ω	<math>< 1.3\mu\text{A}</math>	±(1.5% rdg + 3dpts)
3.2MΩ	1kΩ	<math>< 0.13\mu\text{A}</math>	±(2.5% rdg + 3dpts)
32MΩ	10kΩ	<math>< 0.13\mu\text{A}</math>	±(5% rdg + 5dpts)

Input protection: 500V DC or AC rms

Continuity

Audible indication: <math>< 20\Omega \pm 5\Omega</math>
Resolution: 100mΩ
Test current: <math>< 0.7\text{mA}</math>
Overload protection: 500V DC or AC rms

Diode Test

Range: 0 to 2000
Accuracy: ±(10% rdg + 2dpts)
Test current: 0.6mA at $V_f = 0.6\text{V}$
Resolution: 1mV
Overload protection: 500V DC or AC rms

Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code GW25C A1 Type Model PG019 Digi M/M Price each £39.99

IT'S A FACT!

DECIBELS

The decibel (dB) is the ratio between two quantities, such as power, voltage, current or acoustic pressure. Most sensors, and that includes our ears, have a logarithmic response, which allows them to detect a wide range of intensities.

The ratio in dB of two power levels (P_1 and P_2) is calculated from the formula:

$$\text{dB} = 10 \log (P_1/P_2)$$

If the quantities are voltage, currents or sound pressure levels (X_1 and X_2), then:

$$\text{dB} = 20 \log (X_1/X_2)$$

The dB is not an absolute unit, but certain absolute units using the dB scale have been devised. These include dBµV, dBm and dB SPL.

dBµV is a logarithmic expression of a voltage compared to 1µV, so 76dBµV is equivalent to 6.31mV.

dBm is an expression of a power level compared to 1mW. -20dBm is equivalent to 10µW. Because the unit is a measure of power, 0dBm represents 775mV in a 600Ω impedance but only 224mV in a 50Ω impedance.

dB SPL is a measure of sound pressure level, using 20µPa (micropascals) as a reference, 1 Pascal equals 93.8dB SPL.

PG018 Full Function Digital Multimeter with 3 3/4-Digit LCD

An accurate, versatile multimeter providing measurements over a number of different, very selective, ranges, plus transistor and diode test facilities and a continuity buzzer. The large 3 3/4-digit LCD display provides a very accurate readout in a multimeter that offers exceptional value for money. The ranges are selected by a single rotary switch and include voltage, current, capacitance, resistance and frequency.



The frequency function is autoranging and the resistance function includes the continuity buzzer which sounds if the resistance is less than 40Ω. The switch also selects the transistor and diode test facilities. A separate slide switch provides AC/DC selection. The frequency function is autoranging. A 3 3/4-digit LCD screen displays the reading and the polarity indicator. Also shown are the battery low and range overload indicators. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. Readings on all ranges are sampled at a rate of x2^{1/2} per second. The current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.

Specification

DC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(0.9% rdg + 1dgt)
4V	1mV	±(0.9% rdg + 1dgt)
40V	10mV	±(0.9% rdg + 1dgt)
400V	100mV	±(0.9% rdg + 1dgt)
600V	1V	±(0.9% rdg + 1dgt)

Input impedance: 10MΩ
Overload protection: 600V DC or AC rms

AC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(1.9% rdg + 4dpts)
4V	1mV	±(1.9% rdg + 4dpts)
40V	10mV	±(1.9% rdg + 4dpts)
400V	100mV	±(1.9% rdg + 4dpts)
600V	1V	±(1.9% rdg + 4dpts)

Input impedance: 10MΩ
Overload protection: 600V DC or AC rms

DC Current

Range	Resolution	Accuracy
4mA	1μA	±(2% rdg + 1dgt)
40mA	10μA	±(2% rdg + 1dgt)
400mA	100μA	±(2% rdg + 1dgt)
10A	10mA	±(3% rdg + 1dgt)

Voltage burden: 1.4V
Milliamp ranges: 1.4V
Amp range: 1.5V
Input protection: 0.5A/250V quick-blow fuse
10A/250V quick-blow fuse

AC Current

Range	Resolution	Accuracy
4mA	1μA	±(2.5% rdg + 4dpts)
40mA	10μA	±(2.5% rdg + 4dpts)
400mA	100μA	±(2.5% rdg + 4dpts)
10A	10mA	±(3.5% rdg + 4dpts)

Voltage burden: 1.4V
Milliamp ranges: 1.4V
Amp range: 1.5V
Input protection: 0.5A/250V quick-blow fuse
10A/250V quick-blow fuse

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(1.5% rdg + 3dpts)
4kΩ	1Ω	±(1.5% rdg + 1dgt)
40kΩ	10Ω	±(1.5% rdg + 1dgt)
400kΩ	100Ω	±(1.5% rdg + 1dgt)
4000kΩ	1kΩ	±(1.5% rdg + 1dgt)
40MΩ	10kΩ	±(3% rdg + 3dpts)

Open circuit voltage: 3-3V DC on 400Ω range
0-6V on all other ranges
Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
4000pF	1pF	±(5% rdg + 10dpts)
40nF	10pF	±(5% rdg + 10dpts)
400nF	100pF	±(5% rdg + 10dpts)
4μF	1nF	±(5% rdg + 10dpts)
40μF	10nF	±(5% rdg + 10dpts)

Test frequency: 400Hz at 50mV

Frequency (autoranging)

Range: 2kHz to 1MHz
Accuracy: ±(0.5% rdg + 1dgt)
Sensitivity: 500mV rms
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Test current: 1.0mA ±0.6mA
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dpts)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 4V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
Base current: 10A DC approx
V_{ce}: <3.5V DC

Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Order Code GW86T A1 Type Model PG018 Digi M/M Price each £44.99

Capacitance Meter PG015



An accurate, capacitance meter providing measurements over a very wide range. The desired capacitance range is selected by a single rotary switch which also has an 'off' position. A separate rotary control marked '0-ADJ' provides limited adjustment for the more sensitive ranges to counteract stray capacitance. Two jack sockets and a pair of wire lead sockets, marked (+) and (-), are provided for connection to the component being measured. A 3 1/2-digit LCD screen displays the reading, the polarity indicator and the range selected. Also shown is the battery low and range overload indicators. Readings on all ranges are sampled at a rate of two per second. The meter is protected by a quick-blow fuse. Supplied with a pair of test leads, battery and full instruction manual.

Specification

Capacitance Range	Resolution	Test	
		Frequency	Accuracy
200pF	0.1pF	820Hz	±(0.5% rdg + 1dgt - 0.5pF)
2000pF	1pF	820Hz	±(0.5% rdg + 1dgt)
20nF	10pF	820Hz	±(0.5% rdg + 1dgt)
200nF	100pF	820Hz	±(0.5% rdg + 1dgt)
2μF	1nF	820Hz	±(0.5% rdg + 1dgt)
20μF	10nF	82Hz	±(0.5% rdg + 1dgt)
200μF	100nF	8.2Hz	±(0.5% rdg + 1dgt)
2000μF	1μF	8.2Hz	±(2% rdg + 1dgt)
20mF	10μF	8.2Hz	±(4% rdg + 1dgt)

Test voltage: <3.5V
Input protection: 0.25A/250V quick-blow fuse
Zero adjust range: ±20pF approx. (for values of <200nF)
Dimensions: 151 x 70 x 38mm
Weight: 200g including battery
Battery: 9V PP3 type

Order Code GW23A A1 Type Model PG015 M/M Price each £34.99

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PRECISION GOLD

A quality range of rugged digital multimeters that offer a range of functions at affordable prices.

Rugged Low-Cost Digital Multimeter M105



A low cost, quality multimeter giving accurate measurements over a number of different ranges, including AC and DC voltage, DC current and resistance, together with a diode and transistor junction tester. This rugged, improved model now features SMD technology that provides a greatly extended battery life (up to x10) over the previous model and is now approved to IEC 1010-1 Standards. One rotary switch selects the range required. A 3 1/2-digit, 22mm high LCD display shows the reading and also has polarity, low battery and overload indicators, with a sampling rate of x3 per second. All the resistance ranges (except the 200Ω range) are 'low-power'. The diode test function allows the actual voltage drop across the junction to be measured and compared with other devices. It is also possible to perform these measurements on a device in-circuit, but this is inaccurate if the junction is shunted by a resistance of 1kΩ or less.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	100μV	±0.8% rdg ± 2 dgts
2V	1mV	±0.8% rdg ± 2 dgts
20V	10mV	±0.8% rdg ± 2 dgts
200V	100mV	±0.8% rdg ± 2 dgts
1000V	1V	±0.8% rdg ± 2 dgts

Input impedance: 10MΩ all ranges
 Overload protection: 500V DC, 350V AC for 15s on 200mV range; 1100V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.5% rdg ± 4 dgts
750V	1V	±1.5% rdg ± 4 dgts

Overload protection: 1100V DC, 800V AC for all ranges
 Input impedance: 4.5MΩ

DC Current

Range	Resolution	Accuracy
2mA	1μA	±1.5% rdg ± 2 dgts
20mA	10μA	±1.5% rdg ± 2 dgts
200mA	100μA	±1.5% rdg ± 2 dgts
20A	10mA	±2% rdg ± 2 dgts

Overload protection: 0.5A, 250V fuse all mA ranges
 Voltage drop: 0.3V max.

SELECTION CHART FOR PRECISION GOLD

	M105	M125	M135	M205	M225	M285	M295	M810
DIGITS	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 3/4
ACCURACY	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
DC VOLTAGE	5	5	5	5	5	5	2	5
AC VOLTAGE	2	2	2	5	5	5	2	5
DC CURRENT	4	4	4	5	5	5	2	3
AC CURRENT	-	-	-	5	5	5	2	3
RESISTANCE	6	6	6	6	5	6	3	7
MAX. RES.	20MΩ	20MΩ	20MΩ	200MΩ	20MΩ	200MΩ	20MΩ	400MΩ
BATT. TEST	-	✓	-	✓	-	-	-	-
DIODE TEST	✓	✓	✓	✓	✓	✓	✓	✓
h _{FE}	-	✓	✓	✓	✓	✓	-	✓
CONTINUITY	-	✓	✓	✓	✓	✓	✓	✓
CAPACITANCE	-	-	-	-	5	5	-	5
MAX. CAP.	-	-	-	-	20μF	20μF	-	40μF
FREQUENCY	-	-	3	-	-	3	-	Auto
MAX. FREQ.	-	-	200kHz	-	-	200kHz	-	4MHz
LOGIC TEST	-	-	-	-	-	-	-	✓
TEMPERATURE	-	-	-	-	-	✓	-	-
AUTORANGING	-	-	-	-	-	-	✓	-

	M6000	POCKET PG108	PG102	M-102BZ	M195	M920	M2500I	
DIGITS	3 1/2	3 1/2	Anlg.	Anlg.	Anlg.	3 1/2	3 1/2	Anlg.
ACCURACY	0.25%	2%	4%	4%	4%	1%	0.5	3%
DC VOLTAGE	5	Auto	4	6	5	-	3	-
AC VOLTAGE	5	Auto	4	5	4	-	2	1
DC CURRENT	5	-	2	5	4	-	-	-
AC CURRENT	5	-	-	-	-	-	3	-
AMP CLAMP	-	-	-	-	-	-	✓	-
RESISTANCE	6	Auto	1	4	3	7	2	1
MAX. RES.	20MΩ	2MΩ	1MΩ	10MΩ	10MΩ	20MΩ	200KΩ	200MΩ
BATT. TEST	-	-	✓	✓	✓	-	-	-
DIODE TEST	-	-	-	-	-	-	✓	-
CONTINUITY	-	✓	-	✓	✓	-	✓	-
CAPACITANCE	-	-	-	-	-	7	-	-
MAX. CAP.	-	-	-	-	-	200μF	-	-
AUTORANGING	-	✓	-	-	-	-	-	-
INDUCTANCE	-	-	-	-	-	6	-	-
MAX. IND.	-	-	-	-	-	200H	-	-

Where appropriate the table shows the number of ranges for each function. The accuracy stated applies to the basic DC voltage function, except M195 which refers to resistance and M2500I which refers to insulation resistance.

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±0.8% rdg ± 2 dgts
2kΩ	1Ω	±0.8% rdg ± 2 dgts
20kΩ	10Ω	±0.8% rdg ± 2 dgts
200kΩ	100Ω	±0.8% rdg ± 2 dgts
2MΩ	1kΩ	±0.8% rdg ± 2 dgts
20MΩ	10kΩ	±1.5% rdg ± 3 dgts

Overload protection: 500V DC, 350V AC
 Test voltage: 3.2V max. on 200Ω range, 1V max. on all other ranges.

Diode Test

Test current: 1mA ±0.6mA
 Test voltage: 3.2V max
 Overload protection: 500V DC, 350V AC

Dimensions: 171 x 88 x 39mm
 Weight: 300g

Supplied with a pair of test probes, battery and instruction manual.
 A soft case is available separately.

Order Code	Type	Price each
KW10L A1	Digi Multimeter M105	£19.99
ZC58N	Meter Case 180	£3.25

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01702 553935

Digital Multimeter with Transistor Tester M125



A high quality multimeter giving accurate measurements over a number of different ranges, including AC and DC voltage, DC current, and resistance which includes a continuity buzzer which sounds if the resistance is 40Ω or less. This rugged, improved model now features SMD technology that provides a greatly extended battery life (up to x10) over the previous model and is now approved to IEC 1010-1 Standards. All the resistance ranges (except 200Ω range) are 'low-power' which means that accurate measurements of in-circuit resistances can be made, as the test voltage is below that necessary to forward bias a diode junction. The meter also has a battery tester for 1.5V and 9V batteries, which also loads the battery to get a more realistic idea of the actual 'in service' value. The diode tester can measure diode and transistor junction forward voltage drop, and transistor h_{FE} measurement is possible for both NPN and PNP devices up to a DC gain of 999. In addition to the usual test lead sockets, a special 4-pin socket in the meter's front panel is provided for small signal transistors with different pin-outs. The diode test function allows the actual voltage drop across the junction to be measured for comparison with other devices. It is also possible to perform these measurements on a device in-circuit, but this is inaccurate if the junction is shunted by a resistance of 1kΩ or less. One rotary switch selects the range desired.

A 3½-digit 22mm high LCD is used to show the reading and also has polarity, low battery and overload indicators. Readings are sampled at the rate of x3 per second.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±0.8% rdg ± 2 dgts
2V	1mV	±0.8% rdg ± 2 dgts
20V	10mV	±0.8% rdg ± 2 dgts
200V	100mV	±0.8% rdg ± 2 dgts
1000V	1V	±0.8% rdg ± 2 dgts

Input impedance: 10MΩ all ranges
Overload protection: 500V DC, 350V AC for 15s on 200mV range; 1100V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.5% rdg ± 4 dgts
750V	1V	±1.5% rdg ± 4 dgts

Overload protection: 1100V DC, 800V AC for all ranges
Input impedance: 4.5MΩ

DC Current

Range	Resolution	Accuracy
2mA	1µA	±1.5% rdg ± 2 dgts
20mA	10µA	±1.5% rdg ± 2 dgts
200mA	100µA	±1.5% rdg ± 2 dgts
20A	10mA	±(2% rdg ± 2 dgts)

Overload protection: 0.5A, 250V fuse all mA ranges
Voltage drop: 0.3V max.

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±0.8% rdg ± 2 dgts
2kΩ	1Ω	±0.8% rdg ± 2 dgts
20kΩ	10Ω	±0.8% rdg ± 2 dgts
200kΩ	100Ω	±0.8% rdg ± 2 dgts
2MΩ	1kΩ	±0.8% rdg ± 2 dgts
20MΩ	10kΩ	±1.5% rdg ± 3 dgts

Overload protection: 500V DC, 350V AC
Test voltage: 3.2V max. on 200Ω range, 1V max. on all other ranges.

Continuity Tester

Threshold: <40Ω
Response time: <100ms

Diode Test

Range	Test Load Current
1.5V	100mA
9V	6mA

Test current: 1mA ±0.6mA
Test voltage: 3.2V max
Overload protection: 500V DC, 350V AC

Battery Tester

Dimensions: 171 x 88 x 39mm
Weight: 300g.

Supplied with red and black probes and leads, and instruction manual.
A soft case is available separately.

Order

Code	Type	Price each
KW11M A1	Digi Multimeter M125	£29.99
ZC58N	Meter Case 180	£3.25

Digital Multimeter with Frequency Counter M135



A high quality multimeter giving accurate measurements over a number of ranges, including DC and AC voltage, DC current, and resistance. This rugged, improved model now features SMD technology that provides a greatly extended battery life (up to x10) over the previous model and is now approved to IEC 1010-1 Standards. A frequency

counter, diode tester, continuity buzzer, and a transistor tester for NPN and PNP devices are all provided. One rotary switch selects the range or facility required. A special 4-pin socket in the meter's front panel is provided for small signal transistors with different pin-outs, and these can be easily inserted where the centre pin can be either a base or collector connection. All the resistance ranges (except 200Ω range) are 'low-power' which means that accurate measurements of in-circuit resistances can be made, as the test voltage is below that necessary to forward bias a diode junction. The diode test function allows the actual voltage drop across the junction to be measured for comparison with other devices. It is also possible to perform these measurements on a device in-circuit, but this is inaccurate if the junction is shunted by a resistance of 1kΩ or less. Transistor junctions can be tested in this way too, and transistor h_{FE} measurements can be made up to a DC gain of 999 with open circuit or reversed connection being shown by a '1' as the overrange indicator. The input connections consist of four sockets for voltage, resistance and frequency measurements, with common, mA current and 20A maximum unfused sockets. The continuity buzzer, if used, sounds if the resistance is less than 40Ω. An autoranging frequency function is included that can be used to measure sine waves on the 'HI' input, or square waves, such as TTL logic, on the 'LO' input. A 3½-digit, 22mm high LCD shows the reading and also has polarity, low battery and overload indicators. Readings are sampled at the rate of x3 per second.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±0.8% rdg ± 2 dgts
2V	1mV	±0.8% rdg ± 2 dgts
20V	10mV	±0.8% rdg ± 2 dgts
200V	100mV	±0.8% rdg ± 2 dgts
1000V	1V	±0.8% rdg ± 2 dgts

Input impedance: 10MΩ all ranges
Overload protection: 500V DC, 350V AC for 15s on 200mV range; 1100V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.5% rdg ± 4 dgts
750V	1V	±1.5% rdg ± 4 dgts

Overload protection: 1100V DC, 800V AC for all ranges
Input impedance: 4.5MΩ

DC Current

Range	Resolution	Accuracy
2mA	1µA	±1.5% rdg ± 2 dgts
20mA	10µA	±1.5% rdg ± 2 dgts
200mA	100µA	±1.5% rdg ± 2 dgts
20A	10mA	±(2% rdg ± 2 dgts)

Overload protection: 0.5A, 250V fuse all mA ranges
Voltage drop: 0.3V max.

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±0.8% rdg ± 2 dgts
2kΩ	1Ω	±0.8% rdg ± 2 dgts
20kΩ	10Ω	±0.8% rdg ± 2 dgts
200kΩ	100Ω	±0.8% rdg ± 2 dgts
2MΩ	1kΩ	±0.8% rdg ± 2 dgts
20MΩ	10kΩ	±1.5% rdg ± 3 dgts

Overload protection: 500V DC, 350V AC
Test voltage: 3.2V max. on 200Ω range, 1V max. on all other ranges.

Continued on next page.

Continued from previous page.

Continuity Test

Threshold: <math><40\Omega</math>
Response time: <math><100\text{ms}</math>

Diode Test

Test current: 1mA \pm 0.6mA
Test voltage: 3.2V max
Overload protection: 500V DC, 350V AC.

Autorangeing Frequency Counter

Sensitivity **Range**
100mV Input: 10Hz to 20MHz
TTL Input: 1Hz to 20MHz
Accuracy: \pm 0.3%rdg \pm 2dgt
Overload protection: 500V DC/AC

Dimensions: 171 x 88 x 39mm
Weight: 300g

Supplied with red and black probes and leads, battery and instruction manual.

A soft case is available separately.

Order

Code	Type	Price each
KW12N A1	Digi Multimeter M135	£34.99
ZC58N	Meter Case 180	£3.25

Rugged Digital Multimeter with High Resistance Range M205



A superb rugged digital multimeter that features a battery tester (for 1.5V and 9V batteries) and a high 200M Ω resistance measurement range. Combining quality with accuracy, the display is a 16mm 3 1/2 - digit LCD type, which also offers polarity, low-battery and over-range indicators. In addition to the extensive DC/AC voltage, current and resistance measuring ranges, there are diode, transistor and continuity testers. Supplied with test probes, battery (replacement type PP3) and spare fuse. This meter has been designed to comply with IEC 348 class II and UL1244 safety standards.

Specification

DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	\pm (0.5% rdg + 1dgt)
2V	1mV	\pm (0.5% rdg + 1dgt)
20V	10mV	\pm (0.5% rdg + 1dgt)
200V	100mV	\pm (0.5% rdg + 1dgt)
1000V	1V	\pm (0.5% rdg + 1dgt)

Input impedance: 10M Ω
Overload protection: 500V DC, 350V AC for 15s on 200mV range, 1200V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	\pm (1% rdg + 4dgt)
2V	1mV	\pm (1% rdg + 4dgt)
20V	10mV	\pm (1% rdg + 4dgt)
200V	100mV	\pm (1% rdg + 4dgt)
750V	1V	\pm (1.5% rdg + 4dgt)

Input impedance: 10M Ω
Overload protection: 500V DC, 350V AC for 15s. for 200mV range, 1200V DC, 800V AC for all other ranges.

DC Current

Range	Resolution	Accuracy
200 μ A	100nA	\pm (1% rdg + 1dgt)
2mA	1 μ A	\pm (1% rdg + 1dgt)
20mA	10 μ A	\pm (1% rdg + 1dgt)
200mA	100 μ A	\pm (1% rdg + 1dgt)
10A	10mA	\pm (2% rdg + 3dgt)

Voltage drop: 10A range, 700mV max. All other ranges, 325mV max.

Overload protection: 10A input, unfused, up to 12A for 30s, 0.8A 250V fuse for all other ranges.

AC Current

Range	Resolution	Accuracy
200 μ A	100nA	\pm (1.2% rdg + 4dgt)
2mA	1 μ A	\pm (1.2% rdg + 4dgt)
20mA	10 μ A	\pm (1.2% rdg + 4dgt)
200mA	100 μ A	\pm (1.2% rdg + 4dgt)
10A	10mA	\pm (2% rdg + 4dgt)

Voltage drop: 10A range 700mA max. All other ranges, 325mV max.

Overload protection: 10A input, unfused, up to 12A for 30s, 0.8A 250V fuse for all other ranges.

Resistance

Range	Resolution	Accuracy
200 Ω	100m Ω	\pm (1% rdg \pm 3dgt)
2k Ω	1 Ω	\pm (0.8% rdg + 1dgt)
20k Ω	10 Ω	\pm (0.8% rdg + 1dgt)
200k Ω	100 Ω	\pm (0.8% rdg + 1dgt)
20M Ω	1k Ω	\pm (3% rdg + 1dgt)
200M Ω	10k Ω	\pm (5% rdg + 4dgt)

Overload protection: 500V DC/AC
Test voltage: 3.2V max.

Continuity Test

Threshold: 60 Ω approx.
Response: 100ms

Battery Test

Ranges: 1.5V, 9V
Accuracy: \pm 3% rdg + 1dgt
Loaded current: 1.5V 200mA; 9V 6mA

Diode Test

Test current: 1.0 \pm 0.6mA

Transistor h_{fe}

Base current: 10 μ A DC
VCE: 2.8 \pm 0.4V
Dimensions: 160 x 84 x 32mm
Weight: 200g

A soft case is available separately.

Order

Code	Type	Price each
ZC55K A1	Digi Multimeter M205	£39.99
ZC59P	Meter Case 160	£3.25

Digital Multimeter with Capacitance Meter M225



A superb digital multimeter combining quality and accuracy with a 16mm 3 1/2 - digit LCD type display, which also offers polarity, low-battery and over-range indicators. In addition to the extensive DC/AC voltage, current and resistance measuring ranges, there are diode, transistor, continuity testers, and a capacitance meter. Supplied with test probes, battery (replacement PP3) and spare fuse. It has been designed to meet the new IEC 348 class II and UL1244 safety standards.

Specification

DC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	\pm (0.5% rdg + 1dgt)
2V	1mV	\pm (0.5% rdg + 1dgt)
20V	10mV	\pm (0.5% rdg + 1dgt)
200V	100mV	\pm (0.5% rdg + 1dgt)
1000V	1V	\pm (0.5% rdg + 1dgt)

Input impedance: 10M Ω
Overload protection: 500V DC, 350V AC for 15s on 200mV range, 1200V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	\pm (1% rdg + 4dgt)
2V	1mV	\pm (1% rdg + 4dgt)
20V	10mV	\pm (1% rdg + 4dgt)
200V	100mV	\pm (1% rdg + 4dgt)
750V	1V	\pm (1.5% rdg + 4dgt)

Input impedance: 10M Ω
Overload protection: 500V DC, 350V AC for 15s on 200mV range, 1200V DC, 800V AC for all other ranges.

DC Current

Range	Resolution	Accuracy
200 μ A	100nA	\pm (1% rdg + 1dgt)
2mA	1 μ A	\pm (1% rdg + 1dgt)
20mA	10 μ A	\pm (1% rdg + 1dgt)
200mA	100 μ A	\pm (1% rdg + 1dgt)
10A	10mA	\pm (2% rdg + 3dgt)

Voltage drop: 10A range, 700mV max. all other ranges, 325mV max.

Overload protection: 10A input, unfused, up to 12A for 30s, 0.8A 250V fuse for all other ranges.



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AC Current

Range	Resolution	Accuracy
200µA	100nA	±(1.2% rdg + 4dgt)
2mA	1µA	±(1.2% rdg + 4dgt)
20mA	10µA	±(1.2% rdg + 4dgt)
200mA	100µA	±(1.2% rdg + 4dgt)
10A	10mA	±(2% rdg + 4dgt)

Voltage drop: 10A range, 700mA max.
All other ranges, 325mV max.
Overload protection: 10A input, unfused, up to 12A for 30s. 0.8A 250V fuse for all other ranges.

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1% rdg ± 3dgt)
2kΩ	1Ω	±(0.8% rdg + 1dgt)
20kΩ	10Ω	±(0.8% rdg + 1dgt)
200kΩ	100Ω	±(0.8% rdg + 1dgt)
20MΩ	1kΩ	±(3% rdg + 1dgt)

Overload protection: 500V D/C/AC
Test voltage: 3.2V max.

Continuity Test

Threshold: 60Ω approx.
Response: 100ms

Capacitance

Range	Resolution	Accuracy
2000pF	1pF	±(3%rdg + 10dgt)
20nF	10pF	±(3%rdg + 10dgt)
200nF	100pF	±(3%rdg + 10dgt)
2µF	1nF	±(3%rdg + 10dgt)
20µF	10nF	±(3%rdg + 10dgt)

Test frequency: 400Hz.

Diode Test

Test current: 1.0 ±0.6mA

Transistor h_{FE}

Base DC current: 10µA
V_{CE}: 2.8 ±0.4V
Dimensions: 160 x 34 x 32mm
Weight: 200g
A soft case is available separately.

Order Code	Type	Price each
ZC56L A1	Digi Multimeter M225	£44.99
ZC59P	Meter Case 160	£3.25

Autoranging Digital Multimeter M295



An autoranging multimeter with an especially large, easy to read LCD display, with range/function, continuity and low battery indicators. This meter is very easy to use and represents extraordinarily good

value. Other features include a 10A range on AC and DC, a diode tester, automatic polarity display and overload 'beeper' indication. The meter has a sampling rate of x2 per second, and comes with a pair of test leads, spare fuse, batteries and operators' manual.

Specification DC Voltage

Range	Accuracy	Input impedance
200mV	±0.5%rdg + 4dgt	>100MΩ
2V to 1000V	±0.8%rdg - 4dgt	10MΩ

Resolution on 200mV range: 100µV
Overload protection: 1100V DC, 800V AC.

AC Voltage

Range	Accuracy	Input impedance
2V	±1%rdg + 8dgt	11MΩ
750V	±1%rdg + 8dgt	10MΩ

Resolution on 2V range: 1mV
Overload protection: 1100V DC, 800V AC.

Current

Range	DC Accuracy	AC Accuracy
200mA	±1.2%rdg + 1dgt	±1.5% + 1dgt
10A	±1.5%rdg + dgt	±2% + 8dgt

Resolution on 200mA range: 100µA
Overload protection: 10A, fused to 12A for 30s, other range 0.8A 250V fuse

Resistance

Range	Accuracy	Overload Protection
200kΩ	±0.8%rdg + 4 dgt	500V AC/DC
2MΩ	±1.0%rdg + 4 dgt	500V AC/DC
20MΩ	±3.0%rdg + 4 dgt	500V AC/DC

Resolution on 200kΩ range: 100mΩ
Test voltage: 0.45V max open circuit voltage

Continuity Bleeper

Threshold: <450Ω approx
Response time: <100ms

Diode

Test current: 0.5mA approx
Test voltage: 1.7V max. open circuit voltage
Power requirements: 2 'AA' batteries
Battery life: 500h approx
Dimensions: 150 x 80 x 35mm
Weight: 250g (including batteries)

Order Code	Type	Price each
BZ78K A1	Digi Multimeter M295	£44.99

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Push-Button Digital Multimeter M6000



A digital multimeter with a comprehensive range of features. It has a 13mm high LCD display which includes a 'LO BAT' indicator, and overrange indication by blanking the three least significant digits. Display response time is normally 1s to rated accuracy. The five different ranges of DC and AC voltage and current, and the resistance range are fully overload protected, using a low capacitance spark gap for overvoltage protection, and a pair of fast switching diodes for the current ranges. In addition, the mA input is protected by a 2A fuse, and the 20A input is rated at up to 20A for 15s. The input of the AC converter is overvoltage protected by a resistor and diode combination, and the resistance input has an inrush current limiter. The test probe potential is switchable from a 'normal' maximum of 3V, which produces best results to a 'low' 0.6V if resistance measurements are required around semiconductor junctions. The 'high' position is also used to test forward and reverse bias continuity of diodes. The very low power consumption of this meter provides for a battery life of 2000h using an alkaline PP3. The meter has sideways action push-button range selector switches so that it can be held and operated in one hand. Fitted with non-slip feet and bench tilt stand.

Specification

Maximum open circuit voltage: <3V
Input impedance: 10MΩ all ranges

DC Volts

Range	Resolution	Accuracy
200mV	100µV	±(0.25% rdg + 1dgt)
2V	1mV	±(0.25% rdg + 1dgt)
20V	10mV	±(0.25% rdg + 1dgt)
200V	100mV	±(0.25% rdg + 1dgt)
1000V	1V	±(0.25% rdg + 1dgt)

AC Volts

Range	Resolution	Accuracy
200mV	100µV	±(0.5% rdg + 2dgt)
2V	1mV	±(0.5% rdg + 2dgt)
20V	10mV	±(0.5% rdg + 2dgt)
200V	100mV	±(0.5% rdg + 2dgt)
750V	1V	±(1% rdg + 2dgt)

Frequency range: 45Hz to 400Hz
45Hz to 120Hz (750V)
AC response time: 3s to rated accuracy
Max allowable input: 750V AC

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DC Current

Range	Resolution	Accuracy
200µA	100nA	±(0.5% rdg + 1dgt)
2mA	1µA	±(0.5% rdg + 1dgt)
20mA	10µA	±(0.5% rdg + 1dgt)
200mA	100µA	±(0.75% rdg + 1dgt)
2000mA	1mA	±(1.5% rdg + 1dgt)
20A	10mA	±(2% rdg + 5dpts)

Max allowable input: 1000V DC

AC Current

Range	Resolution	Accuracy
200µA	100nA	±(0.75% rdg + 5dpts)
2mA	1µA	±(0.75% rdg + 5dpts)
20mA	10µA	±(0.75% rdg + 5dpts)
200mA	100µA	±(0.75% rdg + 5dpts)
2000mA	1mA	±(1.5% rdg + 5dpts)
20A	10mA	±(3% rdg + 5dpts)

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(0.5% rdg + 1dgt)
2kΩ	1Ω	±(0.3% rdg + 1dgt)
20kΩ	10Ω	±(0.3% rdg + 1dgt)
200kΩ	100Ω	±(0.3% rdg + 1dgt)
2MΩ	1kΩ	±(0.75% rdg + 1dgt)
20MΩ	10kΩ	±(1.5% rdg + 1dgt)

Dimensions: 180 x 86 x 37mm
Weight: 320g

Supplied with operating instructions, one battery (replacement type PP3), one red and one black test lead with probes and shrouded connectors.

A soft case is available separately.

Order

Code	Type	Price each
YJ78K	A1 Push Button DMM	£44.99
YN72P	Case CB50D	£4.59

Digital Multimeter with TTL Logic Tester M810



A versatile digital multimeter which combines a range of useful features in one easy to use package. In addition to DC and AC voltage, DC and AC current and resistance ranges, the unit also has a capacitance tester, diode and transistor tester, a frequency counter and logic tester. The very useful logic tester can be used with TTL levels and indicates whether a logic data line is high or low, the state being shown on the display through the use of up and down arrows. Frequency measurements are also possible and the instrument is able to measure frequencies over the range 10Hz to 4MHz. Diode forward drop and the DC gain of NPN and PNP transistors can be tested, with the special sockets provided in the front panel. The capacitance meter

can measure from 1pF to 40F, and special sockets allow capacitors with different pin spacings to be connected, and a display hold facility allows a reading to be kept on the display at any time. The display is a 3³/₄ LCD which can show digits up to 3999, and includes polarity, overrange, low battery indicators and has a peak hold function. Battery life is up to 200 hours.

Specification

DC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(0.5% rdg + 1dgt)
4V	1mV	±(0.5% rdg + 1dgt)
400V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 20MΩ
Overload protection: 500V DC/350V AC for 15s on 400mV range; 1200V DC/800V AC on all other ranges.

AC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(1% rdg + 4dpts)
4V	1mV	±(1% rdg + 4dpts)
40V	10mV	±(1% rdg + 4dpts)
400V	100mV	±(1% rdg + 4dpts)
750V	1V	±(1.5 rdg + 4dpts)

Input impedance: 20MΩ
Overload protection: 500V DC, 350V AC for 15s on 400mV 1200V DC, 800V AC for all other ranges

DC Current

Range	Resolution	Accuracy
40mA	10µA	±(1% rdg + 1dgt)
400mA	100µA	±(1% rdg + 1dgt)
10A	1mA	±(2% rdg + 3dpts)

Voltage drop: 700mV max. for 10A range
Overload protection: 10A input, unfused, up to 12A for 30s, 0.8A 250V fuse for all other ranges

AC Current

Range	Resolution	Accuracy
40mA	10µA	±(1.2 rdg + 4dpts)
400mA	100µA	±(1.2 rdg + 4dpts)
10A	1mA	±(2% rdg + 4dpts)

Voltage drop: 10A range 700mV max.
Overload protection: 10A input, unfused, up to 12A for 30s, 0.8A, 250V fuse for all other ranges.

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(5% rdg + 10dpts)
4kΩ	1Ω	±(0.8% rdg + 1dgt)
40kΩ	10Ω	±(0.8% rdg + 1dgt)
400kΩ	100Ω	±(0.8% rdg + 1dgt)
4MΩ	1kΩ	±(0.8% rdg + 1dgt)
40MΩ	10kΩ	±(3% rdg + 3dpts)
400MΩ	100kΩ	±(1% rdg + 20dpts)

Overload protection: 500V AC, 500V DC.
Test Voltage: 32 max.

Diode Test

Test range: 1.0 ±0.6A
Test voltage: 3.2V max.

Test h_{FE}

Base DC current: 10A
VCE: 2.8V ±0.4V
Range: 0 to 1000

Frequency Counter Ranges

Auto-ranging: 10kHz to 4MHz
Input sensitivity: 50mV rms

Accuracy: ±(1% rdg + 2dpts)
Overload protection: 500V DC, 500V AC.
Minimum reading: 10Hz.

Capacitance Measurement

Range	Resolution	Accuracy
4nF	1pF	±(3% rdg + 10dpts)
40nF	10pF	±(3% rdg + 10dpts)
400nF	100pF	±(3% rdg + 10dpts)
4µF	1nF	±(3% rdg + 10dpts)
40µF	10nF	±(3% rdg + 10dpts)

Test frequency: 400Hz
Test Voltage: 50mV.

Logic Measurement

Logic type: TTL
Input impedance: 120kΩ ±10kΩ
Logic threshold
Logic 1: 2.4V ±0.2V
Logic 0: 0.7V ±0.2V
Frequency response: 20MHz
Detectable pulse width: 25ns min.
Overload protection: 50V DC, 50V AC
Dimensions: 160 x 84 x 26mm
Weight: 250g

Includes red and black test leads, battery and instruction manual. Case style may vary.

Order

Code	Type	Price each
ZC60Q	A1 Digi Multimeter M810	£49.99

Digital Multimeter with Electronic Thermometer M285



A very well specified multimeter offering many comprehensive features within its resilient yellow plastic case. Combining quality with accuracy, the display is a 16mm 3¹/₂ - digit LCD type, which also offers polarity, low-battery and over-range indicators. In addition to the extensive DC/AC voltage, current and resistance measuring ranges, there are diode, transistor and continuity testers, a capacitance meter, 200kHz frequency counter and even an electronic thermometer. This product has been designed to meet the IEC 348 class II and UL1244 international safety standards, and is supplied with battery (replacement type PP3; a standard zinc-carbon type will provide up to 200 hours use), test probes, thermocouple probe (for temperature measurement), spare fuse and detailed instruction manual. The case incorporates a bench stand.

Specification

DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(0.5% rdg + 1dgt)
2V	1mV	±(0.5% rdg + 1dgt)
20V	10mV	±(0.5% rdg + 1dgt)
200V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 10M Ω
 Overload protection: 500V DC, 350V AC for 15s on 200mV range, 1200V DC, 800V AC on all other ranges.

AC Voltage

Range	Resolution	Accuracy
200mV	100 μ V	$\pm(1\% \text{ rdg} + 4\text{dgt})$
2V	1mV	$\pm(1\% \text{ rdg} + 4\text{dgt})$
20V	10mV	$\pm(1\% \text{ rdg} + 4\text{dgt})$
200V	100mV	$\pm(1\% \text{ rdg} + 4\text{dgt})$
750V	1V	$\pm(1.5\% \text{ rdg} + 4\text{dgt})$

Input impedance: 10M Ω
 Overload protection: 500V DC, 350V AC for 15s on 200mV range; 1200V DC, 800V AC for all other ranges.

DC Current

Range	Resolution	Accuracy
200 μ A	100nA	$\pm(1\% \text{ rdg} + 1\text{dgt})$
2mA	1 μ A	$\pm(1\% \text{ rdg} + 1\text{dgt})$
20mA	10 μ A	$\pm(1\% \text{ rdg} + 1\text{dgt})$
200mA	100 μ A	$\pm(1\% \text{ rdg} + 1\text{dgt})$
10A	10mA	$\pm(2\% \text{ rdg} + 3\text{dgt})$

Voltage drop: 10A range, 700mV max.
 All other ranges, 325mV max.
 Overload protection: 10A input, unfused, up to 12A for 30s 0.8A 250V fuse for all other ranges.

AC Current

Range	Resolution	Accuracy
200 μ A	100nA	$\pm(1.2\% \text{ rdg} + 4\text{dgt})$
2mA	1 μ A	$\pm(1.2\% \text{ rdg} + 4\text{dgt})$
20mA	10 μ A	$\pm(1.2\% \text{ rdg} + 4\text{dgt})$
200mA	100 μ A	$\pm(1.2\% \text{ rdg} + 4\text{dgt})$
10A	10mA	$\pm(2\% \text{ rdg} + 4\text{dgt})$

Voltage drop: 10A range, 700mV max.
 All other ranges, 325mV max.
 Overload protection: 10A input, unfused up to 12A for 30s, 0.8A 250V fuse for all other ranges.

Resistance

Range	Resolution	Accuracy
200 Ω	100m Ω	$\pm(1\% \text{ rdg} \pm 3\text{dgt})$
2k Ω	1 Ω	$\pm(0.8\% \text{ rdg} + 1\text{dgt})$
20k Ω	10 Ω	$\pm(0.8\% \text{ rdg} + 1\text{dgt})$
200k Ω	100 Ω	$\pm(0.8\% \text{ rdg} + 1\text{dgt})$
20M Ω	1k Ω	$\pm(3\% \text{ rdg} + 1\text{dgt})$
200M Ω	10k Ω	$\pm(5\% \text{ rdg} + 4\text{dgt})$

Overload protection: 500V DC/AC
 Test voltage: 3.2V max.

Frequency counter

Range	Resolution	Accuracy
2kHz	1Hz	$\pm(1\% \text{ rdg} + 1\text{dgt})$
20kHz	10Hz	$\pm(1\% \text{ rdg} + 1\text{dgt})$
200kHz	100Hz	$\pm(1\% \text{ rdg} + 1\text{dgt})$

Input sensitivity: 35mV
 Overload protection: 500V DC/AC

Temperature measurement

Range: -20°C to 1000°C.
 Resolution: 1°C.
 Accuracy
 <= 400°C: $\pm(1\% \text{ rdg} + 2\text{dgt})$
 >400°C: $\pm(2\% \text{ rdg} + 2\text{dgt})$

Capacitance measurement

Range	Resolution	Accuracy
2000pF	1pF	$\pm(3\% + 10\text{dgt})$
20nF	10pF	$\pm(3\% + 10\text{dgt})$
200nF	100pF	$\pm(3\% + 10\text{dgt})$
2 μ F	1nF	$\pm(3\% + 10\text{dgt})$
20 μ F	10nF	$\pm(3\% + 10\text{dgt})$

Test frequency: 400Hz

Continuity test

Threshold: 60 Ω approx
 Response: 100ms

Diode Test

Test current: 1.0 \pm 0.6mA

Transistor h_{FE}

Base current: 10 μ A DC
 VCE: 2.8V \pm 0.4V

Dimensions: 160 x 84 x 32mm
 Weight: 200g

A soft case is available separately.

Order

Code	Type	Price each
ZC57M A1	Digi. Multimeter M285	£59.99
ZC59P	Meter Case 160	£3.25

Replacement Thermocouple for M285



A replacement K-type thermocouple for use with the 285 multimeter. The thermocouple gives a high degree of accuracy at both high and low temperatures. This unit has heat proof sleeving and a standard K-type plug.

Order

Code	Type	Price each
KW09K	Thermocouple	£6.99

Replacement Thermocouple for M3500TC



A replacement K-type thermocouple for use with the M3500TC multi-purpose digital multimeter. This thermocouple is also suitable for use in temperature measurement applications where a high degree of accuracy is required. The thermocouple consists of two wires; nickel-chromium and nickel-aluminium, the sensor tip is a welded junction between the two metals, which produces an emf proportional to the junction temperature. The conductors are insulated with a heat proof mineral sleeve and terminated in a type-K thermocouple plug. The overall length is 91cm.

Order

Code	Type	Price each
ZA13P	Temperature Probe	£7.25

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A range of high quality multimeters with superb specifications suitable for the serious amateurs and professional engineers. All multimeters in the range offer outstanding value for money.

SELECTION CHART FOR WHITE GOLD RANGE

	WG020	WG021	WG022	WG023	WG025	WG026
DIGITS	3 1/2	3 3/4	3 3/4	4 1/2	3 3/4	3 1/2
ACCURACY	0.5%	0.5%	0.5%	0.05%	0.5%	0.5%
DC VOLTAGE	5	5	5	5	5	6
AC VOLTAGE	5	5	5	5	5	6
DC CURRENT	3	3	4	5	3	6
AC CURRENT	3	3	4	5	3	6
RESISTANCE	7	7	6	7	6	8
MAX. RES.	2000M Ω	4000M Ω	40M Ω	20M Ω	40M Ω	2000M Ω
LOGIC TEST	-	✓	-	-	-	-
DIODE TEST	✓	✓	✓	✓	✓	✓
h_{FE}	✓	✓	-	✓	✓	✓
CONTINUITY	✓	✓	✓	✓	✓	✓
CAPACITANCE	5	5	5	-	5	6
MAX. CAP.	200 μ F	200 μ F	40 μ F	-	40 μ F	20 μ F
INDUCTANCE	5	5	-	-	-	-
MAX. IND.	20H	20H	-	-	-	-
FREQUENCY	15MHz	1MHz	1MHz	-	1MHz	15MHz
DUTY CYCLE	✓	-	-	-	-	-

Where appropriate the table shows the number of ranges for each function. All multimeters are supplied with test leads, battery and full instruction manual. The accuracy stated applies to the basic DC voltage function. All multimeters in the White Gold Range conform to IEC 1010-1 standards

Digital Multimeter with 3³/₄-Digit LCD and Frequency Function WG025

A quality, versatile, digital multimeter which provides a comprehensive range of useful features in one, easy to use package. In addition to AC/DC voltage, AC/DC current and resistance, the meter features functions for the measurement of capacitance and frequency. It also features transistor and diode test facilities, and a continuity buzzer. All of these features are selected by a single rotary switch. The frequency function is autoranging and the resistance function includes the continuity buzzer, which sounds if the resistance is less than 40Ω. A 3³/₄-digit LCD screen displays the reading, the polarity indicator, the logic indicators and the function/range selected. Also shown are the battery low and range overload indicators. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. Readings on all ranges are sampled at a rate of $x2^{1/2}$ per second. Conforms to IEC 1010-1 Standards.



Frequency range: 50Hz to 500Hz
 Input protection: 0.5A/250V quick-blow fuse
 20A/600V quick-blow ceramic fuse

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(1% rdg + 4dgt)
4kΩ	1Ω	±(0.8% rdg + 2dgt)
40kΩ	10Ω	±(0.8% rdg + 2dgt)
400kΩ	100Ω	±(0.8% rdg + 2dgt)
4000kΩ	1kΩ	±(0.8% rdg + 2dgt)
40MΩ	10kΩ	±(3% rdg + 4dgt)

Open circuit voltage: 3.0V DC on 400Ω range
 0.6V DC on all other ranges
 Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
4nF	1pF	±(5% rdg + 10dgt)
40nF	10pF	±(5% rdg + 10dgt)
400nF	100pF	±(5% rdg + 10dgt)
4μF	1nF	±(5% rdg + 10dgt)
40μF	10nF	±(5% rdg + 10dgt)

Frequency (autoranging)

Range	Resolution	Accuracy
4kHz	1Hz	±(0.5% rdg + 1dgt)
40kHz	10Hz	±(0.5% rdg + 1dgt)
400kHz	100Hz	±(0.5% rdg + 1dgt)
1000kHz	1kHz	±(0.5% rdg + 1dgt)

Sensitivity: 0.2V rms min
 Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
 Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
 Test current: 1.0mA ±0.6mA
 Open circuit voltage: 3.0V DC typical
 Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
 Base current: 10μA DC approx
 Vce: 3.3V DC

Dimensions: 200 x 90 x 40mm
 Weight: 400g including battery
 Battery life: 150h min
 Battery: 9V PP3 type

Supplied with a pair of test leads, battery and a full instruction manual. Spare test leads and a protective holster are available separately.

Order Code: GW30H A1
 Type: Model WG025 Digi M/M
 Price each: £49.99

Digital Multimeter with 'Hold' Function WG026

A quality, versatile, sensitive digital multimeter which provides a comprehensive range of useful features in one, easy to use package. In addition to voltage, current and resistance, the meter features functions for the measurement of capacitance, and frequency. It also features transistor and diode test facilities and a continuity buzzer. All of these features are selected by a single rotary switch with a separate push-button marked 'DC/AC' to toggle between DC or AC and a further push-button marked 'MAX' allowing the highest reading to be held. The frequency function is autoranging and the resistance function includes the continuity buzzer, which sounds if the resistance is less than 40Ω. A 3¹/₂-digit LCD screen displays the reading, the polarity indicator and the function/range selected. Also shown are the battery low and range overload indicators. With the exception of the 20Ω, 200Ω and 2000MΩ ranges, all resistance ranges are 'low power', which means that accurate measurement of in-circuit resistances can be made, because the test voltage is below that necessary to forward bias a silicon diode junction. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. The logic test function is a useful aid for checking the logic high or low state of a digital circuit. Readings on all ranges are sampled at a rate of $x2^{1/2}$ per second. Conforms to IEC 1010-1 Standards.



Specification DC Voltage

Range	Resolution	Accuracy
20mV	10μV	±(1% rdg + 5dgt)
200mV	100μV	±(0.5% rdg + 1dgt)
2V	1mV	±(0.5% rdg + 1dgt)
20V	10mV	±(0.5% rdg + 1dgt)
200V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 10MΩ
 Overload protection: 1000V DC or 750V AC rms

AC Voltage

Range	Resolution	Accuracy
20mV	10μV	±(3% rdg + 5dgt)
200mV	100μV	±(1.5% rdg + 4dgt)
2V	1mV	±(1.5% rdg + 4dgt)
20V	10mV	±(1.5% rdg + 4dgt)
200V	100mV	±(1.5% rdg + 4dgt)
750V	1V	±(2% rdg + 4dgt)

Input impedance: 10MΩ
 Frequency range: 50Hz to 500Hz
 Overload protection: 1000V DC or 750V AC rms



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Specification DC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(0.5% rdg + 1dgt)
4V	1mV	±(0.5% rdg + 1dgt)
40V	10mV	±(0.5% rdg + 1dgt)
400V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 10MΩ
 Overload protection: 1000V DC or 750V AC rms

AC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(1.5% rdg + 4dgt)
4V	1mV	±(1.5% rdg + 4dgt)
40V	10mV	±(1.5% rdg + 4dgt)
400V	100mV	±(1.5% rdg + 4dgt)
750V	1V	±(2% rdg + 4dgt)

Input impedance: 10MΩ
 Frequency range: 50Hz to 500Hz
 Overload protection: 1000V DC or 750V AC rms

DC Current

Range	Resolution	Accuracy
40mA	10μA	±(1.5% rdg + 1dgt)
400mA	100μA	±(1.5% rdg + 1dgt)
20A	10mA	±(3% rdg + 1dgt)

Input protection: 0.5A/250V quick-blow fuse
 20A/600V quick-blow ceramic fuse

AC Current

Range	Resolution	Accuracy
40mA	10μA	±(2% rdg + 4dgt)
400mA	100μA	±(2% rdg + 4dgt)
20A	10mA	±(3.5% rdg + 4dgt)

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DC Current

Range	Resolution	Accuracy
20µA	10nA	±(1.5% rdg + 1dgt)
200µA	100nA	±(1.5% rdg + 1dgt)
2mA	1µA	±(1.5% rdg + 1dgt)
20mA	10µA	±(1.5% rdg + 1dgt)
2A	1mA	±(3% rdg + 1dgt)
20A	10mA	±(3% rdg + 1dgt)

Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

AC Current

Range	Resolution	Accuracy
20µA	10nA	±(2% rdg + 4dgt)
200µA	100nA	±(2% rdg + 4dgt)
2mA	1µA	±(2% rdg + 4dgt)
20mA	10µA	±(2% rdg + 4dgt)
2A	1mA	±(3.5% rdg + 4dgt)
20A	10mA	±(3.5% rdg + 4dgt)

Frequency range: 50Hz to 500-Hz
Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

Resistance

Range	Resolution	Accuracy
20Ω	10mΩ	±(1% rdg + 4dpts)
200Ω	100mΩ	±(1% rdg + 4dpts)
2kΩ	1Ω	±(0.8% rdg + 2dpts)
20kΩ	10Ω	±(0.8% rdg + 2dpts)
200kΩ	100Ω	±(0.8% rdg + 2dpts)
2000kΩ	1kΩ	±(0.8% rdg + 2dpts)
20MΩ	10kΩ	±(3% rdg + 4dpts)
2000MΩ	1MΩ	±(5% rdg - 10dpts) + 10dpts

Open circuit voltage: 3.0V DC on 20Ω, 200Ω and 2000MΩ ranges
0.3V DC on remaining ranges
Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
200pF	0.1pF	±(3% rdg + 10dpts)
2nF	1pF	±(3% rdg + 10dpts)
20nF	10pF	±(3% rdg + 10dpts)
200nF	100pF	±(3% rdg + 10dpts)
2µF	1nF	±(3% rdg + 10dpts)
20µF	10nF	±(3% rdg + 10dpts)

Test frequency: 200Hz

Frequency (autoranging)

Range	Resolution	Accuracy
2kHz	1Hz	±(0.5% rdg + 1dgt)
20kHz	10Hz	±(0.5% rdg + 1dgt)
200kHz	100Hz	±(0.5% rdg + 1dgt)
2000kHz	1kHz	±(0.5% rdg + 1dgt)
15MHz	10kHz	±(0.5% rdg + 1dgt)

Sensitivity: 1V rms min
Overload protection: 500V DC or AC rms

Logic Test

Threshold
Logic High: 2.8V ±0.8V
Logic Low: 0.8V ±0.5V
Indication: 40ms beep at logic low
Frequency response: 20MHz
Detectable pulse width: 25ns
Pulse limits: >30% & <70% duty
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dpts)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.0V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{FE}

Ranges: 0 to 1000
Base current: 10ΩA DC approx
V_{ce}: <3.3V DC
Dimensions: 200 x 90 x 40mm
Weight: 400g including battery
Battery life: 150h min
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual. Spare test leads and a protective holster are available separately.

Order

Code	Type	Price each
GW87U A1	Model WG026 Digi M/M	£54.99

Digital Multimeter with Capacitance, Inductance and Frequency Measurement WG020

This accurate, versatile multimeter features a comprehensive range of functions for the serious hobbyist and professional. The frequency function is

autoranging, and a 'MAX' hold facility allows the highest reading of a varying measurement to be stored. In addition to the basic functions, a 'duty cycle' measurement facility is provided, which is a useful aid for analysing pulsed signals in digital circuits. Continuity test, diode test, and a transistor h_{FE} tester are also included. A protective holster (GW91Y) is available separately for this multimeter and is strongly recommended.

Specification

Display: 3 1/2 Digit LCD

DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(0.5% rdg + 1dgt)
2V	1mV	±(0.5% rdg + 1dgt)
20V	10mV	±(0.5% rdg + 1dgt)
200V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 10MΩ

AC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(1.5% rdg+4dpts)
2V	1mV	±(1.5% rdg+4dpts)
20V	10mV	±(1.5% rdg+4dpts)
200V	100mV	±(1.5% rdg+4dpts)
750V	1V	±(2% rdg + 4dpts)

Input impedance: 10MΩ

DC Current

Range	Resolution	Accuracy
20mA	10µA	±(1.5% rdg + 1dgt)
200mA	100µA	±(1.5% rdg + 1dgt)
20A	10mA	±(3% rdg + 1dgt)

AC Current

Range	Resolution	Accuracy
20mA	10µA	±(2% rdg + 4dpts)
200mA	100µA	±(2% rdg + 4dpts)
20A	10mA	±(3.5% rdg+4dpts)

Resistance

Range	Resolution	Accuracy
200Ω	100mΩ	±(1% rdg + 4dpts)
2kΩ	1Ω	±(0.8% rdg+2dpts)
20kΩ	10Ω	±(0.8% rdg+2dpts)
200kΩ	100Ω	±(0.8% rdg+2dpts)
2MΩ	1kΩ	±(0.8% rdg+2dpts)
20MΩ	10kΩ	±(3% rdg+4dpts)
2000MΩ	1MΩ	±(5% rdg-10dpts) +10dpts

Capacitance

Range	Resolution	Accuracy
2nF	1pF	±(5% rdg + 10dpts)
20nF	10pF	±(5% rdg + 10dpts)
200nF	100pF	±(5% rdg + 10dpts)
2µF	1nF	±(5% rdg + 10dpts)
200µF	100nF	±(8% rdg + 10dpts) above 100µF

Inductance

Range	Resolution	Accuracy
2mH	1µH	±(5% rdg + 20dpts)
20mH	10µH	±(5% rdg + 10dpts)
200mH	100µH	±(5% rdg + 10dpts)
2H	1mH	±(5% rdg + 10dpts)
20H	10mH	±(5% rdg + 10dpts)

Frequency

Range	Resolution	Accuracy
2kHz	1Hz	±(0.5% rdg + 1dgt)
20kHz	10Hz	±(0.5% rdg + 1dgt)
200kHz	100Hz	±(0.5% rdg + 1dgt)
2000kHz	1kHz	±(0.5% rdg + 1dgt)
15MHz	10kHz	±(0.5% rdg + 1dgt)

Sensitivity: 1V rms min
Overload protection: 500V DC or AC rms

Duty Cycle

Ranges: 0 to 90%
Resolution: 0.1%
Accuracy: ±(1% rdg + 10dpts)
Pulse width: >10µs, >20Hz TTL signal
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dpts)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.0V DC typical
Overload protection: 500V DC or AC rms

Dimensions: 200 x 90 x 40mm
Weight: 400g including battery
Battery life: 150h min
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual. Spare test leads and a protective holster are available separately.

Order

Code	Type	Price each
GW26D A1	Model WG020 Digi M/M	£54.99

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3 3/4-Digit LCD Digital Multimeter with Capacitance Function WG021

A quality, versatile, digital multimeter which provides a comprehensive range of useful features in one, easy to use package. In addition to voltage, current and resistance, the meter features functions for the measurement of capacitance, inductance and frequency. It also features transistor, diode and logic test facilities, and a continuity buzzer. All of these features are selected by a single rotary switch with a separate push-button for toggling between AC or DC and a further push-button marked 'MAX' allowing the highest reading to be held. The frequency function is autoranging and the resistance function includes the continuity buzzer, which sounds if the resistance is less than 40Ω.



A 3 3/4-digit LCD screen displays the reading, the polarity indicator, the logic indicators and the function/range selected. Also shown are the battery low and range overload indicators. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. The logic test function is a useful aid for checking the logic high or low state of a digital circuit. Readings on all ranges are sampled at a rate of $x2\frac{1}{2}$ per second. Conforms to IEC 1010-1 Standards.

Specification DC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(0.5% rdg + 1dgt)
4V	1mV	±(0.5% rdg + 1dgt)
40V	10mV	±(0.5% rdg + 1dgt)
400V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: 10MΩ
Overload protection: 1000V DC or 750V AC rms

AC Voltage

Range	Resolution	Accuracy
400mV	100μV	±(1.5% rdg + 4dpts)
4V	1mV	±(1.5% rdg + 4dpts)
40V	10mV	±(1.5% rdg + 4dpts)
400V	100mV	±(1.5% rdg + 4dpts)
750V	1V	±(2% rdg + 4dpts)

Input impedance: 10MΩ
Frequency range: 50Hz to 500Hz
Overload protection: 1000V DC or 750V AC rms

DC Current

Range	Resolution	Accuracy
40mA	10μA	±(1.5% rdg + 1dgt)
400mA	100μA	±(1.5% rdg + 1dgt)
20A	10mA	±(3% rdg + 1dgt)

Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

AC Current

Range	Resolution	Accuracy
40mA	10μA	±(2% rdg + 4dpts)
400mA	100μA	±(2% rdg + 4dpts)
20A	10mA	±(3.5% rdg + 4dpts)

Frequency range: 50Hz to 500Hz
Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(1% rdg + 4dpts)
4kΩ	1Ω	±(0.8% rdg + 2dpts)
40kΩ	10Ω	±(0.8% rdg + 2dpts)
400kΩ	100Ω	±(0.8% rdg + 2dpts)
4MΩ	1kΩ	±(0.8% rdg + 2dpts)
40MΩ	10kΩ	±(3% rdg + 4dpts)
4000MΩ	1MΩ	±(5% rdg - 10dpts) + 10dpts

Open circuit voltage: 3.0V DC on 200Ω and 2000MΩ ranges
0.6V DC on all other ranges
Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
4nF	1pF	±(5% rdg + 10dpts)
40nF	10pF	±(5% rdg + 10dpts)
400nF	100pF	±(5% rdg + 10dpts)
4μF	1nF	±(5% rdg + 10dpts)
200μF	100nF	±(5% rdg + 10dpts)
		±(8% rdg + 10dpts) above 100μF

Test frequency: 200Hz

Inductance

Range	Resolution	Accuracy
4mH	1μH	±(5% rdg + 20dpts)
40mH	10μH	±(5% rdg + 10dpts)
400mH	100μH	±(5% rdg + 10dpts)
4H	1mH	±(5% rdg + 10dpts)
20H	10mH	±(5% rdg + 10dpts)

Test frequency: 200Hz

Frequency (autoranging)

Range	Resolution	Accuracy
4kHz	1Hz	±(0.5% rdg + 1dgt)
40kHz	10Hz	±(0.5% rdg + 1dgt)
400kHz	100Hz	±(0.5% rdg + 1dgt)
1000kHz	1kHz	±(0.5% rdg + 1dgt)

Sensitivity: 0.2V rms min
Overload protection: 500V DC or AC rms

Logic Test

Threshold: Logic High: 2.8V ±0.8V
Logic Low: 0.8V ±0.5V
Indication: 40ms beep at logic low
Frequency response: 20MHz
Detectable pulse width: 25ns
Pulse limits: >30% & <70% duty
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dpts)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.0V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{fe}

Ranges: 0 to 1000
Base current: 10μA DC approx
 V_{ce} : 3.3V DC

Dimensions: 200 x 90 x 40mm
Weight: 400g including battery
Battery life: 150h min
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual.

Spare test leads and a protective holster are available separately.

Order Code	Type	Price each
GW27E A1	Model WG021 Digi M/M	£59.99

4 1/2-Digit LCD Precision Digital Multimeter WG023

A high quality, very accurate, digital multimeter with a large 4 1/2-digit LCD readout which combines a comprehensive range of useful features and high sensitivity in one, easy to use package. The meter provides functions for the measurement of AC and DC voltage, AC and DC current and resistance. In addition, it also features transistor and diode test facilities and a continuity buzzer. All of these features are selected by a single rotary switch.



The resistance function includes the continuity buzzer, which sounds if the resistance is less than 40Ω.

A 4 1/2-digit LCD screen displays the reading, the polarity indicator and the function/range selected. Also shown are the battery low and range overload indicators.

The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. The transistor test function allows the actual gain (h_{fe}) to be measured and compared with other devices. Useful for finding matched pairs, for example. Readings on all ranges are sampled at a rate of $x2\frac{1}{2}$ per second. Conforms to IEC 1010-1 Standards.

Specification DC Voltage

Range	Resolution	Accuracy
200mV	10μV	±(0.05% rdg + 4dpts)
2V	100μV	±(0.05% rdg + 4dpts)
20V	1mV	±(0.05% rdg + 4dpts)
200V	10mV	±(0.05% rdg + 4dpts)
1000V	100mV	±(0.05% rdg + 4dpts)

Input impedance: 10MΩ
Overload protection: 1000V DC or 750V AC rms

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AC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(0.5% rdg + 10dgt)
50Hz to 10kHz:		
10kHz to 20kHz:		
20kHz to 50kHz:		±(5.0% rdg + 30dgt)
2V	1mV	±(0.5% rdg + 10dgt)
50Hz to 10kHz:		
10kHz to 20kHz:		
20kHz to 50kHz:		±(5.0% rdg + 30dgt)
20V	10mV	±(0.5% rdg + 10dgt)
50Hz to 10kHz:		
10kHz to 20kHz:		
20kHz to 50kHz:		±(5.0% rdg + 30dgt)
200V	10mV	±(0.5% rdg + 10dgt)
50Hz to 1kHz:		
1kHz to 20kHz:		
750V	1V	±(1.0% rdg + 10dgt)
50Hz to 1kHz:		

Overload protection: 500V DC or 350V AC (30s) on 200mV range
1000V DC or 750V AC rms on all other ranges

DC Current

Range	Resolution	Accuracy
200µA	10nA	±(0.5% rdg + 10dgt)
2mA	100nA	±(0.5% rdg + 10dgt)
20mA	1µA	±(0.5% rdg + 10dgt)
200mA	10µA	±(0.5% rdg + 10dgt)
20A	1mA	±(2.0% rdg + 10dgt)

Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

AC Current

Range	Resolution	Accuracy
200µA	10nA	±(0.75% rdg + 10dgt)
2mA	100nA	±(0.75% rdg + 10dgt)
20mA	1µA	±(0.75% rdg + 10dgt)
200mA	10µA	±(0.75% rdg + 10dgt)
20A	1mA	±(2.5% rdg + 10dgt)

Frequency range: 50Hz to 500Hz
Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

Resistance

Range	Resolution	Accuracy
20Ω	1mΩ	±(1.0% rdg + 200dgt)
200Ω	10mΩ	±(0.2% rdg + 20dgt)
2kΩ	100mΩ	±(0.2% rdg + 2dgt)
20kΩ	1Ω	±(0.2% rdg + 2dgt)
200kΩ	10Ω	±(0.2% rdg + 2dgt)
2MΩ	100Ω	±(0.2% rdg + 2dgt)
20MΩ	1kΩ	±(2.0% rdg + 3dgt)

Open circuit voltage: <3.5V DC on all ranges
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3.0% rdg + 3dgt)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.3V DC typical
Overload protection: 500V DC or AC rms

Transistor h_{FE}

Ranges: 0 to 1000
Base current: 10µA DC approx
V_{CE}: 3-3V DC
Dimensions: 200 x 90 x 40mm
Weight: 400g including battery
Battery life: 150h min
Battery: 9V PP3 type

Supplied with a pair of test leads, battery and a full instruction manual. Spare test leads and a protective holster are available separately.

Order Code	Type	Price each
GW29G A1	Model WG023 Digi M/M	£64.99

Autoranging Digital Multimeter with Memory and Bar Graph WG022

A superb, versatile and fully autoranging multimeter providing a comprehensive range of features and functions. The various functions are selected by a single rotary switch and include voltage, current, resistance, capacitance, frequency, continuity and diode test. Various push-buttons above the selector switch allow additional features and modes to be chosen. An LCD screen displays the reading in the form of 4 digits and a bar graph display. Also shown are various mode annunciators, polarity indicator, battery low indication, and range overload indicators (in the form of flashing the most significant digit). The 'memory' mode is taken care of by the 'MEM', 'READ' and 'HOLD' buttons. These provide facilities for monitoring and controlling the last reading taken. The 'HOLD' button is also used for the 'data hold' mode to retain the last reading on the display. The range for each function is selected automatically by the meter but, should it be necessary, the 'RANGE' push-button may be used to override the autoranging, and hold on to a selected range. In the 'max/min' mode the minimum or maximum reading is recorded and stored in memory and becomes available by using the 'MAX/MIN' and 'HOLD' buttons. If the stored value is exceeded, then the new reading replaces the stored value. In the 'RELATIVE' mode the last reading taken is stored as a reference value and all future readings are then referenced from that stored value. The 'REL' button is also used for zero adjustment on the lowest capacitance range. A standby mode is included, should the meter be left unattended, to conserve battery power. Using the 'PON' button returns the meter to the normal operating condition. In the continuity function a buzzer will sound when the circuit resistance is less than 40Ω. The diode test function allows the actual voltage drop across the junction to be measured and compared against other devices. It is also possible to perform the diode test function on a device in-circuit, but this test will be inaccurate if the junction is shunted by a resistance of 1kΩ or less. Readings on all ranges are sampled at a rate of two times per second. The current ranges are protected by quick-blow fuses. Conforms to IEC 1010-1 Standards.



Specification

DC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(0.5% rdg + 1dgt)
4V	1mV	±(0.5% rdg + 1dgt)
40V	10mV	±(0.5% rdg + 1dgt)
400V	100mV	±(0.5% rdg + 1dgt)
1000V	1V	±(0.5% rdg + 1dgt)

Input impedance: >10MΩ
Overload protection: 1000V DC or 750V AC rms

AC Voltage

Range	Resolution	Accuracy
400mV	100µV	±(1.5% rdg + 4dgt) manual only
4V	1mV	±(1.5% rdg + 4dgt)
40V	10mV	±(1.5% rdg + 4dgt)
400V	100mV	±(1.5% rdg + 4dgt)
750V	1V	±(2% rdg + 4dgt)

Input impedance: >10MΩ
Frequency range: 50Hz to 1kHz
Overload protection: 1000V DC or 750V AC rms

DC Current

Range	Resolution	Accuracy
4mA	1µA	±(1.5% rdg + 1dgt)
40mA	10µA	±(1.5% rdg + 1dgt)
400mA	100µA	±(1.5% rdg + 1dgt)
20A	10mA	±(3% rdg + 1dgt)

Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

AC Current

Range	Resolution	Accuracy
4mA	1µA	±(2% rdg + 4dgt)
40mA	10µA	±(2% rdg + 4dgt)
400mA	100µA	±(2% rdg + 4dgt)
20A	10mA	±(3.5% rdg + 4dgt)

Frequency range: 50Hz to 500Hz
Input protection: 0.5A/250V quick-blow fuse
20A/600V quick-blow ceramic fuse

Resistance

Range	Resolution	Accuracy
400Ω	100mΩ	±(1.2% rdg + 4dgt)
4kΩ	1Ω	±(1% rdg + 2dgt)
40kΩ	10Ω	±(1% rdg + 2dgt)
400kΩ	100Ω	±(1% rdg + 2dgt)
4MΩ	1kΩ	±(1% rdg + 2dgt)
40MΩ	10kΩ	±(3% rdg + 4dgt)

Open circuit voltage: 0.4V DC on all ranges
Overload protection: 500V DC or AC rms

Capacitance

Range	Resolution	Accuracy
4nF	1pF	±(2% rdg + 20dgt)
40nF	10pF	±(2% rdg + 4dgt)
400nF	100pF	±(2% rdg + 4dgt)
4µF	1nF	±(2% rdg + 4dgt)
40µF	10nF	±(2% rdg + 4dgt) up to 20µF ±(5% rdg + 4dgt) above 20µF

Frequency

Range	Resolution	Accuracy
100Hz	0.1Hz	±(0.05% rdg + 2dgt)
1kHz	1Hz	±(0.05% rdg + 2dgt)
10kHz	10Hz	±(0.05% rdg + 2dgt)
100kHz	100Hz	±(0.05% rdg + 2dgt)
1000kHz	1kHz	±(0.05% rdg + 2dgt)

Sensitivity: 1V rms min
Overload protection: 500V DC or AC rms

Continuity

Audible indication: <40Ω ±20Ω
Overload protection: 500V DC or AC rms

Diode Test

Accuracy: ±(3% rdg + 3dgt)
Test current: 1.0mA ±0.6mA
Open circuit voltage: 3.0V DC typical
Overload protection: 500V DC or AC rms

Continued on next page.

Continued from previous page.

Dimensions: 200 x 90 x 40mm
 Weight: 400g including battery
 Battery life: 150h min
 Battery: 9V PP3 type

Supplied with a pair of test leads, battery and full instruction manual. Spare test leads and a protective holster are available separately.

Order Code	Type	Price each
GW28F A1	Model WG022 Digi M/M	£79.99

Ceramic Fuses

A range of spare ceramic cartridge fuses suitable for our White Gold digital multimeters. The following ratings are available:
 0.5A/600V, 10A/250V, 20A/600V.

Order Code	Type	Price each
GW88V	Fuse 0.5A	£2.99
GW89W	Fuse 10A	£2.99
GW90X	Fuse 20A	£3.49

Multimeter Holster

A resilient, flexible and durable holster for supporting and protecting our White Gold range of digital multimeters. These holsters incorporate a belt hook and provision for stowing/holding test leads. Colour yellow.



Order Code	Type	Price each
GW91Y	Holster	£5.49

Test Leads

A set of spare test leads for our Academy and White Gold ranges of digital multimeters.

Order Code	Type	Price each
GW92A	Test Leads	£2.99

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REPLACEMENT TEST LEADS

Banana Plug Probes



Test leads for Precision Gold series multimeters M810, M195 and M920. Alligator clips for use with these probes are also available.

Shroud Plug/Probes



Test leads for multimeters M105, M125, M135, M205, M225 and M285. Alligator clips for use with these probes are shown below.

Test Lead TL-30K



Spare test leads for multimeters M2020S, M2500I, M5050B and M5050E multimeters. The probes are threaded to take the crocodile clips illustrated.

Test Lead TL-2SK



Test leads for the Pocket Multimeter and Hobby Multimeter.

Alligator Clips



Alligator clips that screw onto the probes of the M105, M108, M125, M135, M205, M225, M285, M300A, M400D, M775, M779, M810, M874, M920, M990, M1300K, M2020S, M2500I, M3500TC, M4510, M5010, M5010EC, M5020A, M5050DB, M5050E, and M6000. Sold as a red and black pair.

Order Code	Type	Price each
KW07H	Banana Plug/Probes	£2.65
KW08J	Shroud Plug/Probes	£2.75
JG09K	Test Lead TL-30K	£1.80
JG07H	Test Lead TL-2SK	£1.65
JG13P	Alligator Clip	99p

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SOFT CARRYING CASES FOR PRECISION GOLD MULTIMETERS

The following table lists the multimeter model against suitable soft case.



Multimeter Model	Case Order Code
Pocket Meter	YN65V
Hobby Meter	YN66W
M102BZ	YN67X
M105	ZC58N
M108	YN72P
M125	ZC58N
M135L	ZC58N
M205	ZC59P
M225	ZC59P
M285	ZC59P
M303	YN70M
M775	YN71N
M776	YN71N
M779	YN71N
M874	YN71N
M889	YN71N
M2020S	YN68Y
2500I	YN68Y
M4510	YN72P
M5010	YN72P
M5010EC	YN72P
M5020A	YN72P
M5050DB	YN69A
M5050E	YN69A
M6000	YN72P

Order Code	Type	Price each
YN65V	Case CB2K	£1.50
YN66W	Case CB10K	£1.36
YN67X	Case CB20K	£2.35
ZC58N	Meter Case 180	£3.25
YN72P	Case CB50D	£4.59
ZC59P	Meter Case 160	£3.25
YN70M	Case CB2D	£2.99
YN71N	Case CB3D	£3.89
YN68Y	Case CB25K	£2.99
YN69A	Case CB50A	£4.25

Holsters for Digital Multimeters

Very tough and strong flexible plastic holsters for use with our digital multimeters (except M105 and M6000). The small Holster is suitable for use with the Hobby Digital, M26, M775, M776, M874, M889 and M1300K multimeters. The large Holster is suitable for the M5010 and M4510 digital multimeters.



Order Code	Type	Price each
YN73Q	Small Holster	£4.25
YN74R	Large Holster	£4.89

FLUKE 10 SERIES PROFESSIONAL DIGITAL MULTIMETERS

A range of professional quality, multimeters from Fluke. These precision digital meters offer a smart set of troubleshooting features in a design that's exceptionally fast and simple to operate – with one hand. The versatile Series 10 have a large, easy-to-read, 4000-count autoranging display, that updates 4 times per second. These meters measure AC and DC voltage to 600 volts and ohms to 40MΩ. Also featured are continuity and diode tests and a 'sleep' mode allows the meter to conserve battery power if left on and unused for some time. The Fluke Series 10 range sets a new standard in low-cost, tough, dependable meters, backed by a 3-year warranty.

Fluke 10



This meter has a basic accuracy of 1.5% on DC and ohms and 2.9% on AC, and has a large easy-to-read 4000 count digital display, which gives a far better resolution than 1,999-count meters. Autoranging selects the range with the best resolution for the job and when you want to control the range manually, just push a button – ideal for fast, repetitive testing. In addition to the standard AC and DC voltage ranges, the meter also measures resistance, and the voltage drop of properly working diodes. Fast continuity checks can be made without the need to watch the display, just listen for the bleep; for continuity as short as 250µs.

Specification DC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(1.5% rdg + 2 dgt), on 4000mV/4V
±(1.5% rdg + 1 dgt), on other ranges

Input impedance: >10MΩ <100pF

Overload protection: 600V rms

CMRR(50Hz or 60Hz): >100dB

NMRR(50Hz or 60Hz): >50dB

AC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(2.9% rdg + 3 dgt) on all ranges

Input impedance: >5MΩ <100pF (AC-coupled)

Overload protection: 600V rms

CMRR(50Hz or 60Hz): >60dB

Resistance

Range: 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ

Resolution: 0.1Ω on 400Ω range

Accuracy: ±(1.5% rdg + 1 dgt)

±(1.5% rdg + 2 dgt) on 400Ω range

±(1.9% rdg + 3 dgt) on 40MΩ range

Open circuit test voltage: <1.5V

Full scale voltage: <450mV DC to 4MΩ, <1.5V DC 40MΩ

Overload protection: 600V rms

Diode Test

Range: 2V

Accuracy: ±(1.5% rdg + 2 dgt)

Overload protection: 600V rms

Continuity Buzzer

Sensitivity: <25Ω buzzer turns on
>250Ω buzzer turns off

General

Display: 3¾ digits, 4000 counts, updates 4/sec.

Power supply: 9V PP3 battery

Battery life: 650hrs continuous (alkaline)

450hrs continuous

(zinc carbon)

Temperature: -10°C to +50°C (operating)

-30°C to +60°C (storage)

Dimensions: 142.3 x 70.5 x 34.6mm

Weight: 286g

Supplied with battery, instruction manual and a pair of test leads.

Order

Code	Type	Price each
ZF42V	A1 Fluke 10 Multimeter	£64.55

Fluke 11



This meter has a basic accuracy of 0.9% on DC and ohms and 1.9% on AC, and has a large easy-to-read 4000 count digital display, which gives a far better resolution than 1,999-count meters. Autoranging selects the range with the best resolution for the job and when you want to control the range manually, just push a button – ideal for fast, repetitive testing. In addition to the standard AC and DC voltage ranges, the meter also measures resistance, capacitance and the voltage drop of properly working diodes. Fast continuity checks can be made without the need to watch the display, just listen for the bleep; for continuity as short as 250µs. The Fluke 11 has V Chek™; an ingenious additional feature that allows you to make fast accurate checks on power sources and supplies. V Chek™ will determine if your circuit is open or if you have a short. If a voltage greater than 4.5V is present, it will automatically change modes to measure AC or DC volts, whichever is detected. If AC and DC are both present, it will display the greater of the two. V Chek™ lowers the meter's normal 10MΩ impedance to a minimum of 2kΩ, so you can distinguish real voltage from false readings caused by leakage from other sources. It even tells you, with a bleep, as it switches function from continuity to voltage. Capacitance can be measured from 1nF to 9999µF in manual or autoranging mode.

Specification

DC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(0.9% rdg + 2 dgt), on 4000mV/4V

±(0.9% rdg + 1 dgt), on other ranges

>10MΩ <100pF >2kΩ

<200pF (V Chek™ & LoZ)

Overload protection: 600V rms

CMRR(50Hz or 60Hz): >100dB

NMRR(50Hz or 60Hz): >50dB

AC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(1.9% rdg + 3 dgt) on all ranges

>5MΩ <100pF

(AC-coupled) >2kΩ

<200pF (V Chek™ & LoZ)

Overload protection: 600V rms

CMRR(50Hz or 60Hz): >60dB

Resistance

Range: 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ

Resolution: 0.1Ω on 400Ω range

Accuracy: ±(0.9% rdg + 1 dgt)

±(1.5% rdg + 3 dgt) on 40MΩ range

Open circuit test voltage: <1.5V

Full scale voltage: <450mV DC to 4MΩ,

<1.5V DC 40MΩ

Overload protection: 600V rms

Diode Test

Range: 2V

Accuracy: ±(1.5% rdg + 2 dgt)

Overload protection: 600V rms

Continuity Buzzer

Sensitivity: <25Ω buzzer turns on

>250Ω buzzer turns off

Capacitance range: 1µF, 10µF, 100µF, 1000µF,

10000µF

Accuracy: ±(1.9% rdg + 2 dgt)

±(10% rdg + 90) on 10000µF range

General

Display: 3¾ digits, 4000 counts, updates 4/sec.

Power supply: 9V PP3 battery

Battery life: 650hrs continuous

(alkaline)

450hrs continuous

(zinc carbon)

Temperature: -10°C to +50°C (operating)

-30°C to +60°C (storage)

Dimensions: 142.3 x 70.5 x 34.6mm

Weight: 286g

Supplied with battery, instruction manual and a pair of test leads.

Order

Code	Type	Price each
ZF43W	A1 Fluke 11 Multimeter	£76.25

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Fluke 12



The top of the range Fluke 12 has all the features of the Fluke 11, and in addition, extra features that make solving intermittent, troublesome, faults so much easier. The Fluke 12 has the ability to record the highest and lowest voltage readings during a 100-hour period and 'time stamps' the readings to the nearest minute. Now you can hook up, walk away, come back later and see what happened – and when. Continuity Capture™ will display intermittent shorts as brief as 250µs, and display them as open-to-short and short-to-open transitions. The display shows the initial condition (either an open or short) and if the meter detects a transition, it beeps and the display captures the transition. Subsequent transitions cause the meter to beep, but the display does not change.

Specification

DC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(0.9% rdg + 2 dgt), on 4000mV/4V
±(0.9% rdg + 1 dgt), on other ranges

Input impedance: >10MΩ <100pF >2kΩ
<200pF (V Chek™ & LoZ)

Overload protection:

600V rms
CMRR(50Hz or 60Hz): >100dB
NMRR(50Hz or 60Hz): >50dB

AC Voltage

Range: 4000mV, 4V, 40V, 400V, 600V

Resolution at 4000mV: 1mV

Accuracy: ±(1.9% rdg + 3 dgt) on all ranges

Input impedance: >5MΩ <100pF (AC-coupled)
>2kΩ <200pF (V Chek™ & LoZ)

Overload protection:

600V rms
CMRR(50Hz or 60Hz): >60dB

Resistance

Range: 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ

Resolution: 0.1Ω on 400Ω range

Accuracy: ±(0.9% rdg + 1 dgt) on 40MΩ range
±(1.5% rdg + 3 dgt)

Open circuit test voltage: <1.5V

Full scale voltage: <450mV DC to 4MΩ,
<1.5V DC 40MΩ

Overload protection:

600V rms

Diode Test

Range: 2V
Accuracy: ±(1.5% rdg + 2 dgt)

Overload protection: 600V rms

Continuity Buzzer

Sensitivity: <25Ω buzzer turns on
>250Ω buzzer turns off

Capacitance range: 1µF, 10µF, 100µF, 1000µF, 10000µF

Accuracy: ±(1.9% rdg + 2 dgt)
±(10% rdg + 90) on 10000µF range

General

Display: 3¾ digits, 4000 counts, updates 4/sec.

Power supply: 9V PP3 battery

Battery life: 650hrs continuous (alkaline)
450hrs continuous (zinc carbon)

Temperature: -10°C to +50°C (operating)

-30°C to +60°C (storage)

Dimensions: 142.3 x 70.5 x 34.6mm

Weight: 286g

Supplied with battery, instruction manual and a pair of test leads.

Order

Code	Type	Price each
ZF44X	A1 Fluke 12 Multimeter	£88.00

Holster for Fluke 10 Range



A tough, strong, flexible snap-on holster for any Fluke Series 10 meters. The holster fits tightly round the meter and gives a high degree of protection should the meter receive any rough handling. A built-in stand positions the meter for a better viewing angle, and a moulded hanger loop allows the meter to be suspended while taking measurements. The loop can also be used to hold a probe, allowing the meter and a probe to be held conveniently in one hand.
Size: 160 x 76 x 40mm

Order

Code	Type	Price each
ZF45Y	Fluke C10 Holster	£14.99

Soft Case for Fluke 10 Range



A soft vinyl zip-fastened carrying case, with belt loop, to safely carry your Fluke Series 10 meters. The manual and test leads fit into the case with the meter and there is a handy plastic holder for your calling cards.

Size: 180 x 145 x 50mm

Order

Code	Type	Price each
ZF46A	Fluke C12 Softcase	£14.99

Fluke 70 Series II Digital Multimeters

These incredible multimeters from Fluke – one of the world's most respected names in laboratory precision instruments – at last bring superb quality to the hobbyist and professional engineer at an affordable price. Yet even at these amazingly low prices these precision digital multimeters (DMM) incorporate a state-of-the-art analogue bar graph which permits instant observation of trends, and makes peaking and nulling particularly easy and finally removes any last advantage an analogue meter could have. These meters feature a large digital display that is easily read from any angle, with accuracy and resolution far greater than even the best analogue meters. The meters offer autoranging, autopolarity, auto-zero, superior overload protection and a ruggedness that makes them virtually indestructible. Each meter carries a full 3-year guarantee. So if you're looking for a meter for a lifetime, there's no longer any choice.

Fluke 70

This meter has a basic accuracy of 0.5% – better than that of the finest analogue-only meters. Autoranging software instantly selects the proper range for maximum resolution. In addition to the standard AC and DC voltage ranges the meter also measures resistance. A diode tester and audible continuity tester are also contained. This meter offers a superb 3200 count resolution and also 31 segment analogue scale. A manual range-holding facility enables a range to be held on-screen, whilst a touch hold facility captures a reading. A 'sleep' mode allows the meter to conserve battery power, should the meter be left on. A diagnostic self-check of critical functions, e.g., battery and all segments will show that everything is working. When measuring, the digital display is updated 21/2 times every second while analogue



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display is updated 25 times a second. The meter also indicates overload, low battery and 'sleep' conditions.

Specification

DC Voltage

Range: 320mV, 3.2V, 32V, 320V, 1000V
 Sensitivity at 320mV: 0.1mV
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 $\pm 0.6\%$ rdg ± 1 dgt on 1000V range
 Input resistance: 10M Ω
 Overload protection: 1000V, 500V on 320mV range
 NMRR (50Hz to 60Hz): >60dB
 CMRR (50Hz to 60Hz): >120dB

AC Voltage

Range: 3.2V, 32V, 320V, 750V
 Sensitivity: 1mV on 3.2V range
 Accuracy: $\pm 2\%$ rdg ± 2 dgt
 Overload protection: 750V AC, 1000V AC

Resistance

Range: 320 Ω , 3200 Ω , 32k Ω , 320k Ω , 3.2M Ω , 32M Ω
 Sensitivity: 0.1 Ω
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 $\pm 0.5\%$ rdg ± 2 dgt on 320 Ω range
 $\pm 2\%$ rdg ± 1 dgt on 32 Ω range
 Open circuit voltage: 3.1V
 Full scale voltage: <450mV, <1.4V on 32M Ω range

Overload protection:

500V rms

Diode test

Range: 0 to 2V
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 Overload protection: 500mV rms

Continuity buzzer

Sensitivity: <150 Ω
 Frequency: 4096Hz continuous

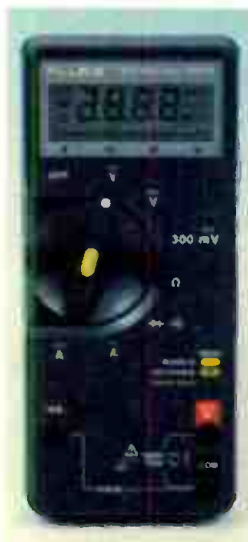
General

Power supply: 9V PP3 battery
 Battery life: >2000hrs (alkaline), 1600hrs (zinc carbon)
 Common mode voltage: 1000V DC or peak AC maximum
 Temperature: 0°C to 55°C (operating) -10°C to 60°C (storage)
 Dimensions: 28 x 75 x 166mm
 Weight: 240g
 Supplied with battery (replacement type PB), instruction manual and a pair of test leads.

Order Code	Type	Price each
ZC62S	A1 Fluke 70 Multimeter	£81.00

Fluke 73

This meter has a basic accuracy of 0.4%, which is better than that provided by most other DMMs. Autoranging software instantly selects the proper range for maximum resolution. In addition to the standard AC and DC voltage ranges the meter also measures AC and DC current, resistance. A diode tester and audible continuity tester are also featured. The meter has a 3200 count resolution surpassing most other digital meters and a 31 segment analogue scale. A manual range-holding facility enables a range to be held on-screen, whilst a touch hold facility captures a reading. A 'sleep' mode allows the meter to conserve battery power, should the meter be left on. A diagnostic self-check of critical functions, e.g., battery and all segments will show that everything is working. When taking a reading the digital display is updated 2½ times every second while analogue display is updated 25 times a second. The meter also indicates overload, low battery and 'sleep' conditions.



Specification

DC Voltage

Range: 320mV, 3.2V, 32V, 320V, 1000V
 Sensitivity at 320mV: 0.1mV
 Accuracy: $\pm 0.4\%$ rdg ± 1 dgt
 Input resistance: 10M Ω
 Overload protection: 1000V, 500V on 320mV range
 NMRR (50Hz to 60Hz): >60dB
 CMRR (50Hz to 60Hz): >120dB

AC Voltage

Range: 3.2V, 32V, 320V, 750V
 Sensitivity: 1mV on 3.2V range
 Accuracy: $\pm 2\%$ rdg ± 2 dgt
 Overload protection: 750V AC, 1000V AC

DC Current

Range: 0 to 10A
 Accuracy: $\pm 1.5\%$ rdg ± 2 dgt
 Sensitivity: 0.01A
 Overload protection: 10A continuous, 20A for 30 secs. max

AC Current

Range: 0 to 10A
 Accuracy: $\pm 2.5\%$ rdg ± 2 dgt
 Frequency: 45Hz to 1kHz
 Sensitivity: 0.01A
 Overload protection: 10A continuous, 20A for 30 secs. max

Resistance

Range: 320 Ω , 3200 Ω , 32k Ω , 320k Ω , 3.2M Ω , 32M Ω
 Sensitivity: 0.1 Ω
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 $\pm 0.5\%$ rdg ± 2 dgt on 320 Ω range
 ± 1 dgt on 32 Ω range
 Open circuit voltage: 3.1V
 Full scale voltage: <450mV, <1.4V on 32M Ω range
 Overload protection: 500V rms

Diode test

Range: 0 to 2V
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 Overload protection: 500mV rms

Continuity buzzer

Sensitivity: <150 Ω
 Frequency: 4096Hz

General

Power supply: 9V PP3 battery
 Battery life: >2000hrs (alkaline), 1600hrs (zinc carbon)
 Common mode voltage: 1000V DC or peak AC maximum
 Temperature: 0°C to 55°C (operating) -40°C to 60°C (storage)
 Dimensions: 28 x 75 x 166mm
 Weight: 240g
 Supplied with battery (replacement type PP3), instruction manual and a pair of test leads.

Order

Code	Type	Price each
YK78K	A1 Fluke 73 Multimeter	£113.50

Fluke 75

This meter has a basic accuracy of 0.4%, and is similar to the Fluke 73, but with better resolution and featuring a current range with improved accuracy. Autoranging software instantly selects the proper range for maximum resolution. In addition to the standard AC and DC voltage ranges, the meter also measures AC and DC current, and resistance. It contains a diode tester and audible continuity tester, and has a 3200 count resolution (unlike most other digital meters with a 31 segment analogue scale). A manual range-holding facility enables a range to be held on-screen, whilst a touch hold facility captures a reading. A 'sleep' mode allows the meter to conserve battery power, should the meter be left on. A diagnostic self-check of critical functions, e.g., battery and all segments will show that everything is working. When measuring, the digital display is updated 2½ times every second and the analogue display is updated 25 times a second. The meter also indicates overload, low battery and 'sleep' conditions.



Specification

DC Voltage

Range: 320mV, 3.2V, 32V, 320V, 1000V
 Sensitivity at 320mV: 0.1mV
 Accuracy: $\pm 0.4\%$ rdg ± 1 dgt
 Input resistance: 10M Ω
 Overload protection: 1000V, 500V on 320mV range
 NMRR (50Hz to 60Hz): >60dB
 CMRR (50Hz to 60Hz): >120dB

AC Voltage

Range: 3.2V, 32V, 320V, 750V
 Sensitivity: 1mV on 3.2V range
 Accuracy: $\pm 2\%$ rdg ± 2 dgt
 Overload protection: 750V AC, 1000V AC

DC Current

Range: 32mA, 320mA, 10A
 Accuracy: $\pm 1.5\%$ rdg ± 2 dgt
 Sensitivity: 0.01mA
 Overload protection: 10A continuous, 20A for 30 secs. max.

AC Current

Range: 32mA, 320mA, 10A
 Accuracy: $\pm 2.5\%$ rdg ± 2 dgt
 Frequency: 45Hz to 1kHz
 Sensitivity: 0.01mA
 Overload protection: 10A continuous, 20A for 30 secs. max.

Continued on next page.

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Continued from previous page.

Resistance
 Range: 320Ω, 3200Ω, 32kΩ, 320kΩ, 3.2MΩ, 32MΩ
 Sensitivity: 0.1Ω
 Accuracy: ±0.5% rdg ±1 dgt
 ±0.5% rdg ±2 dgts on 320Ω range
 ±2% rdg ±1 dgt on 32MΩ range
 Open circuit voltage: 3.1V
 Full scale voltage: <450mV, <1.4V on 32MΩ range
 Overload protection: 500V rms

Diode test
 Range: 0 to 2V
 Accuracy: ±0.5% rdg ±1 dgt
 Overload protection: 500mV rms

Continuity buzzer
 Sensitivity: <150Ω
 Frequency: 4096Hz continuous

General
 Power supply: 9V PP3 battery
 Battery life: >2000hrs (alkaline), 1600hrs (zinc carbon)
 Common mode voltage: 1000V DC or peak AC maximum
 Temperature: 0°C to 55°C (operating) -40°C to 60°C (storage)
 Dimensions: 28 x 75 x 166mm
 Weight: 240g

Supplied with battery (replacement type PP3), instruction manual and a pair of test leads.

Order Code	Type	Price each
YJ88V A1	Fluke 75 Multimeter	£157.50

Fluke 77

This meter has the same resolution as the Fluke 75 and includes the same facilities, but has a better DC voltage accuracy (±0.3% rdg ±1 dgt, and ±0.4% rdg ±1 dgt on 1000V range). A tough protective holster is included for impact protection during everyday use. This item features a stand so that the meter can be angled for better visibility if required. Features of the meter include a basic accuracy of 0.4%, autoranging software, a 3200 count resolution and a 31 segment analogue scale. In addition a 'sleep' mode allows the meter to conserve battery power if left on and unused for some time. When taking readings the digital display is updated 2½ times every second while the analogue display is updated 25 times a second. The LCD panel also indicates overload, low battery and 'sleep' conditions. Supplied with test leads, battery (replacement type PP3), instruction manual and protective holster.



Order Code	Type	Price each
YJ89W A2	Fluke 77 Multimeter	£182.00

Fluke 79

The most comprehensive meter of the Fluke series II range, the Fluke 79 has a better accuracy than most others in its class and offers more facilities. In addition a tough protective holster is included for impact protection during everyday use. This item features a stand so that the meter can be angled for better visibility if required. In addition to several AC/DC voltage/current ranges and resistance measurement (including a 40Ω range), this meter also includes a frequency counter, capacitance meter, diode and continuity testers. Other attributes of the meter include a basic accuracy of 0.3%, autoranging software, a 4000 count resolution, and a 63 segment analogue scale. A 'sleep' mode is provided allowing the meter to conserve battery power if left on and unused for some time. When taking readings the digital display is updated 2½ times every second while the analogue display is updated 25 times a second. The LCD panel also indicates overload, low battery and 'sleep' conditions. Supplied complete with test leads, battery, instruction manual and protective holster.



Specification
DC Voltage
 Range: 40mV, 400mV, 4V, 40V, 400V, 1000V
 Sensitivity: 0.01mV at 400mV
 Accuracy: ±0.3% rdg ±1 dgt ±0.3% rdg ±5 dgts on 40mV range
 Input resistance: 10MΩ
 Overload protection: 1000V, 750V
 NMRR (50Hz to 60Hz): >60dB
 CMRR (50Hz to 60Hz): >120dB

AC Voltage
 Range: 400mV, 4V, 40V, 400V, 750V
 Accuracy: ±1% rdg ±2 dgts ±1.5% rdg ±4 dgts on 400mV ±1.5% rdg ±2 dgts on 4V 750V AC, 1000V DC
 Overload protection: 750V AC, 1000V DC

DC Current
 Range: 4mA, 40mA, 4A, 10A
 Accuracy: ±0.5% rdg ±2 dgts on 4mA and 4A ranges ±0.5% rdg ±5 dgts on 40mA and 10A ranges
 Sensitivity: 0.001mA on 4mA range
 Overload protection: 10A continuous, 20A for 30 secs. max.

AC Current
 Range: 4mA, 40mA, 4A, 10A
 Accuracy: ±1.5% rdg ±2 dgt on 40mA and 10A ranges ±1.5% rdg ±4 dgts on 4mA and 4A ranges
 Frequency: 45Hz to 1kHz
 Sensitivity: 0.001mA
 Overload protection: 10A continuous, 20A for 30 secs. max.

Resistance
 Range: 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ
 Sensitivity: 0.1Ω
 Accuracy: ±0.4% rdg ±1 dgt ±0.4% rdg ±2 dgts on 400Ω range ±1% rdg ±3 dgt on 40MΩ range
 Open circuit voltage: 3.1V
 Full scale voltage: <450mV, <1.3V on 40MΩ range
 Overload protection: 500V rms

Diode test
 Range: 0 to 2.45V
 Accuracy: ±0.4% rdg ±1 dgt
 Overload protection: 500mV rms

Continuity buzzer
 Sensitivity: <30Ω
 Frequency: 4096Hz continuous

Capacitance
 Range: 99.99nF, 999.9nF, 9.999μF, 99.99μF, 9999μF, 9999μF
 Sensitivity: 0.01nF in 99.99nF range
 Accuracy: ±1.9% rdg ±2 dgts ±10% typical for 9.999μF range

Frequency
 Range: 99.99Hz, 999.9Hz, 9.999kHz, 99.99kHz, 999.9kHz
 Sensitivity: 0.01Hz in 99.99Hz range
 Accuracy: ±0.01% rdg ±1 dgt to 20kHz

General
 Power supply: 9V PP3 battery
 Battery life: >700hrs (alkaline), 500hrs (zinc carbon)
 Common mode voltage: 1000V DC or peak AC maximum
 Temperature: 0°C to 55°C (operating) -40°C to 60°C (storage)
 Dimensions: 28 x 75 x 166mm
 Weight: 240g

Order Code	Type	Price each
ZC66W A1	Fluke 79 Multimeter	£222.00

TL75SR Right Angled Test Leads



Red and black replacement leads for the Fluke Mk I and Mk II multimeters. The probes are connected to a flexible insulated cable and a right angled shrouded plug for safety purposes.

Order Code	Type	Price each
ZC67X	R/A Test Lead TL75SR	£12.99

Holster

A shock-absorbing holster for rough handling. The holster incorporates a tilt stand, and will hold or store test leads, and has a belt hook for hands-free carrying.



Order Code	Type	Price each
YK81C	Fluke Meter Holster	£19.99

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Soft Carrying Case



A soft vinyl case with removable belt loop. Holds the meter and test leads ready for testing.

Order Code	Type	Price each
YK79L	Fluke Meter Case	£20.99

Fluke 7x Replacement Fuse

A replacement fuse for the Fluke 70, 73, 75, 77 and 79 digital multimeters. Fuse rating is 15A, 600V AC (max).

Order Code	Type	Price each
UL73C	Fluke 70/ Fuse	£7.99

AVO M2000 SERIES Analogue/Digital Meters

A range of superb quality analogue/digital LCD multimeters which offer a 50mm long 70-segment analogue scale coupled with a 3³/₄ digit display. In addition to auto-ranging voltage and resistance ranges, all models provide continuity buzzer and diode test functions. The 70-point analogue bargraph located along the bottom of the LCD panel displays an accurate representation of the measured value. A negative portion of the display is visible for DC voltages and current measurements so that fluctuations about zero can be studied.

The tough rubber-buffered case resists mechanical shock and incorporates a test prod holder. The terminals are recessed for safety, and each model has been designed to meet BS4743, IEC 348 and VDE 0411 safety specifications. Each model offers over-voltage protection and is supplied with test prods, batteries (replacement type PP3) and full instructions. The range consists of 4 models; M2004, M2005, M2006 and M2007.

M2004 Analogue/Digital Multimeter

This true analogue/digital meter offers a 0.7% basic accuracy, a single 10A (AC and DC) current range, 5 AC and DC voltage ranges and 6 resistance ranges. Overload protection: 500V AC for 10 minutes.



Specification

DC voltage	
Range:	Reads from 300mV to 1000V, 5 ranges autoranging (except 300mV range)
Resolution:	0.1mV max.
Input impedance:	10MΩ/40pF (11MΩ/40pF 3V range)
Accuracy:	±0.7% rdg ±1 dgt (±0.8% rdg ±1 dgt on 100 range)

UNIVERSAL NiCD BATTERY CHARGER AND DISCHARGER



NEW

GREAT VALUE!

£19.99
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[B2]

A very high quality universal automatic NiCd charger that has a discharge cycle built-in, and accepts AAA, AA C, D and PP3. The charger will automatically select the correct charge/discharge rate for the different size batteries. Fast charge will not happen until all the batteries have been fully discharged, and a built-in timer automatically changes from 'fast to trickle charge'. This process will help to prevent 'memory' effect. The unit will charge all the cells (except PP3) in 4h and will accept just one or groups of cells. One or two PP3 will be charged at the standard rate. Each cell (except PP3) has an LED which indicates the state of the charge/discharge process. This charger is designed for NiCd batteries only and is not suitable for other types of cells.

Dimensions: 225 x 65 x 115mm

Batteries not included

Specification

Battery type	Capacity	Charging Time
C/D:	600mA	4h
AA:	200mA	4h
AAA:	60mA	4h
PP3:	11mA	4h

DC current

Range:	Single 10A range
Resolution:	0.01A max.
Accuracy:	±1.5% rdg ±2 dpts

AC voltage

Range:	Reads from 300mV to 1000V, 5 ranges autoranging (except 300mV range)
Resolution:	0.1mV max.
Input impedance:	10MΩ/40pF (11MΩ/40pF 3V range)
Accuracy:	±1.5% rdg ±2 dpts

Voltage overload protection: 1200V AC rms continuous, whilst for 300mV range 500V AC for 10 minutes.

AC current

Range:	Single 10A range can measure 20A for 30s
Resolution:	0.01A max.
Accuracy:	±2% rdg ±2 dpts

Current overload protection: 1A AC rms continuous or 2.5A AC rms for 5 minutes, on 3A range 3.6A rms continuous, 10A range 12A AC rms continuous or 15A for 5 minutes or 20A for 30 seconds.

Resistance:

Ranges:	300Ω, 3kΩ, 30kΩ, 300kΩ, 3MΩ, 30MΩ autoranging
Resolution:	0.1Ω max.
Accuracy:	±0.7% rdg ±1 dgt (300Ω range ±0.7% rdg ±1 dgt (30MΩ range ±2% rdg ±1 dgt

Overload protection:	500V AC rms for 10 minutes.
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Diode test

Voltage:	2V DC
Resolution:	0.001V max.
Accuracy:	±0.7% rdg ±1 dgt
Overload protection:	500V AC rms for 10 minutes.

General

Temperature:	23°C ±2°C
Humidity:	45% to 55% reference humidity
Frequency:	45Hz to 65Hz (sinusoidal)
Power supply:	9V battery
Dimensions:	98 x 185 x 47mm
Weight:	0.5kg

Order Code	Type	Price each
ZC50E	A1 M2004 A/D Multimeter	£147.99



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M2005 AVO Analogue/Digital Multimeter with 'Range Hold'

This model offers several features in addition to those provided with the M2004 meter. The basic accuracy has been improved to 0.5%, additional ranges for AC and DC current measurement have been provided and there is an additional 'Range Hold' facility. Overload protection: 500V AC for 10 minutes +3.15A fuse.



Specification

DC voltage

Range: Reads from 300mV to 1000V, 5 ranges autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 $\pm 0.6\%$ rdg ± 1 dgt on 1000V range

DC current

Range: 3mA, 30mA, 300mA, 3A, 10A can measure 20A for 30s
 Resolution: 0.001mA max.
 Accuracy: $\pm 1.0\%$ rdg ± 1 dgt
 $\pm 1.5\%$ rdg ± 1 dgt on 10A range

AC voltage

Range: Reads from 300mV to 1000V, 5 ranges autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 1.0\%$ rdg ± 2 dgts
 Voltage overload protection: 1200V AC rms continuous, whilst for 300mV range 500V AC for 10 minutes.

AC current

Range: 3mA, 30mA, 300mA, 3A, 10A can measure 20A for 30s
 Resolution: 0.001mA max.
 Accuracy: $\pm 1.5\%$ rdg ± 2 dgts
 $\pm 2.0\%$ rdg ± 2 dgts on 10A range
 Current overload protection: 1A AC rms continuous or 2.5A AC rms for 5 minutes, on 3A range 3.6A rms continuous, 10A range 12A AC rms continuous or 15A for 5 minutes or 20A for 30 seconds.

Resistance

Range: 300 Ω , 3k Ω , 30k Ω , 300k Ω , 3M Ω , 30M Ω autoranging
 Resolution: 0.1 Ω max.
 Accuracy: $\pm 0.6\%$ rdg ± 1 dgt
 300 Ω range $\pm 0.6\%$ rdg ± 3 dgt
 30M Ω range $\pm 2\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 minutes

Diode test

Range: 2V DC
 Resolution: 0.001V max.
 Accuracy: $\pm 0.5\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 minutes

General

Temperature: 23°C ± 2 °C
 Humidity: 45% to 55% reference humidity
 Frequency: 45Hz to 65Hz (sinusoidal)
 Power supply: 9V battery
 Dimensions: 98 x 185 x 47mm
 Weight: 0.5kg

Order Code ZC51F A1 Type M2005 A/D Multimeter Price each £159.99

M2006 Analogue/Digital Multimeter with 'Data Hold'

The M2006 meter offers several improvements over the M2005 model. The basic accuracy is improved further still to 0.25%, the number of AC and DC current ranges has been increased to 6 and a 'Data Hold' function has been included. Overload protection: 500V AC for 10 minutes +3.15A fuse.



Specification

DC voltage

Range: 300mV, 3V, 30V, 300V, 1000V autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 0.25\%$ rdg ± 1 dgt
 $\pm 0.35\%$ rdg ± 1 dgt on 1000V range

DC current

Range: 300 μ A, 3mA, 30mA, 300mA, 3A, 10A can measure 20A for 30s
 Resolution: 0.1 μ A max.
 Accuracy: $\pm 1.0\%$ rdg ± 1 dgt
 $\pm 1.0\%$ rdg ± 2 dgt on 10A and 300 μ A range

AC voltage

Range: 300mV, 3V, 30V, 300V, 1000V autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 0.75\%$ rdg ± 2 dgts
 Voltage overload protection: 1200V AC rms continuous, whilst for 300mV range 500V AC for 10 minutes.

AC current

Range: 300 μ A, 3mA, 30mA, 300mA, 3A, 10A can measure 20A for 30s
 Resolution: 0.1 μ A max.
 Accuracy: $\pm 1.5\%$ rdg ± 2 dgts
 $\pm 1.5\%$ rdg ± 2 dgts on 10A and 300 μ A range

Current overload protection: 1A AC rms continuous or 2.5A AC rms for 5 minutes, on 3A range 3.6A rms continuous, 10A range 12A AC rms continuous or 15A for 5 minutes or 20A for 30 seconds.

Resistance

Range: 300 Ω , 3k Ω , 30k Ω , 300k Ω , 3M Ω , 30M Ω autoranging
 Resolution: 0.1 Ω max.
 Accuracy: $\pm 0.4\%$ rdg ± 1 dgt
 300 Ω range $\pm 0.5\%$ rdg ± 3 dgts
 30M Ω range $\pm 2\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 minutes

Diode test

Voltage: 2V DC
 Resolution: 0.001V max.
 Accuracy: $\pm 0.25\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 minutes

General

Temperature: 23°C ± 2 °C
 Humidity: 45% to 55% reference humidity
 Frequency: 45Hz to 65Hz (sinusoidal)
 Power supply: 9V battery
 Dimensions: 98 x 185 x 47mm
 Weight: 0.5kg

Order Code ZC52G A1 Type M2006 A/D Multimeter Price each £213.99

M2007 Analogue/Digital Multimeter with 'Peak Hold'

This superb meter offers a basic accuracy of 0.1%. It includes all the facilities and ranges of the M2006 meter, but provides an additional 'Peak Hold' facility. Over voltage protection: 500V AC for 10 minutes +3.15A fuse.



Specification

DC voltage

Range: 300mV, 3V, 30V, 300V, 1000V autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 0.1\%$ rdg ± 1 dgt

DC current

Range: 300 μ A, 3mA, 30mA, 300mA, 3A, 10A
 Resolution: 0.1 μ A max.
 Accuracy: $\pm 0.75\%$ rdg ± 1 dgt
 $\pm 1.0\%$ rdg ± 2 dgt on 10A and 300 μ A range

AC voltage

Range: 300mV, 3V, 30V, 300V, 1000V autoranging (except 300mV range)
 Resolution: 0.1mV max.
 Input impedance: 10M Ω /40pF (11M Ω /40pF 3V range)
 Accuracy: $\pm 0.5\%$ rdg ± 2 dgts

Voltage overload protection: 1200V AC rms continuous, whilst for 300mV range 500V AC for 10 minutes.

AC current

Range: 3mA, 30mA, 300mA, 3A, 10A can measure 20A for 30s
 Resolution: 0.1 μ A max.
 Accuracy: $\pm 1.2\%$ rdg ± 2 dgts
 $\pm 1.5\%$ rdg ± 2 dgts on 10A and 300 μ A range

Current overload protection: 1A AC rms continuous or 2.5A AC rms for 5 mins., on 3A range 3.6A rms continuous, 10A range 12A AC rms continuous or 15A for 5 mins. or 20A for 30sec.

Resistance

Range: 300 Ω , 3k Ω , 30k Ω , 300k Ω , 3M Ω , 30M Ω autoranging
 Resolution: 0.1 Ω max.
 Accuracy: $\pm 0.2\%$ rdg ± 1 dgts
 300 Ω range $\pm 0.4\%$ rdg ± 3 dgts
 3M Ω range $\pm 0.4\%$ rdg ± 1 dgt
 30M Ω range $\pm 2\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 mins.

Diode test

Voltage: 2V DC
 Resolution: 0.001V max.
 Accuracy: $\pm 0.1\%$ rdg ± 1 dgt
 Overload protection: 500V AC rms for 10 mins.

General

Temperature: 23°C ± 2 °C
 Humidity: 45% to 55% reference humidity
 Frequency: 45Hz to 65Hz (sinusoidal)
 Power supply: 9V battery
 Dimensions: 98 x 185 x 47mm
 Weight: 0.5kg

Order Code ZC53H A1 Type M2007 A/D Multimeter Price each £289.99

ELECTRICAL METERS

Insulation Resistance Meter M2500I

Precision Gold

A battery operated insulation resistance meter which employs a transistor type, stable voltage DC – DC converter to generate a test voltage of up to 500V DC max. from four AA batteries. With this instrument you can quickly and directly read the insulation resistance of cables and joints, power lines, insulators and other materials up to 100MΩ. Small, light-weight and easy to operate, the meter uses a jewelled pivot mechanism which is stable and little influenced by external magnetic fields. An AC volts range is also included to measure the voltage of AC supply lines. As a safety feature a resistance measurement is normally performed by a 'push to measure' button, bearing in mind the high voltage output of the instrument, but this can be overridden by the 'measure lock' position of the function switch so that continuous readings can be made. An LED indicator flashes whenever the test voltage exists on the probes, both as a safety measure and as a reminder that the converter is operating, and using battery power, if left in the 'measure lock' mode. The AC voltage meter function caters for up to 450V AC, and is very useful for checking that power lines are not energised before a resistance test is attempted.



Specifications

Insulation resistance

Scale range	Accuracy
1 – 100MΩ effective	±7% of value indicated
0 – 200MΩ max.	±3% of scale length (5MΩ at centre)

Terminal to terminal voltage

±10% of rated voltage at left-hand end of scale. Approx. 90% of rated voltage at centre of scale. Rated V/R = 500V/100MΩ.

AC Voltage

Range	Accuracy
0 – 450V	±5% of max. scale value

Dimensions: 102 x 150 x 45mm. Weight: 370g.

Order Code	Type	Price each
YT88V A1	Insulation Tester	£39.99

Clamp Meter M920

Precision Gold



A very useful electrician's digital multimeter with a built-in clamp-tester which will measure AC current of up to 300A without having to break the circuit under test. It achieves this by using a current transformer, the insulating current-carrying conductor acting as the primary of the transformer while the 'jaws' of the meter act as the secondary. No direct electrical connection to the system being tested is therefore required. The jaws are opened by means of a lever on the side of the meter body and the cable is inserted into the hole (which will accept cables of up to 30mm dia). The lever is then released and the jaws spring shut, completing the magnetic circuit. Measurement can then proceed. In addition to the above function the meter will measure AC/DC voltage and resistance in the conventional way, with test leads and probes. The meter has a 3 1/2-digit LCD panel, which includes overrange, low battery and data hold indication. A continuity buzzer is also available. The meter body is made from an attractive and very tough yellow plastic. Supplied with operating instructions, one red and one black test lead with probes, one battery (replacement type PP3), and carrying strap.

Specification

DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±(0.5% rdg + 1 digit)
200V	0.1V	±(0.5% rdg + 1 digit)
1000V	1V	±(0.5% rdg + 1 digit)

Input impedance: 10MΩ. Overload protection: 500V DC, 350V AC on 200mV range. 1200V DC, 800V AC for all other ranges.

AC Voltage

Range	Resolution	Accuracy
200V	0.1V	±(1.2% rdg + 4 digits)
750V	1V	±(1.5% rdg + 4 digits)

Input impedance: 10MΩ @ 50 to 500Hz. Overload protection: 1200V DC, 800V AC for all other ranges.

AC Current

Range	Resolution	Accuracy
20A	0.01A	±(2% rdg + 4 digits)
200A	0.1A	±(2% rdg + 4 digits)
300A	1A	±(2% rdg + 4 digits)

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1% rdg + 1 digit)
200kΩ	100Ω	±(1% rdg + 1 digit)

Test voltage, 200Ω range: 3.2V max.; 200kΩ range, 0.3V max. Overload protection: 500V DC, 350V AC on all ranges.

Diode Test

Test current:	1.0 ±0.6mA
Test Voltage:	3.2V max.
Overload protection:	500V DC, 350V AC max.

Continuity Tester

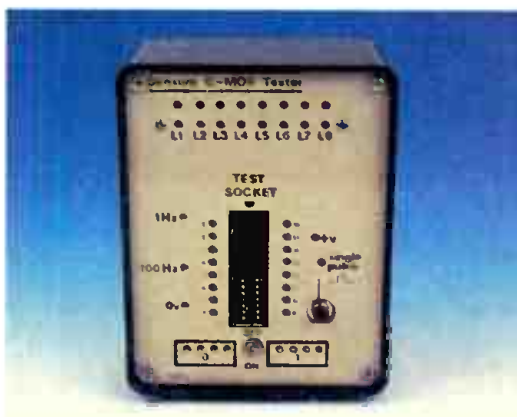
Threshold:	<100Ω
Response Time:	<100ms
Overload protection:	500V DC, 350V AC max.

Order Code	Type	Price each
ZC61R A1	Clamp Meter M920	£49.99

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TEST INSTRUMENTS

CMOS TESTER



A logic tester for CMOS devices, for use by the amateur and professional alike. The instrument is ideal for schools and colleges where it can be used to demonstrate logic functions using actual devices. The tester takes the form of DIL sockets on the front panel for the device under test, which can be connected to a number of CMOS compatible outputs and output logic state indicators, by means of the thirteen patch leads supplied. These test points consist of:-

- Four logic '1' outputs
- Four logic '0' outputs
- One 1Hz square wave
- One 100Hz square wave
- One pushbutton (non-latching push to make release to break) for manual logic '1' pulse output
- Eight LED logic state indicators to monitor outputs of the device under test
- One +V (supply)
- One 0V (0VE)

A booklet of fact sheets is also provided outlining testing procedures for some of the more common devices, for example:-

CMOS devices included in the Fact Sheets—

4000	4009	4015	4020	4025	4040	4069	4081
4001	4010	4016	4021	4027	4042	4070	4082
4002	4011	4017	4022	4028	4047	4071	4093
4006	4012	4018	4023	4030	4049	4073	4095
4008	4014	4019	4024	4031	4050	4077	4502

Although not all CMOS devices are covered in the fact sheets, it should be possible to develop your own test procedures using the methods shown in the booklet.

Order Code	Type	Price each
YK40T	CMOS Tester	£54.99



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DECADE BOXES

Resistance Box

Precision Gold



A six decade resistance box ideal for schools, laboratories and industry. The box can simulate resistances from 1Ω to 999,999Ω in 1Ω steps very accurately. The resistance is set using push-buttons and the value is displayed in ohms. An additional 1kΩ resistor is provided connected between one of the terminals of the internal resistance and a third terminal so that the box can be used as a very accurate potential divider (but ensure that power rating of resistors is not exceeded). A fourth terminal marked 'Screen' enables the metal box to be connected to earth. Outputs are on terminal posts with 4mm top sockets.

Specification

Decade 1Ω to 9Ω:	1W, ±1% tolerance
Decade 10Ω to 99Ω:	1W, ±0.5% tolerance
Decades 100Ω to 999kΩ:	0.5W, ±0.1% tolerance
Max switching current:	75mA
Max carrying current:	1A
Stability:	100ppm/°C

The unit is housed in a black metal box with non-slip feet.

Box size:	113 x 71 x 50mm high
Overall height:	75mm

Order

Code	Type	Price each
JL63T	C1 Resistance Box	£59.99

Capacitance Box



A five decade capacitance box ideal for schools, laboratories and industry. The box can simulate capacitances from 100pF to 9.9999µF in 100pF steps. The capacitance is set using push-buttons and the value is displayed in µF. A third terminal is provided marked 'Screen' to enable the metal box to be connected to earth. Outputs are on terminal posts with 4mm top sockets.

Specification

Range:	100pF to 9.9999µF in 100pF steps
Tolerance:	±1%
Working voltage:	63V DC, 40V AC
Stability:	200ppm/°C
Residual capacitance:	<40pF

The unit is housed in a black metal box with non-slip feet.

Box size:	113 x 71 x 50mm high
Overall height:	75mm

Order

Code	Type	Price each
YT55K	B1 Capacitance Box	£109.99

Capacitance Meter

Powered by a single PP3 battery, this useful piece of test gear will be invaluable in determining the values of capacitors otherwise unknown. Simply insert the leads of the capacitor to be tested into the pair of 1mm sockets on top of the instrument, select the required range and press the button. The five ranges comprise:-

FSD	Resolution
99.9µF	0.1µF
9.99µF	10nF
999nF	1nF
99.9nF	100pF
9.99nF	10pF

The display consists of a 3-digit 7-segment LED display with floating decimal point and an over-range indicator. A pair of short test leads terminated in 1mm plugs at one end and insulated crocodile clips at the other can be used for measuring components that cannot be used with the test sockets. Dimensions: 157 x 81 x 55mm overall. Weight: 200gms.

Order

Code	Type	Price each
YJ86T	A1 Capacitance Meter	£59.99



LCR Bridge

This instrument will determine the value of resistance, capacitance or inductance of any device connected to it, using a bridge nulling technique. It is fully built and tested. It has six ranges for each function allowing readings to be made (assuming one can read to a tenth of a large division) of 0.1Ω to 1MΩ, 10pF to 100µF, 1µH to 10H.



Ranges:

Resistance	10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ, 1MΩ.
Capacitance	1000pF, 0.01µF, 0.1µF, 1µF, 10µF, 100µF.
Inductance	100µH, 1mH, 10mH, 100mH, 1H, 10H.
Accuracy:	±2%
Requires one PP3 battery (not supplied).	

Order

Code	Type	Price each
YB82D	LCR Bridge	£44.99

M195 LCR Meter

Precision Gold

An immensely useful inductance, resistance, and capacitance meter which will provide accurate measurements of component values. The value of each component can be read from a 0.5 inch high, 3 1/2 -digit LCD display, which includes over-range and low battery indicators. Two sets of red and black test leads are provided; a short set terminates in crocodile clips and a pair of conventional test probes. In addition a two terminal socket on the front panel allows direct connection of a component to the meter. A battery is also supplied, replacement type PP3.



Specification

Capacitance	
Ranges:	200pF, 2nF, 20nF, 200nF, 2µF, 20µF, 200µF
Accuracy:	≤0.5µF ±2% ±1 digit >0.5µF ±3% ±1 digit
Zero error:	<5pF
Resistance	
Ranges:	20Ω, 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ
Accuracy:	≤1M ±1% ±1 digit >1M ±5% ±1 digit
Zero error:	<100mΩ
Inductance	
Ranges:	2mH, 20mH, 200mH, 2H, 20H, 200H
Accuracy:	≤2mH to 2H ±3% >2H to 200H ±5%
Zero error:	<10µH

The meter is protected up to 250V AC or DC, instantly or from charged capacitors, to any input terminal.

Order

Code	Type	Price each
ZC54J	A1 LCR Meter M195	£74.99



BS 5750 Part 2 1987
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RS12750



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ELECTRICAL METERS

AC Millivoltmeter

Topward



A superb quality AC millivoltmeter which is certain to prove extremely useful to the audio enthusiast. The instrument is capable of registering, at FSD, voltage levels from 1mV to 300V on its generously sized, 110 x 62mm meter scale with knife-edge pointer. A single attenuator control covers the range in 12 calibrated steps in 1, 3, 10 sequence. A signal voltage to be measured, as applied to the input 4mm terminal posts, is reduced as necessary by a first attenuator, before passing on to second and third attenuation stages via an active impedance changer, which ensures that the instrument is presented with the proper input impedance for accurate operation at all times. The result is displayed on the meter movement, driven by an amplifier followed by an Absolute Mean Value detector. The scale is calibrated as 1V at FSD, and this AC voltage (1V max.) is made externally available on a pair of output sockets.

The meter has four calibrated scales; two black scales from 0 to 1.0V and 0 to 3V RMS respectively corresponding to the voltage positions of the attenuator. These range from 1 to 300mV and 1 to 300V. The 1V position is the reference position and corresponds directly with FSD volts on the scale. Signal gain or loss of an audio, AF or similar analogue system in volts can be established by alternate measurements of the input and output, and noting the attenuator positions required to achieve similar scale readings. The gain or loss of the signal can then be calculated.

For 'proper' measurements of this sort, there are also two dB scales provided. A blue dBV scale is calibrated from -20dB to 0dB, where in this case 0dB corresponds to 1V RMS according to the dBV convention, where the standard of 0dB = 1mW into 600Ω cannot apply. For this purpose the attenuator positions are also calibrated from -60 to +50dB, so that signal level comparisons can be made on the dB scale, and where the 1V position of the attenuator also corresponds to 0dB.

A further red dB scale is also provided and is calibrated for the 'correct' 0dBm standard of 0dB @ 0.775V RMS or 1mW into 600Ω. The entire scale covers the range -20 to +2 dB, and this also corresponds to the dB calibrations of the attenuator. The signal output is always 0 - 1V RMS for 0 - FSD of scale reading.

Specification	
Ranges:	
Volts	1mV - 300V RMS in 12 ranges, in 1, 3, 10 sequence
dBV	-90 to +40dB
dBm	-90 to +42dBm, 0dB = 1mW/600Ω
Error	±3% of FSD @ 1kHz
Freq. response, with reference to 1kHz	±10% @ 5Hz - 1MHz ±5% @ 10Hz - 500kHz ±3% @ 20Hz - 200kHz ±2% @ 30Hz - 100kHz
Input impedance	10MΩ ±5% + 45pF
Max. safe input	500V DC or peak AC
Output amplifier:	
Gain	≈ 70dB
Distortion	<1% @ FSD
Output level	1V RMS ±10% max.
Output impedance	600Ω ±10%
Signal to noise ratio	>40dB @ FSD, >30dB @ 0.3mV
Frequency response	±3dB @ 5Hz - 500kHz
Power requirements	240V AC ±10% 50Hz, ≈ 10VA
Stability	±0.5% of FSD for ±10% of supply voltage
Dimensions	138 x 212 x 218mm
Weight	3kg

Order Code	Type	Price each
XM31J	H8 Millivoltmeter	£129.99

Signal Generator



A Wien bridge oscillator fully built and tested giving high purity sine or square wave outputs with frequency and amplitude adjustable. Robust, lightweight, simple to use, yet its specification is better than many instruments of far higher price.

Specification		
	Sine wave	Square wave
Output voltage (max)	1V rms	9V peak-to-peak
Frequency range	15Hz to 200kHz	15Hz to 100kHz (then to 200kHz non-linear with scale)
Total harmonic distortion:	0.5%.	
Output via 4mm terminals.	Size: 127 x 102 x 51mm.	
Requires one PP3 battery (not supplied).		

Order Code	Type	Price each
YB81C	Signal Generator	£54.99

Low Distortion AF Signal Generator

Topward



- ★ Distortion less than 0.005%
- ★ Frequency range 5Hz to 500kHz
- ★ Precision output attenuator

A precision audio signal generator covering the range 5Hz to 500kHz with both sine and squarewave outputs. An ideal choice for exacting audio work, for the hobbyist and the professional alike, the instrument has a large, 95mm diameter calibrated frequency scale marked from 5 to 50. A bank of five push-buttons to the right of the scale select the ranges X1 to X10,000. The oscillator uses the Wien bridge principle with a movable part resistance to achieve the variable control. The dial has no end stops and so it is possible to jump from the high end of the scale to the low end directly without having to wind it all the way to the bottom again while changing up to the next range, making it much quicker and easier to traverse a wide range of consecutive frequency bands. The generator is optimised for AF testing and its lowest distortion value of 0.005% is concentrated over the range 20Hz to 20kHz, enabling distortion analysers and THD meters to be used with the audio equipment under test. Outside these limits the distortion is slightly greater.

One of the best features of the instrument is the comprehensive attenuator, calibrated in decibels, comprising three rotary switches which select decades, units and tenths of a decibel respectively. With these it is possible to obtain an output level from as low as -69.9dB to +10dB with a resolution of 0.1dB, very useful for extremely fine frequency response measurements. 1V rms is the level chosen as 0dB. A push-button at the bottom of the front panel selects the squarewave option, for which 0dB corresponds to 4V peak-to-peak. The single output socket is BNC and the impedance is 600Ω. There is also a push-button on/off switch and a red LED power on indicator. The instrument is housed in a painted steel case with heavy-duty feet and a carrying strap handle on top, and the width is only 140mm so that the instrument does not take up too much space on the workbench. Altogether a very impressive instrument. Supplied with 1.7m of mains lead and manual. Fuse included on rear panel.

Specification	
Frequency range:	5Hz to 500kHz over 5 ranges
Waveforms:	Sine and square
Frequency response, with reference to 1kHz:	±0.2dB @ 5Hz - 20kHz ±0.5dB @ 20kHz - 500kHz
Distortion:	<0.005% @ 20Hz - 20kHz <0.01% @ 10Hz - 50kHz <0.1% @ 5Hz - 500kHz
Attenuator ranges:	7 x decade, 9 x units, 9 x tenths
Attenuator output:	-69.9dB to +10dB in 0.1dB steps
Source impedance, sine:	600Ω unbalanced

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Continued from previous page.

Square wave output:	4V p-p into 600Ω
Risetime:	200ns
Overshoot:	<5%
Dimensions:	140(W) x 217(H) x 230(D)mm
Weight:	2.3kg
Power supply:	240V AC ±10% 50Hz @ 7VA

Order Code	Type	Price each
GL46A H6	Audio Oscillator	£219.99 ⁴⁴⁴⁸

AM/FM Modulated Function Generator



A high quality, portable bench top function generator with many useful features. The instrument is capable of producing five different waveforms; sine, triangular, square, ramp and pulse, over a frequency range extending from 0.1Hz to 2MHz. A bank of seven interlocked buttons select the frequency bands in 1, 10, 100, 1k, 10k, 100k and 1MHz steps, and an additional calibrated rotary control can be used to 'fill in' between these as well as providing a means of extending the frequency of the selected band from f_0 x1 to f_0 x2. The outputted waveform can be inverted 180° by simply depressing the 'invert' button if required. The output amplitude is continuously variable and can be reduced further by a -30dB attenuator. Three principle square, sine and triangular waveforms can be selected by a further three interlocked buttons, but in addition a rotary control is provided to continuously vary the duty cycle either side of 50%. The knob has to be pulled out to be effective, where the duty cycle can be varied between 20% and 80%. While the knob is pushed in the preset default standard 50% is in effect. It is with this control that both positive or negative going pulse (square wave selected) or ramp (triangular wave selected) outputs are possible with variable duty cycle. A further control is provided to vary the DC offset of the output signal about zero or 0V; again this knob must be pulled out to take effect or else the signal is output with the default of equal amplitude positive and negative peaks either side of 0V. Finally both FM or AM modulation of the output signal is possible, either with an internally generated 400Hz sine wave tone (standard test modulation frequency), or from an external signal applied to a front panel input socket. The modulation depth is continuously variable with a front panel control and can be up to 100% for AM or ±10% of carrier frequency for FM; the two modes are switch selected. If the modulation depth control knob is pulled out then the modulation signal is external as applied to the EXT. socket and must be at least 5V peak to achieve 100% modulation. If the knob is pushed in then the internal 400Hz signal is used, which is also output simultaneously to the EXT. socket for other uses. A rear panel 'VCF' socket is included with which a modulation voltage can be applied direct to the VCO and must be 5V peak to achieve a 1000 : 1 frequency sweep range. The instrument also outputs a TTL compatible synchronisation pulse for each cycle on a second rear panel socket. All front and rear sockets are 50Ω BNC type.

Specifications

Frequency	0.1Hz - 2.0MHz in 7 ranges
Freq. rotary control scale error	±5% of full scale
Output impedance	50Ω ±10%
Output level	5mV p-p to 20V p-p
Output attenuation available	0dB and -30dB
DC offset max.	+ or -10V
Duty cycle	Variable 20% - 80%
Distortion	<1% THD 10Hz - 50kHz
Rise time	<100ns
Sync. pulse	>3V p-p TTL
VCF level	0 - 5V DC for 1000:1 sweep
AM modulation:	
Depth	0 - 100% max.
Frequency, internal	400Hz
Bandwidth, external	DC - 1MHz
Carrier bandwidth	100Hz - 1MHz ±3dB
Ext. sensitivity	<5V p-p for 100% modulation
FM modulation:	
Deviation	0 to ±10% max. of set carrier freq.
Frequency, internal	400Hz ±10%
Bandwidth, external	DC - 20kHz
Power requirements	240V ±10% @ 50Hz, ±9.6VA
Dimensions	251 x 92 x 330mm incl. handle/tilt leg
Weight	1.6kg

Order Code	Type	Price each
XM32K H6	Function Generator	£149.99 ⁴⁴⁴⁹

Wide Range Pulse Generator Topward



A compact, portable bench-top pulse generator with a usefully wide output frequency range from 0.5Hz to 5MHz. Its simple and rugged design built with high quality components will ensure long and reliable service. The instrument is primarily designed as a clock or pulse source, and is fully compatible with both IC and discrete circuits. The output pulse cycle duration, and frequency, are determined by two identical pulse width and spacing controls, comprising a six position range switch, covering 100ms to 100ns, with an integral and continuously variable vernier in the centre which can be used to 'fill in' between ranges and extend the timed duration by up to 10 times the selected value. Duration of positive going pulses are controlled by the pulse width control, and space time between by the pulse spacing control. The generator is capable of four modes of operation. In the 'run' mode, the instrument behaves like an oscillator and produces a continuous output stream of pulses. In the 'trigger' mode, output remains in the low state until a trigger pulse is applied to the trigger input, generating a positive output pulse synchronised with the trigger signal. The output pulse is initiated by the positive edge of the input trigger. The pulse spacing control is not used in this mode. In the 'gate' mode the generator outputs a stream of pulses with duration defined by the width control and spacing defined by the spacing control, for as long as the gate input is high. The last pulse will be completed even if the gate signal finished before it. In the 'one shot' mode, the 'one shot' button will produce an output pulse of duration determined by the width control only.

If the 'square wave' button is depressed then the 'programmed' waveform is converted into a square wave where the output changes state on every positive edge of the original waveform, with a 50% duty cycle and at half frequency. All the other modes still apply. An invert button can be used to invert the output 180°. The output is simultaneously available on two sockets, one of which is a constant TTL level, the other continuously variable from 0.1V to 10V peak via an amplitude control. In addition a sync. pulse is available on the sync. output socket, and is 20ns @ >2.4V, and leads the main outputs by 20ns for the purpose of triggering oscilloscopes, etc. All front panel sockets are 50Ω BNC type.

Specification

Freq. range	0.5Hz to 5MHz
Pulse width and spacing controls, each	100ns to 100ms in 7 steps +vernier x1 to 10
Duty cycle	10 ⁷ to 1 range variable
Accuracy	±5% while vernier x1
Jitter	<0.1% +50ps
Modes:	
Run mode	0.5Hz to 5MHz continuous
Trig. mode input	DC to ±10MHz external
Gate mode input	Leading edge synchronous start
Trig./gate pulse	>2.4V peak, >40ns width
Trig./gate sine	>1.7V RMS <10MHz
Trig./gate input impedance	400Ω max.
Max. input level, all	±10V
Outputs:	
Var. output	±0.1 to 10V peak, variable
Rise & fall time	30ns
Output impedance	50Ω
TTL output	>2.4V peak
Current sink	64mA
TTL fan-out	40 TTL inputs
Rise & fall time	<20ns
Sync. output	>2.4V
Current sync.	16mA
TTL fan-out	10 TTL inputs
Rise & fall time	<20ns
Power requirements	240V ±10% @ 50Hz, 6VA
Dimensions	251 x 92 x 330 incl. handle/ tilt leg
Weight	1.5kg

Order Code	Type	Price each
XM33L H5	Pulse Generator	£149.99 ⁶⁰³⁸

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Digital Frequency Counters

Two compact, portable hand-held frequency counters that have an 8-digit red LED display and are powered from internal rechargeable batteries. The M415F measures from 10Hz to 1.2GHz, and model M416F measures from 10Hz to 2.7GHz. These easy-to-use counters have only two switches and two BNC input sockets. The lower switch has a centre off position and can select either input A or B. Input A covers the range 20MHz to 1.2GHz (2.7GHz on M416F) and input B covers the range 10Hz to 20MHz. The second switch selects the gate period. These high sensitivity meters can be powered from an external 12V DC supply (not supplied) which will also recharge the internal batteries. Normal recharge time is 5 hours and the meters can operate for 4 hours with a full charge. Overcharge protection is included. These meters are ideal for use by any hobbyist, radio amateur, engineer or student who needs an accurate and versatile means of frequency measurement. A suitable charger is BZ83E (see 'Batteries and PSUs').



Specification	Input B	Input A
Frequency range:		
M415F	10Hz to 20MHz	20MHz to 1.2GHz
M416F	10Hz to 20MHz	20MHz to 2.7GHz
Sensitivity:	M415F and M416F	
	Input B	Input A
10Hz to 20MHz	<3mV	
20MHz to 25MHz	<6mV	
21MHz to 26MHz		<12mV
26MHz to 30MHz		<7mV
30MHz to 50MHz		<6mV
50MHz to 400MHz		<2mV
400MHz to 600MHz		<3mV
600MHz to 700MHz		<5mV
700MHz to 900MHz		<6mV
900MHz to 1.05GHz		<8mV
1.05GHz to 1.1GHz		<9mV
1.1GHz to 1.2GHz		<12mV
M416F only		
1.2GHz to 1.4GHz		<12mV
1.4GHz to 1.7GHz		<14mV
1.7GHz to 2.0GHz		<16mV
2.0GHz to 2.7GHz		<20mV
Impedance:	50Ω	1MΩ
Max. input voltage:	100V pk-pk	1.2 pk-pk (+15dBm)
Gate time:	2.00s, 0.20s, 0.02s	2.56s, 0.25s, 0.02s
Resolution:	1Hz	100Hz
Coupling system:	AC coupled	
Display:	8-digit LED display	
Reference oscillator:	5ppm accuracy within operation temperature	
Operating temp:	0°C to 45°C	
Power source:	8.4V internal Ni-Cad battery pack or 12V 500mA DC	
Dimensions:	82.3 x 34 x 131mm	

Order Code	Type	Price each
BZ70M	H1 1.2GHz Counter M415F	£129.99
BZ71N	H1 2.7GHz Counter M416F	£179.99

Antenna Accessory

A six section telescopic antenna for use with frequency counters. By adjusting the sections according to the chart supplied with the antenna it is possible to tune the antenna to frequencies between 14MHz and 2.79GHz.

Order Code	Type	Price each
CR35Q	FC Antenna	£9.99

1GHz Universal Counter Timer

A high quality, 10Hz to 1GHz multiple function counter. The counter has an eight-digit, high brightness, 7-segment LED display and a high stability crystal oven oscillator for maximum accuracy. The meter has six function switches. Three are associated with frequency mode. With the 10MHz or 80MHz switch selected, the frequency on the channel A input BNC socket will be displayed. With the 1GHz switch selected, the frequency on the channel B input BNC socket will be displayed. The gate time for channel A can be set to 100ms, 1s or 10s. For channel B it can be set to 128ms, 1.28s or 12.8s. For very high voltage inputs an attenuator can be switched in to cut the input by a factor of 10 (20dB) but only on channel A.



Specification

Frequency Measurements Channel A	
Range:	10Hz to 80MHz
Resolution:	10Hz, 1Hz, 0.1Hz
Gate time:	0.1s, 1s, 10s
Accuracy:	±1 count ±time base accuracy
Frequency Measurements Channel B	
Range:	50MHz to 1GHz
Resolution:	1kHz, 100Hz, 10Hz
Gate time:	0.128s, 1.28s, 12.8s
Accuracy:	±1 count ±time base
Input Characteristics Channel A	
Input sensitivity:	25mV R.M.S. 10Hz to 80MHz
Attenuation:	x1, x10
Impedance:	1MΩ/100pF
Max. input voltage:	150V R.M.S. 10Hz to 400Hz 20V R.M.S. 400Hz to 100kHz 5V R.M.S. 100kHz to 100MHz

Input Characteristics Channel B	
Input sensitivity:	25mV R.M.S. 50MHz to 1GHz
Impedance:	50Ω
Max. input voltage:	5V R.M.S. 50MHz to 1GHz

Time Base	
Frequency, Channel A:	10MHz
Channel B:	7.8125MHz
Accuracy:	±1 x 10 ⁻⁵ (±10ppm) from 0°C to +40°C

General	
Display:	8 digit, 7 segment LED display. LED indicators for gate, overflow, Hz and MHz
Size:	251 x 92 x 288mm deep
Weight:	1.4kg approx.
Power requirement:	115V/230V ±10%, 50/60Hz 10VA approx.

The case has heavy-duty rubber feet and a carry handle that can be used as a tilt stand. It is supplied with a removable mains lead and a 1m long lead with a BNC plug at one end and red and black crocodile clips at the other. Operator's manual also supplied.

Order Code	Type	Price each
GL47B	H5 MF1000 1GHz Counter	£199.99

OSCILLOSCOPES

20MHz 2-Channel Oscilloscope OS-9020A

Goldstar



A portable 2-channel, dual trace oscilloscope built to a high quality. The front panel layout follows a simple and logical format with which the new user will quickly become familiar. The 9020A has all the capabilities required of a general-purpose oscilloscope and will accept signals from DC to 20MHz with a high degree of accuracy, and includes TV field and line triggering for video work.

Features

Large 6in, high luminance CRT with internal graticule of 8 x 10cm. Wide dynamic range even at high frequencies where sensitivity is down -3dB. Fast rise time with low overshoot. Flat frequency response up to half of the -3dB frequency point. Selectable alternate and chop for 2-channel display. Polarity inversion and algebraic summing of CH1 and CH2. Superb, jitterless trigger sensitivity. TV sync separator and hold-off useful for video signal observation. Z-axis brightness modulation available. Electronically compensated for low trace drift. X-Y phase difference measurement possible up to 50kHz.

Specification

CRT:	
Screen:	6in. rectangular with internal graticule, effective area 8 x 10cm
Acceleration:	1.9kV
Z-axis input (intensity modulation):	
Input signal:	Positive going for decreasing intensity, effective from 5V pk-pk at normal brightness
Bandwidth:	DC to 2MHz (-3dB)
Coupling:	DC
Input impedance:	20kΩ to 30kΩ
Maximum input voltage:	30V DC + peak AC
Vertical deflection (CH1 & CH2):	
Bandwidth:	DC (-3dB @ 10Hz) to 20MHz (7MHz if x5 X magnification on)
Modes:	CH1, CH2, Add, Dual, Chop, Alt.
Sensitivity:	5mV/cm to 5V/cm in 10 calibrated steps in 1-2-5 sequence ±3% (1mV/cm to 1V/cm if x5 magnification on, ±5%)
Accuracy:	±3% (±5% if x5 magnification on)
Input impedance:	1MΩ/25pF
Maximum input voltage:	250V DC + peak AC

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Input coupling: DC/AC/Gnd ref.
 Risetime: <17.5ns (<50ns if x5 magnification on)
 CH1 out: 20mV/cm into 50Ω, DC to 10MHz (-3dB)
 Polarity: CH2 invert option

Horizontal deflection:
 Sweep modes: A, X-Y
 Timebase A: 0.2μs/cm to 0.2s/cm in 19 calibrated steps in 1-2-5 sequence

Hold-off time: Variable
 Sweep magnification: 10 times (20ns/cm max.)
 Accuracy: ±3% (add 2% for magnifier)

Triggering:
 Modes: Auto, Norm, TV vertical, TV horizontal
 Source: CH1, CH2, Line, External
 Coupling: AC
 Slope: + or -
 Sensitivity, Auto, Norm: 0.5cm @ 20Hz to 2MHz internal, 0.2V pk-pk external 1.5cm @ 2MHz to 20MHz internal, 0.8V pk-pk external

TV field or line: At least 1cm internal or 1V pk-pk external

External trigger input impedance: 1MΩ/30pF
 Maximum input voltage: 250V DC + peak AC

X-Y operation:
 Sensitivity: Same as vertical deflection for both CH1 = X and CH2 = Y

X-axis bandwidth: DC to 500kHz (-3dB)
 X-Y phase error: 3° or less (@ DC to 50kHz)

Calibrator: 1kHz square wave, 0.5V pk-pk ±3%, 50% duty cycle

Power supply:
 Line voltage: 240V AC ±10%
 Line frequency: 50/60Hz
 Power consumption: 30W
 Dimensions: (W)320 x (H)135 x (L)320mm
 Weight: 6.8kg
 Supplied with operating manual, mains lead, two spare fuses and probes. Case fitted with stand.

Order Code	Type	Price each
GW03D H19	Scope OS-9020A	£299.99

40/60MHz 2-Channel Oscilloscopes OS-9040D/60D

Goldstar



A choice of two portable 2-channel, dual trace oscilloscope built to a high quality and incorporating a full scale delayed sweep function, where any portion of the signal displayed with the main timebase can be magnified, and both the magnified portion and the original display can be shown simultaneously. This is invaluable for examining short duration events. The front panel layout follows a simple and logical format with which the new user will quickly become familiar. The 9040D is ideally suited to the observation of high

speed events in TV, video and the general purpose fields and will accept signals from DC to 40MHz with a high degree of accuracy. A delay line is also included for the observation of fast leading edges. The 9060D will accept signals from DC to 60MHz, again with a high degree of accuracy.

Features

Large 6 inch, high luminance CRT with internal graticule of 8 x 10 cm.
 Wide dynamic range even at high frequencies where sensitivity is down -3dB.
 Fast risetime with low overshoot.
 Flat frequency response up to half of the -3dB frequency point.
 Selectable alternate and chop for 2-channel display.
 Polarity inversion and algebraic summing of channel 1 and channel 2.
 Maximum sweep rates of 20ns/cm for the 9040D and 10ns/cm for the 9060D.
 Variable scale illumination.
 Delayed sweep function with minimum delay time jitter of 1/20,000 or less.
 Superb, jitterless trigger sensitivity.
 TV sync separator and hold-off useful for video signal observation.
 Z-axis brightness modulation available.
 Electronically compensated for low trace drift.
 Signal delay with delay line useful for high speed pulse work.
 X - Y phase difference measurement possible up to 50kHz.

Specification

CRT:
 Screen: 6in. rectangular with internal graticule, effective area 8 x 10cm

Acceleration
 OS-9040D: 12kV
 OS-9060D: 10kV

Z-axis input (intensity modulation)
 Input signal: Positive going for decreasing intensity, effective from 5V pk-pk at normal brightness

Bandwidth
 OS-9040D: DC to 2.0MHz (-3dB)
 OS-9060D: DC to 3.5MHz (-3dB)

Coupling: DC
Input impedance: 20kΩ to 30kΩ
Maximum input voltage: 30V DC + peak AC
Vertical deflection (Ch1 & Ch2):
 OS-9040D: DC (-3dB @ 10Hz) to 40MHz (7MHz if x5 X magnification on)
 OS-9060D: DC (-3dB @ 10Hz) to 60MHz (20MHz if x5 X magnification on)

Modes: Ch1, Ch2, Add, Dual, Chop, Alt. (CHOP: Time/div 0.2s to 5ms ALT: Time/div 2ms to 0.1μs, to 0.1μs on OS-9060D.)

Sensitivity: 5mV/cm to 5V/cm in 10 calibrated steps in 1-2-5 sequence ±3% (1mV/cm to 1V/cm if x5 magnification on, ±5%) ±3% (±5% if x5 magnification on)

Accuracy: ±3% (±5% if x5 magnification on)
Input impedance: 1MΩ/25pF
Maximum input voltage: 250V DC + peak AC
Input coupling: DC/AC/Gnd ref.
Risetime
 OS-9040D: <8.8ns (<50ns if x5 magnification on)
 OS-9060D: <5.8ns (<17.5ns if x5 magnification on)

Ch1 out: 20mV/cm into 50Ω, DC to 10MHz (-3dB)
Polarity: Ch2 invert option

Horizontal deflection:
 Sweep modes: A, A int B, B, B triggered, X-Y
 Timebase A: 0.1μs/cm to 0.2s/cm in 20 calibrated steps in 1-2-5 sequence

Hold-off time: Variable
Timebase B: 0.1μs/cm to 10μs/cm in 7 calibrated steps in 1-2-5 sequence

Delayed sweep start: <1cm to >10cm
Delay time jitter: Better than 1/20,000
Sweep magnification
 OS-9040D: 10 times (20ns/cm max.)
 OS-9060D: 10 times (10ns/cm max.)
Accuracy: ±3% (add 2% for magnifier)

Triggering:
 Modes: Auto, Norm, TV vertical, TV horizontal
 Source: Ch1, Ch2, Line, External
 Coupling: AC
 Slope: + or -
 Sensitivity, Auto, Norm
 OS-9040D: 0.5cm at 20Hz to 2MHz internal, 0.2V pk-pk external 1.5cm at 2MHz to 40MHz internal, 0.8V pk-pk external
 OS-9060D: 0.5cm at 20Hz to 2MHz internal, 0.15V pk-pk external 1.5cm at 2MHz to 60MHz internal, 0.3V pk-pk external

TV field or line: At least 1cm internal or 1V pk-pk external

External trigger input impedance: 1MΩ/30pF
Maximum input voltage: 250V DC + peak AC

X-Y operation:
 Sensitivity: Same as vertical deflection for both Ch1 = X and Ch2 = Y
 X-axis bandwidth: DC to 500kHz (-3dB)
 X-Y phase error: 3° or less (at DC to 50kHz)

Calibrator: 1kHz square wave, 0.5V pk-pk ±3%, 50% duty cycle

Power supply:
 Line voltage: 240V AC ±10%
 Line frequency: 50/60Hz
 Power consumption
 OS-9040D: 40W
 OS-9060D: 50W
 Dimensions: 320(W) x 135(H) x 320(L)mm
 Weight
 OS-9040D: 7.2kg
 OS-9060D: 7.7kg

Supplied with operating manual, mains lead and two spare fuses. Case is fitted with stand. A 60MHz Scope Probe for use on the 9060D is available separately (AQ58N).

Order Code	Type	Price each
GW04E H20	Scope OS-9040D	£449.99
DK26D H20	Scope OS-9060D	£649.99

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Service Manual

A comprehensive service manual is available for the 20MHz (GW03D) and 40MHz (GW04E) oscilloscopes.

Order Code	Type	Price each
AP95D	Manual for GW03/GW04	£14.99 NV

60MHz Oscilloscope Probe HP-2060



The HP-2060 is a high-quality passive oscilloscope probe for use with scopes up to 60MHz. The probe is suited to equipment with an input impedance of 1MΩ shunted by 25pF. However, it is possible to compensate for equipment with an input capacitance in the range 10-35pF. The probe also features a switchable attenuator with X1 and X10 settings as well as a 1.4m flexible screened cable. The probe head can be detached from the cable assembly by unplugging the push-fit BNC connector. Compensation adjustment is available so that the probe does not distort sampled waveforms. Simply apply a 1kHz square waveform to the probe tip and adjust the recessed trimmer concealed in the probe head.

Specification

Attenuation Ratio:	1:1, 10:1 switchable
Bandwidth:	DC to 15MHz (1:1), DC to 60MHz (10:1)
Rise time:	27ns (1:1), 5.5ns (10:1)
Input resistance	
1:1 attenuation:	1MΩ (ie. oscilloscope input)
10:1 attenuation:	10MΩ (when used with 1MΩ input oscilloscopes)
Input capacitance	
1:1 attenuation:	46pF plus oscilloscope capacitance
10:1 attenuation:	≈18pF
Working voltage:	600V DC including peak AC

The probe is supplied with two channel identifier clips, a sprung loaded hook, ground lead, insulating tip, IC test tip, operating manual and an adjustment tool for the internal trimmer.

Order Code	Type	Price each
AQ58N	60MHz Scope Probe	£12.99

100MHz 3-Channel Oscilloscope OS-9100D

Goldstar

A super oscilloscope capable of displaying waveforms or events at frequencies from DC up to greater than 100MHz, with three input channels showing up to six traces. This bandwidth, along with the increased magnification, makes for displaying complex signals with precision and accuracy. It incorporates a full scale delayed sweep function, where any portion of the signal displayed with the main timebase can be magnified, and both the magnified portion and the original display can be shown simultaneously. This is invaluable for examining short duration events. The front panel layout follows a simple and logical format with which the new user will quickly become familiar. Ideal for exacting laboratory tasks, examining RF signals and high-speed logic.

Features

Wider than specified frequency response.
Fast risetime, less than 3.5ns with low overshoot.
Dynamic range up to 100MHz without waveform distortion.
Low input capacitance of less than 22pF.
Three input channels offering six separate traces with alternate sweep function convenient for observation of multiple signals.
High vertical sensitivity down to 1mV/cm.
High brightness, domed-mesh CRT.
Signal delay line useful for observing fast leading edges.
Auto focusing responding to screen intensity changes.
Alternate and chop trace switching modes.
Algebraic summing of CH1 and CH2 possible.
Polarity inversion of CH2 possible.
Z-axis or brightness modulation from external input.
Drift compensated vertical amplifier.
Maximum sweep rate of 5ns/cm.
Delayed sweep function.
High sensitivity and jitterless triggering.
TV sync. separator and hold-off.
X-Y phase difference measurement up to 100kHz.



Specification

CRT:	
Screen:	6in. rectangular with internal graticule, effective area 8 x 10cm
Acceleration:	16.5kV
Z-axis input (intensity modulation):	
Input signal:	Positive going for decreasing intensity, effective from 5V pk-pk at normal brightness
Bandwidth:	DC to 3.5MHz (-3dB)
Coupling:	DC
Input impedance:	15kΩ
Maximum input voltage:	20V DC + peak AC
Vertical deflection (CH1 & CH2):	
Bandwidth:	DC (-3dB @ 10Hz) to 100MHz (20MHz if x5 X magnification on)
Modes:	CH1, CH2, Add, Dual, Chop, Alt.
Sensitivity:	5mV/cm to 5V/cm in 10 calibrated steps in 1-2-5 sequence ±3% (1mV/cm to 1V/cm if x5 magnification on, ±5%)

Accuracy:	±3% (±5% if x5 magnification on)
Input impedance:	1MΩ/25pF
Maximum input voltage:	250V DC + peak AC or 400V pk-pk at 1kHz or less DC/AC/Gnd ref.
Input coupling:	
Risetime:	<3.5ns (<17.5ns if x5 magnification on)
CH1 out:	20mV/cm into 50Ω, DC to 30MHz (-3dB)
Polarity:	CH2 invert option
Channel 3 vertical deflection:	
Sensitivity:	0.1V/cm to 1V/cm
Bandwidth:	DC (-3dB @ 10Hz) to 50MHz
Risetime:	<7ns
Accuracy:	±5%
Input impedance:	1MΩ/25pF
Maximum input voltage:	250V DC + peak AC
Horizontal deflection:	
Sweep modes:	A, Alt., B, B triggered, X-Y
Timebase A:	50ns/cm to 0.5s/cm in 22 calibrated steps in 1-2-5 sequence
Hold-off time:	Variable
Timebase B:	50ns/cm to 50ms/cm in 19 calibrated steps in 1-2-5 sequence
Delayed sweep start:	<1cm to >10cm
Delay time jitter:	Better than 1/20,000
Sweep magnification:	10 times (5ns/cm max.)
Accuracy:	±3% (add 2% for magnifier)

Triggering:	
Modes:	Auto, Norm, TV vertical, TV horizontal
Source:	CH1, CH2, Line, External (CH3)
Coupling:	AC, LF reject, HF reject, DC
Slope:	+ or -
Sensitivity, Auto, Norm:	0.5cm @ DC to 10MHz internal, 0.1V pk-pk external 1.5cm @ DC to 100MHz internal, 0.3V pk-pk external
TV field or line:	At least 1cm internal or 1V pk-pk external
External trigger input impedance:	1MΩ/30pF
Maximum input voltage:	250V DC + peak AC
X-Y operation:	
Sensitivity:	Same as vertical deflection for both CH1 = X and CH2 = Y
X-axis bandwidth:	DC to 2MHz (-3dB)
X-Y phase error:	3° or less (@ DC to 100kHz)
Calibrator:	1kHz square wave, 0.5V pk-pk ±1%, 50% duty cycle
Power supply:	
Line voltage:	240V AC ±10%
Line frequency:	50/60Hz
Power consumption:	60W
Dimensions:	(W)320 x (H)140 x (L)420mm
Weight:	8.5kg
Supplied with operating manual, mains lead, two spare fuses. Case is fitted with a multi-position stand/carrying handle. A service manual is available separately (AP96E). Probes not included. Suitable probes are YR95D and BW05F.	

Order Code	Type	Price each
GW05F	H20 Scope OS-9100D	£799.99
AP96E	Manual for GW05	£9.99 NV



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40MHz 2-Channel Read-Out Oscilloscope OS-904RD

Goldstar

A portable 2-channel, 40MHz bandwidth dual trace oscilloscope built to a high quality and incorporating a full scale delayed sweep function invaluable for examining short duration events. The front panel layout follows a simple and logical format with which the new user will quickly become familiar.

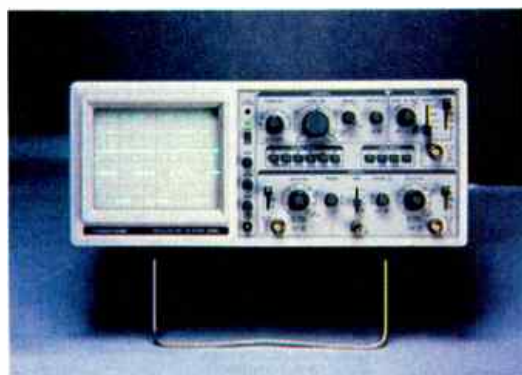
In addition the 904RD has on-screen generated, character read-out capability showing voltage and timing information about the trace if required. The on-waveform potential difference measurement displays the potential difference between two points of the waveform where the moveable cursors intersect. This is helpful for measuring peak to peak voltages of a signal, for example. The measured value is displayed in the top left corner of the screen. In addition the time difference, as measured between the two cursors, is shown top right. The two cursors are shown as 'X' and '+' symbols, and can be positioned horizontally anywhere on the trace. In addition the input channel number, attenuation level (vertical sensitivity per cm) and horizontal timebase sweep per cm are shown at the bottom of the screen.

Finally the read-out can also show the frequency of the waveform, or that part of it that lies between the two cursors. This is most useful for finding the frequency of a harmonic or some other superimposed signal over the fundamental waveform. This display appears at top right in place of the time difference reading in this mode; all other parts of the read-out are as before.

The 904RD is ideally suited to laboratory or workshop uses and the observation of high-speed events in TV, video and the general-purpose fields, and will accept signals from DC to 40MHz with a high degree of accuracy. The read-out facility provides the ability to examine waveforms in minute detail more easily than by interpreting the graticule alone. A delay line is also included for the observation of fast leading edges. The CRT includes automatic focusing responding to screen intensity changes, variable graticule illumination and a rotatable trace.

Features

Large 6-in., 8 x 10cm, high illuminance CRT with internal graticule.



Wide dynamic range even at high frequencies with -3dB.

Fast risetime with low overshoot.

Flat frequency response up to half the -3dB point.

Signal delay line useful for observing fast leading edged waveforms.

Maximum sweep rate of 20ns/cm.

Variable scale illumination.

Delayed sweep function with minimum delay time jitter of 1/20,000 or less.

TV sync separator and hold-off for video signal observation.

X-Y phase shift difference measurement possible up to 50kHz.

Character and cursor read-out on CRT with a selection of character and cursor styles.

High precision measurement of f_V , f_T and $1/f_T$ with the cursors.

Specification

CRT:	
Configuration:	6in. with internal 8 x 10cm graticule also marked for risetime with 2mm divisions along central axes
Accelerating potential:	12kV
Phosphor:	P31 (standard)
Z-axis (intensity modulation):	
Input signal:	Negative going for increase in intensity, 5V pk-pk for discernible change in brightness at normal settings
Bandwidth:	DC to 2MHz (-3dB)
Coupling:	DC
Input impedance:	20kΩ to 30kΩ typical
Maximum input voltage:	30V DC + peak AC
Vertical deflection:	
Bandwidth:	DC (-3dB @ 10Hz AC) to 40MHz (7MHz if x5 magnifier on)
Modes:	CH1, CH2, Add, Dual, Chop (0.2s - 5ms/cm), Alt (2ms - 0.2μs/cm)
Sensitivity:	5mV/cm to 5V/cm in 10 calibrated steps in 1-2-5 sequence (1mV/cm to 1V/cm if x5 magnification on)
Accuracy:	±3% (±5% if x5 magnification)
Input impedance:	1MΩ/25pF
Maximum input voltage:	250V DC + peak AC
Input coupling:	DC, AC, Gnd ref.
Risetime:	<8.8ns (<50ns if x5 magnification on)
CH1 out:	20mVcm into 50Ω, DC to 10MHz (-3dB)
Polarity inversion:	CH2 only
Display modes:	A, A int B, B, B triggered, X-Y
Horizontal deflection:	
Timebase A:	0.2μs/cm to 0.2s/cm in 19 calibrated steps in 1-2-5 sequence
Hold-off:	Variable
Timebase B:	0.2μs/cm to 20μs/cm in 7 calibrated steps in 1-2-5 sequence
Delayed sweep start:	<1cm to >10cm
Delayed sweep jitter:	>1/20,000
Sweep magnification:	10 times (sweep rate 20ns max.)
Accuracy:	±3% (±5% if x10 magnification)
Trigger system:	
Modes:	Auto, Norm, TV vertical, TV horizontal
Source:	CH1, CH2, Line, External AC
Coupling:	+ or -
Slope:	
Sensitivity, Auto, Normal:	0.5V/cm @ 20Hz to 2MHz (1.5V/cm @ 2MHz to 40MHz) internal, 0.2V pk-pk @ 20Hz to 2MHz (0.8V pk-pk @ 2MHz to 40MHz) external
TV field and line:	At least 1cm or 1V pk-pk external
External trigger input impedance:	1MΩ/30pF
Maximum input voltage:	250V DC + peak AC
X-Y operation:	
X-axis:	As CH1 except accuracy, ±6%; frequency response, DC to 500kHz (-3dB)

Y-axis: Same as CH2
X-Y phase error: <3° @ DC to 50kHz

Read-out function:

Cursor read-out: Voltage reference f_V :
 f -REF/time reference;
 f_T : f -REF/frequency
reference; $1/f_T$: f -REF.
Note f_V , f_T changed to
 f_X , f_T when in X-Y mode

Panel setting displays: Vertical axis (CH1,CH2):
V/DIV, UNCAL, MAG
(converted value). Note
displayed when vertical
mode is CH1, CH2 or Dual,
not displayed in ADD or
B modes. Horizontal axis:
S/DIV, UNCAL, MAG
(converted value).
Vertical: within ±3cm;
from centre of horizontal:
within ±4cm graticule:

Resolution: 1/25cm

Calibrator: 1kHz approx., 0.5V (±3%)
square wave, 50%
duty cycle

Power supply:

Line voltage: 240V AC ±10%
Line frequency: 50/60Hz
Power consumption: 45W
Dimensions: (W)320 x (H)140 x
(L)430mm

Weight:

7.5kg
Supplied with operating manual, mains lead, two
spare fuses. Probes not included. Suitable probes will
be found on page 340. Case fitted with stand.

Order

Code	Type	Price each
GW06G H20	Scope OS-904RD	£574.99



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20/40/60MHz 2-Channel Digital Storage Oscilloscopes OS-3020/40/60

Goldstar



A range of superb 2-channel, dual trace oscilloscopes with digital storage capabilities for 'freezing' and continuously displaying fast, complex or non-repeatable events. 'Equivalent sampling' is possible for very high frequencies. This is a useful function for digitising and observing high speed repetitive signals. In this method one data item is sampled for every high speed sweep, and the sampling point is shifted to the right with every sweep. A useful function for digitising and observing high speed repetitive signals up to the bandwidth of the oscilloscope. Another procedure called 'averaging' is used to improve the signal to noise ratio of a signal, i.e. to reduce the noise components from the constantly displayed repetitive waveform shown on the screen which has too much noise. In general, after 'averaging' has been performed a number of times, the noise can be reduced to $1/\sqrt{N}$, where N = the number of times.

The 'pre-trigger' function is also provided to allow the operator to observe what happens prior to the trigger point of a stored waveform. The trigger point may be set from 0.00cm up to 10.00cm.

'Roll mode' provides continuous observation of slow waveforms, whilst linear and sine interpolation functions allow for accurate representation of sampled waveforms (e.g. high speed waveforms) with as little as 2.5 data points per cycle. A RS232 interface is also provided so that stored waveforms can be printed out on paper with a suitable X-Y plotter.

In addition there is an on-screen generated, character read-out capability showing voltage and timing information about the trace if required. The on-waveform potential difference measurement displays the potential difference between two points of the waveform where the moveable cursors intersect. This is helpful for measuring peak to peak voltages of a signal, for example. The measured value is displayed in the top left corner of the screen while the time difference, as measured between the two cursors, is shown at top right. The two cursors are shown as 'X' and '+' symbols, and can be positioned horizontally anywhere on the trace. The input channel number, attenuation level (vertical sensitivity per cm) and horizontal timebase sweep per cm are shown at the bottom of the screen.

Finally, the read-out can also show the frequency of the waveform, or that part of it that lies between the two cursors. This is most useful for finding the frequency of a harmonic or some other superimposed signal over the fundamental waveform. This display appears at top right in place of the time difference reading in this mode; all other parts of the read-out are as before. The read-out also shows the general operating mode of the oscilloscope including active sampling functions. The CRT includes automatic focusing responding to screen intensity changes, variable graticule illumination and a rotatable trace. At the rear of the unit is 'Ch1 Out Connector' which provides an amplified part of the input signal on CH1 for a frequency counter or any other monitoring/measuring device.

Full scale delayed sweep, trace magnification and comprehensive triggering modes are also provided.

Features

- Maximum 2-channel simultaneous sampling rates of 20MS/s.
- Digitised repetitive signal in equivalent mode 60 MHz (OS-3060), 40 MHz (OS-3040), 20 MHz (OS-3020).
- 2-kilowords memory capacity per channel.
- One-touch switching between real and storage modes.
- Two save memories.
- Pre-triggering enables observation of waveform portions before the trigger point.
- Direct copy of screen display using HP-GL commands with RS232C interface.
- Roll mode provides continuous observation of slow waveforms.
- Averaging functions provides summation averaging of up to 256 times.
- Linear and sine interpolation function for optimum pulse or sinusoidal signals.
- Magnification function simplifies detailed waveform observation.
- CRT read-out for displaying set values along with measured values of voltage, time and frequency using the cursor function.

Specifications for models OS-3020;3040;3060.

CRT:

Configuration: 6-inch with internal 8 x 10cm graticule also marked for rise time with 2mm divisions along central axes

Accelerating potential:

OS-3020: 1.9kV
OS-3040: 11.5kV
OS-3060: 10.0kV

Phosphor: P31 (standard)

Z-axis (intensity modulation):

Input signal: Negative going for increase in intensity, 5V pk-pk for discernable change in brightness at normal settings

Bandwidth:

OS-3020; OS-3040 DC to 2MHz (-3dB).
OS-3060 DC to 3.5MHz (-3dB).

Coupling:

DC

Input impedance:

20kΩ to 30kΩ typical

Maximum input voltage:

30V DC + peak AC

Vertical deflection:

Bandwidth:
OS-3020 DC (-3dB @ 10Hz AC) to 20MHz (7MHz if magnified)
OS-3040 DC (-3dB @ 10Hz AC) to 40MHz (7MHz if magnified)
OS-3060 DC (-3dB @ 10Hz AC) to 60MHz (10MHz if magnified)

Modes:

Ch1, Ch2, Add, Dual, Chop (0.2s - 5ms/cm), Alt (2ms - 0.2μs/cm); (2ms - 0.1μs for OS-3060 only)

Sensitivity:

5mV/cm to 5V/cm in 10 calibrated steps in 1-2-5 sequence (1mV/cm to 1V/cm if x5 magnification on)

Accuracy:

±3% (±5% if x5 magnification)

Input impedance:

1MΩ/25pF ±3pF

Maximum input voltage:

250V DC + peak AC

Input coupling:

DC-Gnd-AC.

Rise time:

OS-3020 <17.5ns (<50ns if x5 magnification on)
OS-3040 <8.8ns (50ns if x5 magnification on)
OS-3060 <5.8ns (35ns if x5 magnification on)

Ch1 out: 20mV/cm into 50Ω, DC to 10MHz (-3dB)

Polarity inversion:

Ch2 only

Signal Delay:

OS-3040, OS-3060 only. Delay Cable supplied

Horizontal deflection:

Display modes: A, A int B, B, B triggered, X-Y (OS-3060 push button operation only)

Timebase A:

OS-3020, OS-3040 0.2μs/cm to 0.2s/cm in 19 calibrated steps in 1-2-5 sequence

OS-3060

0.1μs/cm to 0.2s/cm in 20 calibrated steps in 1-2-5 sequence

Hold-off:

Variable
OS-3020, OS-3040 0.2μs/cm to 20μs/cm in 7 calibrated steps in 1-2-5 sequence

OS-3060

0.1μs/cm to 10μs/cm in 7 calibrated steps in 1-2-5 sequence.

Delayed sweep start: <1cm to >10cm

Delayed sweep jitter: >1/20,000

Sweep magnification:

OS-3020, OS-3040: 10 times (sweep rate 20ns max.)

OS-3060:

10 times (sweep rate 10ns max.)

Accuracy:

±3% (±2% additional error for magnifier)

Trigger system:

Modes: Auto, Norm, TV vertical, TV horizontal
Source: Ch1, Ch2, Line, External
Coupling: AC
Slope: + or -

Sensitivity, Auto, Normal:

OS-3020: Internal = 0.5V/cm @ 20Hz to 2MHz (1.5V/cm @ 2MHz to 20MHz)

External = 0.2V pk-pk @ 20Hz to 2MHz (0.8V pk-pk @ 2MHz to 20MHz)

OS-3040: Internal = 0.5V/cm @ 20Hz to 2MHz (1.5V/cm @ 2MHz to 40MHz)

External = 0.2V pk-pk @ 20Hz to 2MHz (0.8V

pk-pk @ 2MHz to 40MHz)

OS-3060: Internal = 0.5V/cm @ 20Hz to 2MHz (1.5V/cm @ 2MHz to 60MHz)

External = 0.15V pk-pk @ 20Hz to 2MHz (0.3V pk-pk @ 2MHz to 60MHz)

TV field and line:

At least 1cm or 1V pk-pk external, composite sync

External trigger input impedance:

1MΩ/30pF

Maximum input voltage:

250V (DC + peak AC)

X-Y operation:

X-axis: As Ch1 except accuracy, ±5%; frequency response, DC to 500kHz (-3dB)

Y-axis:

Same as Ch2

X-Y phase error:

<3° @ DC to 50kHz

Read-out function:

Cursor read-out: Voltage reference ΔV: Δ-REF/time reference; ΔT: Δ-REF/frequency reference; 1/ΔT: Δ-REF

Panel setting displays:

Vertical axis (Ch1, Ch2): V/DIV, UNCAL, MAG (converted value). Note displayed when vertical mode is Ch1, Ch2 or Dual, not displayed in B mode.

Horizontal axis:

S/DIV, UNCAL, MAG (converted value).

Effective cursor range from centre of graticule:

Vertical: within ±3cm;
Horizontal: within ±4cm
1/25cm

Resolution:

Digital storage function:

Display memory: 1000 words per channel

Save memory: 1000 words per channel x 2

Continued on next page.

Continued from previous page.

Acquisition memory:
 OS-3020, OS-3040: 5µs/cm ~ 20s/cm: 2000 words per channel
 0.2µs/cm ~ 2µs/cm: 1000 words per channel
 OS-3060 0-5µs/cm ~ 20s/cm: 2000 words per channel
 0-1µs/cm ~ 2µs/cm: 1000 words per channel

Vertical resolution: 25 points/cm
 Horizontal resolution: 100 points/cm
 Maximum sampling rate: 20Ms/s
 Single-shot event bandwidth: 5MHz
 Repetitive event bandwidth:
 OS-3020: 20MHz
 OS-3040: 40MHz
 OS-3060: 60MHz

Data acquisition method:
 NORM mode: store whole screen each sweep
 Averaging mode: store the average from 4 to 25 times
 Roll mode: continuously read and store and re-display on screen at higher rate
 Hold mode: data is held for NORM, AVG and ROLL
 Single shot: waveform is held after one sweep is stored

Data saving: Up to two screens can be saved and recalled on screen at any time

Pre-trigger: Variable by 0.4cm per step
 Paper plotting: Via RS232 interface
 Magnifier: 10 times by time/cm switch or MAG switch

X-Y operation: Single trace X-Y mode, X-axis = Ch1, Y-axis = Ch2 or X-axis = storage A, Y-axis = storage B; Dual trace mode, X-axis = Ch1, Y-axis = Ch2. Sensitivity, both: 1mV to 5V/cm ±5%. Phase error = <math><3^\circ</math> from DC to 50kHz

Sweep time:
 OS-3020, OS-3040 0.2µs/cm to 20s/cm.
 Repetitive mode: 0.2µs/cm to 2µs/cm.
 Roll mode: 0.5µs/cm to 20s/cm.
 Alternate: 0-2µs/cm to 0-5ms/cm
 Chop: 1ms/cm to 20s/cm .
 OS-3060 0-1µs/cm to 20s/cm.
 Repetitive mode: 0-1µs/cm to 2µs/cm
 Roll mode: 0-5s/cm to 20s/cm
 Alternate: 0-1µs/cm to 0-5ms/cm
 Chop: 1ms/cm to 20s/cm

Read-out function:
 Cursor read-out: Voltage reference ΔV:
 Δ-REF/time reference; ΔT:
 Δ-REF/frequency reference;
 1/ΔT: Δ-REF

Panel setting displays
 V/DIV, UNCAL, MAG. S/DIV, UNCAL, MAG. X-Y, trigger point, number of averaging, roll mode, smoothing, interpolation method, save memory information, probe setting

Calibrator: 1kHz approx., 0.5V (±3%) square wave, 50% duty cycle

Power supply:
 Line voltage: 240V AC ±10%
 Line frequency: 50/60Hz
 Power consumption: 65W

Dimensions: 320(W) x 140(H) x 430(L)mm
 Weight: 8.5kg

Supplied with operating manual, mains lead and two spare fuses. Case is fitted with multi-position stand/carrying handle. Probes, not included, see below. Calibration service available please contact the sales line for details.

Order Code	Type		Price each
GW07H	H20	Scope OS-3020	£874.99
JX40T	H20	Digital Scope 3040	£1099.99
JV08J	H20	Digital Scope 3060	£1299.99

OSCILLOSCOPE ACCESSORIES

Oscilloscope Probe



A very high quality probe suitable for use with almost any oscilloscope. Probe has a slide switch on body for immediate selection of either times 10 or times 1.

Specification

Position x1

Attenuation: 1:1
 Bandwidth: DC to 25MHz
 Rise time: 14ns
 Input resistance: 1MΩ (oscilloscope input)
 Input capacitance: 90pF (+ oscilloscope input)
 Working voltage: 200V DC including peak AC derating with frequency

Position Ref

Probe tip grounded via 9MΩ resistor

Position x10

Attenuation: 10:1
 Bandwidth: DC to >250MHz
 Rise time: <math><1.4\text{ns}</math>
 Compensation range: 10 to 50pF
 Input resistance: 9MΩ ±1% (10MΩ when connected to oscilloscopes with 1MΩ input)
 Input capacitance: 16pF
 Working voltage: 500V DC including peak AC derating with frequency
 Cable length: 1.2m terminated in BNC plug
 Working temperature: -25°C to +70°C

The probe is supplied with a 1.2m flexible screened lead and 20cm earth lead with crocodile clip. Supplied in a plastic storage wallet with the following accessories: spring loaded test hook, IC test tip, probe tip, BNC adaptor, insulating tip and compensating tool.

Order Code	Type	Price each
BW05F	Scope Probe BNC	£16.99

Oscilloscope Probe Accessories



A pack of three spring-loaded test hooks and a pack of five probe tips for use with the oscilloscope probe (BW05F).



Order Code	Type	Price each
KR21X	3 Pk Test Hooks	£5.99
KR22Y	5 Pk Probe Tips	£3.75

Low-Cost Scope Probe



A 50Ω co-axial lead connected to a 50Ω BNC plug at one end and a red probe clip with spring loaded hook and a black crocodile clip at the other end. Length 900mm.

Order Code	Type	Price each
YR95D	Lo-Cost Scope Probe	£4.99



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 Level B: Quality Assurance
 RS12750



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DOUBLE POLE CIRCUIT BREAKER

Safeguard yourself with this double pole residual current circuit breaker. Simply plug the circuit breaker into your existing 13A mains socket outlet and then plug the lawn mower, hedge trimmer or any two or three wire domestic appliance into the 13A socket outlet on the unit. The circuit breaker has a rated trip current of 30mA and will trip within 40ms, with a maximum operating current of 13A. A test button and an indicator flag is incorporated in the unit and allows you to visually check its operation. This facility must be used every time the circuit breaker is used to ensure that the unit is functioning correctly. Please note, a circuit breaker is not a substitute for good electrical safety practices, and normal precautions should be observed when in use.



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£19.99
RZ85G

SELECTION CHART FOR BENCH POWER SUPPLIES

FEATURE	XG89	GW02	GW08	GW09	GW10	GW11	GW12	GW13	GW14	GW15	GW16
VOLTS	30	30	60	30	30	30	30	60	30	30	30
CURRENT	2A	2.5A	1A	3A	3A	3A	2.5A	3A	6A	6A	10A
SINGLE OR DUAL	S	S	S	S	S	D	D	D	S	D	S
DUAL TRACKING	-	-	-	-	-	✓	✓	✓	-	✓	-
5V TTL O/P	-	✓	-	-	-	✓	✓	✓	-	✓	-
12V TTL O/P	-	✓	-	-	-	-	-	-	-	-	-
ANALOGUE OR DIGITAL	A	A	A	A	D	A	D	A	A	A	A
COARSE & FINE CONTROL	-	-	✓	✓	✓	-	-	-	✓	-	✓
CURRENT LIMIT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CV & CC MODES	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
REMOTE	-	-	✓	✓	✓	-	-	-	-	-	-
CONTINUOUS OR DYNAMIC LOADS	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
OVERLOAD & REVERSE POLARITY PROTECTION	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
POWER SAVE	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓

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HOBBYISTS BENCH POWER SUPPLIES

Triple Power Supply



A cost-effective quality power supply, in a strong galvanized steel case, with two fixed outputs and a 0 to 30V DC variable output up to 2.5A max. The two fixed outputs are rated at 5V and 12V DC, each with a 500mA rating (1A surge). Overload and short circuit protection is provided. The PSU has separate analogue voltmeter and ammeter displays, with the output voltage continuously variable over the range, whilst the current can be limited from 0 to 2.5A. The two fixed outputs are fed via 'snap-on' terminals and the variable supply is available at a pair of terminal posts.

Specification

Power requirements: 220V AC 50Hz
Variable output: 0 to 30V DC
Maximum current: 2.5A
Fixed output 1: 5V DC/500mA, 1A surge
Fixed output 2: 12V DC/500mA, 1A surge
Ripple & Noise: 5mV
Line Regulation: 0.05% + 10mV
Load regulation: 0.05% + 10mV
Dimensions: 200 x 150 x 145mm
Weight: 2.8kg

Order

Code	Type	Price each
GW02C F10	Bench PSU 30V/12V/5V	£89.99

30V 2A



A good quality, regulated, variable 30V 2A power supply ideal for the hobbyist's work bench. Featuring a separate voltmeter and ammeter, variable output voltage, and a current limit that can be set to between approximately 300mA and 2.2A. Output is via two terminal posts, and a third post for ground connections that is connected to the chassis and mains earth.

Specification

Input: 210V to 250V AC
Output: 0 to 30V DC in two ranges
Current: 0 to 2A
Voltage regulation
load: <0.1% (30mV) for a no load to full load change
line: <0.15% (45mV) for a 10% line voltage change
Current regulation
load: 0.2% max for a 30V DC load voltage change

Continued on next page.

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line: 0.2% max +3mA for a 10% line voltage change
 Ripple and noise: <250µV rms
 Output mode: Automatic crossover between constant voltage and constant current operation
 Overload protection: by an adjustable electronic current limiting circuit and fuse in AC input
 Current limiting: Adjustable from 1% to 110% of rated load current
 Dimensions: 205 x 100 x 195mm deep

Order Code	Type	Price each
XG89V	D8 Bench PSU 2A30V	£99.99

PROFESSIONAL BENCH POWER SUPPLIES

by Instek

All the PSUs in the 'Professional' range feature overload and reverse polarity protection and current limiting which is set by a rotary control. The supply can be forced to leave 'constant voltage' mode and enter 'constant current' mode. Here the output current is maintained for a given setting of the current control by the output voltage being varied to keep the current constant. As an aid red and green front panel LEDs for each channel signal either 'CV' (constant voltage) or 'CC' (constant current) mode as active. Power consumption and dissipation is conserved by a dual level power saving device which selects lower ratios of the main supply transformers' secondaries automatically if the outputs fall below the relevant thresholds.

Single 60V 1A DC Power Supply

A high quality DC power supply with an output of 0 to 60V DC at up to 1A maximum. A separate voltmeter and ammeter are provided for monitoring the output. Voltage output is continuously variable over the range with one 'coarse' rotary control, and is accompanied by an additional 'fine' control which can vary output over 10% of the set value. In addition the voltage level can be remote controlled from an external source and the output can be switched to handle continuous or dynamic loads. Current limiting is provided by further 'coarse' and 'fine' rotary controls.



Specification

	CV Mode	CC Mode
Input:	240V AC ±10% 50/60Hz	
Output:	0 to 60V DC	0 to 1A DC
Load regulation:	0.01% +3-5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	0.5mV rms	3mA rms
Dimensions:	128 x 145 x 285mm	
Weight:	5kg	

Order Code	Type	Price each
GW08J	H PSU 60V 1A	£139.99

Single 30V 3A DC Power Supply



A high quality DC power supply providing 0 to 30V DC at up to 3A maximum. A separate voltmeter and ammeter are provided for monitoring the output. Voltage output is continuously variable over the range with one 'coarse' rotary control, and is accompanied by an additional 'fine' control which can vary output over 10% of the set value. In addition the voltage level can be remote controlled from an external source and the output can be switched to handle continuous or dynamic loads. Current limiting is provided by further 'coarse' and 'fine' rotary controls.

Specification

	CV Mode	CC Mode
Input:	240V AC ±10% 50/60Hz	
Output:	0 to 30V DC	0 to 3A DC
Load regulation:	0.01% +5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	0.5mV rms	3mA rms
Dimensions:	128 x 145 x 285mm	
Weight:	5kg	

Order Code	Type	Price each
GW09K	H PSU 30V 3A	£149.99

Digital Single 30V 3A DC Power Supply



A high quality DC power supply providing 0 to 30V DC at up to 3A maximum. The instrument includes an auto-ranging digital voltmeter (DVM) with front panel LCD display, and which can also function as a digital ammeter, for monitoring voltage or current output as required according to the setting of the front panel VOLTS/AMPS selector switch. Voltage output is continuously variable over the whole range with one 'coarse' rotary control, accompanied by an additional 'fine' control which can vary output over >5% of the set value. In addition the voltage level can be remote controlled from an external source and current limiting is provided by further 'coarse' and 'fine' rotary controls. The output is provided via three '+', '-' and chassis ground front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires.

Specification

	CV Mode	CC Mode
Input:	240V AC ±10% 50/60Hz	
Output:	0 to 30V DC	0 to 3A DC
Load regulation:	0.01% +3mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	0.5mV rms	3mA rms
Dimensions:	128 x 145 x 285mm	
Weight:	4kg	

Order Code	Type	Price each
GW10L	H PSU 30V 3A Digital	£199.99

Dual Tracking 30V 3A DC Power Supply



A high quality DC power supply featuring two 0 to 30V DC outputs, which can operate either as two entirely independent single ended supplies, or be combined in tracking mode to produce equal dual (+) and (-) supply rails, both continuously variable from one single control, with a central common rail. Each supply can deliver up to 3A maximum in either mode.

Separate voltmeters and ammeters are provided for monitoring each output. Voltage output for each independent supply is continuously variable over the range with one rotary control. Outputs are presented via two pairs of front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires and include two chassis earth terminal posts.

Also provided is one fixed, 5V DC 3A output max., regulated supply to TTL logic circuit standard, the output is available on a pair of 4mm terminal posts on the front panel.

Specification

	CV Mode	CC Mode
Input:	240V AC ±10% 50/60Hz	
Outputs, each:	0 to 30V DC	0 to 3A DC
Load regulation:	0.01% +3-5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	<3mA rms
5V DC supply:		
Deviation limits:	5V ±250mV	
Load regulation:	<10mV	
Line regulation:	<5mV	
Output current:	3A DC ±10% max.	
Dimensions:	255 x 145 x 335mm	
Weight:	11.5kg	

Order Code	Type	Price each
GW11M	H PSU 30 3A Dual	£299.99

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Digital Dual Tracking 32V 2.5A DC Power Supply



A high quality DC power supply featuring two 0 to 30V DC outputs, which can operate either as two entirely independent single ended supplies, or be combined in tracking mode to produce equal dual (+) and (-) supply rails, both continuously variable from one single control, and with a central common rail. Each supply can deliver up to 3A maximum in either mode. The instrument includes auto-ranging digital voltmeters (DVM) with front panel LED displays, which can also function as a digital ammeter, for monitoring the voltage or current output, as required according to the position of the front panel VOLTS/AMPS selector switches of either supply. Voltage output for each independent supply is continuously variable over the range with one rotary control. Outputs are presented via two pairs of front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires, in addition to two chassis earth terminal posts. Also included is one fixed, 5V DC 3A output maximum, regulated supply to TTL logic circuit standard, the output is available on a pair of 4mm terminal posts on the front panel.

Specification

	CV Mode	CC Mode
Input:	240V AC $\pm 10\%$ 50/60Hz	240V AC $\pm 10\%$ 50/60Hz
Outputs, each:	0 to 32V DC	0 to 2.5A DC
Load regulation:	0.01% +3mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	<3mA rms

5V DC supply:	
Deviation:	5V ± 250 mV
Load regulation:	<10mV
Line regulation:	<5mV
Output current:	3A DC $\pm 10\%$ max.
Ripple & noise:	<2mV rms
Short circuit:	
current:	3A
Dimensions:	255 x 145 x 335mm
Weight:	11.5kg

Order Code	Type	Price each
GW12N H	PSU 32V 2.5A Dual Dg	£349.99

Dual Tracking 60V 3A DC Power Supply



A high quality DC power supply featuring two 0 to 60V DC outputs, which can operate either as two entirely independent single ended supplies, or be combined in tracking mode to produce equal dual (+) and (-) supply rails, both continuously variable from one single control, with a central common rail. Each supply can

deliver up to 3A maximum in either mode. Separate voltmeters and ammeters are provided for monitoring each output. Voltage output for each independent supply is continuously variable over the range with one rotary control. Similarly current limiting is provided for each by a further rotary control. Outputs are available on two pairs of front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires, together with two chassis earth terminal posts. Also included is one fixed, 5V DC 3A output max., regulated supply to TTL logic circuit standard, and the output is available on a pair of 4mm terminal posts on the front panel.

Specification

	CV Mode	CC Mode
Input:	240V AC $\pm 10\%$ 50/60Hz	240V AC $\pm 10\%$ 50/60Hz
Outputs, each:	0 to 60V DC	0 to 3A DC
Load regulation:	0.01% +5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	3mA rms

5V DC supply:	
Deviation:	5V ± 250 mV
Load regulation:	<10mV
Line regulation:	<5mV
Output current:	3A DC $\pm 10\%$ max.
Ripple & noise:	<2mV rms
Short circuit:	
current:	3A
Dimensions:	255 x 145 x 420mm
Weight:	18.5kg

Order Code	Type	Price each
GW13P H	PSU 60V 3A Dual	£479.99



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01702 554161

Single 30V 6A DC Power Supply



A high quality DC power supply providing 0 to 30V DC at up to 6A maximum with a separate voltmeter and ammeter for monitoring the output. Voltage output is continuously variable over the range with 'coarse' and 'fine' rotary controls with current limiting provided by further 'coarse' and 'fine' rotary controls. The output is via two front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires. A similar chassis earth terminal post is also provided.

Specification

	CV Mode	CC Mode
Input:	240V AC $\pm 10\%$ 50/60Hz	240V AC $\pm 10\%$ 50/60Hz
Output:	0 to 30V DC	0 to 6A DC
Load regulation:	0.01% +5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	<3mA rms
Dimensions:	255 x 145 x 335mm	255 x 145 x 335mm
Weight:	11.5kg	11.5kg

Order Code	Type	Price each
GW14Q H	PSU 30V 6A	£279.99

Dual Tracking 30V 6A DC Power Supply



A high quality DC power supply featuring two 0 to 30V DC outputs, which can operate either as two entirely independent single ended supplies, or be combined in tracking mode to produce equal dual (+) and (-) supply rails, both continuously variable from a single rotary control, with a central common rail. Each supply can deliver up to 6A DC maximum in either mode. Separate voltmeters and ammeters are provided for monitoring each output. Voltage output for each independent supply is continuously variable over the range with one rotary control. Similarly current limiting is provided for each by a further rotary control. Outputs are presented via two pairs of front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires, together with two chassis earth terminal posts. Also provided is one fixed, 5V DC 3A output max., regulated supply to TTL logic circuit standard, and the output is available on a pair of 4mm terminal posts on the front panel.

Specification

	CV Mode	CC Mode
Input:	240V AC $\pm 10\%$ 50/60Hz	240V AC $\pm 10\%$ 50/60Hz
Outputs, each:	0 to 30V DC	0 to 6A DC
Load regulation:	0.01% +5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	3mA rms
Dimensions:	255 x 145 x 420mm	255 x 145 x 420mm
Weight:	18.5kg	18.5kg

Order Code	Type	Price each
GW15R H43	PSU 30 6A Dual	£479.99

Single 30V 10A DC PSU



A high quality DC power supply providing 0 to 30V DC at up to 10A maximum with separate voltmeter and ammeter for monitoring the output. Voltage output is continuously variable over the range with one 'coarse' and one 'fine' rotary controls. Current limiting is provided by further 'coarse' and 'fine' rotary controls. The output is via two front panel screw terminal posts which accept 4mm wander plugs, spade terminals or stripped wires. A similar chassis earth terminal post is also provided. Output is also overload and reverse polarity protected.

Specification

	CV Mode	CC Mode
Input:	240V AC $\pm 10\%$ 50/60Hz	240V AC $\pm 10\%$ 50/60Hz
Output:	0 to 30V DC	0 to 10A DC
Load regulation:	0.01% +5mV	0.02% +3mA
Line regulation:	0.01% +3mV	0.02% +3mA
Ripple & noise:	<1mV rms	<5mA rms
Dimensions:	255 x 145 x 420mm	255 x 145 x 420mm
Weight:	13.2kg	13.2kg

Order Code	Type	Price each
GW16S H	PSU 30V 10A	£429.99

344 • TOOLS

29 COMPONENT STORAGE

30 TOOLS

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The Maplin Tools Section has a comprehensive range of tools for amateur and professional engineers and DIY enthusiasts. From screwdrivers to sophisticated welding equipment, Maplin can supply all your needs at very competitive prices.

TOOLS

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Tapes	368,397
Taps & Dies	367
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Tool Sets	353
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Wire Strippers	360

COMPONENT STORAGE

Self-Seal Bags



Polythene bags with grip tops ideal for storing small components. The bags have a white panel on one side which can be written on. Bags are available in two sizes in bundles of 100.

Small bag is 57mm wide and 76mm high (2 1/4 x 3in.). Large bag is 89mm wide and 114mm high (3 1/2 x 4 1/2in.).

Order Code	Type	Price each
JK77J	Sealable Bag 2.25x3	£1.49
JK78K	Sealable Bag 3.5x4.5	£1.99

Dimensions Assembled size (W x D)	Stock code
3in x 6in	AQ60Q
4in x 9in	YT57M
4in x 12in	AQ61R
6in x 12in	AQ62S
10in x 12in	AQ63T
6in x 18in	AQ64U

Order Code	Type	Price each
AQ60Q	Card Tray (3 x 6)	49p
YT57M	Card Tray (4 x 9)	99p
AQ61R	Card Tray (4 x 12)	99p
AQ62S	Card Tray (6 x 12)	99p
AQ63T	Card Tray (10 x 12)	£1.09
AQ64U	Card Tray (6 x 18)	£1.09



Hobby Box 9 (Colour Red)	
No. of Compartments:	9
Size:	240 x 195 x 42mm
Stock Code:	KR49D

RAACO STORAGE PRODUCTS

Raaco manufacture a wide range of quality storage products. Each item in the range shows the design, attention to detail and quality of manufacture that have made Raaco world leaders in their field.

Assorted Hobby Boxes

A range of six quality storage boxes and one storage case, made from high grade polypropylene, with a hinged translucent plastic lid and slide locks. Boxes are available in three sizes; A6, A5 and A4. Each type has 2 differently constructed compartment sizes; assorted (red only) or criss-cross (green only) and are fitted with three unbreakable hinges. A groove on the inside of the lid overlocks the base of the box when closed ensuring the the contents of the compartments are held in place, and not mixed when the box is carried.



Hobby Box 15 (Colour Red)	
No. of Compartments:	15
Size:	340 x 260 x 57mm
Stock Code:	KR50E

Storage Tray



A strong cardboard tray in which self-seal bags or components can be stacked. A large self-seal bag fits snugly across the width. The tray is supplied flat and is simply folded into shape. Various different sizes are available to suit every need.



Hobby Box 7 (Colour Red)	
No. of Compartments:	7
Size:	175 x 145 x 32mm
Stock Code:	KR48C



Hobby Box 12 (Colour Green)	
No. of Compartments:	12
Size:	175 x 145 x 32mm
Stock Code:	GX22Y

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Hobby Box 18 (Colour Green)
 No. of Compartments: 18
 Size: 240 x 195 x 42mm
 Stock Code: GX25C



Hobby Box 32 (Colour Green)
 No. of Compartments: 32
 Size: 340 x 260 x 57mm
 Stock Code: GX26D

Hobby Case

Hobby Case 27 comes complete with 16 removable trays of various sizes, two are stacked and sub-divided into 5 and 8 compartments respectively. This makes a total of 27 individual compartments, which can be arranged in the box as desired. Hobby Case 27 has a convenient carrying handle.



Hobby Case 27 (Green only)
 No. of Compartments: 27
 Size: 340 x 260 x 57mm
 Stock Code: KR51F

Order Code	Type	Price each
KR48C	Hobby Box 7	£2.99
KR49D	Hobby Box 9	£4.99
KR50E A1	Hobby Box 15	£9.99
GX22Y	Hobby Box 12	£2.99
GX25C	Hobby Box 18	£4.99
GX26D A1	Hobby Box 32	£9.99
KR51F B1	Hobby Box 27	£12.99

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Transbox

Raaco



A good quality plastic box with two layers of storage and a clear plastic lid with carrying handle and slide-lock. The box contains several dividers which fit into the base to make between 2 and 15 separate compartments. A clear plastic tray with three large compartments fits tightly on top of the base and with the lid closed contents cannot spill from one compartment to another when the box is carried. Overall size of box 275 x 215 x 80mm high.

Order Code	Type	Price each
XJ03D A1	Transbox	£9.99

Bins on Rails

Raaco



Ideally suited for the garage and the workshop. Four grey handwidth boxes (112 x 110mm internal dimensions) with sloping fronts attached to a 500mm long wall mounting rail which has 4mm fixing holes. The boxes are stackable.

Order Code	Type	Price each
GX27E	Bins on Rails	£3.49

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Toolmate

Raaco

A new generation of Toolboxes. Light in weight, their design offers stability in use and a large capacity in relation to their overall size.

Features:

- ★ Do not rust
- ★ Remain stable
- ★ Weatherproof
- ★ Resistant to chemical attack
- ★ Made from durable Polypropylene

Toolmate 1 is supplied with a removable tote tray and two drawers which can be kitted out with compartment inserts.

Toolmate 2 features the removable tote tray, which like Toolmate 1, can be kitted out with compartment inserts.

Toolmate 3 features a removable tote tray but does not use the compartment inserts. Inserts are available as an assorted set of 16, ordered separately (Order Code KU86T), for use only in Toolmates 1 and 2.



Toolmate 1

Dimensions (mm)
 L W H Wt

Order Code	Type	Price each
JP16S D5	Toolmate 1	£22.99

Toolmate 2



Dimensions (mm)
 L W H Wt
 475 240 190 1.6Kg

Order Code	Type	Price each
KU84F B3	Toolmate 2	£17.99

Toolmate 3



NEW!

Dimensions (mm):

L	W	H	Wt
425	215	170	1.2Kg

Order Code	Type	Price each
KU85G	B3 Toolmate 3	£14.99

Compartment Inserts

Raaco



The compartmental inserts provide an organised, movable and flexible storage for small parts in the tote tray and drawer of Toolmate 1 and the tote tray of Toolmate 2. Available in sets of 16 only.

Order Code	Type	Price each
KU86T	Toolmate Inserts	£8.99

Multibox

Raaco



A robust plastic box with separate internal compartmentised tray, carrying handle and revolving clasp. The box has a large open well and the tray fits into this to about half-way down so that the top of the box is level with the top of the tray. With the handle pulled up, the lid when opened out will sit horizontal supported by the handle, with the opened box and the tray can be lifted out of the box and placed in the lid. Overall size 335 x 205 x 162mm high.

Order Code	Type	Price each
XJ05F	A1 Multibox	£10.99

Storage Cabinets



A range of three storage cabinets made from Superlene™, a strong plastic that will not rust, dent, chip or peel, suitable for home, workshop or office. The drawers are made from translucent polypropylene and are divided into compartments, and with the dividers provided, the compartments may be divided in to sections. The cabinets are of one piece construction, and can be stacked to provide additional storage, and can be wall mounted or free-standing.

Type 15 has five drawers (15 compartments), Type 30 has six drawers (30 compartments) and Type 50 has ten drawers (50 compartments).

Dimensions (mm):

	H	W	D
Type 15	183	223	160
Type 30	217	268	132
Type 50	357	268	132

Order Code	Type	Price each
BU95D	D4 Storage Cabinet 15	£10.99
BU94C	E5 Storage Cabinet 30	£12.99
BU93B	G8 Storage Cabinet 50	£16.99

Large Storage Cabinet



A dark grey enamelled steel cabinet with transparent plastic drawers with guides and end-stops. May be screwed to a wall or frame or free-standing. The cabinet contains 60 drawers each 35 x 52 x 135mm

front to back. Each drawer can be subdivided into two or three using optional extra dividers. The drawer front has a label holder; labels can be made out of stiff white card cut to size if required. Overall size 555mm high, 307mm wide, 154mm deep. Dividers are available in packs of 10.

Order Code	Type	Price each
XG98G	F10 60 Drawer Cabinet	£39.99
FP55K	Dividers W Pk of 10	89p

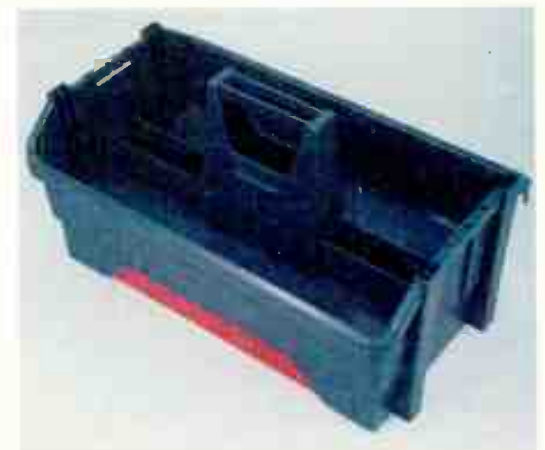
Compact Tool Boxes



A choice of two black tool boxes that are ideal for electronic engineers, service technicians and hobbyists. The tool boxes are molded in Superlene™, a very tough plastic that will not dent, peel, chip or crack. Inside, there is a removable tool/compartment tray that sits securely in the box. A heavy duty rust resistant plated latch (two on the larger box) secures the box for transit, and provision for a padlock is also provided. The smaller box measures 405 x 194 x 220mm, and the larger box measures 480 x 230 x 260mm.

Order Code	Type	Price each
BU90X	F6 Compact Toolbox Sml	£14.99
BU91Y	H9 Compact Toolbox Lrg	£19.99

Open Toolbox



An ingenious open tool box moulded in tough grey plastic with a large red drawer that has compartments for holding smaller items. Ideal for the storage of tools. Dimensions: 481 x 260 x 295mm.

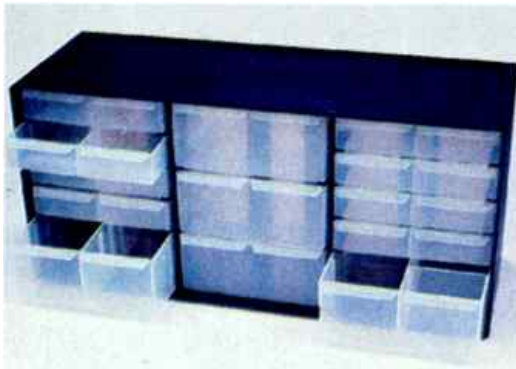
Order Code	Type	Price each
BU92A	E5 Open Toolbox	£16.99

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Drawer Organiser

A tough, durable, black plastic cabinet made from Superfene™, has 5 large drawers (139 x 143 x 60 mm), two of which are divided into two compartments, and 8 small drawers (139 x 143 x 28mm) each of which are supplied with dividers. If more storage space is required then the cabinets can be stacked. Slots are provided on the back of the cabinet for wall mounting. Overall dimensions: 448 x 205 x 160mm.



Order Code	Type	Price each
BU96E	G8 Organiser	£19.99

Drawer Organiser with Lids



A high impact polypropylene black case containing five drawers with hinged lids. The drawers can be removed and carried separately, and have varied numbers of compartments. The organiser can be stacked or wall mounted. Size: 313 x 305 x 202mm.

Order Code	Type	Price each
BU97F	H11 Organiser with Lids	£21.99

CARRYING CASES

Light Weight



A range of 4 elegant, black plastic, splashproof, injection-moulded carrying cases which represent superb value for money. When closed, the edge of the top half of the case overlaps the bottom half. Not only does this provide waterproofing, but also increases rigidity for transport. The two halves of the case are locked together by a 'snap' fit fastener, and it features rigid, moulded handles. The dimensions of the four are:

Type	Length (including handle and feet)	Width mm	Depth mm
A	209	247	49
B	265	335	79
C	335	400	96
D	410	440	110

Primarily for use as tool carrying cases, they can find many other applications, which can include transporting documents. In particular, size A can be used as a handy storage case for vehicle documents as it will fit into most glove compartments.

Order Code	Type	Price each
ZF03D	Carrying Case A	£3.99
ZF04E	A1 Carrying Case B	£5.99
ZF05F	B1 Carrying Case C	£7.99
ZF06G	C4 Carrying Case D	£9.99

Aluminium Type



A quality aluminium type flight case in which items to be carried are packed in foam. The case is silver in colour except for the black rounded corners and the two chrome-plated locks. Two keys are supplied for the locks, which are of the clasp action catch variety. The handle is made from tough black plastic and has attractive chrome trimmings. A shoulder carrying strap is provided which hooks onto buckles mounted on either side of the case. The bottom and the back of the case have four feet fitted, which not only reduce shock being transmitted to the contents of the case when it is placed down on a hard surface, but also help to prevent the underside of the case from getting scratched. Weight: 2.6kg; overall dimensions (including

handle and feet): 350mm long x 470mm wide x 165mm deep; overall depth of foam (compressible): 55mm (lid); 80mm (lower body).

Order Code	Type	Price each
GL34M	F6 Metal Flight Case	£39.99

Tools Harness



A rugged tools harness with a 48mm wide waist strap with adjustable buckle and quick-release plastic buckle clip. The waist strap has a metal bar 85mm long to allow a tape measure to be firmly attached. The strap itself is riveted to the main part of the harness for durability. There are five main compartments built into the padded synthetic harness. Compartment sizes:

- 1 Large (210 x 195 x 30mm)
- 1 Medium (160 x 110 x 15mm)
- 1 Small (110 x 125 x 25mm)
- 2 Small (50 x 120 x 20mm)

There are two heavy duty holsters suitable for holding a hammer and similar large tools such as screwdrivers etc.

Order Code	Type	Price each
RJ73Q	Tools Harness	£14.99

TRIMMING TOOLS

Hexagon Type



Tool moulded in blue acetal for adjusting 6mm cores with 0.1in. a/f hexagon centre hole. Hexagon at each end with screwdriver extension at one end only. Length: 127mm.

Order Code	Type	Price each
BR48C	Hex Trimmer	37p

Pot Core Type

Deltron



Moulded tool, with a phosphor bronze blade at each end. Designed to fit 4mm and 6mm cores. Suitable for use with our pot cores. Length: 46mm.

Order Code	Type	Price each
BR51F	Trim Tool	89p

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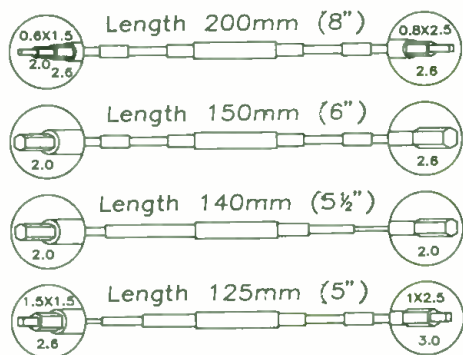
Preset Type



A trim tool for preset potentiometers. Double-ended with protruding blade for single turn presets etc., and recessed blade for our 15-turn cernets etc. Recess prevents blade slipping out during adjustment. Length: 130mm.

Order Code	Type	Price each
BR49D	Preset Trimmer	99p

Alignment Tool Set



A set of moulded plastic tools for alignment of colour TV, Hi-Fi, Radio Amateur, CB and AM and FM radio. This set should enable you to align any combination of cores that require flat-bladed, hex, or square trimming tools.

Order Code	Type	Price each
BK34M	Trim Tool Set	£3.49

TOOL SETS

Miniature Screwdriver Set

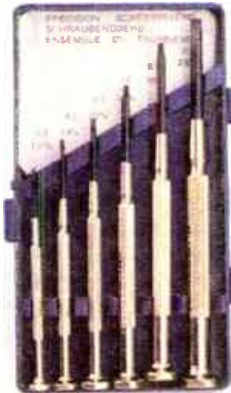
Five precision miniature screwdrivers in a plastic wallet. Screwdrivers are chromed and have a swivel cap. Blade widths (overall length of screwdriver in brackets): 1.2mm (85mm); 1.4mm (85mm); 1.6mm (85mm); 1.8mm (92mm); 2.0mm (92mm).



Order Code	Type	Price each
FY07H	Min Screwdriver Set	99p

Precision Screwdriver Set

Six precision instrument screwdrivers in a hinged plastic box with transparent cover. Each consists of a specially hardened, nickel chrome molybdenum steel blade set into a heavily chromed, knurled brass holder with swivel cap. Blade widths (overall length of screwdriver in brackets): 1.0mm (74mm); 1.4mm (85mm); 2mm (92mm); 2.4mm (103mm); 3mm (114mm); 3.8mm (126mm).



Order Code	Type	Price each
BR58N	Jewellers Screwdr Set	£1.99

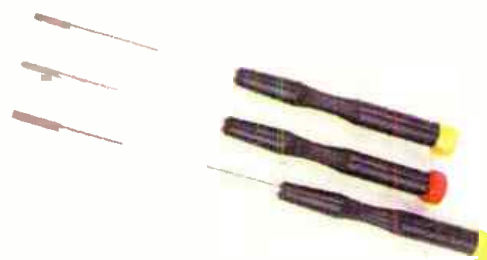
11-Piece Precision Screwdriver Set



Eleven high quality precision screwdrivers with fully hardened tool steel blades, plated brass bodies and freely revolving heads. Set comes in a hinged plastic box, and consists of six plain slot screwdrivers 1.0, 1.2, 1.4, 1.8, 2.4, and 3mm, three crosspoint screwdrivers blade sizes 00, 0, and 1, an awl and a pair of tweezers.

Order Code	Type	Price each
BK44X	11 Pce S/Driver Set	£2.99

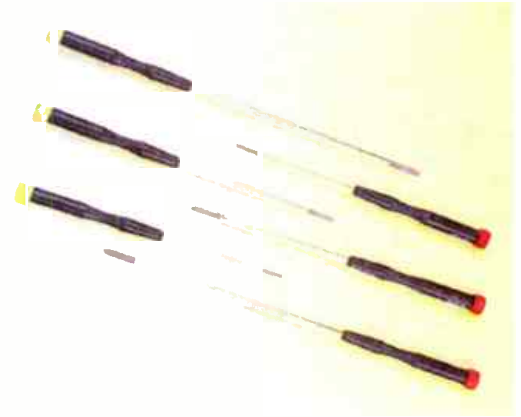
3 Piece Screwdriver Set



A three piece screwdriver set with 2 flat blade and 1 crosspoint screwdriver. The screwdrivers have long shafts and are ideal for reaching recessed screws in electronic equipment. Handles are made from moulded plastic, and incorporate finger grips. Shafts are made from nickel chrome molybdenum steel. Flat blade screwdriver sizes: 2.4 x 75mm, 3.0 x 100mm. Crosspoint screwdriver sizes: (No.0) 2.4 x 75mm.

Order Code	Type	Price each
JM31J	3pc Screwdriver Set	£3.49

6 Piece Screwdriver Set



A six piece screwdriver set with 3 flat blade and 3 crosspoint screwdrivers. The screwdrivers have long shafts and are ideal for reaching recessed screws in electronic equipment. Handles are made from moulded plastic, and incorporate finger grips. Shafts are made from nickel chrome molybdenum steel. Flat blade screwdriver sizes: 2.4 x 75mm, 3.0 x 100mm, 3.8 x 150mm. Crosspoint screwdriver sizes: (No.0) 2.4 x 75mm, (No.1) 3.0 x 100mm, (No.1) 3.8 x 150mm.

Order Code	Type	Price each
JM30H	6pc Screwdriver Set	£5.99

7-Piece Screwdriver Set

A superb set of seven screwdrivers supplied in a range of sizes in flat blade and Phillips crosspoint blade. The handles, supplied in four sizes, are of a tough shatterproof plastic and the shafts, which are of various lengths, are of steel with a bright chrome finish. The set comprises four flat blade and three crosspoint blade screwdrivers.



Flat Blade Types

Blade Width	Shaft Length	Overall Length
5/16 in.	8 in.	12 in.
1/4 in.	6 in.	10 in.
3/16 in.	4 in.	7 3/4 in.
1/8 in.	3 in.	5 1/2 in.

Crosspoint Blade Types

Blade Width	Shaft Length	Overall Length
No. 2	4 in.	7 3/4 in.
No. 1	3 in.	6 in.
No. 0	0 3 in.	5 1/2 in.

Order Code	Type	Price each
YZ44X	7pc Screwdriver Set	£5.49

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Phone 01702 556751

5-Piece Insulated Screwdriver Set with Screw Retainer

A superb set of five screwdrivers which includes three flat blade and two Phillips crosspoint screwdrivers, all protected with a sliding spring-loaded, insulating sleeve on the blade. A 'gripper' on the end of the sleeve acts like an extra hand by holding the screw onto the blade while it is being inserted. The handles and sleeves, supplied in three sizes, are of a tough shatterproof red plastic and the shafts, which are in three lengths, are of chrome vanadium steel with a chemically black finish.



Flat Blade Types

Blade Width	Shaft Length	Overall Length
5mm	150mm	255mm
4mm	125mm	220mm
3mm	125mm	220mm

Crosspoint Blade Types

Blade Width	Shaft Length	Overall Length
No. 2	175mm	280mm
No. 1	125mm	223mm

Order Code	Type	Price each
GW41U	Elect Screw/Dr Set 2	£8.99

7-Piece Insulated Screwdriver Set

A set of seven screwdrivers which includes four flat blade and three Phillips crosspoint screwdrivers, all protected



by an insulating sleeve. The handles and sleeves, supplied in three sizes, are of a tough shatterproof red plastic and the shafts, which are in four lengths, are of chrome vanadium steel with a chemically black finish.

Flat Blade Types

Blade Width	Shaft Length	Overall Length
6mm	150mm	250mm
5mm	125mm	205mm
4mm	100mm	185mm
2.5mm	75mm	155mm

Crosspoint Blade Types

Blade Width	Shaft Length	Overall Length
No. 2	150mm	250mm
No. 1	100mm	190mm
No. 0	75mm	155mm

Order Code	Type	Price each
GW40T	7p Ins Driver Set	£6.99

12-Piece Screwdriver Set



A superb set of twelve screwdrivers supplied in a range of sizes in flat blade and Phillips crosspoint blade. The handles, supplied in four sizes, are of a tough shatterproof plastic and the shafts, which are of various lengths, are of steel with a bright chrome finish. The set comprises eight flat blade and four crosspoint blade screwdrivers.

Flat Blade Types

Blade Width	Shaft Length	Overall Length
9mm	203mm	300mm
7mm	152mm	250mm
6mm	152mm	250mm
6mm	102mm	200mm
4mm	102mm	172mm
4mm*	102mm*	172mm*
3mm	76mm	140mm
7mm	38mm	82mm

*With screwholder

Crosspoint Blade Types

Blade Width	Shaft Length	Overall Length
No. 2	102mm	200mm
No. 1	76mm	152mm
No. 0	76mm	140mm
No. 2	38mm	82mm

Order Code	Type	Price each
GW47B 2	12-Piece S/Drvr Set	£8.99

24-Piece Ratchet Screwdriver Set

A high quality ratchet screwdriver socket and bit set in chrome vanadium. This versatile screwdriver is fitted with a latched pivoting mechanism that allows the handle to be bent at any angle, up to a right angle from the straight line, to increase the leverage. The screwdriver is designed to accept the 1/4in. hex bits and an adaptor is supplied to accept the 1/4in. square sockets.



1/4 in. hex bits:

3, 4, 5 and 6mm flat blade. No's. 1, 2 and 3 Posidriv blade. No's. 1, 2 and 3 Phillips blade.

1/4 in. sockets:

5, 6, 7, 8, 9 and 10mm
1/4, 5/16, 11/32, 3/8, 7/16 and 1/2 in. A/F.

Order Code	Type	Price each
GW44X 2	24-Piece Ratchet Set	£9.99

30 Piece Screwdriver Set



A 30-piece screwdriver set, housed in a well designed case, which can be suspended from a wall hook or similar. The case is in two sections which comprise a transparent plastic lid and a grey base. The overall length of the closed box is 237mm. The base is moulded to hold the contents securely.

A magnetic screwdriver with a 1/4in hex socket attachment is included which has a hollow handle to store several of the blades. Overall length of the screwdriver is 185mm (excluding any driver blades). The kit includes; one 1/4" square drive to 1/4" hex drive adaptor; one 1/4" square drive socket to 1/4" hex drive socket, and an assortment of 26 screwdriver bits:-

- 6 Torx blades, T-10, T-15, T-20, T-25, T-30, T-40.
- 5 Flat ended blades, 9/32", 1/4", 3/16", 5/32", 1/8".
- 5 Allen Key heads, 5/64", 3/32", 7/64", 1/8", 9/64".
- 4 Square headed blades, S0, S1, S2, S3.
- 4 Phillips blades, No.0, No.1, No.2, No.3
- 2 Posidriv/Superdriv blades, PZ1, PZ2.

Each blade is identifiable by the type and size which is printed on one edge.

Order Code	Type	Price each
AQ75S	30pc Screwdriver Set	£6.99

23 Piece Screwdriver and Socket Set



A 23-Piece ratchet screwdriver and socket set in a hinged two part presentation box.

Contents (1x of each item)

- Phillips bits: N° 1, 2, 3
- Flat blade bits: N° 4, 5, 6
- Posi-drive bits: N° 1, 2, 3
- Hex bits: M4, 5, 6
- Sockets (1/4 in.): M5, 5.5, 6, 7, 8, 9, 10, 11
- Socket adaptor
- Magnetic bit holder
- Ratchet handle with removable end cap for storage of small screws.

Order Code	Type	Price each
ZC63T	A1 23pc S/Drvr-Skt Set	£6.99

THE BEST OF SERVICE

53 Piece Screwdriver and Socket Set

NEW



A 53 Piece (including case) 1/4in. ratchet screwdriver & socket set in a grey moulded plastic carry case.

Contents (1x each item)

- Flat blade bits: 5/32", 3/16", 1/4", 9/32"
- Phillips bits: N° 1, 2, 3
- Square bits: S1, S2, S3
- Hex bits: 1/16", 5/64", 3/32", 1/8", 5/32", 3/16", 7/32", 1/4"
- Torx bits: T10, 15, 20, 25, 27, 30, 40, 45
- 4in. bit extension
- Sockets: AF: 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8", 13/32", 7/16", 1/2"
- Metric: 4, 4.5, 5, 5.5, 6, 7, 8, 9, 10, 11, 13
- Socket adaptor 1/4in.
- Ratchet driver with 180° knuckle.

Order Code	Type	Price each
ZC64U	A2 53pc S Dvr-Skt Set	£14.99

Interchangeable Utility Set

A very useful set of small tools all of which fit into screwdriver-type body.

19 different tools:

- Box spanners 3mm, 3.5mm, 4mm, 4.5mm, 5mm
- Open-ended spanners 4mm, 4.5mm, 5mm, 5.5mm, 6mm;
- Allen keys 1.5mm, 2mm, 2.5mm;
- Pozidrive screwdriver size 0 and size 1;
- Flat blade screwdrivers (blade widths) 1.5mm, 2.5mm, 3.5mm; and an Awl.

These miniature precision tools (all approx 50mm long; handle 92mm long) are supplied in a hinged plastic case.



Order Code	Type	Price each
FY08J	Utility Set	£4.99

Universal Driver Set



A comprehensive 17 piece tool set in a plastic storage case with hinged, perspex lid. The driver set comprises a range of six flat blade screwdrivers in 1.0mm, 1.4mm, 2.0mm, 2.4mm, 3.0mm and 3.8mm sizes, plus

a range of four cross-head drivers in 2.0mm diameter and 2.5mm diameter versions of size 0, and 3.0mm and 4.0mm diameter versions of size 1. In addition there are three allen keys of 1.5, 2.0 and 2.5mm, and three metric nut spinners of 3.0, 4.0 and 5.0mm. There is also a 35mm long steel tommy bar for use with the allen keys and nut spinners. The case measures 210mm x 148mm x 22mm. Weight 455gm.

Order Code	Type	Price each
YJ26D	Universal Driver Set	£5.99

SCREWDRIVER SETS

T-handle Screwdriver Set



A precision screwdriver system based on a high quality range of 1/4in. hex blades and a T-handle screwdriver. The eleven, 25mm long, blades are manufactured from chrome vanadium steel and hardened. The T-handle is manufactured from tough impact resistant plastic and the shaft from chrome plated steel. The 1/4in. hex socket, on the end of the shaft, is magnetised to retain the blade in use.

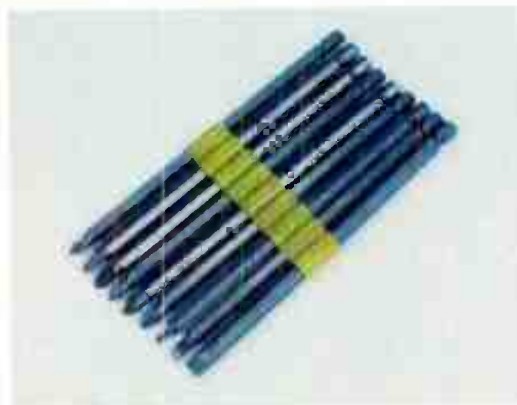
The 11 blades comprise:

- ★ Five flat bits: 3, 4, 5, 6, 7mm.
- ★ Three Posidriv/Supadriv crosspoint bits: No's. 1, 2, 3.
- ★ Three Phillips crosspoint bits: No's. 1, 2, 3.

Order Code	Type	Price each
RD84F	T-handle & 11pcs	£3.49

9 Piece Screwdriver Blade Set

A high quality set of precision 150mm long blades for use with 1/4in. hex screwdrivers. The 9 blades are manufactured from chrome vanadium steel and hardened.



The set comprises:

- ★ Three flat blades: 3, 5, 7mm.
- ★ Three Posidriv/Supadriv blades: No's. 1, 2, 3.
- ★ Three Phillips blades: No's. 1, 2, 3.

Order Code	Type	Price each
RD82D	9pc Lg Hex Blade Set	£4.99

Hex Bit Set

A 7-piece set of Phillips, Pozzi/Supadriv and flat ended chrome-vanadium steel bits to fit standard 1/4in. hex screwdriver/drill holders. The bits are supplied in a plastic dispenser. The set comprises: Phillips No. 1 and 2, Pozzi/Supadriv No. 1 and 2, Flat end 4-5 and 7mm, and an adaptor.



Order Code	Type	Price each
RD83E	Hex Bits	£2.49

9 Piece Screwdriver Blade Set with Holster



A high quality set of precision 65mm long double-ended blades for use with 1/4in. hex screwdrivers. The 9 blades are manufactured from chrome vanadium steel and hardened. Supplied with a useful, rubberised plastic holster that can be threaded on to most belts. The set comprises:-

- ★ Three flat blades: 4, 6, 7mm.
- ★ Three Posidriv/Supadriv blades: No's. 1, 2, 3.
- ★ Three Phillips blades: No's. 1, 2, 3.

Order Code	Type	Price each
RD86T	9pc Set & Holder	£3.99

10 Piece Screwdriver Blade Set



A high quality set of precision 50mm long blades for use with 1/4in. hex screwdrivers. The 9 blades and holder are manufactured from chrome vanadium steel and hardened.

The set comprises:

- ★ Three flat blades: 4, 6, 8mm.
- ★ Three Posidriv/Supadriv blades: No's. 1, 2, 3.
- ★ Three Phillips blades: No's. 1, 2, 3.

Order Code	Type	Price each
RD85G	10pc Hex Blade Set	£3.99

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Phone 01702 552941

MINI FLOODLIGHT WITH PIR

A compact high-powered floodlight, controlled by a built-in passive infra-red intruder sensor, similar to our popular standard security floodlighting system (GK05F). Like its bigger brother, this outdoor security system offers outstanding value for money, and at the flick of a switch can also double as a source of general illumination for outdoor events. When the floodlight is installed, the infra-red sensor provides detection over 110° of arc up a distance of 12m. This detection range means the unit is sensitive enough for use in commercial as well as domestic applications; the level of sensitivity being adjustable. In use, when any form of infra-red radiation (e.g. body heat) passes through this detection region, the 150W halogen tube (supplied separately) is switched on, for up to 12 minutes, catching any intruders unexpectedly in a brilliant flood of light. The 'on' time is adjustable from 3 seconds to 12 minutes. The lamp is not only a useful deterrent against intruders at night, it is also a handy automatic welcoming light for you, your family and friends. The lamp is prevented from operating wastefully during daylight hours.



GREAT VALUE!
£19.99
DM50E
[F2]

- Operating voltage:** 240V AC 50Hz
Maximum lamp rating: 150W
Detection range: 12m (39ft) at 20°C
Horizontal detection angle: 110°
Mounting height: 1.8m to 2m (6ft to 6ft 7in)
Floodlight angle: Adjustable through 100° vertically and 330° horizontally
PIR sensor angle: Adjustable through 60° vertically and 330° horizontally
Operating modes: Automatic and manual
Automatic lighting period: Adjustable from 3 seconds to 12 minutes
Daylight override: Adjustable threshold
Floodlamp housing: Cast zinc alloy

TUBE NOT SUPPLIED
Requires tube: DM51F £3.99

3 Piece Long Screwdriver Blade Set



A high quality set of precision 150mm long single-ended blades for use with 1/4 in. hex screwdrivers. The three blades are manufactured from chrome vanadium steel and hardened. The set comprises:-

- ★ One flat blade of 6mm.
- ★ One Posidriv/Supadriv blade at No. 2.
- ★ One Phillips blade at No. 2.

Order Code	Type	Price each
RD88V	3pc Long Set	£2.49

3 Piece Screwdriver Blade Set

A high quality set of precision 65mm long double-ended blades for use with 1/4 in. hex screwdrivers. The 3 blades are manufactured from chrome vanadium steel and hardened.

- The set comprises:-
- ★ One flat blade of 6mm.
 - ★ One Posidriv/Supadriv blade at No. 2.
 - ★ One Phillips blade at No. 2.

Order Code	Type	Price each
RD89W	3pc Hex Blade Set	£1.99

33 Piece Screwdriver Blade Set



A high quality set of precision blades for use with 1/4 in. hex screwdrivers. The 33 blades and holder are manufactured from chrome vanadium steel and hardened. Supplied with two blade storage tidies made from rubberised plastic. Each tidy will hold 32 by 25mm long blades and a holder.

- The set comprises:
- ★ Five flat blades: 3, 4, 5, 6, 7mm.
 - ★ Seven Posidriv/Supadriv blades: 2 x No. 1, 3 x No. 2, 2 x No. 3.
 - ★ Eight Phillips blades: 1 x No. 0, 2 x No. 1, 3 x No. 2, 2 x No. 3.
 - ★ Six Torx blades: No's T10, T15, T20, T25, T30, T40.
 - ★ Six hexagonal blades: 2, 2.5, 3, 4, 5, 6mm.
 - ★ One 60mm long magnetised blade holder.

Order Code	Type	Price each
RD90X	33pc Hex Blade Set	£5.99

12 Piece Screwdriver Blade Set

A high quality set of precision blades for use with 1/4 in. hex screwdrivers. The 12 blades, in three heads and four different lengths, are manufactured from chrome vanadium steel and hardened.



- The set comprises:
- ★ At 150mm: 6mm flat, No. 2 Phillips, No. 2 Posidriv.
 - ★ At 65mm: 6mm flat, No. 2 Phillips, No. 2 Posidriv. (All double-ended)
 - ★ At 50mm: 6mm flat, No. 2 Phillips, No. 2 Posidriv.
 - ★ At 25mm: 6mm flat, No. 2 Phillips, No. 2 Posidriv.

Order Code	Type	Price each
RD87U	12pc Hex Blade Set	£4.99

17 Piece Screwdriver Blade Set

A high quality set of precision blades for use with 1/4 in. hex screwdrivers. The 16 blades and holder are manufactured from chrome vanadium steel and hardened. Supplied with two blade storage tidies made from rubberised plastic. Each tidy will store 16 by 25mm long blades and a holder.

- The set comprises:
- ★ Four flat blades: 4, 5, 6, 7mm.
 - ★ Three Posidriv/Supadriv blades: No's 1, 2, 3.
 - ★ Three Phillips blades: No's 1, 2, 3.
 - ★ Three Torx blades: No's T25, T30, T40.
 - ★ Two hexagonal blades: 4 and 6mm.
 - ★ One 1/4 in. hex to 1/4 in. square drive adaptor.
 - ★ One 60mm long magnetised blade holder.



Order Code	Type	Price each
RD93B	17pc Hex Blade Set	£3.99

Fax your orders to:
01702 553935

2 Piece Adaptor Set



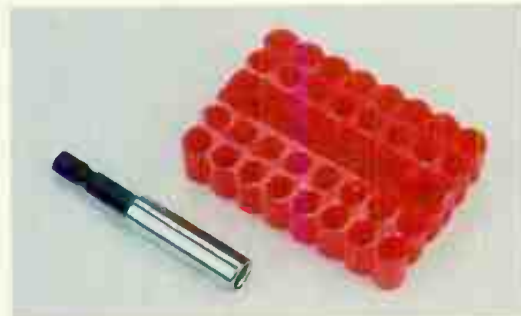
A high quality set of precision adaptors for use with 1/4 in. hex screwdrivers. The adaptors are manufactured from chrome vanadium and hardened. The set comprises:-

- ★ One 1/4 in. square to 1/4 in. hex 65mm long adaptor
- ★ One 1/4 in. hex 60mm magnetised blade holder.

Order Code	Type	Price each
RD91Y	2pc Adaptor Set	£1.99

Screwdriver Blade Tidy

A tough rubberised red plastic blade retainer for storing 32 blades in one handy unit. Dimensions: 66 x 47 x 16mm. Supplied with a 60mm long magnetised blade holder.



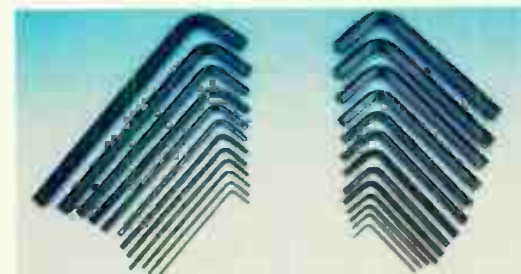
Order Code	Type	Price each
RD92A	Blade Tidy	£1.99

25 Piece Allen Key Set

A heavy duty Allen key set comprising 13 metric and 12 imperial sizes, that is housed in a convenient plastic tool roll.

Imperial sizes (in): 3/8, 5/16, 1/4, 7/32, 3/16, 5/32, 9/64, 1/8, 7/64, 3/32, 5/64, 1/16

Metric sizes (mm): 10, 9, 8, 7, 6, 5.5, 5, 4.5, 4, 3, 2.5, 2, 1.5



Order Code	Type	Price each
RD81C	25pc Allen Key Set	£4.99

Precision Micro Tool Set

A black plastic box with a transparent slide-on lid containing a selection of useful tools. The set contains a pair of long-nose pliers with serrated jaws, cutter and sprung insulated handles overall length 130mm; a pair of cutters with sprung insulated handles overall length 112mm; six flat-blade screwdrivers sizes 1.0mm, 1.4mm, 2.0mm, 2.4mm, 3.0mm and 3.8mm; six phillips screwdrivers, a 1.4mm diameter and a 1.6mm diameter version of size 00, a 2.0mm diameter and a 2.4mm diameter version of size 0, and a 3.0mm

diameter and a 3.8mm diameter version of size 1; a glass magnifier, a pair of steel tweezers with serrated grip; a small hammer with one plastic and one metal face; and a pearl catcher.



Order Code	Type	Price each
FK52G	Micro Tool Set	£12.99

Students Tool Kit

Ewan James



A 15-piece tool kit ideal for electronics courses at schools and colleges, and for electronics hobbyists. The kit includes a 25W soldering iron with two interchangeable bits (flat and pointed), a detachable hook and small fold-up stand, desoldering tool, a supply of solder and a pot of flux. For working on PCBs and delicate equipment, a 'helping hands', a 'scraper' and a wire wrap tool are included. To help in assembly and repair of most work and projects, two crosspoint and two standard screwdrivers are included, a pair of pliers and wire cutters, and for delicate work, a pair of tweezers. Housed in a grey plastic box with handles and two catches, the tools are held in 'cut-outs' to keep them secure during transit.

Order Code	Type	Price each
BZ60Q	C4 Students Tool Kit	£22.99

Hobbyists Starter Tool Kit



An easily affordable tool kit for the new electronics hobbyist, packaged to suit the typical needs of the beginner and offering considerable savings over buying the items separately. Presented in a cloth toolroll, the

pack contains: side cutters; pair of long-nosed pliers with wire cutter; light-duty flat blade screwdriver 75mm long; No. 1 crosspoint screwdriver 75mm long; desoldering tool; and an Antex soldering kit with a CS iron, stand and 5m pack of 18swg multicore solder. Start as you mean to go on, with the right tools.

Order Code	Type	Price each
SK01B	B1 Starter Tool Kit	£24.95

Advanced Tool Kit



Contained in a large, plastic tool box, the advanced tool kit comprises: side cutters; pair of long-nosed pliers with wire-cutter; light-duty, 100mm long flat blade screwdriver; 75mm long chrome-vanadium 5mm wide flat blade screwdriver; No. 0 and No. 1 75mm long crosspoint screwdrivers; No. 2 100mm long crosspoint; easy-to-use, combined wire stripper and cutter tool; and an Antex soldering kit with a CS iron, stand and 5m pack of 18swg multicore solder.

Order Code	Type	Price each
SK02C	B5 Advanced Tool Kit	£34.99

Engineer's Tool Kit



Contained in a large, plastic tool box, this comprehensive engineer's tool kit comprises: side cutters; pair of long-nosed pliers with wire-cutter; pair of heavy-duty electricians pliers; 75mm long chrome-vanadium 5mm wide flat blade screwdriver; a set of long shaft screwdrivers (2 flat blade and 1 crosspoint); light-duty, 100mm long flat blade screwdriver; 75mm long No. 1 crosspoint screwdriver; 100mm long No. 2 crosspoint screwdriver; an 11 piece precision screwdriver set in their own case; a preset trimmer tool; a retractable blade knife; combined wire stripper and cutter tool; a junior hacksaw; needle file set in plastic wallet; a 6-inch stainless steel rule; desoldering tool; and an Antex soldering kit with an XS iron, stand and 5m pack of 18swg multicore solder.

Order Code	Type	Price each
SK03D	D4 Engineers Tool Kit	£49.99

SOCKET SET

8 Piece Long Reach Socket Set

NEW



An 8 piece 1/2 in. long reach socket set supplied on a storage rail. Sockets are good quality chrome plated vanadium steel.

Order Code	Type	Price each
ZC65W B3	8pc L/R Socket Set	£14.99

11 Piece Long Reach Socket Set



An 11-Piece 3/8 in. long reach socket set supplied on a storage rail. Sockets are good quality chrome plated vanadium steel.

Sizes: 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19mm.

Order Code	Type	Price each
ZC68Y A2	11pc L/R Socket Set	£11.99

52-Piece Socket Set



A high quality 52 piece 1/4 in. and 1/2 in. square drive socket set containing a large selection of metric sockets and fittings. Suitable for use in many applications such as maintenance, assembly and service, whether in the field or workshop. Manufactured from chrome vanadium steel and bright chrome-plating, the set includes one 1/4 in. and one 1/2 in. ratchet handle, one 1/4 in. and one 1/2 in. sliding T-bar, one 1/4 in. and two 1/2 in. extension bars, one 1/4 in. and one 1/2 in. universal joint, one spinner ratchet handle for hex driver bits, a hex to 1/4 in. adaptor, a 1/4 in. to hex adaptor, and a spark plug socket. Supplied complete in a tough moulded plastic carrying case. The sockets, hex bits and keys are of standard size as follows:-

1/2 in. Square Sockets:
10, 11, 12, 13, 14, 15, 17, 19, 22, 24, 27, 30, 32mm.

1/4 in. Square Sockets:
4, 4.5, 5, 5.5, 6, 7, 8, 9, 10, 11, 13mm.

1/4 in. Hex Bits:
Flat blade: 4.5, 5, 7mm.
Phillips crosspoint: No's. 1, 2, 3.
Hexagon: 3, 4, 5, 6, 7, 8mm.

Allen Key Wrenches:
1.5, 2, 2.5mm.

Order Code	Type	Price each
GW38R G8	52-Piece Toolkit	£26.99

Fax your orders to:
01702 553935

76-Piece Socket and Wrench Set



A superb, high quality 76-piece car tool kit containing a comprehensive range of tools which are all that you require for general maintenance or for use in servicing, in the field or in the workshop. The ideal kit for keeping in the car, the kit is supplied in an outstanding tough moulded plastic carrying case. Manufactured from chrome vanadium steel and bright chrome plated, the set contains eight combination spanners, five screwdrivers, one pair universal pliers, one pair self-locking pliers, one crimping tool and a box of terminals, one hammer, six hexagon keys in a holder, one thickness gauge, one low-voltage tester, and one battery terminal brush. The set also includes a 1/2 in. square drive socket set that contains 13 sockets, a ratchet handle, a sliding T-bar, two extension bars, a universal joint, and a spark plug socket. The sockets, spanners, screwdrivers and hexagon keys are as follows:-

1/2 in. Square Sockets:
8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 24mm.

Combination Spanners:
10, 11, 12, 13, 14, 15, 17, 19mm.

Hexagon Key Wrenches:
3, 4, 5, 6, 8, 10mm.

Screwdrivers

Flat Blade Types:

Blade Width	Shaft Length	Overall Length
9mm.	195mm.	310mm.
6.5mm.	100mm.	200mm.
6mm.	40mm.	85mm.

Crosspoint Blade Types:

Blade Width	Shaft Length	Overall Length
No. 2	100mm.	200mm.
No. 1	40mm.	85mm.

Order Code	Type	Price each
GW37S H13	76-Piece Toolkit	£39.99

101-Piece Socket Set



A high quality 101-piece 1/4 in. and 1/2 in. square drive socket set containing an extensive range of metric sockets, hex bits and various fittings. Suitable for use in many different applications including maintenance, assembly and service, whether in the field or workshop. Manufactured from chrome vanadium steel and bright chrome-plating, the set includes eleven combination spanners, four double-socket spanners, one 1/4 in. and one 1/2 in. ratchet handle, one 1/4 in. and one 1/2 in. sliding T-bar, two 1/4 in. and two 1/2 in. extension bars, one 1/4 in. and one 1/2 in. universal joint, one spinner ratchet handle for hex driver bits, one hex extension bar, one flexible hex extension bar, a hex to 1/4 in. adaptor, and a spark plug socket. Supplied complete in a tough moulded plastic carrying case. The sockets, hex bits and keys are as follows:-

1/2 in. Square Sockets: 10, 12, 13, 14, 15, 16, 17, 18, 20, 21, 23, 24, 27, 32mm.

3/8, 7/16, 1/2, 9/16, 11/16, 3/4, 13/16, 7/8, 13/16 in. A/F.

1/4 in. Square Standard Sockets:
4, 4.5, 5, 5.5, 6, 7, 8, 9, 10, 11, 12, 13mm.

1/4 in. Square Long Sockets:
4, 5, 6, 7, 8, 9, 10, 11, 13mm.

1/4 in. Hex Bits:

Flat blade: 5, 6, 7mm.

Phillips crosspoint: No's. 1, 2, 3.

Pozidriv/Supadriv crosspoint: No's. 1, 2, 3.

Hexagonal: 1.5, 2, 2.5, 3, 4, 5, 5.5, 6mm.

Torx: T10, T15, T20, T25, T27, T30, T40.

Combination Spanners:

7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19mm.

Double-socket Spanners:

8 x 9, 10 x 11, 12 x 13, 14 x 15mm.

Allen Key Wrenches:

1.5, 2, 2.5mm.

Order Code	Type	Price each
GW36P H16	101-Piece Toolkit	£54.99

SCREWDRIVERS

Pozidrive Screwdrivers

Screwdrivers suitable for use with Pozidrive screws. Sizes are (blade length in brackets) No. 0 point (75mm), and No. 1 point (100mm).



Order Code	Type	Price each
FT54J	Size 0 Pozidriver	£1.69
FY15R	Size 1 Pozidriver	£1.69

Light Duty Screwdrivers



A range of small screwdrivers primarily intended for light duty work and small screws. Blades are made of tempered and hardened tool steel and nickel plated, in 75mm, 100mm and 150mm lengths respectively. Moulded plastic handles.

Order Code	Type	Price each
BR52G	L/Duty Driver 75mm	59p
BR53H	L/Duty Driver 100mm	69p
FV46A	L/Duty Driver 150mm	79p

Electricians Terminal Screwdriver



A high quality 150mm terminal screwdriver with handle and blade insulated with bright orange 'nylon 11' that complies to ESI Standard 26-3 issue 2, and is therefore suitable for 'live' line working. The screwdriver has a fluted handle and a parallel blade to allow the best sight line for locating recessed or countersunk screw heads.

Dimensions	
handle:	75 x 13mm
basic blade:	75 x 3mm
insulation diameter:	5mm
Weight:	19g

Order Code	Type	Price each
DH04E	Elect Term Driver	£2.39

Screw Grip Driver



A long bladed screwdriver with sprung jaws for gripping the head of the screw whilst reaching into difficult places. The clamp can be slid back up to the handle if not required. Overall length 230mm. Blade length 154mm. Width at tip 4mm.



Order Code	Type	Price each
BK35Q	Screw Grip Driver	£2.25

Standard Screwdrivers



Flat blade screwdrivers with chrome-vanadium shanks and heat-treated fully-hardened tips lightly magnetised to help prevent screws being lost during awkward tasks. On the two larger sizes, the shanks are square section for added strength. The handles are moulded shockproof transparent amber plastic with finger grips.

The following sizes are available:

Type	Blade width	Shaft length	Overall length
3.2/75	3.2mm	75mm	127mm
5/75	5mm	75mm	155mm
5/150	5mm	150mm	230mm

Order Code	Type	Price each
JG97F	CV Dvr Flat 3.2/75mm	60p
JG98G	CV Dvr Flat 5/75mm	68p
JH00A	CV Dvr Flat 5/150mm	89p

Standard Crosspoint Screwdrivers



Crosspoint screwdrivers with chrome-vanadium shanks and heat-treated fully-hardened tips lightly magnetised to help prevent screws being lost during awkward tasks. On the two larger sizes, the shanks are square section for added strength. The handles are moulded shockproof transparent amber plastic with finger grips.

The following sizes are available:

Type	Point size	Shaft length	Overall length
0/75	No. 0	75mm	127mm
1/75	No. 1	75mm	155mm
2/100	No. 2	100mm	188mm

Order Code	Type	Price each
JH03D	CV Dvr X-Point 0/75	60p
JH04E	CV Dvr X-Point 1/75	68p
JH06G	CV Dvr X-Point 2/100	99p

Angle Screwdrivers

Manufactured from chrome vanadium steel for maximum strength, and bright nickel plated for rust protection. The tips are set at 90 degrees to the shaft, which makes these screwdrivers ideal for use in confined areas. Two types are available, the first with a 5mm plain blade on one end and a no. 1 cross slot on the other, and the second with a 6mm plain blade on one end and a no. 2 cross slot on the other. Overall length of the first is 125mm, and the second is 135mm.



Order Code	Type	Price each
FG03D	5mm x no1 Angle Dvr	£1.49
FG04E	6mm x no2 Angle Dvr	£1.59

Flexible Screwdriver



A flexible shaft screwdriver for use where a direct straight approach to the screw is impossible. The flexible shaft can be bent through >90°. Overall length 230mm. Length of shaft and blade 135mm. Width of blade tip 4mm.

Order Code	Type	Price each
BK36P	Flex Driver	£4.49

Screw Grip Crosspoint Driver



Long bladed crosspoint screwdriver with sprung jaws for holding screws. All other specifications as BK35Q.

Order Code	Type	Price each
BK37S	Crosspoint Grip Dvr	£2.25

Ratchet Screwdrivers



A range of quality screwdrivers with a left, right and neutral setting ratchet in the moulded plastic handle. The blade is manufactured from a high alloy chrome vanadium steel and is supplied with either a flat tip or a pozidriv tip.

Specification	
Overall length:	225mm
Blade length:	100mm
Flared flat tip:	6mm wide
Pozidriv tip:	6mm across (No. 2 point size)

Order Code	Type	Price each
RD95D	Ratchet Flat Driver	£3.79
RD96E	Ratchet Pozi Driver	£3.79

FOR TOP QUALITY & VALUE!

Mains Tester



A mains tester screwdriver with neon in handle. Neon lights when screwdriver point is touched on voltages between 100 and 500 volts AC or DC with thumb touching metal clip to give earth reference. Has plastic pocket clip. Blade length 48mm with insulating sleeve.

Order Code	Type	Price each
BR71N	Mains Tester	99p

WIRE CUTTERS

5 Piece Plier/Cutter Set



A set of 5 useful pliers and cutters, all of which are lap-jointed and have insulated handles. The set is comprised of: a pair of long-nosed pliers with sprung handles and smooth jaws; a pair of flat-nosed pliers with serrated jaws, a pair of pliers with medium-sized smooth tapered jaws, a pair of end cutters with sprung handles and a pair of side cutters.

Order Code	Type	Price each
YZ45Y	Plier & Cutter Set	£8.49

4in. Miniature Side Cutters



Ideal for use in electronic assembly, where larger tools would be cumbersome, this miniature 4in. spring-loaded diagonal cutter is made from a special high quality steel which has been heat-treated, ground and polished, with hardened cutting edges for cropping hard and soft wire. The handles are protected with a cushion grip in smooth green PVC, for extra comfort in use. Overall length 100mm. Length of cutting edge 12mm.

Order Code	Type	Price each
GW98G	4in Mini Side	£3.99

Miniature Side Cutters



Miniature spring-loaded diagonal cutters, ideal for use in electronic assembly, made from a special high quality steel, heat-treated, ground and polished, with hardened cutting edges for hard and soft wire. The handles are protected with a cushion grip made from smooth glossy green PVC, for extra comfort in use. Overall length 125mm. Length of cutting edge 15mm.

Order Code	Type	Price each
GW96E	Mini Side	£3.99

Snip Cutter



A pair of cutters designed for cropping leads on pcb's. The head is angled at 45° for use in tight spaces. Insulated sprung handles.

Order Code	Type	Price each
JH20W	Snip Cutter	£2.99

Diagonal Side Cutters



Manufactured from special quality high grade alloy steel with a smoothly ground head and hardened cutting edge that will cut hard, medium-hard and soft wires. Cushion grip handles for extra comfort. Size 125mm.

Order Code	Type	Price each
BU74R	Diagonal Side Cutter	£15.49

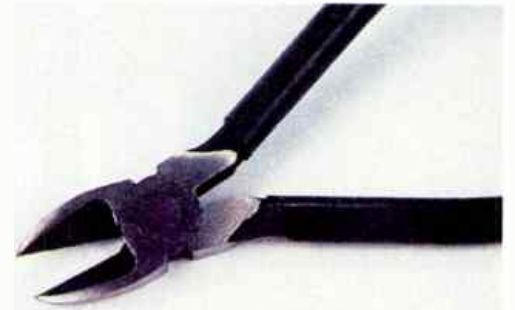
Side Cutters 5in



5in. diagonal cutters made from tool steel with a smoothly finished head and hardened cutting edge that will cut hard and soft wire. The handles are protected with a cushion grip in smooth glossy yellow PVC, for extra comfort in use. Overall length 125mm. Length of cutting edge 19mm.

Order Code	Type	Price each
GX00A	5in Side Cuts	£2.99

Side Cutters 6in



A 6in. diagonal cutter made from tool steel with a smoothly finished head and hardened cutting edge that will cut hard and soft wire. The handles are in hard black plastic with a matt finish. Overall length 155mm. Length of cutting edge 24mm.

Order Code	Type	Price each
GW49D	6in Side Cuts	£2.99

Copper Sheet and Ribbon Cable Cutters

NEW!



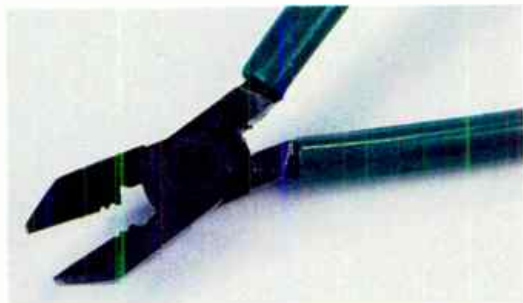
A sturdy pair of cutters for thin copper sheet and ribbon cable, with deep scissor action jaws to allow effective and clean cutting. A lock is provided to allow the cutters to be locked for storage and for safety. The handles are covered with a PVC material to both insulate and provide cushioning when the cutters are gripped. A strong spring ensures that the jaws return to the open position after use to allow for the next cut to take place. A serrated grip at the tip of the cutters allows these cutters to be also used as a holding and bending tool. Construction is from 3mm pressed steel, and provides an overall cutter length of 30mm. Total length including handles is 155mm, width closed 50mm.

Order Code	Type	Price each
UK94C	Ribbon/Sheet Cutters	£2.99

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Slant Edge Cutters

6in. slant-edge cutter/nippers made from a special high quality steel, heat-treated, ground and polished, with hardened cutting edges for hard and soft wire, with two nipping holes. The handles are protected with a cushion grip in smooth glossy green PVC, for extra comfort in use. Overall length 155mm. Length of cutting edge 22mm.



Order Code	Type	Price each
GW39N	Slant Cuts	£3.99

Heavy Duty Cable Croppers



A heavy duty pair of 'crab claw' cutters suitable for cutting even the most heaviest of copper power cables. Construction is from anodised 4mm pressed steel. The spring-loaded action allows these cutters to be used in one hand while the handles are covered with a PVC air-cushioned grip to provide comfort when cutting heavy cables and wires. A lock is also provided on the handle of the cutters to allow them to be locked in the closed position for storage and safety. The jaws pivot on a 12mm metric bolt which may be easily tightened. Overall length: 220mm, width closed 60mm.

Order Code	Type	Price each
UK96E	Heavy Duty Cutters	£6.99

Cable Croppers



A compact pair of light/medium gauge wire 'crab claw' cutters suitable for copper conductors up to 5mm diameter. The handles are covered with an insulating PVC material affording protection to the user and providing comfort during operation. The spring-loaded jaws simplify the use of these cutters by returning the jaws to the 'ready' position for the next cut. A locking clasp on the handle allows the cutters to be stored in the closed position for safety. Construction is from 3mm anodised pressed steel with insulating grips. Overall length: 265mm, width closed 55mm.

Order Code	Type	Price each
RJ72P	Cable Croppers	£3.49

Cutting and Bending Tool

Ewan James



A very useful tool designed for trimming wires on PCB's. After placing components on PCB, turn board over and place angled tip of tool on PCB with a component wire in the notch in the head. Now simply squeeze handles of tool. Component wire is cut with a powerful spring action and the remaining tip of wire bent over to lock the component in place. The wire is now also lying tightly on the PCB track and after soldering this will result in a better connection. Overall length 210mm

Order Code	Type	Price each
FD56L	Cut & Bend Tool	£8.99

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TWEEZERS

Nylon

A pair of nylon tweezers with serrated tips. Overall length 128mm. Max jaw opening 25mm.



Order Code	Type	Price each
YW67X	Nylon Tweezers	75p

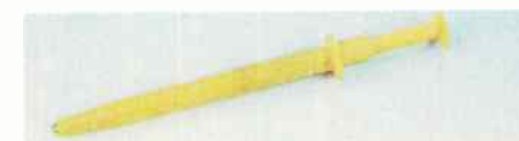
Stainless Steel



A pair of stainless steel tweezers with serrated jaws and finger grips. Overall length 127mm. Max jaw opening 16mm.

Order Code	Type	Price each
FA65V	Steel Tweezers	80p

Pearl Catcher



A spring-loaded 3-pronged tweezers for reaching into those difficult places to retrieve the smallest screw.

Order Code	Type	Price each
BK43W	Pearl Catcher	99p

Vacuum Pick-up Pencil

Antex

A clever device for picking up, holding and positioning delicate electronic components, especially surface mounted devices, on printed circuit boards. The silicon rubber cup is placed on the component and the button pressed and held, the component will now be held by vacuum against the cup. The device can now be moved, positioned, and soldered in place. The button is then released to free the device. The body is made from nickel-plated aluminium for a long trouble-free life, and the probes are made from stainless steel. Supplied with two probes, straight and angled, and three silicon cups 4mm, 6mm and 9mm. Overall length 150mm and 14mm diameter.



Order Code	Type	Price each
BA21X	Vacuum Pencil	£44.99

PLIERS

Combination Pliers



Manufactured from a special high quality tool steel, with smooth ground heads and specially hardened cutting edges, suitable for cutting hard and soft wires. Cushion grip handles for extra comfort and safety. Size 180mm

Order Code	Type	Price each
BU71N	Combination Pliers	£12.99

Miniature Long Nose Pliers



Quality miniature, spring-loaded, 4 1/2 in. long-nosed pliers, made from a special polished. Ideal for handling small components, the tapered half-round jaws have a smooth flat surface to prevent damage to delicate components. The handles are covered in a green PVC cushion grip, for extra comfort in use. Overall length 120mm. Length of jaws 25mm.

Order Code	Type	Price each
GW97F	4.5in Long Nose	£3.99

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Miniature Combination Pliers



High quality miniature pliers manufactured from high grade drop forged tool steel with smooth ground heads, serrated jaws and side cutter. The spring-loaded bow handles are protected with a PVC grip. Size 127mm.

Order Code	Type	Price each
RD99H	Mini Combo Plier	£2.99

Internal Circlip Pliers



High quality, internal circlip pliers, manufactured from chrome vanadium alloy steel with 90° tips and cushion grip handles. Size 170mm.

Order Code	Type	Price each
BU70M	Circlip Pliers	£13.99

Hooked Flat-Nosed Pliers



Miniature, high quality hooked flat nosed pliers. Insulated handles with spring. Size 115mm.

Order Code	Type	Price each
BK41U	Min Hook Nose Pliers	£3.99

Miniature Long Nose Pliers



Quality miniature, spring-loaded, 4 3/4 in. long nosed pliers, made from a special polished steel. Ideal for use in electronic assembly, the long, tapered half-round jaws have a smooth flat surface to prevent damage to delicate components. The handles are covered in a green PVC cushion grip, for extra comfort in use. Overall length 120mm. Length of jaws 33mm.

Order Code	Type	Price each
GW94C	4.75in Long Nose	£3.99

Internal/External Circlip Pliers



A versatile pair of circlip pliers that can be used for both internal and external retaining rings. The special handles feature a movable pivot, allowing both types of circlip to be removed by squeezing the handles together. With the pivot point in one position the jaws will move apart, while in the other position they will be forced together. Suitable for circlips with location holes 1mm in diameter and over, and able to cope with circlips up to 6in. in diameter. The handles are covered with as tough PVC coating and fit easily into the hand. Overall length: 150mm, width closed 55mm.

Order Code	Type	Price each
RJ75S	Int/Ext Circlip Pliers	£2.99

5in. Long Nose Pliers



5in. long nosed pliers with a cutting edge for wire. The tapered half-round jaws are serrated for a firm grip of the workpiece, and the handles have a cushion grip made from blue PVC for extra comfort in use. Overall length 130mm. Length of jaws 39mm.

Order Code	Type	Price each
GW99H	5in Long Nose	£2.99

6in. Long Nose Pliers



6in. long nosed pliers that are fully polished, with a cutting edge for wire. The long, tapered half-round jaws are serrated for a firm grip of the workpiece, and the polished handles are covered in glossy PVC, colour may vary. Overall length 160mm. Length of jaws 48mm.

Order Code	Type	Price each
GW48C	6in Long Nose	£3.49

Snipe Nose Pliers



Quality 5in. spring-loaded, snipe nosed pliers, made from a special tool steel, heat-treated, polished and finished in a rounded style, with a cutting edge for wire. Ideal for small component assembly work, the long, tapered half-round jaws are serrated for a firm grip of the workpiece. The tips are less than 1.5 x 2mm, when closed. The handles are covered in a green PVC cushion grip for extra comfort in use. Overall length 130mm. Length of jaws 37mm.

Order Code	Type	Price each
GW95D	Snipe Nose	£3.99

Angled Internal/External Circlip Pliers



An angled pair of circlip pliers that can be used on both internal and external retaining rings. The 45° angled tips allows easy access to concealed or difficult to get at circlips. The special handles feature a movable pivot, allowing both types of circlip to be removed by squeezing the handles together. With the pivot point in one position the jaws will move apart, while in the other position they will be forced together. Suitable for circlips with location holes 1mm in diameter and larger, and able to cope with circlips up to 6in. in diameter. The handles are covered with as tough PVC coating and fit easily into the hand. Overall length: 150mm, width closed 55mm.

Order Code	Type	Price each
RJ76H	Angled Int/Ext Circ Pl	£2.99

Snipe Nose Pliers



Snipe nose pliers with a cutting edge suitable for hard and soft wires. The straight, long, flat-round jaws are serrated for easy grip and the handles have a cushion grip for extra comfort. Manufactured from quality vanadium steel. Size 200mm.

Order Code	Type	Price each
BU73Q	Snipe Nose Pliers	£19.99

30



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Electricians Pliers



A good quality pair of lap-jointed electricians pliers with plastic insulated handles. Size 160mm.

Order Code	Type	Price each
BR91Y	Electricians Pliers	£2.99

Radio Pliers



Manufactured from special high quality tool steel, these pliers have a separately hardened cutting edge suitable for cutting hard and soft wires. The flat-round jaws have serrated gripping surfaces. Complete with cushion grip handles. Size 140mm.

Order Code	Type	Price each
BU75S	Radio Pliers	£14.49

Long Nose Radio Pliers



Long nose pliers with serrated gripping surfaces that are ideal for small component assembly work. Manufactured from chrome vanadium alloy steel, these high quality pliers have a smoothly ground head with fine pointed, extra slim, flat-round jaws. Size 160mm.

Order Code	Type	Price each
BU72P	Long Nose Radio Pliers	£16.99

CRIMPING, STRIPPING AND CUTTING TOOLS

Low Cost Type

A useful low-cost combination tool with cushioned plastic handles. Tool has bolt cutters for M2.5, M3, M3.5, M4 and M5 bolts, strippers for wires of conductor area 0.75, 1.0, 1.5, 2.5, 4.0 and 6.0mm², a crimping tool for red, blue and yellow insulated crimp connectors and 1.5, 2.5 and 4.6mm² non-insulated crimp connectors, and a wire cutter. Overall length 232mm.



Order Code	Type	Price each
FY31J	Crimp Tool	£2.99

Heavy Duty Crimping Tool

A crimping tool for use with red, yellow and blue insulated crimp terminals. Simply place the connector to be crimped in the appropriate die in the jaws and squeeze the handles together, until the tool re-opens. A ratchet prevents the tool opening until the crimp is complete. A latch is provided so that the tool can be opened manually after the ratchet has engaged and before the crimp is complete if necessary. Manufactured from 3mm steel plate with plastic handles. Overall length 225mm.



Order Code	Type	Price each
JH19V	Crimp Tool Ratchet	£24.99

Crimping Tools for Modular FCC68 Connectors

Ewan James

Crimping tools for use with FCC68 modular connectors which are used on computers and American telephones. Simply place the plug with the cable in the tool and squeeze the grips together, thus causing the plug to bite into the cable. The handles are spring loaded for automatic opening. Wire can be cut with blades built into the handle. All made from toughened plastic. Overall length 190mm.

The following types are available:

Plastic Crimp 4C4P

This model is used on plugs with 4 contacts in a 4 position shell.

Plastic Crimp 4C6P

This model is used on plugs with 4 contacts in a 6 position shell.

Plastic Crimp 6C6P

This model is used on plugs with 6 contacts in 6 position shell.

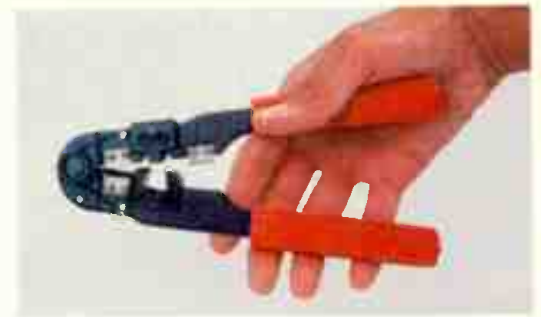


Order Code	Type	Price each
JW51F	Plas FCC68 Crmp 4C4P	£4.99
JW50E	Plas FCC68 Crmp 4C6P	£5.99
JW49D	Plas FCC68 Crmp 6C6P	£6.99

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Heavy Duty Crimping Tool for Modular FCC68 Connectors



A crimping tool for use with FCC68 modular connectors which are used on computers and American telephones. This model crimps 8 position modular plugs. Simply place the plug with the cable in the tool and squeeze the grips together, thus causing the plug to bite into the cable. The handles are spring loaded for automatic opening. Wire can be stripped and cut with two separate blades built into the handle. Made from 2.5mm steel with comfortable plastic grip. Overall length 200mm.

Order Code	Type	Price each
JW52G	HD FCC68 Crmp 8C8P	£16.99

Coax Connector Crimping Tool



A coax crimping tool that has five separate sections to accept 1-72, 2-5, 5-4, 6-48 and 8-2mm connectors for crimping. The pressure necessary for crimping can be adjusted for individual requirements, and is made easy with the aid of long contoured, plastic covered handles.

Order Code	Type	Price each
ZF41U	Coax Crimper	£19.99

Crimping Tool for IDC Connectors

A crimping tool designed for assembling IDC connectors onto flat cable. The crimping distance is capable of accepting connectors from 6 to 27.5mm in height, between the fixed and moving jaws. A plastic adaptor is supplied with 6mm and 10mm slots to cater for different connector types. Simply place the cable into the connector, load the connector into the tool and squeeze the grips together. The tool is 240mm long by 77mm wide and manufactured from 2mm and 3.5mm carbon steel with comfortable cushioned plastic grips. Black oxide finish.



Order Code	Type	Price each
GW34M A	Crimper IDC	£9.99

Crimping Tool for D-type Connectors



A crimping tool designed for assembling D-type IDC connectors onto flat cable. The crimping distance between the jaws is capable of accepting connectors up to 28mm in height. Easy to use, simply place the cable into the connector, the connector between the fixed and moving jaws of the tool and squeeze the handles together. The tool is 240mm long by 77mm wide and manufactured from 2mm and 3.5mm carbon steel with comfortable cushioned plastic grips. Black oxide finish.

Order Code	Type	Price each
GW35Q A	Crimper D	£12.99

D-Connector Crimp Tool



A high-quality D type connector contact crimp tool for use on 18 to 30 AWG wire/pin combinations. These crimpers incorporate a ratchet action, with adjustable crimp pressure (can be locked), and plastic handle grips. Construction is from heavy duty, high-quality steel.

Order Code	Type	Price each
AQ72P	D-Type Crimp Tool	£19.99

Tab Connector Crimp Tool



A high-quality crimp tool for cable/tab combinations. Suitable for 0.5 to 1mm² and 1.1 to 2.5mm² cable tabs. The crimp pressure is adjusted by a wheel and locking screw. Constructed from high-quality steel, with moulded plastic handle grips.

Order Code	Type	Price each
AQ73Q	Tab Crimp Tool	£19.99

WIRE AND CABLE STRIPPERS

Side-Action Wire Strippers

Ewan James

A range of wire strippers all of which strip insulation quickly and easily from flex and cable without cutting the wire and are easily adjustable to most wire sizes. They also have cutting blades for cutting wire easily and splitting plastic twin flex.



Model 8B

Model 8B: Fitted with a unique 7-gauge selector. Spring incorporated for automatic opening. Easy-grip plastic covered handles.

Model 9: Easily adjusts for most sizes of flex and cable. Fitted with extra strong spring for automatic opening after each stripping operation. Ideal for repetitive work. Easy-grip plastic handles.



Model 9

Order Code	Type	Price each
BR94C	Wire Strippers 8B	£2.99
BR95D	Wire Strippers 9	£2.99

Precision Wire Stripper



A wire stripper made from precision ground, hardened steel, that strips and cuts wire. The wire stripper has six holes that are used to cut and remove the insulation from the wire. The holes are marked in AWG (American wire gauge) sizes, but are suitable for 18 to 27 SWG sizes. At the base of the jaws is the cutting area which will cut copper or aluminium wire. A convenient flat design allows the wire stripper to be used in tight locations and to fit easily in a pocket or tool kit.

Order Code	Type	Price each
KC16S	Stripper	£10.99



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Wire Cutter/Stripper Tool

Ewan James

A quick and very easy to use wire stripping tool, which has jaws to grip the wire sheath, whilst a pair of blades strip off the insulation by simply squeezing the handles. The blades do not have to be set for a specific wire thickness, but are internally sprung in order to apply just the pressure required to bite through the insulation before moving backwards taking the insulation with them. The blades can however be adjusted by a simple thumb screw so as to operate effectively for a range of different insulation plastics. It is even possible to strip two or more wires, inserted side by side, simultaneously.



Order Code	Type	Price each
FT44X	Cutter/Stripper Tool	£5.49

High Quality Wire Cutter/Stripper Tool



A quick and very easy to use high quality wire stripping tool, which has jaws to grip the wire sheath, whilst a pair of blades strip off the insulation by simply squeezing the handles. The blades do not have to be set for a specific wire thickness, but are internally sprung in order to apply the correct pressure required to bite through the insulation before moving backwards taking the insulation with them. The blades can be adjusted by a simple thumb screw so as to operate effectively for a range of different insulation plastics. It is possible to strip two or more wires, inserted side by side, simultaneously. A depth of cut adjustment allows precise lengths of insulation to be stripped accurately, and consistently.

Order Code	Type	Price each
AQ74R	Quality Cutter/Strip	£7.99

Single-Action Wire Strippers

For precise rapid wire-stripping without risk of damage to the wire or insulation. Simply place the wire to be stripped between the jaws and squeeze the handles. The tool automatically grips the wire, cuts the insulation, and strips it from the wire in one operation. The tool is manufactured in die cast aluminium and fitted with hardened steel cutting blades. The tool comes complete with blade fitted and is available with a choice of two blades to suit most common wires.

Blade A has holes to strip wires of 0.5, 1.2, 1.6 and 2.0mm diameter. Blade B has holes to strip wires of 1.0mm, 1.6mm, 2.0mm, 2.6mm and 3.2mm.

Size: 180mm (7in.).
Length of strip: 22mm max.



Order Code	Type	Price each
BR96E	Singl Action Stripp	£7.49
YT24B	Singl Action Strip B	£7.49

Low Cost Coax Cable Stripper

Ewan James



A simple, quick to use, coax cable stripper for cables from 4.8 to 7.5mm outer diameter i.e. most RF, radio and TV aerial cables. At one end, the blades are set for removing the outer sheath, and at the other end, the blades are set for removing the dielectric. The cable is inserted to the desired length, the stripper is closed, a quick twist to the left and right and the sheath/dielectric is removed. The coax cable stripper is spring-loaded for ease of use. Overall size 98 x 25mm.

Order Code	Type	Price each
BZ19V	Coax Stripper	£3.99

Co-axial Cable Stripper

Ewan James



A stripper which removes the inner and outer sheath of co-axial cables simultaneously. An allen key is provided to set the blades to suit your cable. Cables from 4mm to 7mm outside diameter can be accommodated. The tool is set at the factory to suit RG58 and RG59 cable. To change from one to the other the die is reversed in the tool. To operate, squeeze to open the jaws, then place the cable on the cable guide and close the jaws. Insert a finger in the loop on the tool and revolve the tool around the cable four to five times. Then holding the tool, pull the cable firmly out of the tool. Both the inner and outer will be neatly trimmed away leaving the cable ready for connection.

Order Code	Type	Price each
JH18U	Co-Ax Stripper	£9.99

Cable Tie Gun

Ewan James



A cable tie wrap gun that tensions and cuts cable ties. The cable tie is simply placed around the cables in the normal way and the 'tail' is inserted into the cable tie gun. Operating the trigger tensions the cable tie and automatically cuts the tail off, all in one fast, simple, action. Ideal for production environments where quick, accurate assembly is important.

Order Code	Type	Price each
JU29G	Cable Tie Gun	£5.99

Self-Gripping Wrench



High quality, standard and long nose wrenches with self-locking, quick-release jaws which are ideal as a third hand when clamping or gripping sheet materials, pipework, nuts, bolts, or other components. Manufactured from chromed alloy steel, with screw adjustment, the standard wrench is 168mm long and the long nosed wrench is 230mm long.

Order Code	Type	Price each
RJ01B	Standard Wrench 230	£3.99
RJ02C	Long Nose Wrench 168	£3.99

HELPING HANDS



A very useful piece of apparatus which allows a PCB or any delicate work to be held in position by means of two large crocodile clips. Enables user to keep both hands free for positioning, soldering, and assembling. Six ball joints allow adjustments to the exact angles needed, and the heavy iron base prevents tipping. Includes a glass magnifier.

Order Code	Type	Price each
YK53H	Helping Hands + Mag.	£6.49

MAGNIFYING GLASSES

Pocket Magnifier



A 50mm glass magnifying lens, which slides away into a protective synthetic leather pouch when not in use. It offers a 5x magnification factor with low distortion.

Order Code	Type	Price each
ZF02C	Pocket Magnifier	£1.75

Large Magnifier



A good quality, general purpose 75mm dia. glass magnifier with a 93mm long handle. It offers a 3.5 x magnification factor with low distortion.

Order Code	Type	Price each
ZF01B	Large Magnifier	£1.99

Illuminated Glass Magnifier

Ewan James



An illuminated glass magnifier that is ideal as an aid for fine inspection of electronic components and circuit boards, but equally suited for reading fine print, maps etc. The handle incorporates an on/off slide switch for the lamp, which is powered by 4 x AA size batteries (not supplied). Magnifier 95mm dia., handle length 135mm.

Order Code	Type	Price each
BZ53H	Illuminated Glass	£3.99

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ANTISTATIC PRODUCTS

Work Mat



A tough conductive flexible plastic mat which can be used to prevent the build-up of static charges on devices or equipment likely to be at risk. The mat has an earthing strap which may be clamped to a suitable earth by a jubilee clip. The static charge on any item placed on the mat will leak away to earth. Computers placed on the mat will not generate spurious data when touched by someone holding a static charge for example. The mat is also useful for safe handling of CMOS devices etc. Size 500 x 350 x 1mm.

Order Code	Type	Price each
YJ90X	Antistatic Workmat	£17.49

Wrist-Strap

For use when handling CMOS and other devices that are prone to electrostatic damage. This fabric wrist-strap is comfortable to wear and prevents electrostatic charge building up. The strap is pulled tightly around the wrist and locked in place with a Velcro fastener. Three conductive threads woven into the fabric press against the skin and allow any electrostatic charge to leak away to earth. The earthing cable is a very lightweight coiled wire which attaches to the strap via a press-stud. An insulated alligator clip at the other end of the wire is provided for connection to an earth. The wire contains a 1M ohm resistor for safety, but always remove the strap before working on live equipment. The wrist-strap is washable.



Specification

Material:	Acetate fibre
Size:	230mm x 20mm
Fits wrists from:	160mm to 200mm circumference
Cable length retracted:	430mm (extended: 2m)
Current limiting resistor:	1MΩ moulded into fastener
Net weight:	22g

Order Code	Type	Price each
FE29G	ESD Wrist Strap	£8.99

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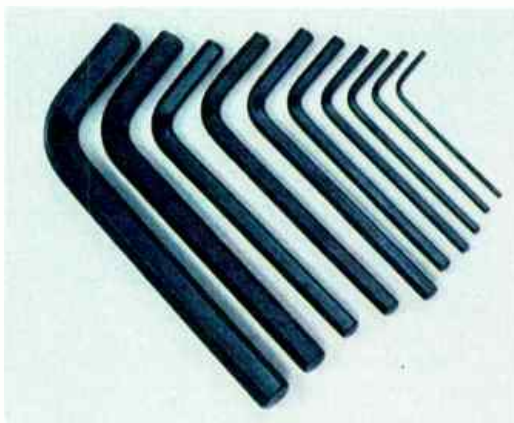
Foam

Conductive foam sheet 6mm thick in two densities. High density type is suitable for retaining IC's which may be simply pushed into the material and are held tightly in place. Low density type is very flexible for use as a packing material where static sensitive devices are being stored or packaged. Sheets are 12in x 12in (305 x 305mm).



Order Code	Type	Price each
FA82D	Hidensty A/stat Foam	£3.99
FA83E	Lodensty A/stat Foam	£2.49

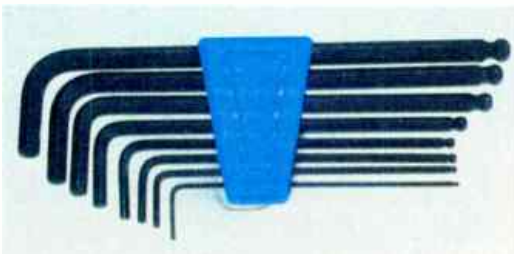
ALLEN KEYS Standard Sets



A pack of ten Allen keys available in AF or metric sizes. Both types supplied in a plastic wallet. Sizes: AF - 1/16in, 5/64in, 3/32in, 1/8in, 5/32in, 3/16in, 7/32in, 1/4in, 5/16in and 3/8in. Metric: - 1.5, 2, 2.5, 3, 4, 5, 5.5, 6, 8 and 10mm.

Order Code	Type	Price each
FY34M	Allen Keys AF	£2.99
FY35Q	Allen Keys Metric	£2.99

Metric Allen Key and Balldriver Sets



A choice of two sets of Allen Keys that have a balldriver at one end, for all types of socket head screws. The balldriver can be used at an angle up to 25° from the screw centre line, making it easier to access screws in confined places and in equipment with awkward accessibility. Available in sets of eight or ten keys. The eight-key set comprises: 1.5, 2, 2.5, 3, 4, 5, 5.5 and 6mm size keys. The ten-key set comprises: all of the eight-key set plus 8 and 10mm size keys.

Order Code	Type	Price each
AQ76H	8-Key & Driver Set	£4.99
AQ77J	10-Key & Driver Set	£6.99

SPANNERS

Miniature Nut Spinner Set

Five precision miniature nut spinners in a hinged plastic box with a transparent cover. Handles are chromed and have a swivel cap. Spanners are 3mm, 3.5mm, 4mm, 4.5mm and 5mm. The handles have a hole drilled in them and a bar is supplied which fits in the hole to give extra leverage. All tools are approx. 100mm long.



Order Code	Type	Price each
YW61R	Box Spanner Set	£1.99

Miniature BA Open-Ended Spanners



Miniature chrome vanadium open-ended spanners, chrome-plated and polished. Type 24 has 2BA one end, 4BA the other, type 68 has 6BA one end 8BA the other. Overall length: type 24: 79mm; type 68:57mm.

Order Code	Type	Price each
FY36P	Min Spanner 24	£3.99
FY37S	Min Spanner 68	£3.99

Miniature Metric Open-Ended Spanner Set



A set of five chrome plated open-ended spanners angled at 30° at each end. Sizes are as follows, overall length in brackets. 3.2 x 3.5mm (70mm), 4 x 5mm (80mm), 5.5 x 6mm (90mm), 6.5 x 7mm (100mm), 8 x 9mm (110mm). Packed in a vinyl roll-up wallet.

Order Code	Type	Price each
FA66W	Metric Spanner Set	£11.99

Adjustable Spanners



An adjustable spanner in drop-forged steel. Three sizes available.

Overall length:	Max jaw opening:
150mm	19mm
198mm	24mm

Order Code	Type	Price each
FY45Y	Adjust Spanner 150	£2.49
FY46A	Adjust Spanner 200	£2.99
RJ00A	Adjust Spanner 250	£3.99

Metric Spanner Tool Roll



A set of 11 spanners which have both open and ring ends, the spanners are supplied complete with tool roll for storage. Sizes are 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 22mm.

Order Code	Type	Price each
YZ46A C1	Open/Ring Span Set	£9.99

Box Spanners



These spanners have a tempered and hardened nickel plated tool steel shaft and good-size plastic handle for a firm grip. Available in four sizes to suit nuts that fit M5, M4, M3 and M2.5 bolts. All types have plastic handles and are 210mm in length.

Order Code	Type	Price each
FV56L	Box Spanner M5	£2.99
FY41U	Box Spanner M4	£2.99
FV57M	Box Spanner M3	£2.99
FY42V	Box Spanner M2.5	£2.99

Deep Socket Set



An 8-piece set of high quality extra deep sockets, for use with 1/4 in. drive, manufactured in chrome-vanadium steel and chrome-plated. The set contains the following sizes: 5.5, 6, 7, 8, 9, 10, 12, 13mm. The set includes a storage rack.

Order Code	Type	Price each
RJ10L	Deep Socket Set	£6.99

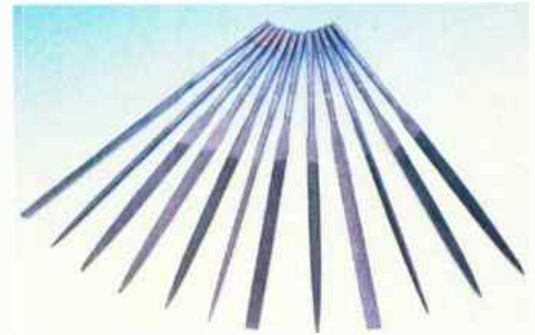
NEEDLE FILES Diamond Needle File Set



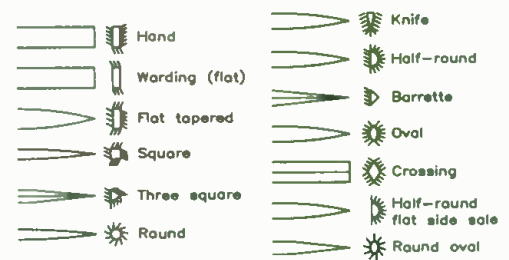
A set of very high quality, industrial standard, needle files coated with diamond grit enabling them to file materials such as tungsten carbide, ceramics, carbon, glass, hardened steels, etc. The set comprises five of the more popular profiles; flat, tapered square, tapered round, tapered triangular, tapered half-round. The files are 120mm long. Supplied in a vinyl wallet.

Order Code	Type	Price each
GW32K	Diamond Files	£7.99

Needle File Set 140mm

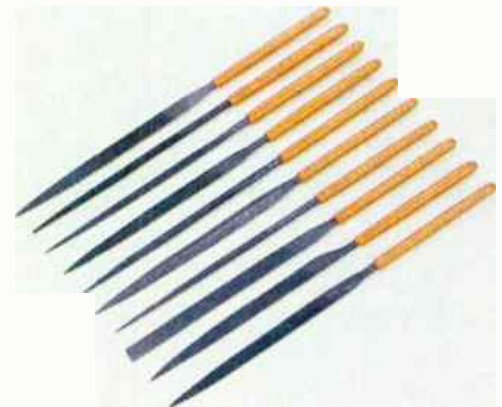


A plastic wallet containing twelve needle files of various types. All types are 140mm long, cut length 65mm. A selection of some of the following types are supplied. Hand, flat warding, flat tapered, square, threesquare, round, knife, half-round, half-round flat-sided safe, barrette, oval, and crossing.



Order Code	Type	Price each
YW63T	Needle File Set	£4.99

Needle File Set 140mm



A red plastic wallet containing 10 needle files of various types. All types are 140mm long, with 70mm long working surfaces, and are fitted with a plastic handle. A selection of the following types are supplied: hand, flat tapered, square, triangular, round, knife, half round, barrette, flat oval and round oval.

Order Code	Type	Price each
KW27E	Needle File Set 140	£4.99

Torque Wrench



A 'snap action' torque wrench with a range of 10lbs/ft to 150lbs/ft (1.4kg/m to 20.7kg/m). The required torque is set by turning the knurled handle at the end of the main stem until the zero mark on the bevelled edge of the knurled handle aligns with the required value marked on the main stem. The main scale is graduated in tens of lbs/ft. but extra single units can be added by rotating the handle further to align the numbers on the units scale around the edge of the bevel.

In use the head of the wrench is pivoted on the end of the main bar and will snap over at this joint when the set torque is reached. The head has a reversible ratchet action and has a 1/2 in. square drive to which a 4 inch extension or a 3/8 in. square converter can be attached (supplied). All other standard 1/2 in. drive sockets and extensions will also fit. Overall length of wrench is 18.5cm and a metric version of the main bar scale is repeated on the other side of the bar. Supplied in black plastic carry case.

Order Code	Type	Price each
RJ11M B4	Torque Wrench	£19.99

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Needle File Set 170mm



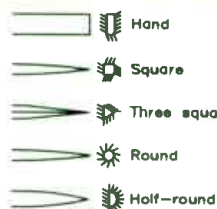
A blue plastic wallet containing 6 needle files of various sizes. All types are 170mm long, have an 85mm working surface and are fitted with a tough blue moulded handle. The six files supplied include the following: hand, square, round, half-round, medium triangular and coarse triangular.

Order Code	Type	Price each
KW26D	Needle File Set 170	£4.99

Needle File Set 180mm



A plastic wallet containing five needle files of various types. All types are 180mm long, cut length 85mm. Types supplied are hand, square, threesquare, round, and half-round.



Order Code	Type	Price each
JH42V	Warding File Set	£4.99

CENTRE PUNCHES

Standard Centre Punch

Ewan James



A chrome plated, hardened and tempered, drop forged steel centre punch. Size 6 x 3/8 in (15.2 x 9.5mm).

Order Code	Type	Price each
FA67X	Centre Punch	£1.39

Automatic Centre Punch

A professional quality automatic centre punch that can be used on iron plate, wood and a variety of other hard materials, and is used to mark or pierce work, particularly prior to drilling holes.

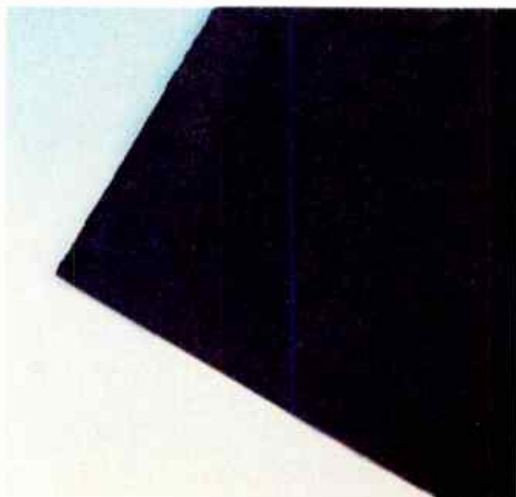
An automatic centre punch does the same task as a conventional centre punch but in a slightly different manner. The tool point is positioned on the required intersection and then pushed down. This automatically releases a striking block which punches the point into the metal. The force can be adjusted by turning the knurled adjuster at the opposite end to the point. Length: 5 inches Weight: 78.5gm



Order Code	Type	Price each
FS96E	HQ Centre Punch	£5.99

ABRASIVES

Wet and Dry Paper



A 280 x 224mm sheet of wet and dry abrasive paper.

Available in three grades:

Fine: (Approx. 600 grade)

Medium: (Approx. 320 grade)

Coarse: (Approx. 80 grade)

Order Code	Type	Price each
FY55K	Wet & Dry Fine	35p
FY56L	Wet & Dry Med	35p
FY57M	Wet & Dry Coarse	45p

Abrasive Fibreglass Pencil



A fibreglass abrasive stick housed in a propelling pencil type case. Designed for removing protective lacquer coatings on PCB board, prior to repair, and generally cleaning copper track for soldering. Refills are also available. **Warning:** A certain amount of fibreglass dust is produced which should be removed with great care. Avoid touching with exposed skin as the particles can easily penetrate flesh and be extremely uncomfortable. Avoid contact with eyes.

Order Code	Type	Price each
KR61R	Fibreglass Pencil	£3.80
KR62S	Pencil Refill	75p

HAMMERS

Tacking Hammer



A small 100g hammer which is ideal for cable clip tacking and other similar light-duty work. The hammer has a steel head, square in cross-section, with bevelled edges and a chisel-shaped cross-pein. The varnished hardwood handle is contoured for good grip. The head is fixed to the shaft with a metal wedge.

Order Code	Type	Price each
YZ43W	Small Hammer	£1.49

HAND DRILLS

Pistol Grip Hand Drill

Draper



A compact design Hand Drill incorporating a spring loaded three jaw chuck with 8mm capacity. The comfortable polycarbonate pistol grip allows good control on small or intricate work and can be used for storing drill bits when not in use. A 2:1 ratio of the internal gears ensures good performance. Length: 210mm. Weight: 347gm.

Order Code	Type	Price each
YP70M A1	Pistolgrip Hnd Drill	£12.49

Hand Drill



A professional quality double pinion drill with semi-enclosed centre metal frame, lacquered wood side and end handles and plated spring-loaded three-jaw chuck with 8mm capacity. Overall length: 294mm

Order Code	Type	Price each
YN56L A1	Hand Drill	£10.99

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SAWS Junior



A junior hacksaw with a steel frame and 6in pinned tungsten steel blade. Packs of ten replacement blades are also available.

Order Code	Type	Price each
BR63T	6in Hacksaw	80p
BR64U	6in Hacksaw Blades	£1.29

Junior Hacksaw



A cost-effective, junior sized, adjustable tension hacksaw frame which accepts standard 150mm (6in) hacksaw blades. The chrome frame, and comfortable black plastic handle is of robust construction and includes a knurled blade-tensioning adjusting nut to provide the means of retaining blade tension.

Order Code	Type	Price each
GW31J	Junior Saw	£1.20

6in Hacksaw



A quality 6in alloy hacksaw with a plastic padded handle.

Order Code	Type	Price each
RD79L	6in Alloy Hacksaw	£3.99

Standard



A standard hacksaw with a tubular chromed frame adjustable to suit 200mm, 250mm or 300mm blades. The strong metal handle is finished in hammertone blue. Supplied with one blade 250mm x 24 teeth per inch.

Order Code	Type	Price each
YT12N	Hacksaw	£2.99

Spare Blades



A pack of six spare blades for the standard hacksaw. Blades are 250mm x 24 teeth per inch.

Order Code	Type	Price each
JG71N	10 in Hacksaw Blades	£1.29

Tenon Saw



10in. hardpoint tenon saw with a comfortable moulded plastic handle and strengthened steel back. Saw blade length: 10in. (254mm) Max depth of cut: 3in. (75mm)

Order Code	Type	Price each
ZC32K	Tenon Saw	£6.99

Mitre Box & Saw



A quality, precision engineered tool, this mitre box and saw is designed for making accurate joints in wood, plastic and alloys. It is the ideal tool for the enthusiast, useful for making picture frames, door frames, and in fact, all types of mitre work, enabling four, five, six, and eight-sided frames to be made up accurately, using the readily located preset angles. Alternatively, provision is made for those odd angles to be set up. The mitre box is manufactured as an aluminium pressure casting with a precision ground finish. It carries an arm of similar manufacture, having four saw guides attached. This swings about a graduated scale marked out in degrees on the mitre box. The arm carries a sprung-loaded lever that locates in any one of nine preset positions to lock the guide rods to a selected angle. The bow saw frame is a pre-tensioned assembly of aluminium and steel with a comfortable cast aluminium handle at one end. The blade is of high tensile steel and provided with adjustment at the handle. An adjustable clamp is supplied to restrain the workpiece and an end stop or depth guide is supplied to enable identical work to be repeated. A spare saw blade is available.

Specification	
Maximum width of workpiece 90°:	160mm
Maximum width of workpiece 45°:	110mm
Maximum height of workpiece:	85mm
Table length:	400mm
Blade length:	550mm
Blade width:	45mm

Pre-set angles: $\pm 67.5^\circ$, $\pm 60^\circ$, $\pm 54^\circ$, $\pm 45^\circ$, 90°
Overall dimensions (assembled)
mitre box with arm at 90°: 487 x 256 x 320mm
saw: 648 x 170 x 52mm

Order Code	Type	Price each
RJ08J	F11 Mitre Box & Saw	£29.99
RJ09K	Saw Blades	£3.99

KNIVES

Versatile DIY Knife

Fisco



A very high quality knife which has several features. The blade can be extended or retracted by means of a lever on the side of the knife. When the blade has been pushed out to the required position, it may be 'locked' in place by turning a thumbwheel. The blade can also be mounted horizontally so that the entire cutting edge is exposed, but it cannot be retracted if used in this way so more care is required. The handle features an in-built safety blade dispenser, each of which holds up to 10 spare blades. Packs of 10 replacements are available in two different types; the standard straight edge variety (of which 5 are supplied with the knife) and also a hooked type. Supplied with 5 straight-edge blades, full instructions and clear plastic storage case.

Order Code	Type	Price each
KW23A	Versatile DIY Knife	£8.99

Spare Blades for DIY Knife

Packs of 10 replacement tungsten alloy blades for the versatile DIY knife (above). Two types are available, both of which offer up to double the life of normal blades. The first type is a standard straight edge blade, while the other is a hooked type (used for cutting materials such as linoleum and carpet). The 10 blades are supplied in a safety dispenser which slots into the handle of the knife.

Order Code	Type	Price each
KW24B	Straight Blades	£2.79
KW25C	Hooked Blades	£3.29

Retractable Blade Knife



A retractable action trimming knife supplied with five blades. Blade retracts right back into the handle when not in use. Overall length 150mm.

Order Code	Type	Price each
FY03D	Retractable Knife	£2.65

Spare Blades

A pack of five replacement blades for use with retractable knife.

Order Code	Type	Price each
FY04E	Knife Blades	86p

Snap-Off Blade Knife

A compact knife ideal for intricate model making applications. The tough, impact resistant body houses a steel blade made up of 11 'snap-off' segments. When the blade in use is worn, it can be snapped off by placing it into the slot of the pocket clip. The blade is retractable and is held firmly when in use by a blade locking device.

Length: 127mm
Weight: 11.5gm



Order Code	Type	Price each
YW64U	Snap-Off Blade Knife	60p

Spare Blades

A pack of ten spare blades for YW64U. Blades are supplied in a plastic storage box with slide-on cap.



Order Code	Type	Price each
JK31J	Snap-off Blades	£1.29

Heavy Duty Snap-Off Blade Knife



An all purpose knife with a retractable blade. The tough, impact resistant contoured plastic body houses a steel blade made up of 7 'snap-off' segments. When the blade in use is worn, it can be snapped off by placing it into the slot provided on the end cap. The blade is held firmly when in use by a blade locking device.

Length: 154mm
Weight: 38gm

Order Code	Type	Price each
FS98G	HD Snap Blade Knife	99p

Spare Blades

A pack of ten spare blades for FS98G. Blades are supplied in a plastic storage box with slide-on cap.



Order Code	Type	Price each
JH59P	HD Snap-off Blades	£1.89

Scalpel



A surgical scalpel which will be found the most suitable tool for making PCB artworks using our tapes etc. They are also suitable for all kinds of accurate and delicate cutting work. The handles and blades must be ordered separately.

Handle

A small metal handle designed to hold the blades detailed below.

Order Code	Type	Price each
FY05F	Scalpel Handle	£4.20

Blade

A blade to fit the scalpel handle described above. Blades are made of the finest surgical steel and are supplied in a sterile pack. Supplied in packs of five.

Order Code	Type	Price each
FY06G	Scalpel Bld Type 11	85p

Chassis Punch Set

A set of five punches for thin tin or aluminium sheet up to 1.6mm thick. The punches make it easy to make neat round holes where drills are not practical. Sizes are 16, 18, 20, 25 and 30mm. The set is supplied with a reamer.



Order Code	Type	Price each
YK27E	A1 Chassis Punch Set	£29.99

Electricians Bolster Chisel



The 56mm blade electricians chisel has been especially designed for cutting the tongue of 'tongue and groove' boarding and lifting floorboards. The chisel has been hardened and the blade tempered to give a keen cutting edge to make it easier to remove floorboards.

Order Code	Type	Price each
RJ05F	Bolster	£4.99

Sheet Metal Punches

A range of sheet metal punches for cutting perfect holes in stainless and mild steel up to 16swg (1.62mm), sheet copper, brass, and aluminium up to 2.0mm, and many other sheet materials, ductile plastics etc. These sheet metal cutters are ideal for electricians, electronic engineers, plumbers, vehicle mechanics, in fact anywhere that requires clean, accurate and burr-free holes. At the centre of where the hole is to be punched, a hole is drilled large enough to clear the Allen screw of the punch to be used. The punch is assembled with the panel between



the two parts of the punch, and the Allen screw is tightened, with a suitable Allen key (not supplied), until the hole is cleanly punched out.

Sizes available (mm)	Allen Key required A/F
12.5	6mm
16	6mm
20	8mm
22.5	8mm
25	8mm
32.5	10mm

Order Code	Type	Price each
KR29G	Metal Punch 12.5	£4.99
BA66W	Metal Punch 16	£4.95
BA67X	Metal Punch 20	£5.65
BA68Y	Metal Punch 22.5	£5.65
BA69A	Metal Punch 25	£5.99
BA70M	Metal Punch 32.5	£6.99

Reamer

A hand operated, tapered reamer for finishing and deburring panel holes.

Made from carbon-chrome alloy steel, it may also be useful in opening holes out to non-preferred diameters. Will cover holes from 3mm up to 12mm (1/8 to 1/2 in).



Order Code	Type	Price each
FG11M	Reamer	£5.75

Metal Sheet Folding Tool



A heavy duty manual sheet metal folding machine made from thick steel plate and angle sections. It is particularly useful for producing metal boxes and brackets. A slotted former bolted to the jig holds the sheet metal to be bent, in place, the slots being occupied by previously bent sections. This arrangement allows 33 different widths of box to be produced, ranging from 10mm to 420mm. The former also has eccentric adjustment screws to allow for different thicknesses of metal. Sheet steel of up to 0.6mm thick, and aluminium to 1.5mm thick or less, can be safely bent. The folder must be bolted down securely at 4 points before use. It is supplied with two steel handle bars (used to operate the pivoted bending mechanism) and full operating instructions.

Order Code	Type	Price each
GK13P	H15 Metal Folder	£89.99

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Riveting Kit

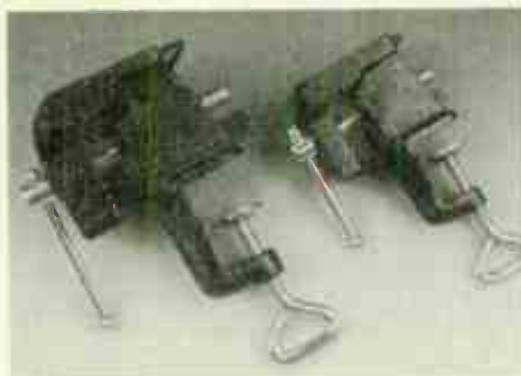


A useful riveting kit comprising a heavy-duty hand riveter with four heads and a spanner, plus an assortment of rivets. The riveter is made from two alloy castings finished in blue with black plastic handles, one of which has a pocket to store the spanner. The rivet sizes supplied are 2.4, 3.2, 4.0 and 4.8mm.

Order Code	Type	Price each
RJ07H	Riveter Kit	£8.99

Bench Vices

Ewan James



Two good quality steel bench mounting vices with smooth jaws. 2 inch type fixes to benches from 2mm to 32mm thick. Jaw width 50mm, max opening 40mm. 3 inch type fixes to benches from 13mm to 46mm thick. Jaw width 75mm, max opening 60mm. Finished in hammertone.

Order Code	Type	Price each
YJ83E	A2 2 inch Vice	£14.99
YJ84F	D4 3 inch Vice	£24.99

G Clamp Set

Ewan James



A three piece, diecast G clamp set comprising 20mm, 30mm and 40mm capacity clamps. A shoe on the end of the threaded screw protects the workpiece. The screw is operated by a knurled knob. A round, magnetic base is included, which incorporates a slot to accept any of the three clamp frames, such that two may be combined to form a small table edge vice, or to make the clamp free-standing for holding small items. Ideal as a third hand for holding pcb's etc., holding together small objects being bonded, and many other uses.

Order Code	Type	Price each
FT76H	Mini G Clamp Set	£3.75

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VICES & CLAMPS

Hobby Vice

Ewan James



A small modellers vice in tough plastic construction with metal faced jaws. The vice has a very strong suction clamp for mounting to flat non-porous surfaces. Jaw width: 37mm. Max opening 27mm. Overall dimensions fully closed 90mm long x 70mm wide x 68mm high.

Order Code	Type	Price each
YP38R	Hobby Vice	£2.65

Large Hobby Vice

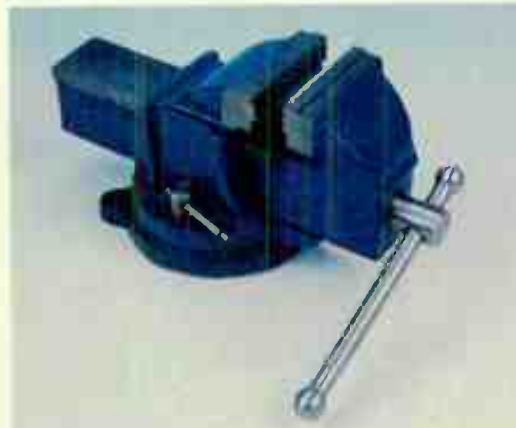
Ewan James



A modellers vice in a tough plastic construction with metal faced jaws. The vice has a very strong suction clamp for mounting to flat non-porous surfaces. Jaw width: 62mm. Max opening 40mm. Overall dimensions fully closed: 115mm long x 85mm wide x 90mm high.

Order Code	Type	Price each
YT06G	Large Hobby Vice	£3.65

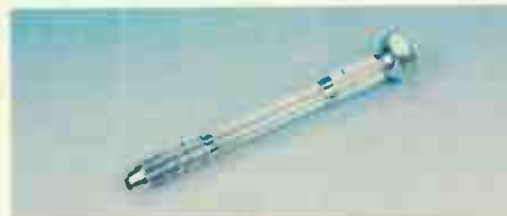
Bench Vice with Swivel Base



A quality 75mm vice with integral swivel base that is manufactured from cast steel and finished in blue. The swivel base can rotate 360° and can be locked in any position with two locking handles. Maximum jaw opening is 105mm. The vice has three fixing holes 8mm diameter for securing to a bench. Overall dimensions: 268 x 155 x 136mm.

Order Code	Type	Price each
RJ13P	D4 75mm Bench Vice	£14.99

Pin Vice



A quality, handy, versatile pin vice suitable for holding small files, taps, drills, scriber points, wires, etc. All steel construction, with bright chrome finish, the pin vice has a revolving head and ribbed sides for ease of use. Supplied with two double-ended jaws, giving it a wide handling capacity of 0.1 to 3.2mm diameter. The second set of jaws is retained at the top of the pin vice. Removing the cap, to which the revolving head is attached, uncovers this second set. Overall length 94mm.

Order Code	Type	Price each
GW33L	Pin Vice	£6.99

Fast Action Screw Clamps



Two fast action screw clamps that are ideal for clamping work to benches, or to hold work securely while glue sets. As the adjustable part of the clamp is tightened and starts to secure the work, it 'locks' into a ratchet on the stem. When the clamp is unscrewed, the clamp 'unlocks' and can slide down the stem, instantly releasing the work. The centre of the clamp to the stem is 50mm and the clamp can open to either 100mm or 300mm.

Order Code	Type	Price each
KR45Y	Screw Clamp 100	£3.99
KR46A	Screw Clamp 300	£4.99

TAPS AND DIES

Tap Wrench

A general purpose T-type tap wrench with nickel-plated body and jaws and a black barrel. The jaws open from 1/16 in. to 3/16 in. Supplied with instructions for use.



Order Code	Type	Price each
JK88V	Tap Wrench 1/16-3/16	£2.99

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Taps

A range of hand taps for cutting metric threads. Manufactured in high carbon steel with accurately cut threads. Each set contains a taper and a bottoming plug. The following thread sizes are available M2, M2.5, M3, M3.5, M4 and M5 to suit our range of bolts (M3.5 is size of thread in electrical boxes).

Order Code	Type	Price each
JK89W	Hand Tap 2mm	£2.75
JK90X	Hand Tap 2.5mm	£2.75
JK91Y	Hand Tap 3mm	£2.75
JK92A	Hand Tap 3.5mm	£2.75
JK93B	Hand Tap 4mm	£2.75
JK94C	Hand Tap 5mm	£2.75

Die Holder



A steel die holder for use with the dies shown below. Holds dies of $\frac{13}{16}$ in. diameter. Overall width: 155mm.

Order Code	Type	Price each
JK81C	Die Holder 13/16	£3.99

Dies

Circular dies manufactured from high carbon steel with accurately cut threads. The following thread sizes are available M2, M2.5, M3, M3.5, M4 and M5 to suit our range of nuts (M3.5 is size of thread in electrical wall plates etc.).



Order Code	Type	Price each
JK82D	Split Die 2mm	£3.49
JK83E	Split Die 2.5mm	£3.49
JK84F	Split Die 3mm	£3.49
JK85G	Split Die 3.5mm	£3.49
JK86T	Split Die 4mm	£3.49
JK87U	Split Die 5mm	£3.49

Cutting Compound

A general purpose cutting compound for use with drills, taps, dies and other cutting tools. The cutting compound gives enhanced performance when cutting metals and other hard materials and also prolongs the life of the cutting tool itself. Supplied in a 30cc container with nozzle applicator.



Order Code	Type	Price each
JU38R	Cutting Compound	£2.49

MEASURES AND LEVELS

Circular Level

A top mounted circular level allowing adjustment in all directions without re-positioning the level. The level is suitable for levelling domestic appliances, hi-fi equipment, caravans and trailers etc. Fixing holes are provided for permanent fixing to the equipment if required.



Order Code	Type	Price each
YP55K	Circular Level	£2.50

Multi Level

A level with the reading vials set at right angles to each other to allow adjustment in all directions without re-positioning the level. The level is suitable for levelling domestic appliances, hi-fi equipment, caravans and trailers etc. Fixing holes are provided for permanent attachment to the equipment.



Order Code	Type	Price each
YP56L	Multi Level	£3.60

Pocket Level



A 250mm (10in.) spirit level, fitted with ultrasonically sealed acrylic multi-way vials. Accuracy is 1mm per 1m (=0.058°).

Order Code	Type	Price each
KR43W	Pocket Level	£5.99

36in. Level



A bright yellow plastic-covered aluminium level which has an 'H' shape cross-section and three vials, for vertical, horizontal and 45° planes. Suitable for indoor and outdoor use, the level has an overall length of 36in. Cross-sectional dimensions $2\frac{1}{4}$ x 1in.

Order Code	Type	Price each
KR44X	C1 36in Level	£10.99

9in Spirit Level



A tough, light weight plastic non-conductive, non-corrosive, spirit level that will not mark wood surfaces, or scratch paint on household appliances. The level is fitted with three large acrylic vials with etched graduations for improved visibility.

Order Code	Type	Price each
RZ77J	9in Spirit Level	£3.99

Steel Tape Rule



A metal tape rule marked in inches and metres. It has a smart black plastic case, contoured to fit neatly in the hand. The rule has a coil spring return to retract the tape and a lock mechanism to keep it extended at the required length. The case has a chromed belt clip. The tape rule is available in two lengths, 3m (10 ft) and 5m (16 ft). 3m rule: overall size is 58 x 55 x 23mm (excluding belt clip) and tape is 12.5mm wide. 5m rule: overall size 67 x 65 x 30mm (excluding belt clip) and tape is 18mm wide. Both types have sliding tips for accurate internal and external measurements.

Order Code	Type	Price each
FY59P	Tape Measure 3m	£1.75
JM90X	Tape Measure 5m	£2.99

Ultrasonic Tape Measure (Range Finder)



A precision made, fast and convenient measuring device in matt black ABS with a range from 61cm to 13.72cm or 2 feet to 45 feet. A slide switch instantly converts any measurement from metric to imperial or vice versa. The range finder measures from the rear of the case to the target, and is very easy to use. For example to measure a room, place the back of the unit against one wall, pointing at the opposite wall. Press the clear key, then 'measure'. A short beep indicates that the press button has registered. The display flashes zero, then displays the distance. As soon as the display settles, a long beep sounds for confirmation. The reading can now be taken. If no key is pressed for over 1 minute, the range finder automatically switches off to conserve power. If you want to measure the area or volume of a space, the range finder has three memories to allow this to be

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done. The memories are not cleared when the unit is switched off and can be recalled at any time. In the example above, after taking the first measurement, simply press the 'store' and then 'M1' key to store the distance in the first memory. Now follow the same procedure with the other two walls in the room, this time pressing the 'M2' key to store that distance in the second memory. Pressing the 'area' key followed by 'M1' and then 'M2' will instantly display the floor area of the room.

To measure the height of the room, place the unit on the floor pointing up at the ceiling, press 'measure', then after the long beep, press 'store' and then 'M3'. Now pressing the 'volume' key will instantly display the volume. Pressing the 'area' key followed by 'M1' and then 'M3' will display the area of two of the walls and 'area' followed by 'M2' and then 'M3', will display the area of the room's other two walls.

A '+' key and '-' key allow you to add to or subtract from measurements stored in memory (providing units are the same e.g. both metric). If the sonic signal is not cleanly reflected, or the range is over the maximum, the display shows 'error'. This may happen if the unit is pointed at soft furnishings such as curtains or carpets, or irregular surfaces, though windows are an excellent reflector. Objects such as chairs, tables, wall corners, door frames etc, in the path of the sonic beam will give you false readings. A low battery indicator shows on the display when the batteries need replacing.

Specification

Range: 61cm to 13.72m, 2ft to 45ft
 Accuracy: Better than 0.5% reading at 13.81ft, 25°C
 Resolution: 1cm, 0.1ft
 LCD: 7-digit, indicates measurement being taken
 Sensor: Polaroid ultrasonic sensor
 Power saving: Automatic shut off after 1 minute
 Memories: 3 non-volatile memories for length, width and height (memory is retained after switch off)
 Volume: Single key calculation
 Area: Three key calculation
 Other features: Allows addition or subtraction of results. Automatic and accurate temperature compensation from 0°C to 40°C. Beep tone indicates measurement is complete. Error tone and LCD indicator if measurement fails. Easy to use 10 key panel.
 Battery life: 1 year in normal use
 Size: 127 x 66 x 27mm (length of unit automatically incorporated in measurement)
 Weight: 156g with batteries

The range finder requires four AAA cells to operate (not supplied).

Order Code	Type	Price each
YU01B	Electronic Measure	£21.49

Steel Rules



6 inch (140mm) and 12 inch (300mm) stainless steel rules having both imperial and metric graduations on one side and conversion tables on the reverse side.

Order Code	Type	Price each
FA69A	6" Stainless Stl Rule	£1.99
FT75S	12" Stainless Stl Rule	£2.99

AIR BRUSH KIT

This quality airbrush is the ideal gift for the hobbyist, craftsman, artist, modeller and DIY enthusiast. The comprehensive kit comprises an airbrush, 5ft. long air hose, glass paint bottle with attachment, spare paint bottle, propellant cap with air supply valve for setting airflow volume and one canister of propellant. The airbrush is fitted with an adjustable paint nozzle for controlling the spread and a spring-loaded push-button valve for controlling the air flow.



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 GW46A

FOLDING SACK TRUCK

A high quality, strong, extendable two-wheeled truck, with a folding platform, that is useful in the home or industry but small enough to fit in the boot of a car. The truck is of rugged construction, manufactured from aluminium alloy with a chromed handle and fitted with rubber tyred wheels 152mm (6in.). The wheels run on ball bearings secured to a solid axle. A strong spring-loaded latch holds the platform open or folded. The platform is painted black. The extendable handle is locked in the open or closed position by a sprung-loaded mechanism. In the closed position the truck is 725mm high x 400mm wide and 190mm deep. In the open position the platform extends the depth by a further 217mm and the handle extends the height up to 1095mm. The truck weighs 7kgs.



Order Code	Type	Price each
GW43W	H17 Sack Truck	£59.99

ELECTRICAL TOOLS

MINICRAFT

Precision Collet Drill



The MB130 is a high-quality, low cost, lightweight precision drill fitted with a collet chuck for a greater degree of accuracy in drilling and detailing in modelling, jewellery and other miniature work. This drill has been ergonomically styled for comfortable handling to allow for long periods of continuous use without excess fatigue. Fitted with a high-torque, high-speed, fan-cooled motor to ensure that it will give a long and trouble-free life. A locking ring provides for simple and straightforward switching of collets. Alternatively, the drill can be fitted with a keyless chuck (BA96E).

Specification

Operating voltage: 9 to 18V DC
 Maximum power: 25W
 Off load speed: 16000rpm
 Chuck type: Collet
 Chuck capacity: 1.0, 1.5, 2.3mm
 Cable type: Straight
 Cable length: 1.9m
 Dimensions: 160 x 32mm approximately
 Weight: 190g

Order

Code	Type	Price each
RD74R	A1 MB130 Collet Drill	£19.99

Hobby Drill



The MB150 is a high-quality, low cost, miniature lightweight drill ideal for use in electronics for PCB preparation, in jewellery fabrication and in model making. This drill has been ergonomically styled for comfortable handling to allow for long periods of continuous use without excess fatigue. A high-torque, high-speed, fan-cooled motor ensures that it will give a long and trouble-free life. A lightweight keyless chuck allows for simple accessory changeover and versatility in use. Alternatively, the drill can be fitted with a collet chuck (BA95D) for a greater degree of accuracy in drilling and detailing.

Specification

Operating voltage: 9 to 18V DC
 Maximum power: 25W
 Off load speed: 16000rpm
 Chuck type: Keyless
 Chuck capacity: 0.4 to 3.2mm
 Cable type: Extendable
 Cable length: 1.8m
 Dimensions: 165 x 32mm approximately
 Weight: 190g

Order

Code	Type	Price each
RD75S	E1 MB150 Hobby Drill	£24.99

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High-Speed Precision Drill for the Hobbyist



- ★ **Lightweight ergonomically designed housing**
- ★ **Keyless chuck for easy accessory changeover**
- ★ **Twin bearing drive shaft for smoother running**
- ★ **Powerful 40W fan cooled motor**
- ★ **Very high speed for increased versatility**

For the hobbyist who requires a drill that offers a perfect balance between speed and handling, then this drill is the ideal choice. This lightweight ergonomically designed drill has a powerful high speed motor with a twin bearing drive shaft for smoother running. A lightweight keyless chuck ensures easy accessory changeover and for extra flexibility, a collet set (BA95D) can be fitted.

Specification

Operating voltage:	9 to 18V DC
Power:	40W
Off-load speed (12V):	20,000 r.p.m.
Chuck type:	Keyless
Chuck capacity:	0.4 to 3.2mm
Cable type:	Extendable
Cable length:	1.8m
Weight:	210g

Order Code	Type	Price each
BA80B A1	MB170 Hobby Drill	£29.99

High Power High Precision Miniature 'Buffalo II' Drill

- ★ **Very powerful 100W fan cooled motor**
- ★ **Twin bearing drive shaft**
- ★ **Precision key operated chuck**
- ★ **Integral on/off/push-on**
- ★ **Coiled cable**
- ★ **Ergonomically styled**

A highly recommended miniature drill which offers both power and precision. The drill has an extremely powerful motor and a special on/off/push-on switch which allows continuous use or intermittent use. Twin drive shaft bearings ensure long life, accuracy and smooth operation. The key operated chuck accepts drill bits or accessories between 0.4 and 6mm dia. The drill is neatly styled, comfortable to hold, well balanced and easy to use. Supplied with chuck key. Spare chuck keys available (BA97F). This versatile drill, when used with the MB540 twin pillar vertical drill stand (XP21X) is ideal for printed circuit board fabrication and other precision drilling applications.



Specification

Operating voltage:	9 to 18V DC
Power:	100W
Off-load speed (12V):	12,500 r.p.m.
Chuck type:	Key operated
Chuck capacity:	0.4 to 6.0mm dia.
Cable type:	Extendable, coiled
Cable length:	1.8m
Weight:	420g

Order Code	Type	Price each
YZ94C A1	MB1012 Buffalo Drill	£39.99

MINICRAFT®

10VA Transformer Unit



A well made, compact transformer unit for use with all 40W drills and engraving pen. The unit is self contained, with integral 13A plug pins and output cable with free socket. The unit is double insulated and thermally protected against overload, the thermal trip is self resetting. This unit is suitable for indoor use only.

Specification

Input voltage:	240V AC 50Hz
Output voltage:	12V DC
Output power:	10VA
Output cable connector:	Minicraft 2-pin socket
Cable length:	2m
Weight:	520g

Order Code	Type	Price each
YZ97F B1	MB714 10VA Xformer	£24.99

24VA Variable Speed Transformer Unit

A variable speed transformer unit for use with all Minicraft tools. The unit is well made and compact and features a manually resettable trip to guard against overload. Mains input is via a two core mains cable to which a 13A plug with 2A fuse should be fitted (plug and fuse not supplied). A rotary front panel control allows adjustment of output voltage, thus controlling speed. The unit is double insulated and is suitable for indoor use only.



Specification

Input voltage:	240V AC 50Hz
Output voltage:	9V to 16V DC
Output power:	24VA
Speed control range:	~ 7,000 to 30,000 r.p.m.
Output connector:	Minicraft 2-pin socket
Mains cable length:	2m
Weight:	1.05kg

Order Code	Type	Price each
XP19V D2	MB730 24VA Xformer	£39.99

Universal Variable Speed Transformer

This top of the range power centre is suitable for all Minicraft® precision tools, and has a massive 100VA peak output. This unit is equipped with a unique microchip controlled electronic variable speed for smoother running, with full torque control for effective work at lower speeds. Additionally, a re-settable overload cut-off facility is incorporated for extra safety and longer life, and for added convenience, three outputs are included for easy tool changeover. Storage space for 60 accessories is included along with a tool rest for quick and easy access.



Specification

Input voltage:	240V AC 50Hz
Output voltage:	8.8V to 16.2V DC
Output power:	50VA constant 100VA peak
Speed control range:	500 to 18,000 r.p.m.
Cable type:	Standard
Cable length:	2.0m
Weight:	2.0kg

Order Code	Type	Price each
BA83E H3	MB750 100VA Xformer	£69.99

MB1037 Cordless Drill Kit



A top quality kit which comes complete with cordless drill, charger and 15 accessories for drilling, grinding, cutting, routing, shaping, polishing and sanding. All items are packed in a handy carry and storage case. The drill itself is extremely practical, it can be used anywhere at any time when its internal batteries have been charged. It features a lightweight, keyless chuck to make changing of accessories quick and easy. The body of the drill has been ergonomically designed to make using it a pleasure. For longer life and high reliability, a fan-cooled motor is fitted, and the drive shaft has twin bearings for smoother running.

Specification

Power source:	3 x Ni-Cd cells (3.6V DC) Charger included
Off-load speed:	13,500 r.p.m.
Drilling capacity:	230 x 3mm holes in 10mm softwood 400 x 2mm holes in 10mm softwood
Chuck type:	Keyless
Chuck capacity:	0.4mm to 6mm
Recharge time:	12 hours
Weight:	440g

Order Code	Type	Price each
ZC94C C2	MB1037 Drill Kit	£49.99

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World Radio History

Hobby Drill Kit



The MB1001 is an excellent high-quality, starter kit for the hobbyist, craft and do-it-yourself enthusiast. This kit contains a 25 watt drill that is connected, via 2m of straight cable, to a plug-in adaptor. The kit includes 6 accessories for drilling, routing and shaping.

Order Code	Type	Price each
RD76H C3	MB1001 Drill Kit	£36.99

MINICRAFT®

High Precision Drill Kit



This top of the range kit is suitable for use by all hobby enthusiasts and professional users. Ideal for various model building and repairing work. It combines the MB1012 'Buffalo II' 100W high power high precision drill with the MB730 variable speed transformer unit (13A plug not supplied) and 15 selected accessories for drilling, grinding, cutting, routing, shaping, polishing and sanding. Supplied complete with a chuck key and tough carrying and storage case

Order Code	Type	Price each
XP20W D4	MBE571 Drill Kit	£79.99

Vertical Mini Drill Stand



A single pillar drill stand for use with RD74R, RD75S and BA80B drills. The spring loaded pressure mechanism is easily and smoothly operated by a lever to lower the drill. The 'at-rest' position of the drill can be raised or lowered. The die cast construction ensures stability. The 79 x 88mm base plate can be attached to a bench for increased stability. Supplied with an Allen key for adjusting the drill holder.

Order Code	Type	Price each
ZA01B B1	MB820 Min Vert Stand	£28.99

Twin Pillar Precision Vertical Drill Stand



Drill not included.

A twin pillar precision vertical drill stand for use with either the MB160 'Topi' or MB1012 'Buffalo II' drills. The stand is made from die cast metal for stability and maximum accuracy. The large base plate (155 x 188mm) has holes and slots cut in it so that the MB715 Machine Vice can be fixed in position. Mounting holes are also provided so that the stand can be secured to a bench. Supplied with a reducing collar for YZ94C drill.

Order Code	Type	Price each
XP21X D5	MB540 Vert Stand	£42.99

Machine Vice



A precision machine vice for clamping and holding workpieces. Shafts and tubes may be held securely by means of horizontal and vertical 'V' grooves. The vice incorporates slots and screws enabling it to be attached to the MB540 vertical drill stand or alternatively secured to a bench. Capacity: jaw width: 35mm, jaw extension: 30mm, jaw depth: 10mm.

Order Code	Type	Price each
JW16S	MB715 Machine Vice	£10.99

Super Fine Drill Bits

A pack of 5 different Minicraft, superfine, High Speed Steel drill bits in the following diameters: 0.8mm, 1.0mm, 1.2mm, 1.5mm, 2.0mm. The bits are designed for use with the Minicraft range of drills and are suitable for drilling wood, non-ferrous metals and plastics.



Order Code	Type	Price each
JW04E	MB1728 5pc Drill Set	£8.99



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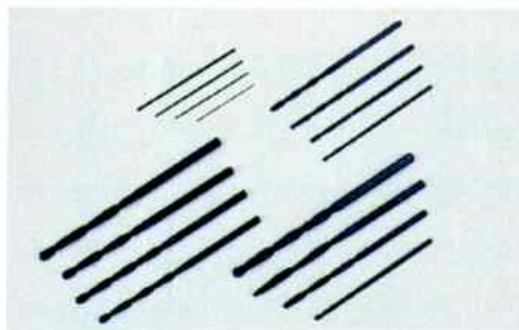
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HSS Twist Drill Bits



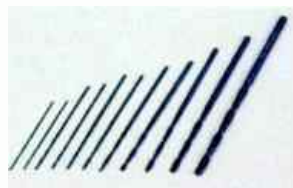
A range of quality, High Speed Steel twist drill bits suitable for precision drilling applications in wood, non-ferrous metals and plastics. The bits are designed for use with the Minicraft range of drills and are available in packs, each containing 4 different drill sizes.

Type	Diameters
MB1720	0.4mm, 0.6mm, 0.8mm, 1.0mm
MB1721	1.2mm, 1.4mm, 1.6mm, 1.8mm
MB1722	2.2mm, 2.4mm, 2.6mm, 2.8mm
MB1723	1.5mm, 2.0mm, 2.5mm, 3.0mm

Order Code	Type	Price each
JU96E	MB1720 Drill Pk	£3.99
JU97F	MB1721 Drill Pk	£3.99
JU98G	MB1722 Drill Pk	£3.99
JU99H	MB1723 Drill Pk	£3.99

11 Piece HSS Drill Bit Set

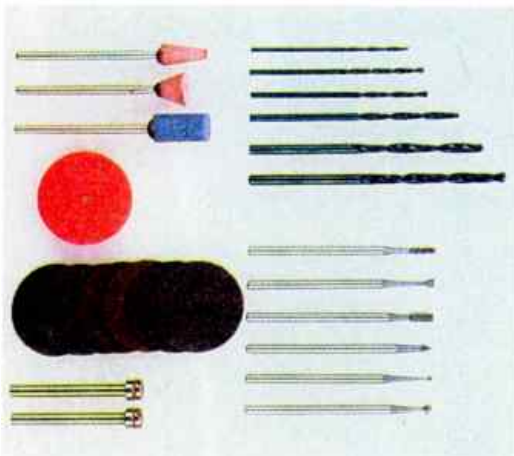
A set of 11 High Speed Steel bits designed for use with the Minicraft range of drills. The set comprises:



2 x 0.4mm, 2 x 0.8mm, 2 x 1.0mm, 1 x 1.2mm, 1 x 1.5mm, 1 x 1.6mm, 1 x 2.0mm and 1 x 2.5mm.

Order Code	Type	Price each
JW20W	MB1905 11pc DrillSet	£8.99

25 Piece Accessory Set



A general purpose accessory set comprising six High-Speed Steel drill bits (1.0, 1.2, 1.5, 2.0, 2.5 and 3.0mm), six fine milling cutters, three grinding stones, one grinding wheel, seven carborundum cutting discs and two mandrels.

Order Code	Type	Price each
BA88V	MB1900 Accessory Set	£13.99

MINICRAFT®

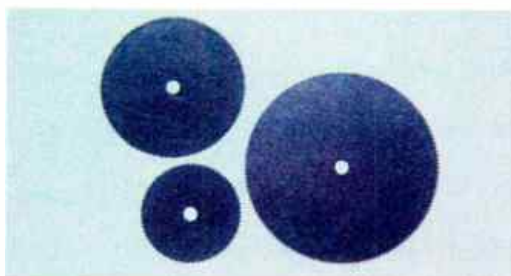
Diamond Saw Blade

An 22mm diameter diamond cutting disc designed for use with the Minicraft range of drills. The blade is supplied complete with a mandrel and is suitable for cutting glass.



Order Code	Type	Price each
JW05F	MB1763 Diamond Saw	£9.49

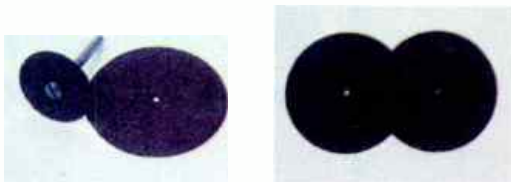
Circular Saw Blades for Drills



Circular saw blades designed for use with the Minicraft range of drills. The blades are suitable for cutting and trimming small sections of wood and plastic. MB1640 has 12mm, 19mm and 25mm diameter saw blades (3 items).

Order Code	Type	Price each
JU91Y	MB1640 Saw Blades	£6.49

Carborundum Cutting Wheels



Carborundum cutting wheels suitable for use with the Minicraft range of drills. The wheels are available in 22mm and 40mm diameter and are suitable for cutting through small metal tubes and shafts. Three different packs are available:

MB1630 has 1 x 40mm cutting wheel, 1 x 22mm cutting wheel, 1 x mandrel.

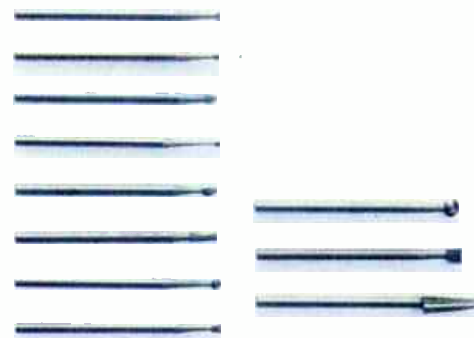
MB1631 has 2 x 40mm cutting wheel.

MB1632 has 6 x 22mm cutting wheel.

Please note: packs MB1631 and MB1632 do not contain mandrels.

Order Code	Type	Price each
JU89W	MB1630 Whls&Mandrl	£2.99
JW22Y	MB1631 Carb Whls40	£2.49
JU90X	MB1632 Carb Whls22	£2.99

12 Piece Fine and Medium Cutter Set



A 12 piece cutter set comprising nine fine and three medium milling cutters. The set is suitable for a variety of hollowing, carving, shaping and engraving of wood, metals and plastics. The cutters cover a wide range of shapes and include reverse taper, taper, round, cylindrical, conical, oval and dome. The fine sizes are 1.5mm and 2.3mm diameter, and the medium sizes are 4mm and 6mm diameter.

Order Code	Type	Price each
BA90X	MB1903 Cutter Set	£14.49

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01702 553935

15 Piece Cutting and Grinding Set



A general purpose cutting and grinding set comprising three assorted grinding stones (cylindrical, taper and reverse taper), seven carborundum cutting wheels, one mini saw blade, two grinding wheels and two mandrels. Suitable for use on a wide range of materials.

Order Code	Type	Price each
BA91Y	MB1904 Grinding Set	£9.49

Self Adhesive Sanding Discs



A range of self adhesive sanding discs to fit the Minicraft MB1780 rubber holder. The discs are available in two different grades and are supplied in packs containing 6 discs.

The following types are available:
MB1781 pack of 6 discs (coarse).
MB1783 pack of 6 discs (fine).

Order Code	Type	Price each
JW25C	MB1781 Sand Discs C	£1.59
JW26D	MB1783 Sand Discs F	£1.59

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Rubber Holder with Self Adhesive Sanding Discs

A rubber holder for self adhesive sanding discs suitable for use with the Minicraft range of drills. The holder is supplied with four self adhesive sanding discs (2 coarse and 2 fine) and is suitable for a wide range of sanding applications in wood and metal.



Order Code	Type	Price each
JW11M	MB1780 Hldr & Discs	£2.99

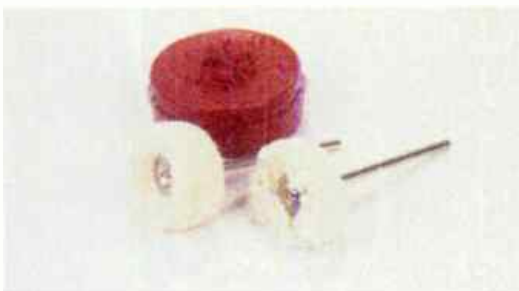
Felt Polishers



Three felt polishers primarily intended for metals, particularly silver and pewter. The pack has one tapered, one reverse-tapered and one wheel polisher, each of which has its own 2mm mandrel. They are intended to work at speeds of up to 12,000 r.p.m.

Order Code	Type	Price each
KW17T	Felt Polisher Pack	£3.25

Polishing Set



A set of polishing accessories for the Minicraft range of drills. The set includes a 22mm diameter soft felt polisher, a wool "mop" and a pot of polishing paste. Both the polisher and the mop are supplied with fixed mandrels. The polishing paste is applied using the felt polisher and the wool mop is then used to do the polishing. Suitable for metals, glass and ceramics. Maximum recommended speed: 10,000 r.p.m.

Order Code	Type	Price each
JW07H	MB1652 Polish Set	£4.25

Mounted Silicone Polishers

A pack of mounted silicone polishing tips for use with the Minicraft range of drills. The pack contains one circular and one elliptical silicone polishing wheel suited to a wide range of specialist polishing applications. Both are 12mm in diameter and are supplied with fixed mandrels.



Order Code	Type	Price each
JW08J	MB1661 Sil Polishers	£3.49

Steel and Brass Wire Brushes



A selection of steel and brass wire brushes suitable for use with the Minicraft range of drills. The brushes can be used for a wide variety of metal cleaning tasks including derusting and paint removal. Each type is supplied in a pack containing 3 different brushes: one pencil shape, one cup shape and one wheel shape. Note: the maximum recommended speed is 10,000 r.p.m.

Order Code	Type	Price each
JW09K	MB1670 Steel brushes	£3.65
JW10L	MB1671 Brass brushes	£3.65

15 Piece Cleaning and Polishing Set



A set of 15 cleaning and polishing accessories for use with the Minicraft range of drills. The set contains accessories suitable for sanding, cleaning, grinding, deburring and polishing on wood, plastics and soft metals.

Order Code	Type	Price each
JW19V	MB1902 Clean&Polish	£9.49

Grinding Stones

A pack of three grinding stones of various types. They are used for grinding, deburring and engraving metal, glass, stone, ceramics, plastic and wood. They can also be used for sharpening knives, etc. The three stones supplied are: 7mm cylindrical, small taper and reverse taper. All types have an integral 2mm mandrel. Maximum drill speed: 35,000 r.p.m.



Order Code	Type	Price each
KW15R	Grinding Stones 3Pk	£3.25

Grinding Wheels



A pack of 22mm grinding wheels. There are three in the pack; graded as coarse grit (purple), medium grit (brown) and fine grit (white). The chosen wheel is screw-fitted to a separate 3mm dia. mandrel, the free end of which is inserted into the drill's chuck. These grinding wheels are suitable for using on ceramics, metals, stones and glass, with a maximum speed of 40,000 r.p.m.

Order Code	Type	Price each
KW16S	Grinding Wheels 3Pk	£3.25

Mandrels

A pack of three mandrels for use with Minicraft drill fitting sawblades and cutting discs. Suitable for all Minicraft drills.



Order Code	Type	Price each
JW18U	MB1625 Mandrels	£1.99

Collet Set

A four piece collet set suitable for use with Minicraft® drills MB1010, MB170 (BA80B) and MB160. Diameter sizes: 0.5, 1.0, 2.3, 3.2mm.



Order Code	Type	Price each
BA95D	MB1925 Collet Set	£4.49

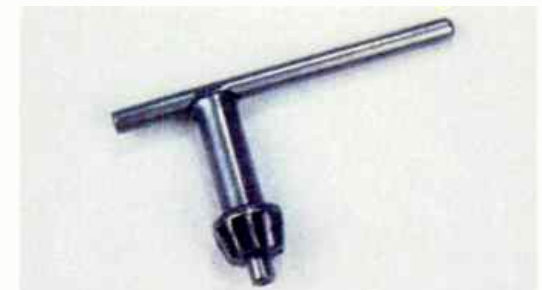
Keyless Chuck

A keyless chuck for use with Minicraft® collet drill MB120. Size: 0.4 to 3.2mm.



Order Code	Type	Price each
BA96E	MB1932 Keyless Chuck	£4.49

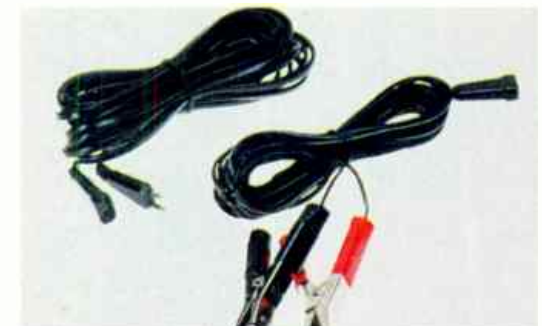
Chuck Key



A replacement chuck key for use with the Minicraft® high power, high precision drill MB1012 (YZ94C).

Order Code	Type	Price each
BA97F	MB1936 Chuck Key	£2.49

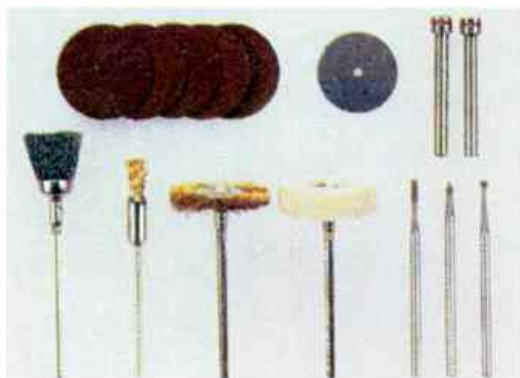
Extension Cables



Two extension cables for use with the majority of Minicraft® power tools. The cables are 5m long and one has a Minicraft® socket at one end and a compatible plug at the other end. The other version has battery clips at one end and a Minicraft® compatible socket at the other end (BA94C).

Order Code	Type	Price each
BA93B	MB1802 Ext Cable	£4.99
BA94C	MB1805 Cable + Clips	£5.99

15 Piece Modelling Set



A 15 piece modelling set comprising five carborundum cutting discs, one mini saw blade, two mandrels, three fine milling cutters, one hard felt polisher, two steel wire brushes and one brass wire brush.

Order Code	Type	Price each
BA89W	MB1901 Modelling Set	£9.99

Engraving Pen

An extremely simple to use engraving pen for craft and security engraving on glass or metal. The lightweight pen-style unit is comfortable to hold. The on/off switch requires very little pressure to operate, thus reducing operator fatigue. Accessory bits simply push-in/pull-out for fast interchangeability. Tip speed is 20000 R.P.M. (off-load) for fast efficient engraving. Supplied with one diamond tipped engraving bit.



Order Code	Type	Price each
YZ96E	MB185 Engraving Pen	£15.99

Engraving and Security Kit

A superb kit ideal for the craft enthusiast and householder. This comprehensive, simple to use engraving kit comes with a lightweight pen-style engraver, plug-in transformer, one diamond bit and two grinding stones. The kit also includes a paper stencil for craft engraving on glass and a plastic stencil for security marking on valuables i.e. videos, cameras, car radio. Supplied with a handy carry and storage case.



Order Code	Type	Price each
BA86T	MB186 Engraving Kit	£27.99

MINICRAFT®

Diamond Engraving Bit Set

A set of diamond engraving bits designed for use with the Minicraft MB185 engraving pen. The bits are suitable for fine engraving work on a wide range of plastics, metals and glass. The set contains three different types as follows: 1mm diameter round bit, 1.4mm diameter round bit, 1.5mm diameter oval bit.



Order Code	Type	Price each
JW06G	MB1766 Engravers	£9.49

Drum Mandrels and Sanding Drums

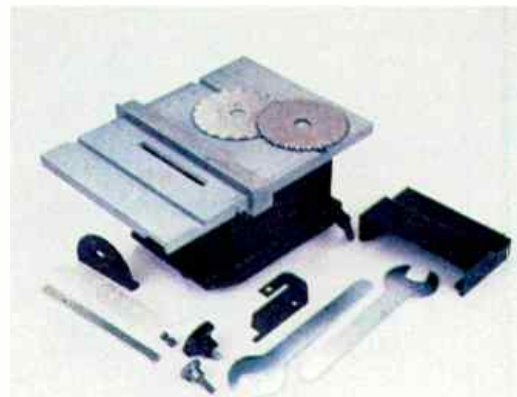


A pack of three drum mandrels for use with all Minicraft sanding drums. Suitable for all Minicraft drills. Drum diameter 10mm. A selection of sanding drums for use with Minicraft drum mandrels is also available. Three types of sanding drum are available: fine grade, coarse grade, silicon carbide. The sanding drums are sold in packs of five.

Order Code	Type	Price each
RZ62S	MB1784 Fine	£3.49
RZ63T	MB1785 Coarse	£3.49
RZ64U	MB1786 SilCarbide	£3.49
RD77J	Drum Mandrels	£2.99

Precision Circular Saw Table

- ★ Powerful 100W fan cooled motor
- ★ Diecast table
- ★ Rip fence
- ★ Mitre guide
- ★ Transparent blade guard
- ★ Supplied with two blades

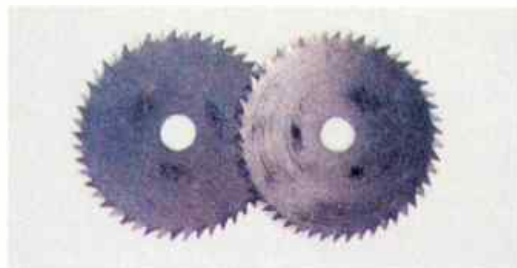


A precision circular saw table for modellers, a fan cooled 100W motor provides power to the saw blade which rotates at 12,500 r.p.m. off-load. The saw table is made from die cast metal for accuracy and reliability. A transparent saw blade guard protects the operator whilst allowing the progress of the blade through the workpiece to be observed. A rip fence ensures precise straight cuts in wood, metal and plastic. An adjustable mitre guide is also provided to allow mitres to be cut accurately, the guide is adjustable from 0° to 90°. Supplied with two blades; an 84-tooth blade for wood and plastic and a 106-tooth blade for metal and plastic.

Specification	
Voltage:	9 to 18V DC
Power:	100W
Off-load speed:	12,500 r.p.m.
Table area:	169 x 119mm
Cutting capacity:	
Non-ferrous metal:	1mm
Plastic:	2mm
Wood:	6mm
Mitre guide angle:	0° to 90°
Blade diameter:	50mm or 60mm
Cable connector:	Minicraft 2-pin plug
Cable length:	1.8m
Weight:	900g

Order Code	Type	Price each
XP18U	D2 MB410 Circular Saw	£49.99

Blades to Fit Circular Saw

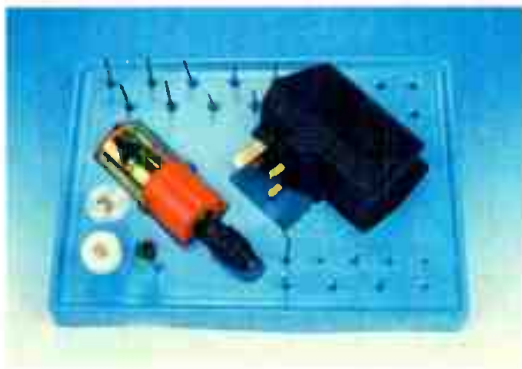


A range of blades designed for use with the Minicraft MB410 circular saw table. Two different types of blade are available, each designed for cutting different materials. The blades are supplied in packs of two as follows:
 MB1647 has 50mm diameter saw blade for plastic and non-ferrous metals (pack of 2).
 MB1648 has 60mm diameter saw blade for wood (pack of 2).

Order Code	Type	Price each
JU93B	MB1647 Saw Bls50PM	£11.99
JU94C	MB1648 Saw Bls60W	£7.49

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Reliant Drill Kit



A kit comprising the Reliant electric drill, fitted with latest automatic 3 jaw pin chuck, adjustable to take any size drill bit up to 2.9mm dia. Kit includes 16 twist drills, one axial brush, one radial brush, polishing pad, tommy bar and Allen key. A mains adaptor is included in the kit.

Order Code	Type	Price each
LH79L	A1 Reliant Kit	£34.99

Reliant Electric Drill



A sub-miniature 12V electric drill suitable for drilling printed circuit boards etc, and similiary light duties. Features the latest automatic 3 jaw pin chuck with up to 2.9mm capacity. Suitable power supply XM20W.

Rated voltage:	12V DC
No load current:	175mA
Full load current:	1.5A
Torque:	100gm cm
Speed:	9,000 r.p.m. $\pm 7\frac{1}{2}\%$
Body dimensions:	76mm long x 33mm diameter
Weight:	160g

Order Code	Type	Price each
BW03D	Reliant Drill	£12.99

Zircon Electric Drill

Miniature 12V DC electric drill suitable for drilling printed circuit boards, thin aluminium and other light duty work. The T section magnets and 5-pole motor produce more torque than drills of twice this size. The drill utilises a ground shaft, ball race drive and 3-jaw pin chuck which has a capacity of 0.5mm to 3.0mm. The drill is well balanced, comfortable to hold and easy to use.



Specification

Rated voltage:	12V
No load current:	390mA
Full load current:	2.25A
Running torque:	150g.cm
Stall torque:	1150g.cm
Speed on load:	9,700 r.p.m.
No load speed:	11,200 r.p.m.
Dimensions:	170mm x 35mm dia.

Order Code	Type	Price each
YU92A	Zircon Drill	£19.99

Drill Stands

A range of drill stands for use with the Reliant and Zircon miniature electric drills. A lever on the stand lowers/raises the drill; thus accurate alignment can be easily achieved.



Order Code	Type	Price each
XM82D	B3 Reliant Stand	£26.99
XP05F	B3 Zircon Stand	£26.99

POWER TOOLS

Cordless Variable Speed Reversing Hammer Drill

Black & Decker

- ★ Cordless
- ★ 7.2V battery pack
- ★ Variable speed trigger and two-speed gearbox
- ★ Bright steel 10mm chuck
- ★ Comfortable 'pistol grip' case
- ★ Switchable two-stage hammer action
- ★ Reversible
- ★ Chuck key storage
- ★ Supplied with double-ended screwdriver bit
- ★ Fast recharge



The BD602 is a highly versatile cordless drill with a number of innovative features not often found on cordless drills. The drill is equipped with a variable speed trigger and two-speed gearbox. Chuck speed is variable from 0 to 300 r.p.m. or 0 to 600 r.p.m. depending on which gear ratio is selected. The direction of chuck rotation is reversible, making the drill ideal for use as a powerful cordless screwdriver. The drill also has a two-stage hammer action to cope with large holes in concrete and masonry. Recharging takes only 3 hours compared to 16 hours of many other units. Drilling capacity is 16mm in wood, 10mm in steel and 10mm in masonry. Supplied complete with double-ended screwdriver bit (suitable for Philips and slotted screws) and charger unit.

Order Code	Type	Price each
XP13P	G4 Cordless Drill BD602	£69.99

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Two Speed Hammer Drill

Black & Decker



The BD562 is a rugged, two-speed hammer drill capable of drilling into wood, steel and concrete. Fitted with a powerful 400W motor driving a 10mm chuck at either 2100 or 2500 rpm, provide superb drilling capacities of 20mm in wood and 10mm for all metals. The hammer action is selected by another switch, the drilling capacity for concrete and masonry is 10mm. A lock-on button in the base of the handle, along with the carefully designed and contoured 'pistol-grip' casing, enables easy continuous drilling. The high specification of all moving parts ensures a longer working life for the drill.

Order Code	Type	Price each
RJ22Y	G4 BD562 Drill	£41.99

Cordless Variable Speed Reversing Drill with Two-speed Gearbox

Black & Decker

- ★ Proline™ professional
- ★ Cordless
- ★ Two-speed gearbox
- ★ Variable speed
- ★ Hammer action
- ★ Reversible
- ★ 9.6V battery pack



The PL97K is a robust, versatile professional cordless drill. The drill is equipped with a variable speed, high and low ratio gearbox. Chuck speed is variable from 0 to 450 rpm or 0 to 1100 rpm depending on which gear ratio is selected. This helps to conserve battery power and gives extra torque at low speeds. The hammer action makes the drill ideal for drilling into masonry, and the ability to reverse the direction of rotation of the chuck makes the drill a powerful cordless screwdriver as well. Equipped with a $\frac{3}{8}$ in. chuck and supplied with a tough moulded kit box and detachable battery pack. Additional battery packs are available separately.

Order Code	Type	Price each
BU30H	G6 Drill PL97K	£99.99

Cordless Variable Speed Hammer Drill

Black & Decker



The PL99K is a versatile, industrial quality cordless drill having more than enough power and endurance to meet the needs of the professional. The powerful 12V motor is equipped with a variable speed and a reversing facility. With two, switchable, speed ranges available, of 0 to 500 rpm and 0 to 1200 rpm, helping to conserve battery power and provide extra torque at low speed. The drill can easily handle the chuck capacities of 16mm in wood, 10mm in steel and, with the added hammer action, 10mm in masonry. The detachable battery pack caters for two-pack operation, with one pack in use and the other on charge, enables easy continuous drilling. The high specification of all moving parts ensures a long working life for the drill. Equipped with a 10mm chuck and supplied with a tough moulded kit box. Additional battery packs (RJ29G) are available separately.

Order Code	Type	Price each
RJ23A	H5 PL99K Drill	£124.99

Battery Packs

Black & Decker

Battery packs suitable for use with the Proline™ range of cordless drills. 8-cell, 9.6V battery pack for use with Model PL97K (BU30H) 10-cell, 12V battery pack for use with Model PL99K (RJ23A).



Order Code	Type	Price each
BU34M	9.6V Battery Pack	£38.99
RJ29G	12V Battery Pack	£47.99

2 Hour Charger for Proline™ Cordless Drills

Black & Decker

A 2 hour charger compatible with all Proline™ cordless drills. A red light indicates when the battery is charging and flashes when the battery is ready.



Order Code	Type	Price each
BU31J	2 Hour Charger	£19.99

1 Hour Charger for Proline™ Cordless Drills

Black & Decker

A 1 hour charger compatible with all Proline™ cordless drills. A red light indicates when the battery is charging and a green lamp indicates when the battery is ready. A 'maintenance' charge mode ensures the battery is always fully charged.



Order Code	Type	Price each
BU32K	1 Hour Charger	£39.99

Horizontal Drill Stand

Black & Decker



A rigid high quality horizontal drill stand for use with Black & Decker claw grip drills. Ideal for use when sanding or polishing, or when a flexible drive shaft is to be used and a secure mounting bed for the drill is required. Features a strong cast alloy body having a silver grey finish and a large chemically blackened steel screw with locknut for retaining the drill. Four fixing holes are provided for securing the stand to a workbench.

Order Code	Type	Price each
RJ34M	Horizont Drill Stand	£12.99

Vertical Drill Stand

Black & Decker

The D2037 is a rigid high quality vertical drill stand, for use with Black & Decker claw grip drills, that is perfect for precision drilling. The single solid support column is fitted with a multi-position handle that can be set to any position. The handle operates a spring loaded drill support bracket which can be rotated through 360° and provides automatic retraction. Included on the support bracket is a calibrated depth scale and drill stop for accurate drilling control. The professional quality of this drill stand will ensure a long working life.



Order Code	Type	Price each
RJ33L	C4 Vertical Drill Stand	£32.99

Hobby Shop

Black & Decker

The D2057 Hobby Shop is designed for all hobbyists work such as mitre cutting, grinding and sanding, and comprises a horizontal stand and tilting table. The horizontal stand is suitable for all Black & Decker 43mm DIN nose drills and allows the drill to be rotated through 360°. The tilting table is adjustable for greater accuracy of finish. The stand can be held in a vice, a Black & Decker Workmate™, or secured with screws to a worksurface.



Order Code	Type	Price each
RJ35Q	D2057 Hobby Shop	£12.99

Lathe Attachment

Black & Decker



The D2160 lathe attachment is a high quality unit designed for use with Black & Decker 43mm DIN nosed drills. This lathe is ideal for all wood turning and, with a working length of 650mm and working diameter of 125mm, quite large pieces can be turned. Accuracy of workmanship is aided by the easily adjustable quick-release tool rest and ball bearing tailstock. The horizontal drill stand can be used separately.

Order Code	Type	Price each
RJ36P	G5 D2160 Lathe	£54.99

Machine Vice

Black & Decker



A machine vice that features a quick-release adjustment mechanism and jaw width of 100mm (4in.) with a jaw opening of 100mm (4in.). Suitable for use with the Black & Decker vertical drill stand.

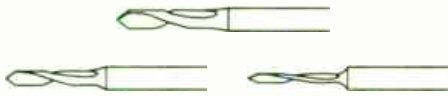
Order Code	Type	Price each
RJ37S	D4 Machine Vice	£18.99

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01702 553935**

DRILL BITS AND ACCESSORIES

Drill Bits with 2.35mm Shank



A range of high speed drill bits all with 2.35mm shanks designed for use with the older type Reliant, Titan or Mini Mains drills that do not have the new 3-jaw pin chucks. The following sizes are available: 0.8mm (for IC pins), 1mm (for most components), 1.4mm (for presets etc).

Order Code	Type	Price each
BR85G	HS Twist Drill 0.8mm	99p
BR86T	HS Twist Drill 1mm	99p
BR87U	HS Twist Drill 1.4mm	99p

Tungsten Carbide Drills



A range of very high quality solid tungsten carbide drills which offer extended life when drilling pcb's especially fibre-glass. All drills have an 1/8 in. 3.175mm diameter shank approx 24mm long. Overall drill length 38mm. Tungsten carbide drills are not recommended for hand-held use as they snap very easily under sideways pressure. For best results, use a drill stand and run the drill at a slower speed than would be normal for high-speed steel. Available in six sizes 0.6, 0.8, 0.9, 1 and 1.3mm diameter.

Order Code	Type	Price each
FE48C	Tung/carb Drill 0.6	£2.99
FE49D	Tung/carb Drill 0.8	£2.99
FE50E	Tung/carb Drill 0.9	£2.99
FE51F	Tung/carb Drill 1.0	£2.99
FE52G	Tung/carb Drill 1.3	£2.99

Burrs



Two burrs suitable for making shaped holes; and cleaning out holes etc. Both have 2.35mm shanks for use with the Reliant, Titan or Satum drills. Two sizes are available: 1mm dia; 1.4mm dia.

Order Code	Type	Price each
BR65V	Twist Burr 1.0mm	£1.10
BR66W	Twist Burr 1.4mm	£1.10

Tool Sets

Packs of tools with 2.35mm shanks to fit our Reliant, Titan and Mini Mains electric drills. Two are available, one with 20 pieces and one with 37 pieces.

20-Piece



Tools vary, but a typical set comprises four drills, four abrasives, nine burrs of various shapes, one polishing pad, one radial brush and one axial brush.

Order Code	Type	Price each
LH77J	20-Piece Tool Kit	£12.99

37-Piece



Tools vary, but a typical set comprises of drills, abrasives, burrs of various shapes, polishing pads, brushes, axial and radial, mandrels on which fit abrasives, or saws of different sizes, tommy bar and allen key.

Order Code	Type	Price each
LH78K	37-Piece Tool Set	£24.99

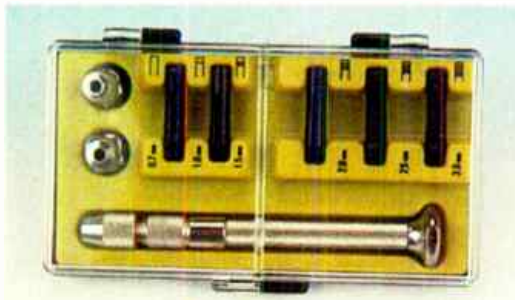
Pin Drill

A 55mm long pin drill with a 3-jaw chuck having a capacity up to 1/8 in.



Order Code	Type	Price each
YW66W	Pin Drill	£6.99

Pin Vice Set



A well made pin vice set comprising 6 pin vices, 0.7mm, 1mm, 1.5mm, 2mm, 2.5mm, 3mm; 3 chucks 11mm square, 11mm hex and 11mm round with knurl. Each vice is marked with grooves to indicate the size and these markings are repeated in the box to assist in identification. The set is supplied in a hinged plastic box with a transparent cover.

Order Code	Type	Price each
YP54J	Pin Vice Set	£9.99

1/4 in. Keyless Chuck

A 3-jaw keyless pin chuck for handling shank diameters up to 1/4 in. The shank of the chuck is hexagonal in cross-section, and 6mm across flats by 22mm long. All steel construction with black and chrome finish. Overall diameter 26mm. Overall length 62mm.



Order Code	Type	Price each
RD80B	1/4in Chuck	£2.99

High Speed Metric Drills



A range of miniature high speed steel straight shank twist drills in metric sizes. Ideal for metal and suitable for pcb's.

Order Code	Type	Price each
QY64U	Metric Drill 0.8mm	80p
QY65V	Metric Drill 1mm	75p
QY90X	Metric Drill 1.2mm	75p
QY66W	Metric Drill 1.4mm	72p
QY91Y	Metric Drill 1.5mm	68p
QY94C	Metric Drill 2mm	60p
QY95D	Metric Drill 2.5mm	60p
FV60Q	Metric Drill 3mm	60p
FV61R	Metric Drill 3.5mm	68p
FV62S	Metric Drill 4mm	72p
FV63T	Metric Drill 5mm	78p
FV64U	Metric Drill 6mm	£1.10

High Speed Twist Drills



A range of good quality high speed twist drills for metal. The following sizes are available:

Order Code	Type	Price each
HQ02C	HS Drill 1/16in	49p
HQ03D	HS Drill 5/64in	49p
HQ04E	HS Drill 3/32in	49p
HQ05F	HS Drill 7/64in	49p
HQ06G	HS Drill 1/8in	49p
HQ07H	HS Drill 9/64in	49p
HQ08J	HS Drill 5/32in	56p
HQ10L	HS Drill 3/16in	60p
HQ12N	HS Drill 7/32in	80p
HQ14Q	HS Drill 1/4in	99p
HQ16S	HS Drill 9/32in	£1.20
HQ18U	HS Drill 5/16in	£1.45
HQ22Y	HS Drill 3/8in	£1.98
HQ26D	HS Drill 7/16in	£2.75
HQ29G	HS Drill 1/2in	£3.60

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Masonry Drills



Tungsten carbide tipped masonry drills with a special flute spiral for fast material removal. $\frac{3}{16}$ and $\frac{1}{4}$ in sizes have straight shanks 85mm long for use with hand or power drills.

Order Code	Type	Price each
FV65V	Masonry Drill 3/16	82p
FV66W	Masonry Drill 1/4	92p

Professional Quality Metric Masonry Drill Set

Black & Decker

A set of 5 superb quality metric masonry drills suitable for use in both rotary and hammer action drills. The precision ground tip is hardened for longer life and is suitable for drilling through brick, concrete and all natural stones. The 5 sizes provided are 4mm, 5mm, 6mm, 8mm and 10mm. All 5 drills are supplied in a plastic hinged storage case.



Order Code	Type	Price each
ZC92A	Metric Masonry Drills	£9.99

Professional Quality HSS Metric Drill Set

Black & Decker

A set of 6 top quality high-speed metric drill bits which offer long-life coupled with fast drilling speeds. They can be used with both hand and power drills, and will penetrate steel, iron, alloys, most other metals, laminates, plastics and wood. Sizes: 2mm, 3mm, 4mm, 5mm, 6mm and 8mm. The drills are supplied in a hinged plastic storage case.



Order Code	Type	Price each
ZC93B	Metric HSS Drills	£9.99

13 piece Imperial HSS Drill Set

High-speed drill bits which are suitable for use with hand or power drills on wood, mild steel, soft non-ferrous metals, plastics, etc. They are supplied in a sturdy metal hinged storage case. The set contains 13 imperial sizes:



$\frac{1}{16}$ in., $\frac{5}{64}$ in., $\frac{3}{32}$ in., $\frac{7}{64}$ in., $\frac{1}{8}$ in., $\frac{9}{64}$ in., $\frac{5}{32}$ in., $\frac{11}{64}$ in., $\frac{3}{16}$ in., $\frac{13}{64}$ in., $\frac{7}{32}$ in., $\frac{15}{64}$ in., $\frac{1}{4}$ in.

Order Code	Type	Price each
FM97F	Imperial HSS Drills	£4.99

19 Piece Metric HSS Drill Set

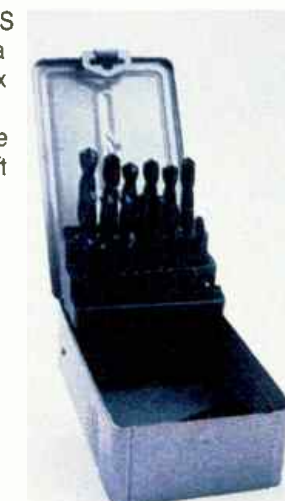
A nineteen piece HSS drill set, complete with a strong hinged metal box for storing drills. These drills are suitable for use on wood, mild steel, soft non-ferrous metals, plastics, etc. The set contains the following metric sizes: 1mm, 1.5mm, 2mm, 2.5mm, 3mm, 3.5mm, 4mm, 4.5mm, 5mm, 5.5mm, 6mm, 6.5mm, 7mm, 7.5mm, 8mm, 8.5mm, 9mm, 9.5mm, 10mm.



Order Code	Type	Price each
YU68Y A1	19pc Met Drill Set	£8.99

29 Piece Imperial HSS Drill Set

A twenty nine piece HSS drill set, complete with a strong hinged metal box for storing drills. These drills are suitable for use on wood, mild steel, soft non-ferrous metals, plastics, etc. The set contains the following imperial sizes:



$\frac{1}{16}$ in., $\frac{5}{64}$ in., $\frac{3}{32}$ in., $\frac{7}{64}$ in., $\frac{1}{8}$ in., $\frac{9}{64}$ in., $\frac{5}{32}$ in., $\frac{11}{64}$ in., $\frac{3}{16}$ in., $\frac{13}{64}$ in., $\frac{7}{32}$ in., $\frac{15}{64}$ in., $\frac{1}{4}$ in., $\frac{17}{64}$ in., $\frac{9}{32}$ in., $\frac{19}{64}$ in., $\frac{5}{16}$ in., $\frac{21}{64}$ in., $\frac{11}{32}$ in., $\frac{23}{64}$ in., $\frac{3}{8}$ in., $\frac{25}{64}$ in., $\frac{13}{32}$ in., $\frac{27}{64}$ in., $\frac{7}{16}$ in., $\frac{29}{64}$ in., $\frac{15}{32}$ in., $\frac{31}{64}$ in., $\frac{1}{2}$ in.

Order Code	Type	Price each
YU25C B3	29pc Imp Drill Set	£17.99

Power Tool Nibbler

A high quality nibbler that fits any power drill for cutting sheet metals and plastics. The nibbler cuts cleanly without distortion in straight or curved lines and will also cut corrugated sections. For most work a drill speed of 2500 to 3000 rpm is used, but for heavy continuous cuts a slower speed is recommended. It is important that plenty of oil is used on the cutting edges and along the job. This is very important when cutting aluminium. The width of cut is 3mm and the maximum gauge is 1.5mm (16swg) for mild steel and 2mm (14swg) for aluminium etc. Replacement punches and dies are available.



Order Code	Type	Price each
BA25C	Nibbler Attachment	£24.99
BA26D	Spare Die	£4.99
BA27E	Spare Punch	£2.75

Single Speed Jigsaw

Black & Decker

- ★ Powerful 350W motor
- ★ Dust extraction facility
- ★ Blade support roller
- ★ Blade guard
- ★ 45° - 0° - 45° tilting sole-plate
- ★ Smooth, balanced action



A general purpose single speed jigsaw, suitable for wood, metal, plastic, plasterboard, tiles, laminates and other materials when fitted with suitable blades. The blade is driven in a vertical plane by a balanced reciprocating mechanism at a rate of 3200 strokes per minute. Cutting capacity is 50mm in wood, 3mm in steel, 8mm in aluminum and 35mm in plastic. This jigsaw features a blade support roller which helps to reduce blade stress when cutting through thick or hard materials. A transparent, retractable full-depth blade-guard is provided for operator safety. By attaching a vacuum cleaner hose to the rear of the jigsaw, dust can be extracted and collected. An adjustable sole-plate allows angles of up to $\pm 45^\circ$ from vertical to be cut.

Order Code	Type	Price each
XP17T D4	BD531 Jigsaw	£37.99

Variable Speed Jigsaw

Black & Decker

The BD538SE is a rugged, high quality jigsaw that is ideally suited for those more intricate tasks, with a powerful 350W motor that enables you to cut plastics, wood, metal, tiles and plasterboard when fitted with suitable blades. The variable electronic speed facility controls the power and sawing rate from 800 to 3200 strokes per minute, so that even difficult materials cut easily. The scrolling facility control on top of the jigsaw, selected by a switch on the side, allows ornamental tasks to be undertaken, whilst the adjustable, tilting sole plate means that you can make cuts

close to vertical surfaces and you can cut chamfers or mitres with angles of up to $\pm 45^\circ$ from the vertical. The cutting capacity of the jigsaw is such that it will cut through materials such as wood, up to 55mm thick, plastic up to 35mm thick, aluminium up to 8mm thick and steel up to 3mm thick, to give but a few examples. Blade stowage, for spare blades, is provided in the base of the jigsaw. On the rear of the jigsaw, provision is made for the attachment of a vacuum hose to remove the sawdust from the job in hand. This maintains a clean working environment and means less clearing up. The high specification of all moving parts ensures a long working life for the jigsaw.



Order Code	Type	Price each
RJ24B	F3 BD538SE Jigsaw	£64.99

Jigsaw Blades

Black & Decker

Blades suitable for use with Black & Decker jigsaws. Two types are available; medium finish in metal and medium finish in wood, supplied in packs of three.



Order Code	Type	Price each
JU87U	Jig Bls Med Metal	£4.99
JU88V	Jig Bls Med Wood	£3.49

Jigsaw Blade Set



A quality 5-piece set of universal shank jigsaw blades suitable for most makes of jigsaw. The set contains a saw-blade for each of the following requirements: cross-cutting timber; cutting plywood; rip-cutting timber; scroll-cutting timber; cutting metal.

Order Code	Type	Price each
RJ03D	Jigsaw Blade set	£2.99

Orbital Sander

Black & Decker



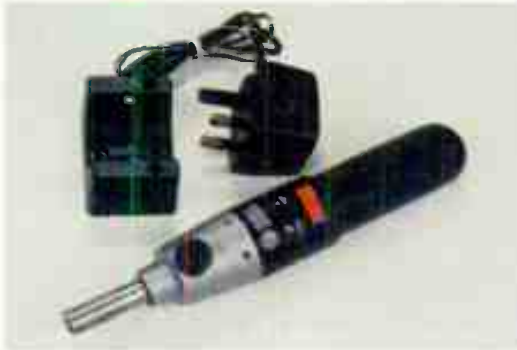
The BD175 orbital sander is a quality product that is ideal for smoothing and achieving that perfect finish prior to painting or varnishing, making light work of a time consuming task. The sander is equipped with a powerful

135W motor driving the base at a high orbital speed of 10,000 orbits per minute, an action that, coupled with a sheet size of $1\frac{1}{4}$ (93 x 230mm), is ideal for large sanding tasks. Dust extraction is provided in the form of a vacuum spout fitted to the rear of the sander, allowing a vacuum hose to be attached. The sander comes with a high specification of all moving parts thus ensuring a longer working life.

Order Code	Type	Price each
RJ25C	E3 Orbital Sander	£37.99

Cordless Power Screwdriver

Black & Decker



- ★ 2.4V battery pack
- ★ Reversing
- ★ Shaft lock
- ★ Wall mounting
- ★ Supplied with charger
- ★ Supplied with double-ended screwdriver bit

A compact, yet powerful, cordless screwdriver with numerous applications where screws need to be inserted or removed. Shaft rotational speed 130 R.P.M. The screwdriver is easy to use; with one switch that selects the direction of rotation by sliding to the left or right and applies power when pressed. With the switch in the centre 'neutral' position power cannot be applied, thus acting as a safety lock against accidental operation. A shaft lock is provided so that screws can still be driven home if for any reason the battery pack runs flat during a job. Supplied with a double-ended screwdriver bit, suitable for philips and slotted screws; and a wall mounting bracket/charging receptacle. Recharge time is 12 hours.

Order Code	Type	Price each
XP15R	A1 Cordless Driver 9018	£20.99

Cordless Power Screwdriver with Clutch

Black & Decker



- ★ 3.6V battery pack
- ★ Reversing
- ★ Adjustable clutch
- ★ Wall mounting
- ★ Supplied with charger
- ★ Supplied with double-ended screwdriver bit

A compact, yet powerful, cordless screwdriver with numerous applications where screws need to be inserted or removed. Shaft rotational speed 180 R.P.M. The screwdriver is easy to use; with one switch that selects the direction of rotation by sliding to the left or right and applies power when pressed. With the switch in the centre 'neutral'

position power cannot be applied, thus acting as a safety lock against accidental operation. An adjustable clutch is provided so that screws can be tightened by the correct amount. Supplied with a double-ended screwdriver bit, suitable for philips and slotted screws; and a wall mounting bracket/charging receptacle. Recharge time is 12 hours.

Order Code	Type	Price each
XP16S	A1 Cordless Driver 9019	£31.99

Powerdriver Kit

Black & Decker



A handy, rechargeable, cordless power screwdriver, that drives in and removes screws quickly and easily at the press of a button. The rotational speed is 130 rpm in forward and reverse. A locking feature enables the powerdriver to be used as a standard screwdriver. The powerdriver comes with three double function bits, three 'pozidrive' bits (no. 1, 2, 3), three 'philips' bits (no. 1, 2, 3), three slotted (4, 6, 7.2mm), a magnetic bit holder to keep the bits tidy and a kit box. The kit includes a wall-mounting bracket and a charger which takes 12 hours to fully charge the powerdriver.

Order Code	Type	Price each
BU28F	B2 Powerdriver Kit	£31.99

Power Screwdriver Kit

Black & Decker



A compact, powerful rechargeable cordless screwdriver that drives and removes screws quickly and easily at the press of a button. The shaft rotational speed is 180 r.p.m. in forward and reverse - the direction being selected by a single switch - with a six position torque control for a wide variety of screwdriving tasks, from the most delicate screws to the more stubborn. For the exceptionally tough screws the neutral position of the direction switch includes an auto locking feature that enables the screwdriver to be used conventionally, like a standard tool. The screwdriver kit comes complete with three double function bits, three pozidriv bits, three philips bits, three flat bladed bits, a magnetic bit holder, wall mounted battery charger and a tough moulded plastic kit box. The battery charging time is 12 hours.

Order Code	Type	Price each
RJ28F	B2 9019 Powerdriver Kit	£42.99

Screwdriver Bits for Cordless Screwdrivers and Variable Speed Drills

Black & Decker

A set of 10 screwdriver bits, housed in a dial-a-bit storage drum. These bits are suitable for use with Black & Decker cordless screwdrivers and variable speed drills. The set consists for 4 slotted bits, 3 pozidrive, 2 philips bits and 1 magnetic bit holder.



Order Code	Type	Price each
JU86T	10pc Screw Bit Set	£9.99

Socket Set

Black & Decker

A seven piece socket set for use with Black and Decker cordless screwdrivers and variable speed reversing drills. The set consists of six sockets 6, 7, 8, 10, 11, 13mm and an adaptor.



Order Code	Type	Price each
RJ31J	7pc Socket Set	£6.99

SOLDERING TOOLS AND ACCESSORIES

Soldering Station PSU24

Antex



An attractively styled soldering station, powered from 240V AC mains and provides a 24V AC output to power 24V CS and 24V XS irons (see below). This unit provides isolation between the mains supply and soldering iron output, thus providing low voltage safety and very low leakage currents. The unit incorporates a mains on/off switch and a mains fuse. Note: soldering irons must be purchased separately. Included with the unit is a detachable sponge tray and a coil spring iron holder.

Specifications	
Maximum power output:	50W
Input voltage:	240V AC mains
Output voltage:	24V AC
Weight:	0.8kg
Mains cable length:	1.8m
Dimensions:	200 x 110 x 70mm

Order Code	Type	Price each
XM79L C3	Solder Station PSU24	£47.99

Replacement 17W/24V CS Element

A replacement heating element for the 17 watt 24V CS iron.

Order Code	Type	Price each
JR42V	24V 17W CS Element	£5.29

25W 24V XS Iron for PSU24



A 25W precision miniature soldering iron intended for use with the above soldering station PSU24. The double shaft element ensures minimal leakage current whilst retaining good mechanical strength. This iron is designed for use with modern miniature components. Supplied with Bit No. 51. Note: this iron must not under any circumstances be directly connected to 240V AC mains. Fitted with 1.8m of cable. The iron requires a plug for connection to XM79L. Please order JU67X (see Connectors section) if required.

Specification	
Operating voltage:	24V
Power consumption:	25W
Breakdown voltage:	>2,500V
Leakage current:	<1µA
Max. bit temperature:	420°C
Length:	193mm
Weight:	42g

Order Code	Type	Price each
YZ16S	24V 25W XS Iron	£10.49

SAFETY GOGGLES

BS Lens



Safety goggles for use when working with power tools, machinery or in situations where flying debris is a hazard. These safety goggles are manufactured from impact resistant polycarbonate to BS2092/1. The goggles have a comfortable, ventilated soft plastic surround and adjustable elastic head-band. Suitable for protection when drilling, filing, sanding, planing, chipping, spraying, grinding and other hazardous jobs.

Order Code	Type	Price each
YZ68Y	BS Safety Goggles	£4.99

17W 24V CS Iron for PSU24

Antex



A 17W precision miniature soldering iron intended for use with the above soldering station PSU24. The double shaft element ensures minimal leakage current whilst retaining good mechanical strength. This iron is designed for use with modern miniature components. Supplied with Bit No. 1100. Note: this iron must not under any circumstances be directly connected to 240V AC mains. Fitted with 1.8m of cable. The iron requires a plug for connection to XM79L. Please order JU67X (see Connectors section) if required. This iron is also available with a 'bum proof' silicon rubber cable.

Specification	
Operating voltage:	24V
Power consumption:	17W
Breakdown voltage:	>2,500V
Leakage current:	<2µA
Max bit temperature:	390°C
Length:	183mm
Weight:	26g

Order Code	Type	Price each
YZ15R	24V 17W CS Iron	£10.99
BA22Y	17W Iron Silicon Lead	£13.49

Replacement 25W/24V XS Element

A replacement heating element for the 25 watt 24V XS iron.

Order Code	Type	Price each
JR43W	24V 25W XS Element	£5.59

24V Soldering Station U500

Antex



A rugged and neatly styled industrial soldering station featuring polycarbonate case construction for use with the following irons: Antex A545 in-handle adjustable temperature controlled soldering iron, Antex 24V A718, 24V CS or 24V XS fixed temperature soldering irons, Weller 24V TCP irons or any 24V soldering irons up to 50W. The unit is 240V AC 50Hz mains powered and provides a 24V AC output. The unit provides isolation between the mains supply and soldering iron output, thus providing low voltage safety and low leakage



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currents. The unit incorporates a mains on/off switch and a mains fuse. Included with the unit is a detachable sponge tray and coil spring iron holder. The iron holder bezel will accept irons fitted with fume extraction tubes. Note: soldering irons must be purchased separately.

Specification		
Maximum power output:	50W	
Input voltage:	240V AC 50Hz mains	
Output voltage:	24V AC	
Weight:	1.5Kg	
Mains cable length:	1.5m	
Dimensions:	200 x 110 x 70mm	
Order		
Code	Type	Price each
XP08J	B3 Solder Station U500	£48.99

45 Watt 24V Iron A545 & A545F

Antex



An industrial 45 Watt A245 soldering iron with in-handle temperature adjustment for use with Antex U500, Weller PS and other 24V solder stations. Temperature is adjustable over the range 200°C to 450°C. The iron features a polycarbonate body which gives good balance and tip visibility. The element is a long life ceramic thick film unit which incorporates the temperature sensor. The iron is fitted with 1.5m of silicone rubber cable terminated in a 3-pin P631 connector. Two versions are available; with and without fume extraction tube, fume extraction version is indicated by 'F' suffix. Both versions are supplied with a 1106 chrome bit. These irons must not under any circumstances be connected to 240V AC mains.

Specification		
Max power:	45W	
Voltage:	24V	
Leakage current:	5µA max.	
Temperature range:	200°C to 450°C	
Length:	221mm	
Weight		
without fume extraction:	50g	
with fume extraction:	70g	
Standard bit:	1106 chrome	

Order		
Code	Type	Price each
YZ70M	45W Ind T/Iron A545	£43.49
YZ71N	45W Ind T/Iron A545F	£50.99

Replacement Element for Iron A545

A replacement 45W element for the A545 soldering iron.

Order		
Code	Type	Price each
YZ77J	A545 Element	£17.49

18 Watt 24V Iron A718 & A718F



An industrial fixed temperature 18 Watt A718 soldering iron for use with Antex U500, Weller PS and other 24V soldering stations. The iron features a polycarbonate body which gives good balance and tip visibility. The element is a wire wound unit. The iron is fitted with 1.5m of silicone rubber cable terminated in a 3-pin P631

connector. Two versions are available; with and without fume extraction tube, fume extraction version is indicated by 'F' suffix. Both versions are supplied with a 1106 chrome bit. These irons must not under any circumstances be connected to 240V AC mains.

Specification		
Max power:	18W	
Voltage:	24V	
Leakage current:	1.5µA max.	
Temperature:	390°C	
Length:	221mm	
Weight		
without fume extraction:	44g	
with fume extraction:	64g	
Standard bit:	1106 chrome	

Order		
Code	Type	Price each
YZ72P	18W 24V Iron A718	£18.39
YZ73Q	18W 24V Iron A718F	£28.35

Replacement Element for 24V Iron A718

A replacement 24V 18W element for the A718 soldering iron.

Order		
Code	Type	Price each
YZ79L	24V A718 Element	£6.59

MAINS SOLDERING IRONS

Beginners Soldering Iron



A robust mains-powered 25W general-purpose soldering iron. The handle is yellow and ribbed for extra grip, and a removable clip is supplied to enable the iron to be safely hung up whilst not being used. If the iron is remaining idle while still hot then the iron MUST be placed in a stand, or hung by its clip, for safety reasons. The bit has a 5mm chisel tip and is held in place by one of the grub screws on the barrel. A replacement bit is available separately. The element cannot be changed.

Order		
Code	Type	Price each
ZF32K	Econ Solder Iron	£3.99
KW70M	Econ Bit	99p

12W Miniature Soldering Iron Type M

Antex



A 12W miniature 240V AC soldering iron which has a heating element contained in a stainless steel shaft, such that the heat is transferred to the bit with maximum efficiency. The soldering bit (No. 10 fitted)

can be easily removed from the shaft for replacement. Ideal for SMD rework and other applications where not too much heat is required. Fitted with 1.8m of mains cable.

Specification		
Power consumption:	12W	
Breakdown voltage:	1250V	
Leakage current:	<5µA	
Max. bit temperature:	370°C	
Length:	147mm	
Weight:	21g	

Order		
Code	Type	Price each
YU90X	Iron M	£10.19

Type M Replacement Element

A 240V mains replacement element for the M model iron.

Order		
Code	Type	Price each
JR55K	M Element 240V/12W	£5.39

15W Miniature Soldering Iron Type C



A 15W miniature 240V AC soldering iron which has a heating element contained in a stainless steel shaft, such that the heat is transferred to the bit with maximum efficiency. The soldering bit (No. 820 fitted) can be easily removed from the stainless steel shaft for replacement. Ideal for light duty and PCB soldering jobs where not too much heat is required. Fitted with 1.4 metres of mains cable.

Specification		
Power consumption:	15W	
Breakdown voltage:	1250V	
Current leakage:	<5µA	
Max. bit temperature:	370°C	
Length:	147mm	
Weight:	21g	

Order		
Code	Type	Price each
FJ44X	Iron Type C	£10.49

Type C & CN Replacement Element

A 240V replacement element for irons type C and CN.

Order		
Code	Type	Price each
FR01B	Element Type CN	£4.99

Type CN Replacement Handle

A replacement handle for the iron type CN240.

Order		
Code	Type	Price each
FR02C	Handle Type CN	£1.39

Type CX Replacement Element

A replacement 240V AC mains element is still available for the CX model iron.

Order		
Code	Type	Price each
FY63T	Element CX	£5.99

17W Miniature Soldering Iron Type CS



A 17W precision miniature soldering iron featuring a double shaft. An inner shaft of ceramic provides a very low leakage current of <math><2\mu\text{A}</math>, and has an outer stainless steel sleeve for strength. It is intended for use with modern miniature components. The iron comes fitted with a Bit No. 1100, but many alternative bits are available. 240V AC mains operated. Fitted with 1.8m of mains lead.

Specification

Power consumption:	17W
Breakdown voltage:	>2,500V
Leakage current:	<math><2\mu\text{A}</math>
Max bit temperature:	390°C
Length:	183mm
Weight:	26g

Order Code	Type	Price each
FY62S	Iron CS	£10.99

Type CS Replacement Element

A 240V AC mains replacement element for the CS model iron.

Order Code	Type	Price each
FY95D	Element CS 240V	£4.99

Soldering Iron Kit SK5

Antex



An attractive presentation kit that makes the perfect present for the beginner. A superb CS soldering iron and a Stand ST4 neatly packaged with full instructions on how to use the iron as well as some general hints on soldering.

Order Code	Type	Price each
FY68Y	CS Kit SK5	£14.29

25 Watt Soldering Iron Type XS



A strongly recommended 25W 240V mains soldering iron ideal for soldering transistors and integrated circuits since the leakage current is <math><1\mu\text{A}</math>. It has a shatterproof handle and detachable hook. The iron is designed to use the same bits as the X25 model which it replaces. The iron comes fitted with a Bit No. 51. 240V AC mains operated, with 1.8 metres of mains lead attached.

Specification:

Power consumption:	25 watts
Breakdown voltage:	>2,500V
Leakage current:	<math><1\mu\text{A}</math>
Max bit temperature:	420°C
Length:	193mm
Weight:	42g

Order Code	Type	Price each
FR12N	Iron XS	£10.19

Type XS Replacement Element

A replacement 240V AC mains element for the XS model iron.

Order Code	Type	Price each
FY96E	Element XS 240V	£5.09

Soldering Iron Kit SK6



An attractive presentation kit that makes the perfect present for the beginner. A superb XS soldering iron and a Stand ST4 neatly packaged with full instructions on how to use the iron as well as some general hints on soldering.

Order Code	Type	Price each
FY69A	XS Kit SK6	£13.79

Low Voltage Soldering Iron MLXS



A low voltage 25 watt soldering iron designed to work from a 12V car battery. The iron has the same specifications as the XS mains iron, and replaces the MLX12 model iron. The bits are interchangeable with the XS iron. The MLXS is supplied with an $\frac{1}{8}$ in bit (bit no. 51), two large crocodile clips for connection to battery terminals, and 4.5 metres of 2-core lead, (all ready fitted). A tough plastic wallet is provided to house the iron when not in use.

Order Code	Type	Price each
FR13P	12V Iron MLXS	£14.79

Type MLXS Replacement Element

A replacement 12V element for the MLXS model 12V iron.

Order Code	Type	Price each
FY97F	Element MLXS 12V	£5.59

Replacement Hook for XS and MLXS Irons

A replacement hook/finger guard to fit the XS and MLXS type irons.

Order Code	Type	Price each
FT09K	Finger Hook XS/MLXS	39p

Soldering Iron Stand



A stand designed for use with our smaller Antex soldering irons. Manufactured from a high grade insulation material with a chromium plated strong steel spring. The sponge serves (when damped) to keep the soldering bits clean. Spare bits can be accommodated on the stand.

Order Code	Type	Price each
FR20W	Stand ST4	£4.09

Stand ST5



A very high quality heavy-duty bench stand for our range of soldering irons and particularly suitable for our 50W soldering iron which will not fit in Stand ST4. It is made from a high grade insulating material with a chromium-plated steel spring. It has a metal base to keep the stand completely stable. A sponge is supplied which, when damped, is used to keep the bit clean. This stand is also suitable for our other soldering irons, holder bezels being provided that will accommodate CS, XS, C, G and M irons.

Order Code	Type	Price each
ZF26D	Stand ST5	£8.99

Replacement Sponge for Stand ST4

A spare sponge is available as a replacement for use with the stand ST4, and is also used with the temperature controlled soldering iron system TCSU-1.

Order Code	Type	Price each
RK33L	Sponge ST4	60p

Replacement Sponge for Stand ST3

Spare sponges for the discontinued Stand ST3 are still available.

Order Code	Type	Price each
FR11M	Sponge ST3	42p

18 Watt 240V Iron A718 & A718F

Antex



An industrial fixed temperature 18 Watt A718 soldering iron powered by 240V 50Hz AC mains. The iron features a polycarbonate body which gives good balance and tip visibility. The element is a wire wound unit. The iron is fitted with 1.5m of 3-core PVC cable (Mains plug not supplied). Two versions are available; with and without fume extraction tube, fume extraction version is indicated by 'F' suffix. Both versions are supplied with a 1106 chrome bit.

Max power:	18W
Voltage:	240V
Leakage current:	1.5µA max.
Temperature:	390°C
Length:	221mm
Weight	
without fume extraction:	44g
with fume extraction:	64g
Standard bit:	1106 chrome

Order Code	Type	Price each
YZ74R	18W 240V Iron A718	£16.29
YZ75S	18W 240V Iron A718F	£25.49

Replacement Element for 240V Iron A718

A replacement 240V 18W element for the A718 soldering iron.

Order Code	Type	Price each
YZ78K	240V A718 Element	£5.89

Fax your orders to:
01702 553935

TEMPERATURE CONTROLLED IRONS

50W Temperature Controlled Iron Type TCS240



A 50W 240V AC mains operated Temperature Controlled Soldering Iron with the temperature controller built into the handle of the iron. A Thermocouple near the tip of the heating element provides feedback for temperature control within the range 200 to 450°C, with an accuracy of ±1%. The temperature may be selected by using a screwdriver inserted into an adjuster in the body of the iron. The iron comes fitted with a Bit No 1100, but many alternative bits are available. Fitted with 1.2 metres of mains lead. Bits for the CS iron will fit this iron.

Specification	
Power consumption:	50W
Voltage to Element:	240V AC
Warm up time:	60 seconds to 450°C

Control:	Analogue Proportional
Temperature range:	200 - 450°C
Control accuracy:	±1% typical
Length:	222mm
Weight:	50gm

Order Code	Type	Price each
XJ45Y	50W Iron	£37.69

Replacement TCS Element

Replacement heating element – 50 watt TCS iron.

Order Code	Type	Price each
JR39N	TCS Element	£16.29

Soldering Iron Kit TCS

Antex



A quality soldering kit that is ideal for the serious hobbyist and offering excellent value for money. The kit includes a temperature controlled TCS240 soldering iron complete with a moulded mains plug fitted with a 3A fuse, a ST5 heavy duty stand with TCS bezel, a desolder pump and 2m of fluxed solder wire.

Order Code	Type	Price each
BA14Q	A1 TCS Solder Kit	£40.79

Solder Station TCSU-1



A very robust soldering unit with a choice of 30W (CSTC) or 40W (XSTC) temperature controlled irons. Temperature range is controllable from 70°C to 435°C with an accuracy of 2%, using a slider control. Electronically controlled zero voltage switching of the heating element is employed to avoid radiated fields and transient pulses, and a thermocouple near the tip of the iron provides for feedback control. The iron, which must be ordered separately, plugs into the controller's 24V output via a 5-pin DIN plug and socket and 1.2m of silicone covered 5-core cable, completely isolating the user from the mains voltage. The TCSU-1 has the additional provision of a separate earthing jack, into which a cable can be plugged terminating in a crocodile clip, which when attached to the work nullifies any static charge problems developing between the iron and the work. Provided with a separate sponge tray. The control unit is fitted with 1.8 metres of mains lead.

Specification	
Power consumption:	60 watts max
Voltage output:	24 to 26V AC
Dimensions:	145 x 104 x 142mm
Weight:	1.6kg (3½lbs)

Order Code	Type	Price each
XG55K	C4 Solder Station TCSU1	£89.99

30W Iron CSTC for TCSU-1



A 30 watt iron for use with the TCSU-1 controller. The iron is fitted with 1.2 metres of 5-core cable and is supplied with three bits.

Specification	
Max power:	30 watts
Current leakage:	Negligible
Length:	183mm
Standard bit:	102
Weight:	23gm

Order Code	Type	Price each
FT13P	30 Watt Iron CSTC	£26.49

Replacement CSTC Element

Replacement heating element – 30 watt CSTC iron.

Order Code	Type	Price each
FT26D	CSTC Element	£16.29

40 Watt Iron XSTC for TCSU-1

A 40 watt XSTC iron for use with the TCSU-1 controller. The iron is fitted with 1.2 metres of 5-core cable terminated in a 5-pin DIN plug, and is supplied with three bits.



Specification	
Max power:	40 watts
Current leakage:	Negligible
Length:	183mm
Standard bit:	1100
Weight:	27gm

Order Code	Type	Price each
FT28F	40 Watt Iron XSTC	£25.99

Replacement XSTC Element

Replacement heating element – 40 watt XSTC iron.

Order Code	Type	Price each
FT27E	XSTC Element	£16.29

TCSU-1 Sponge Tray

A spare sponge tray for the TCSU-1 which takes the same size sponges as does the stand ST4 above.

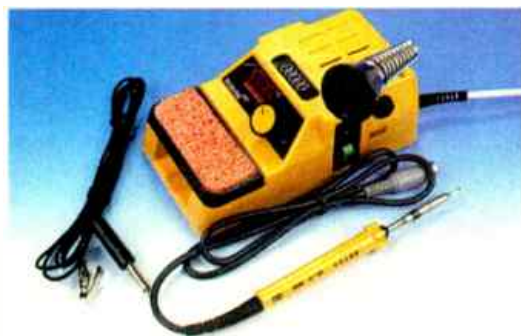
Order Code	Type	Price each
FT10L	Sponge Tray TCSU-1	£2.19

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Solder Station TCSU-D2

Antex



An elegantly designed, moderately priced, 240V AC temperature controlled soldering unit giving an accurate and continuous display of soldering tip temperature. The unit is built around a unique ULA; custom-built by Ferranti. Temperature range is adjustable by means of setting the temperature required in degrees centigrade on the display. The control unit is then allowed to 'run' whereupon it will maintain the soldering tip at that temperature. The range is from ambient to 450°C, with an accuracy of ±5°C, handled by a 50W soldering iron type XSD. Other features include zero crossing switching control and a detachable sponge tray. The iron is fitted with 1.2 metres of 5-core cable which plugs into the control unit's 5-pin DIN socket.

Specification

Control unit:
 Power consumption: 60 watts
 Output voltage: 24 to 26V AC
 Dimensions: 200 x 110 x 70mm
 Weight: 1kg
 Iron:
 Power: 50 watts max
 Current leakage: Negligible
 Standard bit fitted: 1100
 Length: 183mm
 Weight: 27gm

Order Code	Type	Price each
XG57M B3	Soldr Station TCSUD2	£132.99

Replacement Iron for TCSU-D2



A replacement 50 watt iron type XSD for use with the TCSU-D2 controller. The iron is fitted with a bit No. 1100, plus 1.2 metres of 5-core cable terminated in a 5-pin DIN plug.

Order Code	Type	Price each
FT12N	50 Watt Iron XSD	£28.59

Replacement Element for Iron XSD

A replacement 50 watt heating element for the XSD iron used with the TCSU-D2 controller.

Order Code	Type	Price each
FT29G	XSD Element	£15.79

TCSU-D2 Sponge Tray

A spare sponge tray for the TCSU-D2 controller unit.

Order Code	Type	Price each
FT11M	Sponge Tray TCSUD2	£1.59

TCSU-D2 Sponge

A replacement sponge for the TCSU-D2 sponge tray.

Order Code	Type	Price each
FT08J	Sponge TCSUD2	69p

Temperature Controlled Solder Station U100



A rugged and neatly styled industrial soldering station featuring polycarbonate case construction for use with the Antex A245 soldering iron. The unit is 240V AC 50Hz mains powered and provides a 24V output. The temperature of the iron is selected by means of a rotary potentiometer, temperature is controlled over the range 50°C to 450°C using state of the art electronics linked to a precision sensor housed in the iron. An LED indicator lights when power is being delivered to the iron. The proportional temperature control system only switches during the zero-crossing point of the mains cycle, therefore reducing EMI and allowing the unit to be used with sensitive components. The unit provides isolation between the mains supply and soldering iron output, thus providing low voltage safety and low leakage currents. The unit incorporates a mains on/off switch and a mains fuse. Included with the unit is a detachable sponge tray and coil spring iron holder. The iron holder bezel will accept irons fitted with fume extraction tubes. Note: soldering iron must be purchased separately.

Specification

Maximum power output: 50W
 Input voltage: 240V AC 50Hz mains
 Output voltage: 24V
 Temperature range: 50°C to 450°C
 Accuracy: ±5°C
 Weight: 1.5Kg
 Mains cable length: 1.5m
 Dimensions: 200 x 110 x 70mm

Order Code	Type	Price each
XP06G B3	Solder Station U100	£86.99

Temperature Controlled Solder Station with Digital Temperature Readout U200

Antex



A rugged and neatly styled industrial soldering station featuring polycarbonate case construction for use with the Antex A245 soldering iron. The unit is 240V AC 50Hz mains powered and provides a 24V output. The temperature of the iron is selected by means of a rotary potentiometer and a set/run switch, the actual temperature of the bit is displayed on a 3-digit digital LED display with a 1°C resolution. Temperature is controlled over the range 50°C to 450°C using state of the art electronics linked to a precision sensor housed in the iron. The proportional temperature control system only switches during the zero-crossing point of the mains cycle, therefore reducing EMI and allowing the unit to be used with sensitive components. The unit provides isolation between the mains supply and soldering iron output, thus providing low voltage safety and low leakage currents. The unit incorporates a mains on/off switch and a mains fuse. Included with the unit is a detachable sponge tray and coil spring iron holder. The iron holder bezel will accept irons fitted with fume extraction tubes. Note: soldering iron must be purchased separately.

Specification

Maximum power output: 50W
 Input voltage: 240V AC 50Hz mains
 Output voltage: 24V
 Temperature range: 50°C to 450°C
 Accuracy: ±5°C
 Weight: 1.5Kg
 Mains cable length: 1.5m
 Dimensions: 200 x 110 x 70mm

Order Code	Type	Price each
XP07H B3	Solder Station U200	£122.99

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45 Watt Iron A245 & A245F

An industrial 45 Watt A245 soldering iron for use with Antex U100, U200; Weller EC2100/2000; WECP and EC2002 solder stations. The iron features a polycarbonate body which gives good balance and tip visibility. The element is a long life ceramic thick film unit which incorporates the temperature sensor. The iron is fitted with 1.2m of silicone rubber cable terminated in a locking 5-pin bayonet DIN plug. Two versions are available; with and without fume extraction tube, fume extraction version is indicated by 'F' suffix. Both versions are supplied with a 1106 chrome bit.



Specification

Max power:	45W
Voltage:	24V
Leakage current:	1.5µA max.
Temperature range:	50°C to 450°C
Length:	221mm
Weight	
without fume extraction:	47g
with fume extraction:	67g
Standard bit:	1106 chrome

Order Code	Type	Price each
YZ80B	45W Ind Iron A245	£37.49
YZ81C	45W Ind Iron A245F	£47.99

Replacement Element for Iron A245

A replacement 45W element for the A245 soldering iron.

Order Code	Type	Price each
YZ76H	A245 Element	£17.49

Fume Extraction Kit

Antex



A fume extraction upgrade kit suitable for the Antex series 'A' industrial soldering irons with sufficient parts to upgrade 10 irons. The kit includes: 10 stainless steel tubes, 20m silicone rubber tubing, 5 cleaning brushes and 50 ties (to tie tubing to cable). A single iron kit is also available, order code DK73Q.

Order Code	Type	Price each
KR26D	81 Fume Extraction Kit	£79.99
DK73Q	Single Fume Ext Kit	£8.75

Fax your orders to:
01702 553935

Replacement Bits

A range of replacement bits for the indicated soldering irons. These bits are all iron clad to give long life and they must therefore not be filed or they will quickly disintegrate. They should only be cleaned by wiping with a damp sponge when they are hot. The following types are available:

Type No.	Tip Size	For Iron	
102	2.3mm	C, CSTC, M	
103	4mm	C, CSTC, M	
104	4.7mm	C, CSTC, M	
106	1mm	C, CSTC, M	
820	2.3mm	C, M	
821	3mm	C, M	
822	4.7mm	C, M	
202	2.3mm*	C, CSTC, M	
302	2.3mm	C, CSTC, M	
10	0.5mm	C, CSTC, M	
1100	2.3mm	CS, CX, TCS, XSD, XSTC, A	
1101	3mm	CS, CX, TCS, XSD, XSTC, A	
1102	4.7mm	CS, CX, TCS, XSD, XSTC, A	
1103	6mm	CS, CX, TCS, XSD, XSTC, A	
1105	0.5mm	CS, CX, TCS, XSD, XSTC, A	
1106	1mm	CS, CX, TCS, XSD, XSTC, A	
1108	3mm	CS, CX, TCS, XSD, XSTC, A	
1109	5mm	CS, CX, TCS, XSD, XSTC, A	
50	2.3mm	MLXS, XS, X25	
51	3mm	MLXS, XS, X25	
52	4.7mm	MLXS, XS, X25	
53	2.3mm*	MLXS, XS, X25	
54	3mm*	MLXS, XS, X25	
55	0.5mm	MLXS, XS, X25	
14A	19mm†	MLXS, XS, X25	

* Chiselled tip. † Desolder head.

Order Code	Type	Price each
FR03D	Bit 102	£1.85
FT00A	Bit 103	£1.85
FR04E	Bit 104	£1.85
FR05F	Bit 106	£1.99
FR06G	Bit 820	£1.85
FR07H	Bit 821	£1.85
FR08J	Bit 822	£1.85
FT01B	Bit 202	£1.85
FT02C	Bit 302	£1.99
FT03D	Bit 10	£1.85
FY64U	Bit 1100	£1.85
FY65V	Bit 1101	£1.85
FY66W	Bit 1102	£1.85
FY67X	Bit 1103	£1.85
JP15R	Bit 1105	£1.85
FR30H	Bit 1106	£1.85
JU68Y	Bit 1108	£1.85
JU69A	Bit 1109	£1.85
FR16S	Bit 50	£1.85
FR17T	Bit 51	£1.85
FR18U	Bit 52	£1.85
FT04E	Bit 53	£1.99
FT05F	Bit 54	£1.99
JP14Q	Bit 55	£1.85
FT06G	Bit 14A	£6.75

Surface Mount Technology Desoldering Bit Set



A range of special SMT desoldering bits designed for use with A series irons but can also be used with CS, TCS, XSTC and XSD series irons. The set comprises of 12 bits with profiles engineered to fit the majority of SMT components. Desoldering of SMT components requires sufficient localised heat to melt the solder, whilst not overheating adjacent components and tracks. It is strongly advised that a temperature controlled iron is used so that the lowest possible temperature consistent with efficient desoldering is used, thus minimising the possibility of damage to components or PCB. A spade bit is included which can be dressed (filed) to suit any component that is not catered for in the standard range. By using either of the miniature 0.1mm or 0.5mm bits, SMT components can be resoldered after a replacement device has been positioned. The 12 bits are stored in a neat tray, which is supplied with the set.

Order Code	Type	Price each
YZ82D	SMT Desolder Set	£43.99

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PORTABLE AND GAS POWERED SOLDERING TOOLS

Portable Battery Powered Soldering Iron

Ewan James



A novel soldering iron which is powered by either 4 alkaline C cells or two Ni-Cd C cells. The combined low voltage element/bit retracts when not in use which serves both as a safety feature and also protects the element/bit from damage. A conveniently placed push-to-heat button operates the iron, working temperature is reached in approximately 10 seconds. A charging socket is provided so that Ni-Cd cells may be charged in situ from an AC or DC adaptor (suitable type XX09K). Charging time is 12 to 16 hours. Important: Under no circumstances must any attempt be made to recharge non-rechargeable cells. Supplied with one element/bit and solder. Batteries not included. Spare element/bits are available separately.

Order Code	Type	Price each
YZ42V	Portable Iron	£4.99
JU28F	Spare Tip	£2.25

Replacement Parts for Rechargeable Iron

Replacement bits and spare sponges are available for use with rechargeable iron WY05F we sold up to mid-1992.

Order Code	Type	Price each
FP32K	Bit for Rechgbl Iron	£3.75
FP33L	Sponge fr Chgbl Iron	99p

Gas Soldering Iron Flame Master



An extremely useful soldering iron and gas torch for engineers and hobbyists alike, this gas torch is butane gas (lighter fuel) powered and is therefore extremely portable. Ideal for field service engineers where power points may not always be close to hand. The soldering head contains a platinum catalyst which heats the bit without a flame! (Gas will burn when first ignited, but flame will extinguish when catalyst is up to temperature). The torch head may be used for engineering, jewellery and model making work. The flame is adjustable and reaches a temperature of 1300°C (2370°F). Refilling is achieved using standard gas lighter fuel available from newsagents and tobacconists.

Overall dimensions: 230mm x 19mm dia (soldering head fitted).

Note: gas torch is supplied unfilled. Spare soldering iron bits and catalytic converters are available, see below.

WARNING: extreme care must be exercised when using this gas torch due to the very high temperature of the gas flame.

Order Code	Type	Price each
YT72P	Gas Soldering Iron	£12.99



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Gas Torch Combination Kit Flame Master



A combination kit which incorporates a gas torch and includes the following accessories: pencil flame head, hot blower head, flat flame head, soldering head, four bits, hot knife, soldering iron sponge, reel of solder and storage box. This kit is ideal for engineers and hobbyists alike. The gas torch is butane gas (lighter fuel) powered and is therefore extremely portable. Ideal for field service engineers where power points may not always be close to hand. The soldering head contains a platinum catalyst which heats the bit without

a flame! (gas will burn when first ignited, but flame will extinguish when catalyst is up to temperature). The torch head may be used for engineering, jewellery and model making work. The flame is adjustable and reaches a temperature of 1300°C (2370°F).

Note: gas torch is supplied unfilled. Refilling is achieved using standard gas lighter fuel available from newsagents and tobacconists.

Overall dimensions of gas torch (accessories not fitted): 168mm x 19mm dia. Accessories and spare soldering iron bits are available, see below.

WARNING: extreme care must be exercised when using this gas torch due to the very high temperature of the gas flame.

Order Code	Type	Price each
YT73Q	A1 Gas Torch Kit	£24.99

Glue Gun Attachment



A hot glue attachment (complete with sticks) and replacement glue sticks supplied in packs of 18 which fit YT72P/YT73Q.

Order Code	Type	Price each
JU33L	Glue Gun + Glue Stks	£5.99
JU34M	18 Glue Sticks	£1.39

Replacement Parts for Gas Soldering Iron and Combination Gas Torch Kit



Soldering iron bit, pointed tip.
Soldering iron bit, chisel tip 3.5mm.
Soldering iron bit, chisel tip 7mm.
Soldering iron bit, diagonal tip 2.5mm.
Soldering iron bit, diagonal tip 3.5mm.
Catalytic soldering head.
Catalytic hot blower head.

Order Code	Type	Price each
JP05F	Bit Point Tip	£1.29
JP06G	Bit Chisel Tip 3.5	£1.29
JP07H	Bit Chisel Tip 7	£1.29
JP08J	Bit Diagonal Tip 2.5	£1.29
JP09K	Bit Diagonal Tip 3.5	£1.29
JP10L	Catalytic Sold Head	£4.99
JP11M	Catalytic Blow Head	£4.49

Gas Soldering Iron Antex



A compact, pocket sized, butane gas (lighter fuel) soldering iron for use in those areas of soldering where mains power is unavailable or trailing leads are a hindrance. The strong nylon casing will hold sufficient liquid butane for one hours' continuous use. An adjustable fuel regulator controls the tip temperature up to a maximum of 400°C. The iron is supplied with a 1mm soldering tip fitted as standard and a protective cap, which has an integral flint lighter and a pocket clip. Supplied with instructions. A range of spare tips are available separately.

Specifications

Max. tip temperature:	400°C
Max. torch temperature:	1300°C
Max. operating time:	1 hour
Flint life:	900 cycles
Length:	188mm
Weight:	52g

Order Code	Type	Price each
RD51F	Compact Gas Iron	£19.99

Gas Soldering Iron Kit Antex



A compact, handy, pocket sized kit, containing our butane gas (lighter fuel) soldering iron (RD51F) with the 1mm tip, a tube of 1mm diameter 60/40 resin cored solder, a cleaning pad, a hot flame tip, a hot knife tip, a hot air tip, and spring clip that fits into two holes as an iron rest when the iron is being used. The kit is supplied in a plastic case 205 x 103 x 38mm in size and includes instructions. A range of spare tips are available separately.

Order Code	Type	Price each
AJ97F	Gas Iron Kit	£32.99



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Gas Soldering Iron Tips

Antex



A range of tips to suit the gas soldering iron RD51F and the kit AJ97F. The range includes 4 solder tips, a hot knife tip, a gas flame tip, a hot air tip and heat shield.

Manufacturer's Part No.	Description	Stock Code
XGS S120	Pointed Tip	RD52G
XGS S220	Fine Chisel Tip	RD53H
XGS S320	Med. Chisel Tip	RD54J
XGS S420	Broad Chisel Tip	RD55K
XGS S520	Knife Tip	RD56L
XGS S620	Flame Tip	RD57M
XGS S720	Hotair Tip	RD58N
XGS S820	Shield	RD59P

Order Code	Type	Price each
RD52G	Pointd Tip	£5.49
RD53H	Fin Ch Tip	£5.49
RD54J	Med Ch Tip	£5.49
RD55K	Brd Ch Tip	£5.49
RD56L	Knife Tip	£5.49
RD57M	Flame Tip	£5.49
RD58N	Hotair Tip	£5.49
RD59P	Shield	£6.49

Soldering Aid Set



A set of three useful soldering aids ideal for printed circuit board work. Each tool has two different ends, and the six available in this set are a reamer, a hook, a knife, a scraper, a brush, and a fork.

Order Code	Type	Price each
FG08J	Soldering Aid Set	£6.49

Tip Tinner/Cleaner TTC 1

The TTC 1 is a small block of electronics-grade solder powder and chemicals compacted into the shape of a thick disc. It is packaged in a metal container complete with lid and self adhesive pad on the underside so that it can be fixed to any convenient surface. A single wipe of the iron across the TTC 1 block at once cleans, wets and tins the tip.



The composition will remove the stubborn tin/iron intermetallic layer that forms on iron plated tips and resists resin based fluxes. The Tip/Tinner Cleaner does all the work of sponges or wipes and acid-cored solder wire which, although often used for tinning, does not really belong in an electronics assembly environment. Net Weight: 15gm

Order Code	Type	Price each
JG06G	Tip Tinner Cleaner	£2.99

Heat Shunt



A pair of locking metal tweezers which when clipped to a transistor lead for example, will prevent the heat of soldering reaching the device.

Order Code	Type	Price each
FR10L	Heat Sink Tweezers	99p

DESOLDERING TOOLS

Low Cost

Powerful desoldering tool quickly removes molten solder from joint. Spring loaded piston is closed while solder is being melted, then released by a simple push button. The cylinder is made of aluminium for increased resistance to wear. The nozzle is easily removed for cleaning or replacement. Plunger has a plastic shroud so that the knob cannot spring up into the operators face or eyes.



Order Code	Type	Price each
FR26D	Desolder Tool	£3.99

Nozzles

Replacement nozzles for the desolder tool above. The tool is supplied fitted with teflon nozzle type T1. An antistatic version T2 is also available.

Order Code	Type	Price each
UJ00A	Tip T1	60p
UJ01B	Tip T2	70p

Desoldering Pumps

Antex



A range of three desoldering pumps in various sizes and construction. To operate, the plunger is pushed down until it locks, the pump tip is then placed over the molten solder and the button pressed to release the plunger, the molten solder is now sucked up into the body of the pump. The 'Mini' has a glass filled nylon body with a white Teflon tip and the 'Pro-Desold' has the same construction but with a larger capacity and a black conductive Teflon tip. The 'Conductive' version has a nickel-plated aluminium body with a black conductive Teflon tip. This results in a low 'top-to-tip' resistance. Replacement tips are available for each version.

	Mini	Pro-Desold	Conductive
Overall length:	198mm	210mm	195mm
External diameter:	22mm	26mm	20mm
Suction volume:	9.0cc	14.0cc	7.7cc
'Top-to-tip' resistance:	Infinite	Infinite	10Ω
Spare tip:	BA16S	BA18U	BA20W

Order Code	Type	Price each
BA15R	Mini Pump	£5.99
BA16S	Mini Tip	£1.19
BA17T	Pro-Desold Pump	£9.99
BA18U	Pro-Desold Tip	£1.49
BA19V	Conductive Pump	£11.99
BA20W	Conductive Tip	£1.60

Desolder Braid

A flux-impregnated copper braid approx. 1.5m long which speedily removes unwanted solder from a joint. Place braid on defective joint and apply soldering iron for about one second. Then remove braid and iron together and joint will be left clean. Braid width: 2mm.



Order Code	Type	Price each
FR29G	Solda-Mop	99p

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SOLDER Standard Solder

Adapto



A 60% tin, 40% lead alloy solder containing a non-corrosive flux. We recommend this solder for use with the iron-clad and nickel-clad bits supplied with our soldering irons and for use with all the electronic components shown in this catalogue. Melting temperature 188°C. Suggested bit temperature 248°C. Solder is available in 18 swg (1.22mm) and 22 swg (0.71mm). 18 swg is sold in packs of 5m and on 1/2kg reels (approx 61m). 22 swg is sold in packs of 10m and on 1/2kg reels (approx 178m).

Order Code	Type	Price each
FV53H	5 Mtr Pk 18swg Sldr	99p
FR21X	Solder 22swg 10m pk	99p
YJ92A	18 swg Solder Reel	£8.99
FY70M	22 swg Solder Reel	£9.99

Silver Solder



A specially designed solder containing 10% silver that will join copper, brass, nickel more cleanly and with a lower resistance than standard solder, to give an improved joint for higher quality hi-fi equipment. The melting point of this solder is 420°C to 450°C, therefore a high temperature soldering iron will be required, to obtain satisfactory results. Solder is 18 s.w.g., sold in 50cm lengths.

Order Code	Type	Price each
GW45Y	Silver Solder	99p

Aluminium Solder

Multicore



A specially designed solder that will joint aluminium, brass, copper, nickel, stainless steel and tin-plate more easily than standard solder. This solder is 18% tin, 80% lead and 2% silver alloy. A higher temperature is required to melt this solder than ordinary solder so it is unlikely that a miniature iron will be satisfactory unless the volume of the parts to be jointed is very small. The solder contains four cores of non-corrosive flux. Melting temperature 270°C. Solder is 16 s.w.g. (1.63mm) Sold only in packs of 1m.

Order Code	Type	Price each
FY71N	Aluminium Solder	£1.49

Solder Pots

Antex



Two sizes of solder pots are available, the 'Major' and 'Minor'. Both models operate at a stabilised temperature of 310°C (typically the melting point of solders used in electronics is around 185°C). It is recommended that 60/40 solder pellets are used, (solder containing flux MUST NOT be used), and it will normally take up to 30 minutes for the solder to melt and the temperature to stabilise. The solder pots are of sturdy construction with a wide base giving excellent stability on the work bench, although holes are provided in the base for those installations where permanent fixing is required. The 'Major' has a removable dross tray which retains excess dross when cleaning the solder surface. The 'Minor' has a smaller capacity and lower power consumption and no dross tray. The pots are supplied with 1.5m of mains lead.

Specification

	Major	Minor
Input voltage:	220/240V AC	
Power consumption:	60W	45W
Nominal stabilised running temperature:	310°C	
Full solder capacity:	17cm ³	9.5cm ³
Normal solder depth:	17mm	14mm
Weight without solder:	960g	770g

Order Code	Type	Price each
KR27E	A2 Major Solder Pot	£69.99
KR28F	A2 Minor Solder Pot	£59.99

High Purity Pellets and Bar Solder

Warton

Two types of non-fluxed solder, 60/40 and 63/37, available in pellet and/or bar form. Can be used with the Solder Pots KR27E and KR28F. Pellets are supplied per kilo and the bars are supplied in nominal kilo bars.

Order Code	Type	Price each
KP57M	A2 Pellet Solder 63/37	£9.99
AY10B	A2 Bar Solder 63/37	£8.99
KP56L	A2 Pellet Solder 60/40	£9.99
KP63T	A2 Bar Solder 60/40	£8.99

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General Purpose Silver Brazing Alloy Silver-Flo 55

A general purpose, low temperature, silver brazing alloy that is free from cadmium (cadmium content not greater than 0.025%). Applications include model making, model railways, precision engineering, fluid carrying vessels & pipes and joining of metal objects where higher strength and operation temperature is required than can be achieved with conventional soft soldering. The alloy consists of 55% silver, 21% copper, 22% zinc and 2% tin. Melting temperature range is 630 to 600°C and is therefore suitable for use with the Mini Gas Torch (JL98G) and many other gas torches that can achieve sufficiently high temperature. Full instructions and details of safety precautions supplied. Supplied in 600mm x 1.5mm diameter rods. This brazing alloy requires the use of a special flux (JX39N).

Order Code	Type	Price each
ZA19V	Brazing Rod	£3.75

Silver Brazing Alloy 'Easy-Flo' Flux

A special flux powder for use with Silver-Flow 55 and other silver brazing alloys. Suitable for use at temperatures up to 800°C. The flux powder should be mixed with water to a creamy consistency and applied to the metals to be joined. Metals should be clean and degreased before applying flux. Mix only sufficient flux for the joint(s) to be undertaken. Replace lid to keep contents dry and in good condition. The flux powder is harmful if swallowed and irritating to eyes and skin, therefore wear suitable gloves and goggles. Avoid inhalation of dust. Keep out of reach of children. Full instructions and details of safety precautions supplied. Flux powder is supplied in 25g tubs.

Order Code	Type	Price each
JX39N	Brazing Flux	£1.10

Micro Gas Torch

Flame Master



An extremely compact, butane (gas lighter fuel) powered gas flame torch. Ideal for engineering, jewellery and model making work. The flame is adjustable and reaches a temperature of 1300°C (2370°F). A full charge of gas will last 40 minutes. Refilling is achieved using standard gas lighter fuel available from newsagents and tobacconists. Overall dimensions: 184mm x 15mm dia. Note: Gas torch is supplied unfilled.

WARNING: extreme care must be exercised when using this gas torch due to the very high temperature of the gas flame.

Order Code	Type	Price each
JL97F	Micro Gas Torch	£6.49

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Tools for Mini Gas Torch



A range of accessory tools which fit onto the Gas Torches. The following accessory tools are available: A heat director tube and reflector attachment, a hot air blower, and a soldering iron attachment which fit JL98G.

Order Code	Type	Price each
JU30H	Heat Director	£2.99
JU31J	Hot Air Blower	£4.99
JU32K	Soldering Iron	£6.99

HEATING TOOLS

Heat Gun Black & Decker



A very useful mains powered 240V 1600W heat gun for paint stripping, thawing pipes, shrink-wrapping, welding plastics (in a very well ventilated area) etc. The heat gun has two heat settings, 300°C and 560°C and extreme care MUST be exercised when using the heat gun to avoid personal injury. The air flow of either 270 l/min. or 450 l/min. ensures faster paint stripping using the push-and-pull scrapers supplied with the heat gun. The heat gun is fitted with a two way handle for either conventional pistol grip, or in-line grip for one handed use, which provides added safety, particularly during external use.

Order Code	Type	Price each
BU36P	D2 Heat Gun	£32.99

Pipemaster Antex



A unique product from Antex which makes central heating fitting quick and easy. Allows Yorkshire-type capillary fittings and end feed capillary fittings to be soldered without the use of a blow-torch. This is particularly useful when working in roof spaces, underfloor, or close to decorated surfaces, carpets etc. Simply slide the copper tube into the fitting, place Pipemaster jaws around edge of fitting and squeeze handles. Joint is complete in 10 to 40 seconds. The tool requires about 5 minutes to reach working temperature and care should be taken as the heads reach a temperature of 520°C.

For integral solder ring fittings, joint is complete when molten solder appears at outer edge of fitting. For end feed fittings, close heads around pipe beside fitting and apply solder. When solder flows it will be drawn into the fitting and the joint is made.

The tool is supplied with heads suitable for 15mm pipe. Heads for 22mm pipe are also available. Complete with approx. 1.8m of mains lead. A safety stand is also included. Manufactured in rugged yellow polycarbonate. Overall length 285mm. Supplied with full instructions for use

Order Code	Type	Price each
YP01B	B3 Pipemaster 240V	£32.49

Replacement Parts for Pipemaster



Replacement heads in 8mm, 10mm, 15mm and 22mm, and replacement elements for the Pipemaster are available. They are supplied in pairs (each tool has a pair of elements and a pair of heads).

Order Code	Type	Price each
JG16S	Pipemastr 8mm Heads	£7.49
JG17T	Pipemastr 10mm Heads	£7.49
FP36P	Pipemastr 15mm Heads	£7.49
FP37S	Pipemastr 22mm Heads	£8.49
FP38R	Pipemastr 240V Element	£15.99

WELDING EQUIPMENT

MIG Welder Clarke



A high quality rugged 'metal inert gas' (MIG) arc welder designed for the hobbyist, professional and light industrial user who needs the advantages of standard mig welding that are offered by this welder. The welder is used with a mild steel wire and a CO₂ gas bottle, strapped to the rear, to produce its own gas shroud as it burns, to weld steel. It can be used for other metals with only a change of wire and gas, if necessary. Stowage for a spare bottle is provided. The wire is retained inside the machine and automatically fed out by a feeder unit through the torch nozzle: the rate of feed being controlled by a 'min/max' switch and wire tension controlled by a 0 to

10 position variable rotary control. Two switches provide four power settings for optimum welding power control at the torch. The torch incorporates a control 'switch' for full 'on/off' control. Designed to be simple to use, yet capable of producing professional results, this machine is ideal for welding thin sheet metal-work and car body repairs. Supplied with CO₂ gas bottle, welding torch, gas regulator, mild steel welding wire, earth clamp, face mask and full operating instructions.

Specification	
Input voltage:	240V AC 50Hz
Open-circuit output voltage:	21 to 28V
Output current	
Max:	90A
60%:	30A
Min:	25A
Maximum metal thickness:	3 to 4mm mild steel
Wire size:	0.6/0.8mm
Wire spool capacity:	Mini or 5kg
Max wire feed speed:	14m/min
Dimensions:	430 x 370 x 250mm
Weight:	23.0kg

Order Code	Type	Price each
RJ47B	H49 90A MIG Welder	£179.99

Welding Gases Clarke

A selection of gases, for use with MIG welder RJ47B, are available. Supplied in standard bottles, the gases are CO₂ for mild steel, Argon for aluminium/stainless steel, and a CO₂ Argon Mix for thin sheet metal/mild steel.



Order Code	Type	Price each
RJ48C	H CO2 Welding Gas	£9.99
RJ49D	H Argon Welding Gas	£9.99
RJ50E	H3 CO2/Argon Weld Gas	£9.99

Mig Welder Clarke



The NO GAS MIG 85EN is a high quality rugged 'metal inert gas' (MIG) welder for professionals and DIY'ers alike offering the advantages of standard mig welding but without the need for a CO₂ gas bottle. The welder is used with a special flux-cored mild steel wire that produces its own gas shroud as it burns allowing these machines to weld steel without the need for additional gas, thus simplifying their use. The wire is retained inside the machine and automatically fed out by a feeder unit through the torch nozzle: the rate of feed being controlled by a 'min/max' switch. A second

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'min/max' switch provides two power settings at the torch, to give increased welding power control. The torch incorporates an 'on/off' control 'switch'. Designed solely for use without gas and simple to use, yet capable of producing professional results, this machine is ideal for welding thin sheet metal-work and car body repairs. Supplied with welding torch, flux-cored mild steel wire, earth clamp, face mask and full operating instructions.

Specifications

Input voltage:	240V AC 50Hz
Open-circuit output voltage:	21 to 28V
Output current	
Max:	85A
60%:	35A
Min:	30A
Maximum metal thickness:	3 to 4mm mild steel
Wire size:	0.9mm
Wire spool capacity:	Mini or 5kg
Max wire feed speed:	15m/min
Dimensions:	430 x 370 x 250mm
Weight:	21.5kg

Order Code	Type	Price each
RJ46A	H MIG Welder 85EN	£129.99

Welding Wire

Clarke

Supplied on mini-spools, welding wire is available for the MIG welders RJ46A (which uses flux-cored wire) and RJ47B, in a selection of types and sizes.

Description	Order Code
Mild steel wire spool, 0.6mm diam.	RJ51F
Mild steel wire spool, 0.8mm diam.	RJ52G
Mild steel wire spool, 0.9mm diam. flux-cored	RJ53H
Stainless steel wire spool, 0.8mm diam.	RJ54J
Aluminium wire spool, 0.8mm diam.	RJ55K

Order Code	Type	Price each
RJ51F	M/S Weld Wire 0.6mm	£5.49
RJ52G	M/S Weld Wire 0.8mm	£5.49
RJ53H	M/S W/W 0.9mm Fluxed	£8.99
RJ54J	S/S Weld Wire 0.8mm	£14.99
RJ55K	Alum Weld Wire 0.8mm	£14.99

Welding Tips

Clarke

Supplied in packs of five, a selection of welding tips is available for the MIG welders RJ46A and RJ47B. Three sizes are available: 0.6mm, 0.8mm, and 1.0mm.

Order Code	Type	Price each
RJ57M	0.6mm Welding Tip	£3.49
RJ26D	0.8mm Welding Tip	£3.49
RJ58N	1.0mm Welding Tip	£3.49



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CAR BATTERY BOOSTER/CHARGER

A high quality, powerful battery charger that besides supplying a useful 15A charge is also capable of providing a short boost charge or even starting a car. This compact charger will prove a useful tool to anyone who uses machinery, such as the building and farming industries, or the motor trade. It will also prove valuable to most car owners in winter when engines and batteries are cold and indifferent towards starting, because it can supply a healthy 12V 100A boost for up to 5 seconds. The charger is housed in a robust plastic case with a built-in handle and can be wall mounted. Two sturdy leads, terminating in heavy duty crocodile clips, carry the charge to the battery. Built-in overload protection is provided and reset with a push switch. Overall dimensions: 130 x 173 x 240mm. Weight: 4.0kg.



GREAT VALUE!
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RJ600
[F]

Welding Torch Shroud

Clarke

A spare shroud for use with the torches supplied with MIG welders RJ46A and RJ47B. Supplied in packs of two.

Order Code	Type	Price each
RJ56L	Welding Torch Shroud	£4.49

Glass for Welding Mask

Clarke

A spare darkened safety glass for the welding mask supplied with MIG welders RJ46A and RJ47B.

Order Code	Type	Price each
RJ59P	Weld Mask Dark Glass	£3.99

SERVICE AIDS AND ADHESIVES

Magnetic Pick-up



A magnetic extendable tool for capturing small metallic objects that are in inaccessible places. The tool has a telescopic rod which is attached to a plastic screwdriver handle. The rod extends from 167mm to 537mm with a small magnet fixed to the end of the rod. Care must be exercised when working round electrical equipment as the telescopic rod is conductive.

Order Code	Type	Price each
JM89W	Magnetic Pick Up	£3.99

Motorist's First-Aid Kit



A first-aid kit especially for the motorist, that is housed in a green polypropylene carry case. All dressings are packed in a sterile wrapping.

Contents

Sterile wound dressing:	1
Triangular bandage:	1
Tube antiseptic cream:	1
Alcohol-free wipes:	4
8in. waterproof dressing strip:	1
2.5cm cotton bandage:	1
5cm cotton bandage:	1
15gm cotton wool:	1
Assorted sterile plasters:	6
Assorted safety pins:	6
Pair of 4in. scissors:	1
Vehicle label:	1
Guidance card:	1
Dimensions:	230 x 195 x 50mm
Weight:	406g

Order Code	Type	Price each
DH83E	Car First-Aid Kit	£14.99

60W Magnifier Lamp



A magnifying lamp which is a practical and functional aid for hobbyists, and whenever magnification and extra light are needed for viewing small objects. It comes with a 60W incandescent bulb and a 1.75x magnification lens. It has an impact resistant, coloured plastic shade and a well-balanced, easily adjustable angle-poise arm. Provided with clamp for table fixing. Dimensions: arm length 80cm; shade 22 x 8cm. Colour: grey.

Order Code	Type	Price each
RJ4CT	60W Magnifier Grey	£49.99

Desk Lamp



Reading/work lamp suitable for use with incandescent bulbs. Ideal for desk-work, at the drawing board and work bench, anywhere, in fact, where a substantial light is required. The shade has a functionally correct design and distributes the light evenly over a large area. The lamp is supported on a jointed, angle-poise arm with sprung suspension and table clamp, to position the light precisely where needed. Bulb not included. Dimensions: arm length 75cm; shade diameter 18cm.

Order Code	Type	Price each
RJ41U	60W Lamp Round	£21.99

11W Fluorescent Lamp



A good basic angle-poise lamp at a reasonable price. Its parallel controlled, spring suspended arm makes it very simple to adjust, to provide the desired angle of light. The required degree of arm length is easily set, using the arm adjustment knobs. Uses a single, 11W compact fluorescent tube. Supplied with table edge fixing clamp. Dimensions: overall length including shade: 108cm. Colour: black.

Order Code	Type	Price each
RJ42V	11W Lamp Black	£49.99
AP15R	Spare 11W Lamp	£5.99

Electrically Conductive Silver Paint

Electrolube

An air drying electrically conductive paint containing pure silver. The paint should be applied to dry, grease and oil free surfaces with a soft bristled brush to obtain as thin a coating as possible to ensure minimum resistance. After approx 15 minutes the paint will be dry, but is not completely cured for 12 hours. The resistance will be about 001Ω per cm. However, by applying heat (e.g. from a hair dryer) to speed the drying time immediately after application the resistance can be reduced to less than 0.5mΩ per cm. Before use always shake the tube well. Applications include: repairing broken tracks on pcb's; repairing demisters on car rear windows; bonding wires together; rf shielding; prototype pcb manufacturing; conductive ink and many more. Supplied in a phial containing 3gm. Note: Shake well before use.



Order Code	Type	Price each
FY72P	Conductive Paint	£6.49

Nickel Screening Spray

Electrolube

An electro-conductive coating based on nickel for EMI and RFI screening (electro-magnetic and radio frequency interference). Adheres to a wide variety of materials and ideal for spraying the insides of plastic boxes to provide a screen. Has a surface resistivity of 0.7Ω per sq.cm. with 50 microns thickness. The can must be shaken for at least 2 minutes before use. Supplied in a 400g aerosol can.



Order Code	Type	Price each
DM10L	Screening Spray	£18.75

Contact Cleaner Lubricant Pen



Identical with the aerosol electro-mechanical lubricant below, but in the form of a pen containing 5ml.

Order Code	Type	Price each
FM77J	Switch Cleaner Pen	£1.68

Contact Cleaner Lubricant

Electrolube

An electro-mechanical lubricant in aerosol form. It consists of a solvent suspended oil for use where a thin film of contact lubricant is required having good penetrating and cleaning properties. It is safe to use on all metals and most plastics and rubbers. Supplied in 200ml aerosol can. Uses pentane propellant.



Order Code	Type	Price each
DM85G	Switch Cleaner	£4.20

Contact Lubricant

Electrolube

An extra high quality contact treatment oil for preserving long term reliability and performance. It is anti-static, and safe to use on most plastics, paints and rubbers. Supplied in 200ml aerosol can.



Order Code	Type	Price each
DM86T	Contact Lubricant	£8.49

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Contact Treatment Grease

Electrolube

A grease version of the contact treatment oil DM86T. A high quality, non-melting, tenacious grease giving better protection for vertical surfaces, sliding contacts and connections than DM86T. It is antistatic and is safe on most plastics, paints and rubbers. Supplied in 200ml aerosol can.

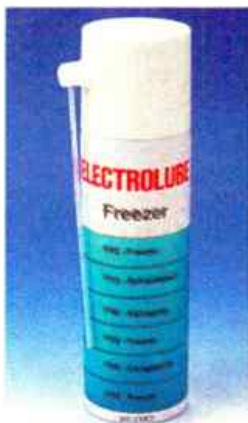


Order Code	Type	Price each
DM87U	Contact Grease	£4.80

Freezer Spray

Electrolube

A non-corrosive refrigerant aerosol for the rapid cooling of electronic components as an aid in tracking down and detecting thermally related faults. Can also find invaluable uses such as cooling semiconductors during soldering to prevent damage, and/or shrinking mechanical components having an interference fit with one another and thereby making fitting easier. The freezer spray can lower temperature to as much as -56°C (70°C below ambient). Supplied in 200ml aerosol can.



Order Code	Type	Price each
DM88V	Freezer	£5.75

Ultrasolve Degreasing Solvent

Electrolube

A special cleansing solvent of very high purity for the most critical electro-mechanical applications. It is highly recommended for cold cleaning applications in conjunction with all types of electro-mechanical equipment. This solvent has a powerful penetrating action and works faster and more thoroughly than conventional solvents. Supplied in a 200ml aerosol can.



Order Code	Type	Price each
DM89W	Ultrasolve	£4.75

Degreasing Solvent

Electrolube

A fast drying, non-toxic electronic cleaning and degreasing solvent which is non-flammable and leaves no residue. Intended for delicate electronic and electrical components and contacts, and also precision components. It is harmless to plastics and rubbers etc. Supplied in a 200ml aerosol



Order Code	Type	Price each
DM90X	Ultrasolve	£3.49

Sprayduster

Simply contains a microscopically clean, inert gas which is non-toxic, non-flammable and non-corrosive, for use as a pressurised gas jet for clearing accumulated debris, dust and fluff from otherwise inaccessible nooks and crannies of radio and TV chassis, variable capacitor assemblies and similarly difficult and sensitive areas where any alternative attempt at cleaning may cause damage. Supplied in 164gm aerosol can.

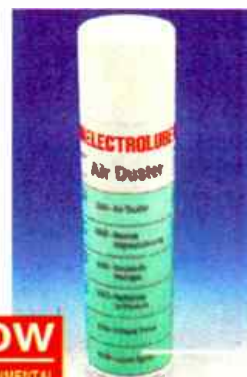


Order Code	Type	Price each
YB73Q	Spray Duster	£4.75

Airduster

Electrolube

Pure compressed inert gas for removal of dust and airborne contamination from very delicate or inaccessible areas of electrical and electronic equipment. Supplied in a 400ml aerosol can. Contains no CFC.



Order Code	Type	Price each
KR69A	Airduster	£8.25

Silicone Grease

Electrolube

A high quality, tenacious, electrically insulating compound which is resistant to water and extremes of temperature. It has the property of preventing high voltage tracking, arcing or corona discharge. It makes an excellent releasing agent whilst casting resin in a mould, for example. Will not harden with age. Supplied in 200ml aerosol can.



Order Code	Type	Price each
DM91Y	Silicone Compound	£4.25

Anti-Static Foam Cleanser

Electrolube

In addition to its ability to remove general grease and grime this foaming cleanser has lasting anti-static properties, defeating static charges, eliminating dust attraction and preventing the advent of further static charges for long periods. Particularly suitable for all hard surfaces and crackle finish paints. If in doubt about its suitability for a particular surface test a small area first before using. Supplied in a 200gm aerosol can.



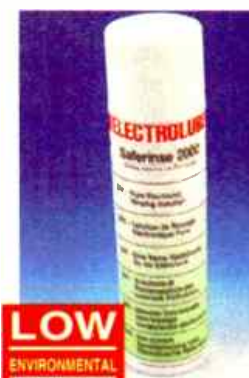
LOW ENVIRONMENTAL HAZARD

Order Code	Type	Price each
YB76H	Foam Cleanser	£1.89

Aqueous Foam Cleaner

Electrolube

An ozone friendly biodegradable foam cleanser for removing flux and heavy contamination from PCBs, and electromechanical assemblies. It is recommended that 'Saferinse 2000' KR71N be used to remove the foam cleaner. Supplied in a 400ml aerosol can. Contains no CFC.



LOW ENVIRONMENTAL HAZARD

Order Code	Type	Price each
KR70M	Safewash 2000	£6.49

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Rinsing Solution

Electrolube

A non-flammable biodegradable rinsing solution for use with 'Safewash 2000'. The solution is used to remove all foam and contaminant residue and drying may be assisted with 'Airduster' KR69A. Supplied in a 400ml aerosol can. Contains no CFC.



Order Code	Type	Price each
KR71N	Safewash 2000	£4.99

Antistatic Polish

A high grade polish containing a blend of waxes, cleansing and anti-static agents. Cleans at the same time as it polishes. Can be used on wood, paint, glass, metal, plastic surfaces etc. Leaves a high gloss durable finish. Supplied in 289gm aerosol can.



Order Code	Type	Price each
YB78K	Antistatic Polish	£3.25

Antistatic Spray

Electrolube

A water based antistatic spray in a pump action container, used for nullifying static charge problems. Supplied in a 250ml bottle.



Order Code	Type	Price each
YB79L	Anti-Static Spray	£3.49

Cleaning Strips



A unique cleaning, lubrication and protection treatment for relay and other non-wiping switch contacts, edge connectors etc, and other contacts requiring only a thin film of protective lubricant. For very dirty contacts use a solvent first. For heavy duty contacts especially where arcing occurs the treatment should be followed up with an aerosol contact lubricant. Supplied in packets containing 20 strips.

Order Code	Type	Price each
FM79L	Cleaning Strips	£1.28

Cleaning Pads



Solvent impregnated pads for cleaning the edge connectors of printed circuit boards and other delicate items. Contains isopropanol and demineralised water. Supplied as two sachets with one Pad in each sachet.

Order Code	Type	Price each
FM81C	Safe Pads Sachet	49p

Safecleans

An anti-static cleaner particularly for VDU and TV screens, etc. It is approved by manufacturers of anti-glare coatings. Used in conjunction with Safewipes it removes dust, dirt, finger marks and nicotine stains whilst at the same time eliminating static charges. This reduces eye-strain and errors caused by a blurred display. It would also be most useful for cleaning the glass of photocopiers, microfilm readers and lenses, and will also remove typewriter ribbon ink from the hands. Supplied in 250ml aerosol can.



Order Code	Type	Price each
YK91Y	Safecleans	£4.49

Safebuds

Small cotton buds on sticks to used with Safecleans for awkward or fiddly cleaning jobs. 150mm in length. Supplied in packs of ten.



Order Code	Type	Price each
YK98G	Data Buds Pk of 10	24p

Safewipe

Lint free cotton squares 230 x 230mm, which are used with Safecleans for cleaning VDU screens etc. Due to their lint free nature they can be safely used for very delicate cleaning operations on component parts of computer hardware. Supplied individually.

Order Code	Type	Price each
YK99H	Data Wipes	28p

WD-40 All Purpose Lubricant



The legendary WD-40 all-purpose light oil and solvent, which lubricates, penetrates, disperses and replaces water, frees tight components and forms a protective film over metal surfaces to protect them from oxidation. Electrically insulating, and resists tracking up to 12kV. Ideal for all automotive servicing applications; will drive damp out of HT leads and immediately restore normal engine running; protects battery terminals, cleans and recovers all types of electrical connections and switches. As a penetrating lubricant it frees any type of sticky mechanism. Use it to recover the smooth action of locks, padlocks, door catches; the joints of pliers, secateurs, shears, and switches of any type. Eliminates annoying squeaks in door, gate and car door hinges. Squirt WD-40 into your car locks to make them ice-proof in the winter. WD-40 is also a powerful cleaning agent, dissolving crayon, grease, tar, gum, adhesive and hard water deposits. It can be used to clean machine parts prior to maintenance or repair, and will even clean your hands afterwards! Supplied in aerosol cans in the following sizes: 100ml, 200ml and 400ml. Contains no CFC's.

Warning: contains 78% petroleum, extremely flammable. Flash point 43°C. Under no circumstances apply to hot surfaces or expose to a naked flame.

Order Code	Type	Price each
ZF08J	100ml WD-40	£1.49
ZF09K	200ml WD-40	£1.99
ZF10L	400ml WD-40	£2.99



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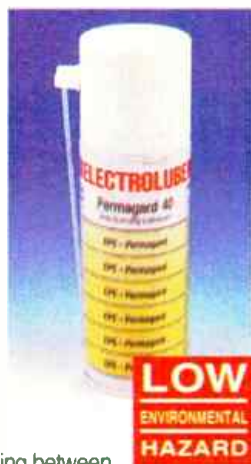


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Permagard 40 Electrolube

Similar to the popular 'WD40' type general purpose lubricant. As such Permagard lubricates, penetrates, disperses and replaces water, frees tight components, and forms a protective film over metal surfaces to protect them from the effects of oxidation. It is electrically insulating and ideal for automotive applications (for example, driving damp out of HT leads, preventing tracking between battery terminals due to condensation, cleaning and recovering electrical connections) and other electrical appliances which find themselves most used or stored out of doors. It is instrumental in recovering the reliability and smooth action of all types of switches. Supplied in 250g aerosol can.



Order Code	Type	Price each
YJ47B	Permagard 40	£2.49

Clear Mechanical Oil Electrolube

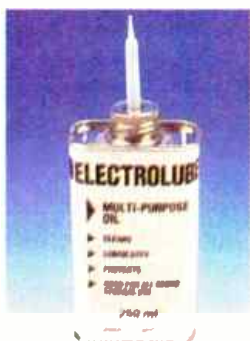
A multi-purpose, light machine oil of very high quality and performance. Ideal for delicate mechanisms, yet is designed to meet high temperature and extreme pressure conditions. Contains non-staining Molybdenum Disulphide additives for long life, tenacity and exceptional anti-wear protection. Supplied in 200ml aerosol can.



Order Code	Type	Price each
DM92A	Aerosol Mech Oil	£3.25

General Purpose Oil Electrolube

A high quality, low viscosity oil for general purpose use. Excellent lubrication and penetration characteristics. Supplied in 250ml can with dispensing spout.



Order Code	Type	Price each
JL76H	General Purpose Oil	£2.99

Dry Film Lubricant Electrolube

A special colourless dry lubricant (PTFE) with excellent anti-stick and mould release characteristics. Non-oily, extremely pure, chemically inert even at high temperatures. Does not affect plastics. Supplied in 200ml aerosol can. Uses pentane propellant



Order Code	Type	Price each
DM93B	Dry Film Lubricant	£5.99

Multi-Purpose Grease Electrolube



A general purpose grease for use in many mechanical and electro-mechanical applications. It has a wide temperature range and good lubrication and thermal properties. Supplied in a tube of 50ml.

Order Code	Type	Price each
FM80B	Tube of Grease	£1.10

Silicone Grease

A tube of good quality silicone grease for gear boxes and other moving parts of all types of racing models. All models should be kept well greased at all times.



Order Code	Type	Price each
JG00A	Silicone Grease	£1.20

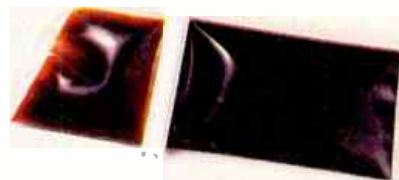
Anti-Seize Paste



A corrosion inhibitor which, when applied, will help prevent the seizing of mechanical components due to progressive rusting or oxidation. The threads of screws, nuts and bolts are the most obvious candidates for such treatment. Supplied in a 2gm syringe.

Order Code	Type	Price each
FM82D	Syringe Anti-Seize	£1.39

Potting Compound



Encapsulate your circuits to make them damage and moisture proof. Our potting compound packs are available in four different sizes to minimise wastage. Final mix is black. All resins get hot as they are curing, but where delicate electronic components are concerned, it can be a considerable advantage if the cure temperature is low and our compound does exhibit a comparatively low exothermicity. The resin and hardener are supplied in a single airtight pack with each part separated by a clip. When you wish to use the compound simply remove the clip and grip each end of the pack and pull gently. The compound may then be mixed in the bag which takes about 5 minutes. Full instructions are supplied with the pack. The compound remains workable for about 90 minutes, and is completely cured in 24 hours at 20°C. May be stored for at least 12 months without detriment. Has very high electrical resistance. Available in four sizes: 50g size makes 28.7cc, 100g size makes 57.5cc. 250g size makes 143.7cc, 500g size makes 287.4cc.

Order Code	Type	Price each
FT17T	Potting Compnd 50g	£3.25
FT18U	Potting Compnd 100g	£3.75
FT19V	Potting Compnd 250g	£4.99
LQ02C A1	Potting Compnd 500g	£6.99

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Flexible Rubber Sealant



A ready-to-use one part paste which when cured forms a tough flexible rubber seal. Adheres to most surfaces and has excellent electrical insulating and waterproofing properties. It is ideal for making watertight, electronic equipment used outdoors. Supplied in an 78gm tube with plunger.

Order Code	Type	Price each
YJ91Y	Flex Rubber Sealant	£3.99

Plastic Gloves



A pair of light, throw-away plastic gloves for those especially messy jobs, or when handling chemicals. Ideal for protecting the hands whilst handling ferric chloride and PCB's in the process of being etched. Supplied in pairs.

Order Code	Type	Price each
YJ48C	Plastic Gloves	49p

Riggers Gloves



These heavy duty 'riggers' gloves offer protection from sharp edges or rough surfaces when lifting or handling materials and are used on building sites, in warehouses, or gardens.

Order Code	Type	Price each
RJ04E	Gloves	£1.99

Funnel



A general purpose high density polyethylene funnel. Diameter, 120mm. Spout requires minimum 20mm diameter entry hole.

Order Code	Type	Price each
JU50E	Funnel 120mm	80p

Brass Brush



A wide wire brush with brass bristles and a hardwood handle. Bristle length: 25mm
Brush width: 35mm
Brush length (including handle): 280mm.

Order Code	Type	Price each
ZC34M	Wire Brush	99p

Dustbuster Black & Decker



A compact and lightweight cordless rechargeable vacuum cleaner. Ideal for cleaning in 'nooks and crannies' and cleaning up everyday spills. Supplied with wall-mounting housing and recharger.

Order Code	Type	Price each
RJ21X	DustBuster	£21.99

ADHESIVES

Superglue

A fast, high viscosity cyanoacrylate adhesive that has a handling time of 8 to 20 seconds for plastics and rubber and 20 to 40 seconds for metals.

Development of strength is very rapid, 50% of the ultimate strength is achieved in one hour. The durability of joints is good, particularly where plastic and rubber components are concerned. The adhesive is applied sparingly to one surface, usually one drop is sufficient, and the components are brought together quickly and correctly aligned. Sufficient hand pressure is applied to ensure the adhesive spreads into a thin film. The joint must not be disturbed or realigned until curing is achieved, normally in a few seconds. It is strongly recommended that polythene gloves are used when applying the adhesive. Available in 20g containers.



Order Code	Type	Price each
BA08J	Superglue 20g	£13.49

Fast Superglue

A very fast, low viscosity cyanoacrylate adhesive designed for bonding some of the more difficult rubbers and plastics, or when exceptionally fast cure is required. Usually one drop applied to one surface is sufficient – curing times are 1 to 5 seconds for rubber and plastics, and 5 to 10 seconds for metal.

Development of strength is very rapid, 50% of the ultimate strength is achieved in one hour. It is strongly recommended that polythene gloves are used when applying the adhesive. Available in 20g containers.



Order Code	Type	Price each
BA09K	Fast Superglue 20g	£13.75

Cyanoacrylate Adhesive

A one part adhesive which forms a very strong bond in a matter of seconds.

The adhesive is suitable for virtually all materials except polyethylene, polypropylene, Teflon (PTFE) and very porous surfaces. Apply the adhesive to one surface only. Align surfaces then bring them together quickly applying light finger pressure. For very small bond areas spread glue by lightly rubbing components together once or twice, but once bond is established do not break it (adhesive cures in a few seconds depending on material, but in general do not handle for 10 minutes).

Supplied in 3g tubes.



Order Code	Type	Price each
FL46A	Cyanoacrylate 3g	99p

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5-Pack Cyanoacrylate Adhesive



A single part, solvent free, rapid curing adhesive, that sets in seconds. The adhesive is applied sparingly to one surface (usually one drop is sufficient), the components are brought together and by applying sufficient hand pressure to ensure the adhesive spreads into a thin film, curing is achieved. The durability of joints is generally good, particularly, where plastics and rubber components are concerned. Supplied in packs of 5 x 5g bottles.

Order Code	Type	Price each
BA07H	Cyanoacrylate 5Pk	£16.49

Threadlock

An anaerobic adhesive designed for locking and sealing threaded metal parts. Handling strength is reached after 10 to 25 minutes and full strength after 24 hours. Supplied in a 10ml bottle.



Order Code	Type	Price each
BA13P	Threadlock	£3.99

Retainer

An anaerobic adhesive designed for retaining metal parts i.e. bushes, studs, bearings, etc. Applied straight from the bottle, the components are brought together (and by doing so air is excluded) and then, and only then, will the curing process commence. The components can be handled after 10 to 25 minutes and a full strength bond is reached after 24 hours. Supplied in a 10ml bottle.



Order Code	Type	Price each
BA12N	Retainer	£3.75

Thermal Bonding Compound



A metal-oxide loaded two part epoxy bonding system having excellent thermal conductivity while being electrically insulating. Ideal for bonding to heatsinks etc. Supplied in two syringes and applied in the ratio 3 parts of Part A (colour blue) to 1 part of Part B (colour cream). Contains 20ml total.

Order Code	Type	Price each
FA81C	Thermalbond Compound	£6.99

Fast Setting Epoxy Resin



A quick setting two part epoxy resin supplied in two 7.5g tubes (resin and hardener). The resin is suitable for use with metal, porcelain, glass, wood, stone and concrete. Surfaces to be joined should be clean and free from dust and grease. Smooth surfaces (such as metal) should be sandpapered to provide a 'key' for the adhesive. Resin will begin to set in 5 minutes, usable bonding strength reached in 15 to 60 minutes.

Order Code	Type	Price each
JL92A	Epoxy Resin 15g	99p

Fast Setting Clear Epoxy Resin

A quick setting two part epoxy resin that dries clear with superior strength. The joint is stronger than many other types of adhesive and is resistant to fuel, oil and water. Ideal for bonding metal, wood, china, glass, fibreglass and rigid plastic, the adhesive begins to harden in 4 to 5 minutes. Supplied in two tubes or bottles and in combined weights of 28g, 112g, and 224g packs. A slower setting version is available that has a higher strength, the setting time being half to one hour, available only in 168g packs.



Order Code	Type	Price each
KC17T	Speed Epoxy 28g	£3.25
KC19V	Speed Epoxy 112g	£6.49
KC20W	Speed Epoxy 224g	£7.99
KC21X	One Hour Epoxy 168g	£7.25

Araldite Rapid



A quick setting version of the famous two part epoxy resin glue made by Araldite. Suitable for bonding almost all materials in common use; metals, wood, rubber, earthenware, glass and most plastics except polythene. Araldite sets with virtually no shrinkage and joints are resistant to chemical attack and provide a seal which is impervious to moisture, electrically insulating and a protection against electrolytic corrosion. Supplied in two 16gm tubes, one containing the resin and one the hardener. The tubes are supplied in a pack with detailed instructions.

Order Code	Type	Price each
FL44X	Araldite Rapid	£3.99

Extra-Fast-Setting Adhesive

A two part epoxy resin adhesive that sets in 3 to 5 minutes. Supplied in a 3.5gm sachet simply cut off the end and squeeze out. Sachet contains exactly the correct proportional amounts of the resin and hardener to ensure a perfect mix. Stir the two parts together with stick (supplied) and apply immediately to both surfaces to be bonded then hold tightly together for a few minutes. Within one hour bond reaches a considerable strength, but is not completely cured for 24 hours. Can also be used as a filler.



Order Code	Type	Price each
FL45Y	Double Bubble Sachet	89p

Double Bead Extra Fast Epoxy Resin



The easy way to use extra-fast setting epoxy adhesive. Two syringes, containing equal amounts of resin and hardener, are used to dispense equal amounts for mixing and give 25ml of mixed adhesive. The adhesive sets in 3 to 5 minutes and reaches a working strength in about 30 minutes. Suitable for bonding a wide variety of materials such as metals, plastics, wood, ceramics and concrete, and for filling gaps and voids.

Order Code	Type	Price each
BA11M	Twin Syringe Epoxy	£2.99

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Adhesive Spreader/Mixer



A useful plastic tool for spreading and mixing adhesive, suitable for use with most adhesives, such as contact adhesive and epoxy resin. Length, 70mm. Spreader width, 13mm.

Order Code	Type	Price each
JU49D	Glue Spreader	10p

ADHESIVE TAPES

Paper Masking Tapes



A general purpose masking tape with a sticky backing, ideal for protecting areas prior to painting, spraying etc. Available in two widths 19mm and 25mm, both in roll lengths of 25m and 50m.

Order Code	Type	Price each
BZ05F	19 Masking Tape 25M	59p
DF17T	19 Masking Tape 50M	85p
BZ06G	25 Masking Tape 25M	85p
DF18U	25 Masking Tape 50M	£1.00

PVC Insulation Tape



Strong, self-adhesive flame resistant PVC insulation tape. Width: 3/4 in (19mm). Length: all colours including black: 4.6m reel. Alternative black only: 20m reel. Breakdown voltage: 7500V. Insulation resistance: 10¹⁴Ω/cm. Thickness: 0.15mm. VDE Approved. Available in Black, Blue, Green, Red, White and Yellow.

Order Code	Type	Price each
FM84F	20m Black PVC Tape	89p
FT20W	4.6m Black PVC Tape	30p
FT21X	4.6m Blue PVC Tape	30p
FT22Y	4.6m Green PVC Tape	30p
FT23A	4.6m Red PVC Tape	30p
FT24B	4.6m White PVC Tape	30p
FT25C	4.6m Yellow PVC Tape	30p

Gaffer Tape

A very tough, self-adhesive, synthetic fibre tape which can be used for sealing boxes, binding cables or securing them, joining carpets, temporary repairs and the like. It is 50mm wide and is supplied on 50m long reels. Available in silver, black and white.



Order Code	Type	Price each
KW31J	A1 Gaffer Tape Black	£4.65
KW33L	A1 Gaffer Tape Silver	£4.65
KW32K	A1 Gaffer Tape White	£4.65

Aluminium Tape

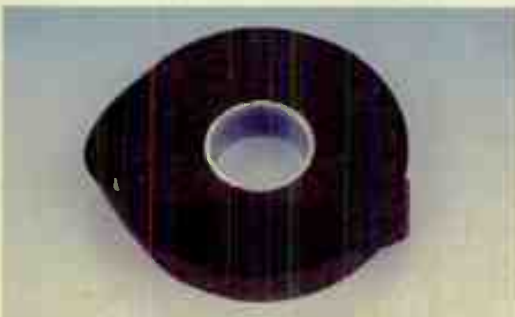
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A self-adhesive, 30µm thick aluminium tape 25mm wide which has many applications, particularly within the field of electronics and electrics. For example, it can be used for PCB repair, screening enclosures and circuits susceptible to RFI, and when applied to windows it can be used as a very cost-effective 'broken window detector' for security systems. Supplied on a reel containing 4.6m of tape.

Order Code	Type	Price each
KW30H	Aluminium Tape	£1.60

Self-Amalgamating Tape



A very useful derivative of insulating tape which can be used for waterproofing connections. To use, the top protective layer is peeled off and the rubbery self-amalgamating tape underneath is wrapped tightly around the connection to be waterproofed. Eventually, the layers of this tape will merge together and create a waterproof seal. This tape is highly recommended for automotive work and also aerial installations, particularly those for satellite TV where cables enter the LNB and polariser. The tape is in black, 19mm wide and is supplied on 10m reels.

Order Code	Type	Price each
KW29G	Self Amalgamate Tape	£4.25

P.T.F.E. Thread Sealing Tape



12mm wide white P.T.F.E. screw thread sealing tape for threading pipe joints, e.g. water, gas, etc.. Thickness of tape is 0.075mm. Supplied on 12m rolls.

Order Code	Type	Price each
RJ45Y	PTFE Thread Tape	30p

METAL AND VOLTAGE DETECTOR



A very useful instrument for tracing pipes, detecting nails and screws etc. in walls. In addition to detecting metals it can also detect electric cables that are connected to the mains even if no current is flowing. To distinguish between metal objects and mains cables an LED indicator and buzzer will give a continuous tone and light for metal objects and an intermittent tone and flashing light for mains cable. The detector is housed in a tough plastic case and is powered by one 9V PP3 battery (not supplied).

Order Code	Type	Price each
YP30H	Metal/Volt Detector	£6.99

QUICK MAINS CONNECTOR



A completely safe way of connecting mains cables to the power supply without having to fit plugs. The wire ends of the cable simply fit under three clips which are exposed when the lid is lifted. With lid lifted it is not possible to touch any live part. When lid is closed all live parts are fully enclosed and mains is connected to the clips and thus to the cable.

Specification

Max rating: 13A, 240V AC
Size: 127 x 67 x 51mm high.
Weight: 340gms (12oz)

Order Code	Type	Price each
YB21X	Quick Mains Connectr	£10.99

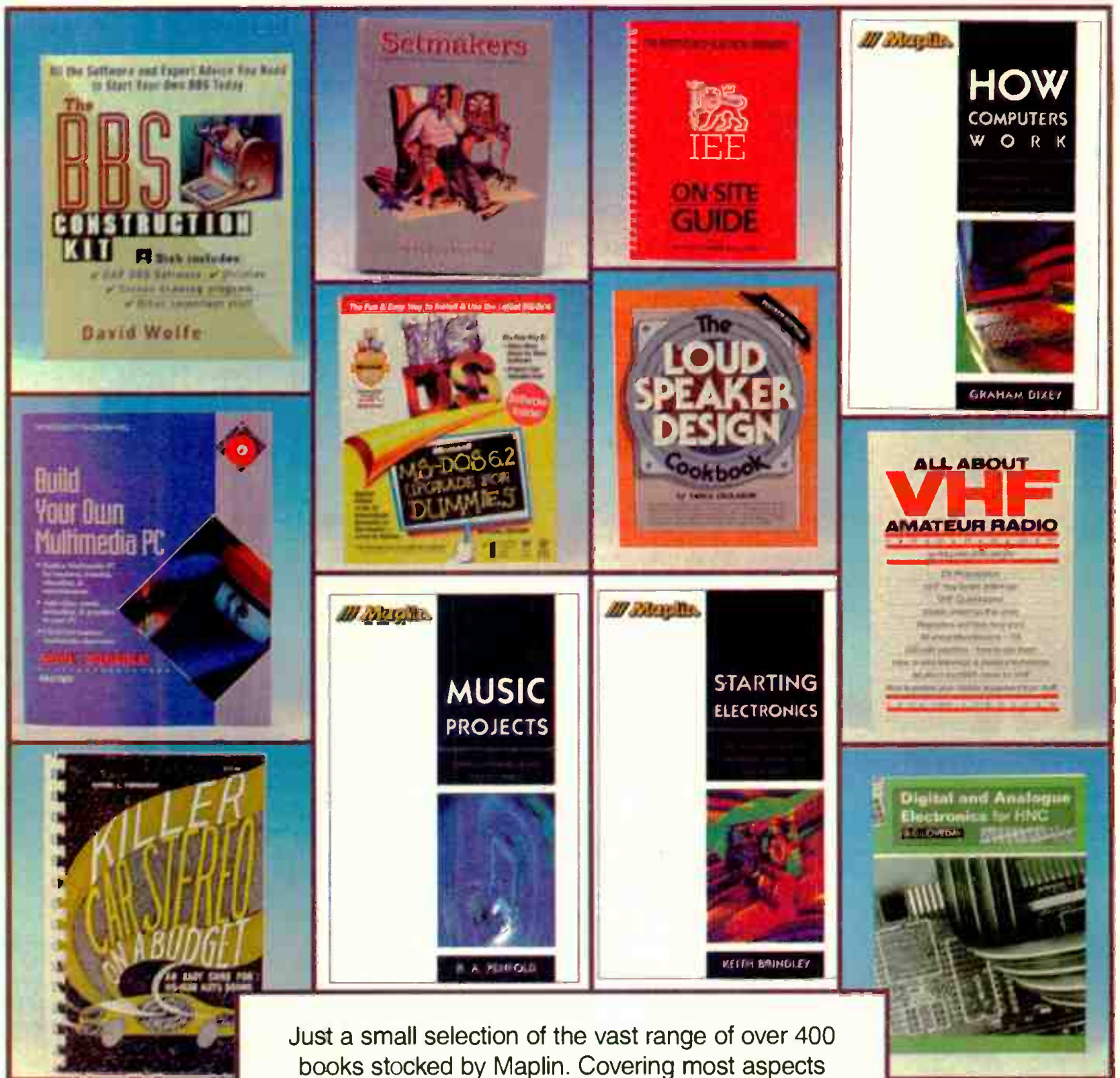


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AMATEUR RADIO BOOKS

Amateur Radio for Beginners – How to Discover the Hobby

by Victor Brand G3JNB

Amateur Radio is a hobby which is enjoyed by over one and a half million people. These people are on air from their homes, clubs and schools worldwide. Designed for the absolute beginner, this book could easily be enjoyed by another million. As well as extolling the virtues of 'Ham' radio, the book goes on to explain how to make your first receiver



and progress through to the acquisition of a licence. The grades of Novice (class A or B) licence are described, as is the help provided by R.S.G.B. to obtain the licence. The support and benefits derived from being in a club are described. Hopefully, this will go some way to shattering the common fallacy that 'Ham' radio is some kind of lonely attic hobby. For many people the discovery of amateur radio has been the beginning of an entirely new and unique hobby. They have derived much from its pursuit and have gained knowledge of electronics in the process. Whatever the age, or reason this book will ensure the absolute beginner has all the information needed to join the worldwide Amateur radio family. 1991. 65 pages, 210 x 145mm, illustrated.

Order Code	Type	Price each
WT69A	Amtr Radio Beginners	£3.50 NV

An Introduction to Amateur Radio

by I.D. Poole

Amateur radio is a unique and fascinating hobby which has attracted thousands of people since it began at the turn of the century. It encompasses a wide variety of subjects from the historical to the latest technology, and from operating to construction. In fact there is always some aspect of the hobby to interest people.



This book gives the newcomer a comprehensive and easy to understand guide through the subject so that the reader can gain the most from the hobby. It then remains an essential reference volume to be used over and over. Topics include the basic aspect of the hobby, such as operating procedures, jargon and setting up a station. Technical topics covered include propagation, receivers, transmitters and aerials etc. 1989. 160 pages 176 x 112mm, illustrated.

Order Code	Type	Price each
WS50E	Intro Amateur Radio	£3.50 NV

Setting Up An Amateur Radio Station

by I.D. Poole

The aim of this book is to give guidance on the decisions which have to be made when setting up any amateur radio or short wave listening station. Often, the experience which is needed is learned by making mistakes, but this can be expensive. To help overcome this, the book gives advice on many aspects of setting up and running an efficient station, and then proceeds by discussing the steps that need to be taken in gaining a full transmitting licence.



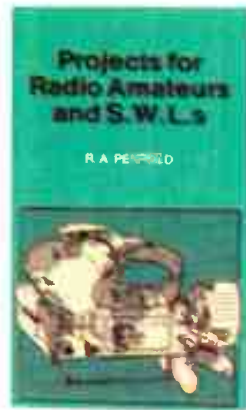
The topics covered include: the equipment needed; setting up the station; which aerials to use; methods of construction; test equipment; and preparing for the licence. 1991. 94 pages. 178 x 111mm, illustrated.

Order Code	Type	Price each
WT74R	Set Up Radio Station	£3.95 NV

Projects for Radio Amateurs and S.W.L.s

by R. A. Penfold

This book describes a number of electronic circuits, most of which are quite simple, which can be used to enhance the performance of most shortwave radio systems. Even those who are not interested in building receivers and transmitters are often keen to experiment with home built aerials, and to construct some accessories for their ready-made equipment. The circuits include an aerial tuning unit, audio filters (notch and a high performance bandpass type), a volume expander, add-on B.F.O, simple active aerial, a C.W./RTTY decoder and other useful projects. Where appropriate there are details of how to set up and use the equipment, plus notes on any unusual aspects of construction. No precise constructional details are provided, as some experience of electronic construction is assumed. Some of the projects are very simple, and should be within the capabilities of practically anyone who has previously built one or two simple projects, and providing the experience to progress to the more complex circuits. 1992. 92 pages. 178 x 111mm, illustrated.



Order Code	Type	Price each
WZ69A	Prjts For Radio Hams	£3.95 NV

An Introduction to VHF/UHF for Radio Amateurs

by I.D. Poole

The increase in the use of the VHF and UHF bands is now one of the largest growth areas within amateur radio. In fact, most radio amateurs have equipment for use on these bands, either for local contacts or simply to exploit some of the many interesting and challenging aspects of so



doing. This book covers the essentials required to gain the most from using the VHF and UHF bands. As such it will be of use to both the newcomer and the more experienced enthusiast alike.

Topics include propagation, the bands and channels, aerials, receivers, transmitters, and a special chapter on scanners. In addition, operation of repeaters and mobiles is included together with DXing and data modes, and a section on packet radio. 1990. 110 pages. 178 x 111mm, illustrated.

Order Code	Type	Price each
WS93B	Intro VHF/UHF Radio	£3.50 NV

An Introduction to Amateur Communications Satellites

by A. Pickard

There are a large number of amateur communications satellites around the world, traversing the globe continuously and they can be tracked and their signals received with relatively inexpensive equipment. This equipment can be connected to a home computer such as the BBC micro or an IBM compatible PC for decoding the signal. This book describes several currently available systems, their connection to an appropriate computer and how they can be operated with suitable software.



The results of decoding signals containing such information as telemetry data and weather pictures are demonstrated and will hopefully encourage the reader to become actively involved in pursuing this fascinating activity, which embraces many aspects of electronics, engineering and science as well as being an encapsulation of information technology. 1990. 102 pages, 178 x 110mm, illustrated.

Order Code	Type	Price each
WT24B	Intro Amtr Comm Sat	£3.95 NV

An Introduction to Satellite Communications

NEW!

by F. A. Wilson

Satellites have become a very important part of our everyday life. Not only are they instrumental in providing us with a plethora of additional television programmes, but they are also vital in the fields of communications and navigation. There are literally hundreds of them circling the earth already, and there are many more planned to join them.

The aim of this book is to provide the reader with an insight into the workings of satellites – the technical level of the book is moderate. It has not been written with the expert in mind but is intended for the general electronics engineer or enthusiast who wishes to obtain a basic understanding of the technology. 1993. 240 pages. 198 x 129mm, illustrated.



Order Code	Type	Price each
AA56L	Intro Sat Comms	£5.95 NV

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NEWNES PRACTICAL RF HANDBOOK

NEW

by Ian Hickman

This book is primarily intended to help both the amateur and professional increase their knowledge and expertise in the field of RF engineering. The book is not intended to be a textbook, and lengthy derivation of formulae have been omitted. Text covers the portion of the RF spectrum up to 1000MHz. This is used for a wide variety of services, including sound broadcasting and television, commercial, professional, government and military communications, telemetry and telecontrol, radio telex and facsimile and amateur radio. 1993. 280 pages. 232 x 155mm, illustrated.

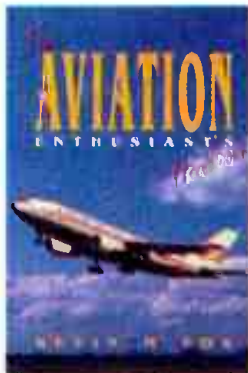
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The Aviation Enthusiast's Handbook

by Kevin M. Fox

Plane spotting is a popular and growing hobby, but there has never been one totally comprehensive guide and reference to the pastime. This book fills the gap. Packed with tips, advice and hints, the book includes detailed information on aircraft operations, aircraft types, propulsion and avionics, air-traffic control, optics, computer systems, aviation and weather as well as numerous appendices and radio frequency databases. One important feature of the book is a section which covers the complete HF/VHF and UHF range of airbands.



If you are an avid plane spotter, then this handbook, presented in a non-technical and easily digestible format, is the one book you will not want to be without. 1991. 250 pages. 232 x 155mm, illustrated.

Order Code	Type	Price each
WT95D	Aviation Handbook	£9.95 NV

Radio Amateur and Listener's Pocket Book

by Steve Money G3FZX

A unique collection of useful and intriguing data for the traditional and modern radio amateur and the hi-tech listener. Familiar radio topics are probably covered more concisely than in any similar book (for example, abbreviations and codes, symbols, formulae and frequencies) but the most interesting sections of the book deal with the newer features of the ham's world;



AMTOR, packet radio, slow scan TV, computer decoding, airband and maritime glossaries and so on. Radio amateurs, 'hackers' and monitors will all find this book the best single-source, quick reference guide to an increasingly wide-ranging subject. 1987. 160 pages. 196 x 95mm, illustrated.

Order Code	Type	Price each
WP91Y	Radio Ams Pocket Bk	£10.95 NV

Radio Communication Handbook

5th Edition
Radio Society of Great Britain

The most authoritative reference manual for the radio amateur. Completely revised and up-dated, often in parts entirely re-written, its many pages cover all aspects of radio from the fundamentals of Ohm's Law to design and construction of high powered transmitters. Tending towards those who have an interest in low frequencies, i.e. under 30MHz, it also has practical information on VHF technology and equipment. Chapters include; principles, HF and VHF receivers, HF and VHF transmitters, RTTY, propagation, HF and VHF aerials, mobile and portable equipment, satellites, noise, interference and measurement. 1982. 808 pages. 248 x 182mm, illustrated.



Order Code	Type	Price each
WS12N ^{A2}	Radio Communication	£11.00 NV

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An Introduction to Radio Wave Propagation

by J.G. Lee

Radio wave propagation has its origins in the world of solar physics. The Sun's radiation provides the mechanism for the formation of the ionosphere. How this is done and how it provides long distance communication is carefully explained. Non-ionospheric propagation, including 'moonbounce' or satellite communications is covered as well. This book has been written with the average electronic hobbyist in mind. Technical language and mathematics have been kept to a minimum in order to present a broad, yet clear, picture of the subject. The radio amateur, as well as the short-wave listener, will find the explanations of the propagation phenomena which both experience in their pursuit of communications enjoyment. 1991. 124 pages, 178 x 111mm, illustrated.



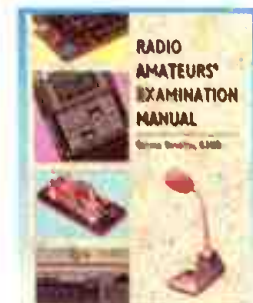
Order Code	Type	Price each
WT48C	Intro Radio Wave Prp	£3.95 NV

Radio Amateurs Examination Manual

13th Edition

by G. L. Benbow G3HB

This highly informative manual is aimed at supplying all the knowledge required to become a radio amateur. The book covers all the technical subjects you need to know to pass the RAE examination, as well as general information about being an amateur and some example examination papers (with answers). The subjects covered include electrical theory, semiconductors, receivers and transmitters, measurements, propagation, antennas, and operating practices and procedures. Other sections cover mathematics, transmitter interference and licence conditions. Valid for 1994 examinations. 1992. 128 pages. 244 x 180mm, illustrated.

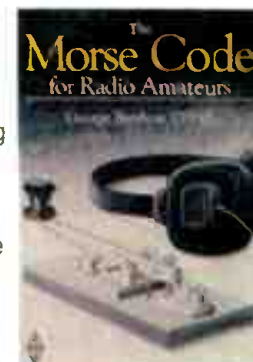


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WP87U	Radio Ams Exam Manul	£6.99 NV

The Morse Code for Radio Amateurs

Eight Edition by George Benbow G3HB

It is an international requirement that every person holding a radio amateur licence shall have satisfied the licence-issuing authority of their country that they have a sound knowledge of the Morse Code. Slow morse practice transmissions are radiated daily on frequencies in the amateur bands. The book shows the morse alphabet, procedures and includes 9 do-it-yourself exercises. 1992. 28 pages, 244 x 183mm, illustrated.



Order Code	Type	Price each
WT36P	Morse Code AM Radio	£3.99 NV

The Secret of Learning Morse Code

by Mark Francis

Morse code is the oldest means of radio communication and yet is also one of the most reliable. It is not until you come to study the code that you begin to realise just how effective it can be. When voice communication fails, owing to weak signals or interference, morse code invariably gets through.

Yet the equipment required is the most basic of all. There are many circumstances, both at professional and amateur levels where these advantages are of paramount importance. Several amateur radio operators are still 100% morse code users. Not only do they find it ideal for long distance contacts with modest power and aerial systems, but they also enjoy the satisfaction and pleasure obtained from practising their skills as CW operators.

1989. 93 pages. 210 x 148mm, illustrated.



AMTOR; SSTV and FAX; packet radio; commercial decoders; controlling a radio with a computer; computer assisted circuit development and appendices. 1990. 363 pages. 214 x 138mm, illustrated.

Order Code	Type	Price each
WT17T	Amateur Radio Comp	£15.95 NV

VHF/UHF Manual

4th Edition
by G. R. Jessop, G6JP

A companion volume to the Radio Communication Handbook, this book is dedicated to the VHF/UHF enthusiast who uses frequencies above 30MHz. Its very detailed chapters guide the reader from first principles through to the design and testing of quality VHF and UHF transmitters and receivers. Included in the book are chapters on propagation, receivers, transmitters, filters, aerials, microwave operation, space communication and integrated equipment.

1983. 526 pages. 248 x 184mm, illustrated.



Order Code	Type	Price each
WS14Q ^{A2}	VHF/UHF Manual	£10.50 NV

Introduction to Antenna Theory

by H.C. Wright

Any conducting body exposed to radio waves will have electric currents induced in it and, conversely, any conductor carrying varying electric currents will radiate energy in the form of radio waves. Thus an antenna can take any form from a bedstead to a tin-tack and, while these particular items are seldom encountered in practice, the experimenter can test ideas and innovations with little more than bent copper wire, particularly when it comes to TV and CB wavelengths. This book illustrates the basic concepts relevant to receiving and transmitting antenna in a manner which emphasises the mechanism involved, supported by copious diagrams and illustrations which help to reduce mathematics to a minimum.

1987. 86 pages. 178 x 110mm, illustrated.



Order Code	Type	Price each
WP78K	Intro Antenna Theory	£2.95 NV

Experimental Antenna Topics

by H.C. Wright

Although nearly a century has passed since Marconi's first demonstrations of radio communication, there is still research and experiment to be carried out in the field of antenna design and behaviour. The aim of the experimenter will be to make a measurement or confirm a principle, and this



can be done with relatively fragile, short-lived apparatus. Because of this, devices described in this book make liberal use of cardboard, cooking foil, plastic bottles, cat food tins, etc. These materials are, in general, cheap to obtain and easily worked with simple tools, encouraging the trial-and-error philosophy which leads to innovation and discovery. Although primarily a practical book with text closely supported by diagrams, some formulae which can be used by straightforward substitution and some simple graphs have also been included.

1990. 80 pages. 178 x 110mm, illustrated.

Order Code	Type	Price each
WS86T	Exp Antenna Topics	£3.50 NV

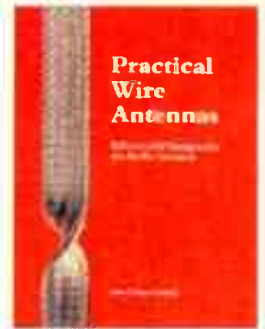
Practical Wire Antennas Effective H.F. Designs for the Radio Amateur

by John D. Heys
G3BDQ

Wire antennas offer one of the most cost-effective ways of putting out a good signal on the HF bands, and this practical guide to their construction has something to interest every amateur on a budget. Many different types are covered, ranging from simple dipoles to ingenious multi-wire systems, even underground antennas! Full details about feeding and matching are included, making each antenna easy to set up and use successfully.

Theory has been kept to a minimum – instead, the author has shared his years of experience in this field, offering down-to-earth advice that will be appreciated by beginners and enthusiasts alike. No-one who builds and uses wire antennas can afford to be without this handy guide.

1989. 100 pages, 244 x 184mm, illustrated.



Order Code	Type	Price each
WT37S	Prctcl Wire Antennas	£8.49 NV

25 Simple Shortwave Broadcast Band Aerials

by E.M. Noll

25 simple shortwave aerial project ideas are covered in this easy to understand, illustrated book. 1984. 68 pages. 178 x 112mm, illustrated.



Order Code	Type	Price each
WM33L	25 Aerials Book	£1.95 NV

Amateur Radio Operating Manual

3rd Edition
by R. J. Eckersley,
G4FTJ

Such is the pace of modern electronic and radio technology, that this book is now in its third edition. There have been many advances, notably in amateur satellites, packet radio and computer RTTY. This book gives the newcomer an excellent guide to the proper operating practices of all aspects of amateur radio. Chapters include; setting up a station, mobile and portable operation, slow-scan television, contests and eight appendices giving everything from foreign language contacts to international call signs.

1985. 204 pages. 245 x 182mm, illustrated.



Order Code	Type	Price each
WS13P	A/R Operating Manual	£6.99 NV

Newnes Amateur Radio Computing Handbook

by Joe Pritchard

The widespread availability of small computers has changed the lives of radio enthusiasts. 'Old' modes of communication, such as morse code and even voice, have been joined by new, computer-based methods of communication. Computers are even used to predict which frequencies to use for the best results.

Contents include basic radio principles; basic computer principles; software for electronic design; logkeeping and QSL card software; satellite and geographical software; miscellaneous software; interfacing the computer to the radio; morse code; RTTY and ASCII;



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25 Simple Indoor and Window Aerials

by E.M. Noll

For the short-wave listening enthusiast who may be living in a flat or similar accommodation where the use of external aerials is impossible, this book describes how one can install aerials in or around the room, ceiling, windows, attic, etc. – twenty-five different permutations are shown in detail. The book also shows how simple variations can be improved for optimum performance. Much information is given on the short-wave bands, aerial directivity, time zones, working dimensions etc. 1984. 64 pages. 178 x 110mm, illustrated.



Order Code	Type	Price each
WM81C	25 Simple Ind Aerial	£1.75 NV

25 Simple Tropical and MW Band Aerials

by E.M. Noll

Not about how to construct an aerial that will withstand the climatic rigours of a tropical climate, rather, this book contains details of how to construct antennæ for receiving the 60, 75, 90 and 120 metre tropical broadcast bands. The 49 metre band is also included. In addition, information is given for the construction of MW aerials in the 550-1600kHz band. An essential addition to the library of all radio amateurs. 1984. 54 pages. 177 x 110mm, illustrated.



Order Code	Type	Price each
WM93B	25 Simple Trop Aer	£1.75 NV

HF Antennas for All Locations

2nd edition
by Les Moxon

The introduction of the 10, 18, and 24MHz bands in recent years has brought a lot of opportunities for amateur radio enthusiasts, as well as many problems. The worsening problem of interference, as well as the demand for smaller, less visible, antennas has resulted in an interest in small transmitting loops. The aerial designer is faced with the dilemma of whether to maximise gain or minimise interference. This second edition has been revised, updated and expanded and includes more novel antenna designs, including beams which cover more bands with fewer problems, no trap losses and better rejection of interference. A chapter provides a comprehensive review of ways to make antennas smaller, with particular emphasis on small transmitting loops. The book provides a wealth of practical information on the choice and construction of antennas to suit most locations and requirements, and will be an indispensable reference for the antenna experimenter and enthusiast. 1993. 322 pages. 245 x 186mm, illustrated.



Order Code	Type	Price each
WS16S A1	HF Antennas All Locs	£13.99 NV

Aerial Projects

by R.A. Penfold

The book contains various practical aerial designs including active, loop and ferrite aerials which give good performances yet are relatively simple and inexpensive to build. Complex theory and mathematics of aerial design have been avoided. Constructional details are given for a number of aerial accessories including a preselector, attenuator, filters and tuning unit. 1982. 96 pages. 178 x 110mm, illustrated.

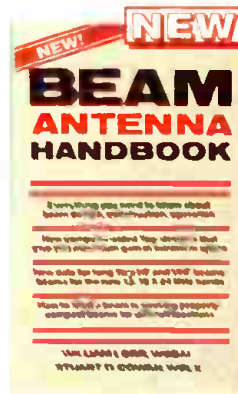


Order Code	Type	Price each
WA37S	Book BP105	£2.50 NV

Beam Antenna Handbook

by William I. Orr and Stuart D. Cowan

This handbook covers all aspects of HF and VHF Yagi antenna design. Information on construction, installation, testing and operation of these aerials is included along with the effects of element taper, mounting hardware and matching systems. The twelve chapters cover topics ranging from radiation and propagation antenna, transmission lines, matching the antenna to the line through to antenna test instruments. This is in addition to the many antenna designs that are featured in this book including computer derived designs for high gain antenna for the HF and VHF bands. Dimensions are conveniently provided in both English and metric measurements, along with scaling information that permits many designs to be used on frequencies outside the amateur bands. This attractively priced book is a must for all amateur radio enthusiasts. 1990. 272 pages. 233 x 186mm, illustrated. American book.



Order Code	Type	Price each
AA59P	Beam Antenna H/Book	£7.50 NV

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Simple Short Wave Receiver Construction

by Robert Penfold

Short Wave Radio is a fascinating hobby, and can be pursued for a minimal monetary outlay if you are prepared to undertake a bit of DIY, and the receivers described in this book can all be built at low cost. All the sets are easy to construct, full wiring diagrams, etc. are provided, and they are suitable for complete beginners. The receivers only require simple aerials, and do not need any complex alignment or other



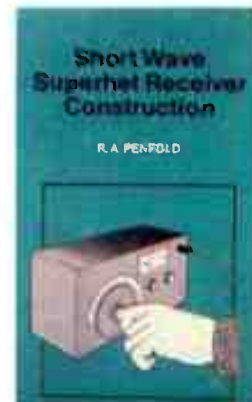
difficult setting up procedures. Topics covered include: the broadcast bands and their characteristics; the amateur bands and their characteristics; the propagation of radio signals; simple aerials; making an earth connection; short wave crystal set; simple t.r.f. receivers; single sideband reception; and a direct conversion receiver. Contains everything you need to know in order to get started in this absorbing hobby. 1990. 88 pages, 178 x 111mm, illustrated.

Order Code	Type	Price each
WT16S	Simpl SW Rcvr Cons	£3.95 NV

Short Wave Superhet Receiver Construction

by R.A. Penfold

The basic short wave receiver described in this book is a superhet with separate mixer and oscillator stages, a ceramic filter for good selectivity and a simple audio amplifier which drives headphones. An optional BFO permits reception of CW and SSB, the main operating modes used for the amateur short wave bands. The receiver also include AGC. The remainder of the book describes a number of 'add on' enhancements. These consist of: input filter to improve image rejection; RF amplifier to boost sensitivity and image rejection; product detector for improved CW and SSB reception; higher powered audio output amplifier for loudspeaker; signal strength ('S') meter; audio CW filter; stabilised mains power supply. The fully expanded receiver provides excellent results from the broadcast and amateur bands, but remains relatively inexpensive to build. 1991. 80 pages, 78 x 111mm, illustrated.

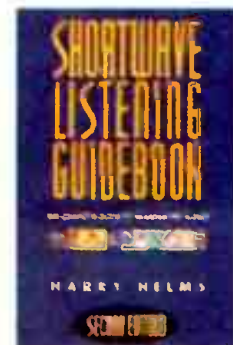


Order Code	Type	Price each
WT43W	SW Receiver Constrn	£2.95 NV

Shortwave Listening Guidebook – 2nd Edition

by Harry L. Helms

It is a strange fact of life that in this age of satellite television and digital communications, that shortwave listening should still be a very popular hobby. So what makes a shortwave listener? Regardless of the particular frequencies or bands they listen to, SWLs are searching for something out of the ordinary - listening for signals that the general public does not normally receive. This book provides all the information that is required to become a successful SWL in a concise and non-technical way, and in a style that is very easy to read. The book is entertainingly written and not only provides an introduction and the requirements for SWLing, but includes a very informative history of the subject – well worth a read. 1993. 338 pages. 228 x 152mm, illustrated. American book.



Order Code	Type	Price each
AA53H	S/Wave List GuideBk	£17.50 NV

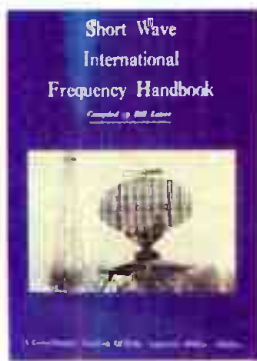
Short Wave International Frequency Handbook

by Bill Laver

Intended to be of particular interest to the European short wave listener, this guide covers all the stations that are capable of being heard in the Northern hemisphere. Some stations are low powered and will need good aerials and receivers, but under favourable conditions even modest set-ups will 'pull them in'. The guide's main objective is to quickly direct the listener to the frequency or band most likely to provide him with the kind of station that he is seeking. To many the SW band presents something of a mystery, pouring out a wide range of strange noises which at first convey no intelligible information whatsoever. Indeed, the newcomer can be excused for being somewhat overwhelmed at the wide range of signals to be heard, all apparently fighting for space. In fact the SW band is full of surprises and even the most experienced listener is frequently rewarded with a new station that he or she has never heard before. It helps to know where to start looking and so there is a real need for a guide such as this to the utility stations on the SW band, and to this end this book should more than fill the gap.

1993. 188 pages. 298 x 210mm, illustrated.

Order Code	Type	Price each
WT73Q	SW Freq List	£9.95 NV



An Introduction to Scanners and Scanning

by I. D. Poole

Radio scanners are rapidly increasing in popularity, opening a whole new realm to shortwave listening. This book aims to cater for the new breed of scanner listener. Scanners are specifically designed for modern listening. They can be programmed to tune or scan over a number of preset frequencies and stop when they find a signal. By using this facility the receiver can be made to monitor several frequencies of interest. Topics covered in the book include: radio wave propagation; types of transmission which can be heard, how a scanner operates, aerials, the radio frequency spectrum (including a frequency list), operating procedures, broadcast bands, amateur radio, and citizen's band. In addition to this there is an appendix which includes a glossary of essential terminology and call sign prefix lists. This book will provide a useful reference to scanner listeners, those who own World Band Radios and anyone with an interest in shortwave listening of any description.

Order Code	Type	Price each
WZ62S	Intro To Scanners	£4.95 NV



of 3 TV services in the UK has now made the area centred around 200MHz available to many PMR users, and clearly the use of UHF will also be actively promoted by the DTI who will be anxious that the pressure be taken off the frequencies below 200MHz. And newly launched public telephone and satellite services will require more airwave space. Consequently the bands have gone through a major re-shuffle making it difficult to find some transmissions again because they have moved. Covers equipment requirements including aerials, the future of VHF/UHF communications, frequency guide to 26 to 225MHz, military aeronautical band of 225 to 399MHz, and a frequency guide from 399.9MHz to 47.2GHz. 1993. 156 pages. 296 x 210mm.

Order Code	Type	Price each
WT70M	VHF/UHF Freq Guide	£9.95 NV

The VHF/UHF DX Book

Edited by Ian White

Contacting stations in far-away places - 'working DX' - is one of amateur radio's greatest challenges, especially if you choose to do it on the VHF and UHF bands. The VHF and UHF bands can produce some truly exotic signals. These bands offer many different modes of propagation, and activity has increased so much that almost every DX opening is recognised and exploited. From the UK, amateurs have worked all over western and central Europe on 144MHz and 432MHz. Additionally 50MHz can cover the world at the height of the sunspot cycle. The aim of the book is to bring together the operating and the technical sides of VHF/UHF DX, as each needs the other. A station assembled with no technical knowledge can never be operated at full efficiency, and a technically good station is pointless if it is never used.

Order Code	Type	Price each
AA08J	The VHF/UHF DX Book	£18.00 NV



Scanners - a VHF/UHF Listener's Guide

by Peter Rouse GU1DKD

The first complete British guide to VHF/UHF listening. Subjects covered include the equipment, accessories and aerials, and explains basic radio theory, modes, and simplex and duplex transmission, installation and use. A most useful feature is the inclusion of full British wave-band charts from 26MHz to 1300MHz, including aviation, marine, amateur, emergency services, satellites (amateur, military, communication, navigation, weather, including the COSMOS and NASA Space Shuttle frequencies), cordless telephones, cellular radio, beacons, pagers, message handling, private mobile radio (PMR), radio microphones, telemetry, industrial, scientific and medical etc. Also explained is how to interpret what is being said when 'RT procedure' is being used.

Order Code	Type	Price each
WP47B	Scanners	£9.95 NV

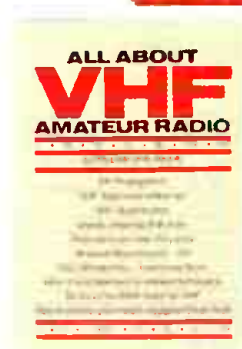


All About VHF Amateur Radio

by William Orr

This handy, inexpensive VHF handbook has been written for the non-technical and ham enthusiast who wants to work on the 6m and above bands. The text, illustrations and general information is presented in an enjoyable and easily understood style, and provides valuable information covering all aspects of VHF radio. The book covers VHF bands and propagation; VHF repeaters; VHF moonbounce communication; amateur satellite communication; coaxial lines; VHF vertical and mobile antennas; VHF beam antennas; VHF interference. There are many suggestions for the DIYer for building vertical, mobile and beam antennas.

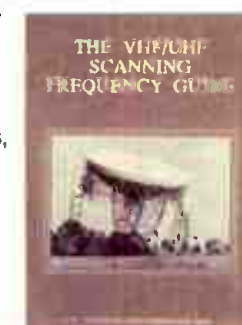
Order Code	Type	Price each
AA58N	VHF Amateur Handbook	£7.50 NV



The VHF/UHF Scanning Frequency Guide

Compiled by Bill Laver

The pressure on frequency space in the VHF/UHF bands, together with technological improvements, results in almost endless changes and amendments that have recently occurred. These include 25kHz channel stepping in both bands, requiring that many civil and RAF frequencies be reallocated. Similarly private mobile radio, due to increasing use which is now causing major overcrowding problems in the VHF band. The removal



Air Band Radio Handbook

Third Edition

by David J. Smith

Air band radio listening allows you to eavesdrop on the conversations between aircraft and those on the ground who control them, and is an increasingly popular and fascinating hobby. It not only assists in the recognition of aircraft flying overhead, but also provides an insight into the complex world of air-traffic control. The author, who is an air-traffic controller by profession, describes the types of air band radio available and how to use them. With the intricacies of air-traffic control and its jargon explained, you will be able to translate what you hear into what's actually going on over your head. The book also includes full appendices containing comprehensive, up-to-date lists of VHF, UHF and HF frequencies, call signs etc. This extensively revised and updated edition maintains the book's position as the indispensable guide to the hobby, and the essential companion for every air band radio enthusiast.

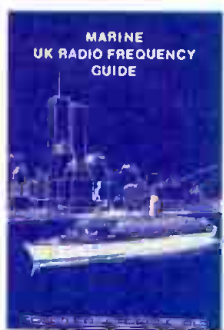
Order Code	Type	Price each
WT83E	Air Band Radio Hbook	£7.99 NV



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Marine UK Radio Frequency Guide

Compiled by **Bill Laver**



Produced for the benefit of the many enthusiasts who enjoy listening to marine radio transmissions, this book is entirely devoted to UK stations as it is felt that these provide the greatest interest for listeners in the British Isles. It is intended to be a handy reference book for the listener and is not a definitive manual, but contains information that has been taken from official publications and reference books. The frequencies cover both the VHF and short wave bands and to successfully monitor all those listed would require the use of two receivers, one for HF up to 30MHz and another to cover the marine band in the VHF segment to 174MHz. The information has been kept as concise as possible while providing the fullest details from the point of view of the listener. Channel numbers are also included for receivers, with which they are calibrated, mariners are more familiar with channels than frequencies, and coast stations usually direct ships to which channel to use, so you will need to know what they are. The information will fill a need that many have considered long overdue.

Order Code	Type	Price each
WT71N	Marine Freq Guide	£4.95 NV

International Radio Stations Guide

by **P. Shore**



A fully revised and updated edition which includes as much up-to-date information as possible, eliminating that which is no longer current or accurate. It is presented in a most readable way, and includes in many of the tables the town and country in which the radio station's transmitter is sited. The transmission frequency in kHz/MHz and/or wavelength in metres, plus the ERP in kW is listed. The book is divided into fifteen sections including listings of: worldwide short wave stations; medium wave stations in Europe, Middle East and Africa; and UK FM stations. There are listings of broadcasts in English, as well as useful information for SWL's such as time differences around the world, country codes, using the ISRG, choosing a short wave receiver and lots more.

Order Code	Type	Price each
WP36P	Radio Stations Guide	£5.95 NV

World Radio TV Handbook

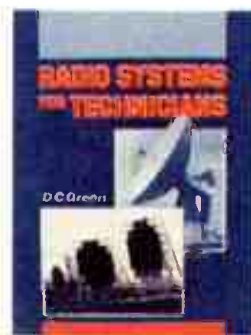
A complete directory of international radio and television with details of every broadcast station in the world, including frequencies, operating times, announcers station identification and signature tune. Also contains articles of interest to listeners to world broadcasts. Annual, current edition supplied.



Order Code	Type	Price each
XW91Y A1	Book WRTV	£18.99 NV

Radio Systems for Technicians

by **D. C. Green**



This book provides a comprehensive coverage of the circuits and techniques used in modern radio communication systems and equipment. The BTEC scheme for the education of telecommunication technicians introduces the basic principles of radio systems in a unit intended for inclusion in certificate/diploma courses. This book has been written to provide a complete coverage of this unit. All the important aspects of radio engineering are covered from amplitude and frequency modulation, r.f. transmission lines, aerials and radio wave propagation, to the circuits and techniques used in modern radio receivers and transmitters and communication systems. A comprehensive text on radio communication systems is provided that should be eminently suitable for all non-advanced students of radio engineering.

Order Code	Type	Price each
WZ84F	Radio Syst For Techs	£15.99 NV

The Setmakers

by **Keith Geddes in collaboration with Gordon Bussey**



This very enjoyable book tells of the British involvement in the development of radio and television, the colourful characters involved, which led to the enormous growth in radio in the 30s, and television in the 50s. This rapid growth was soon followed by an equally rapid fall, with the subsequent loss of famous household names in manufacturing. This change in fortunes left many in its wake and witnessed some hugely expensive casualties. The book discusses the interdependence of setmakers and broadcasting, and in particular the very close liaison between the setmakers and the BBC. This liaison led to major technological developments in Britain, not least of all, television, which by 1937, Britain was showing to the world. The book is very much up to date, as it goes on to tell the story of the chaos surrounding the introduction of satellite TV in the UK.

This profusely illustrated hardback book is highly recommended to anyone, young or old, who has an interest in radio or television, as it provides a detailed history of setmaking in the UK.

Order Code	Type	Price each
WZ96E	The Setmakers	£14.95 NV

The Story of Radio

by **Graham Dixey**



The Story of Radio was first serialised in the Maplin Magazine 'Electronics' and proved to be extremely popular amongst readers. Now for the first time The Story of Radio is available in one volume. Now you have the opportunity to read about Marconi and his pioneering work. Read how radio helped trap the notorious character Dr Crippen and how wireless was adapted for use by the armed forces during both world wars. Gain an insight into radio from space and follow the development of the transistor from the mighty valve.

Order Code	Type	Price each
XL17T	Story of Radio	£1.95 NV

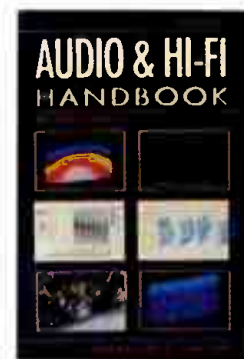
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AUDIO BOOKS

Newnes Audio and Hi-Fi Handbook

2nd Edition

Edited by **Ian Sinclair**



Prior to the introduction of digital audio, advances in Hi-Fi technology was very much a case of the law of diminishing returns. However, during the late eighties and now the nineties, this situation has changed, with advances in audio technology on the move again. This book is concerned with the new technology and is aimed at the professional designer, service engineer and home user, as the book covers areas where professional and domestic audio overlap, such as electronic music and public address. The handbook covers a vast range of audio topics from the basic theory of sound waves and acoustics through to digital equipment such as compact disc, NICAM, DAT, DCC and MD. Loudspeakers and enclosures as well as in-car audio are all covered in great detail. A must for all Hi-Fi enthusiasts whether professional or amateur.

Order Code	Type	Price each
AA09K A3	Audio & Hi Fi H/Book	£40.00 NV

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The New Stereo Soundbook

by F. Alton Everest and Ron Streicher

This book sets out in a very readable and non-mathematical way to answer the question – what is stereophonics? The book is suitable for the beginner and novice alike, as no previous knowledge is required, although an interest in stereo or audio production would be useful. The opening chapter gives an interesting and informative history of stereophonics. The following chapters deal with how stereo information is conveyed to the ear, and how the ear and brain interpret stereo information. Two chapters are devoted to the philosophical and pragmatic implications of stereo production techniques, while five chapters examine in detail modern stereo microphone practices. Other chapters explore 'auditory spaciousness', colouration of sound, and optimising the stereo listening environment. This profusely illustrated book is packed with tips and techniques you can use to get the most out of your stereo system. 1992. 294 pages. 235 x 189mm, illustrated. American book.



Order Code	Type	Price each
WZ68Y	Stereo Soundbook	£16.95 NV

Designing, Building and Testing Your Own Loudspeaker System

by D. B. Weems

The book contains many detailed plans for speaker-box construction, for one, two or three-way systems. Simplified design charts are provided so that it is easy to design your own system. Full circuit details of many different types of crossover networks are given and much of the theory is explained, and includes much background theory with useful mathematical formulae. The appendix even includes a speaker design program listing to run on IBM compatible computers. 1990. 222 pages. 236 x 186mm, illustrated. American book.



Order Code	Type	Price each
WG82D	Book FT1364	£16.95 NV

Killer Car Stereo on a Budget

by Daniel L. Ferguson

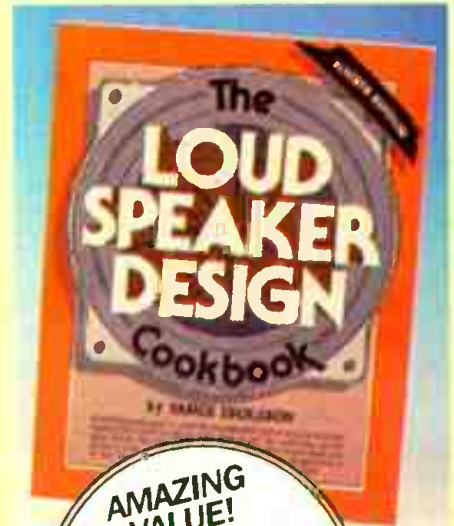
Car stereo systems have come a long way in the last few years, particularly in the field of electronics. However, what the driver and passengers hear has remained largely unchanged, normally due to the severe limitations posed by the loudspeaker systems installed by the car manufacturer. The purpose of this handy little book is to describe in detail how to build and install a high-powered, biamped in-car loudspeaker system. Although an American book, there are many suggestions and ideas that can be adapted by anyone with enthusiasm and a reasonable understanding of electronics and loudspeakers. The book includes



THE LOUDSPEAKER DESIGN COOKBOOK – FOURTH EDITION

by Vance Dickason

This latest edition of this highly regarded book provides a comprehensive listing of the most widely accepted engineering procedure that can be used to construct a pair of high quality loudspeakers – with the minimum of test gear. Additionally, the text describes the science of loudspeaker design, and using all this information, will yield numerous possible variations in loudspeaker design, with a wide range of subtle and not so subtle differences. The opening chapter gives a very detailed but easily understandable insight into how loudspeakers work. The following chapters delve into closed box, vented-box, passive radiator and transmission-line low frequency systems. These chapters are followed by cabinet construction, mid and high frequency drivers, passive and active crossover networks and loudspeaker testing. A highly recommended book for all those who wish to build a pair of high quality loudspeakers to be proud of. 1991. 192 pages. 279 x 214mm, illustrated. American book.



NEW

circuit and construction details for an electronic filter-crossover designed for use with a sub-woofer, that can be made from readily available components. There are suggested systems for saloon, hatchback and pickups, with in-depth guides on installation. 1989. 126 pages. 216 x 152mm, illustrated. American book.

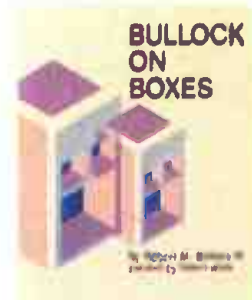
Order Code	Type	Price each
AA77J	Budget Car Stereo	£7.99 NV

Bullock on Boxes

by Robert M. Bullock

This book is a compilation of a series of articles written by the author for the highly regarded magazine Speaker Builder. It is an easy to read guide to designing and building vented-box systems based on Thiele-Small models. In addition to the background theory and descriptions of the models, the text covers a host of related information drawn from a variety of sources. By far the best way to tackle the design of a loudspeaker box is to use a computer program of the model to investigate the various options. The use of computer programs is explained in clear detail with programs supplied and developed by the author. Filled with tables, graphs and design tables this book is a must for the serious home loudspeaker constructor. 1991. 79 pages. 279 x 215mm, illustrated. American book.

NEW



Order Code	Type	Price each
AA76H	Bullock On Boxes	£8.99 NV

Loudspeaker Enclosure Design and Construction

Selection of cabinet designs and enclosures for the chassis loudspeaker units in Maplin's BIG CAT range of loudspeakers and many others. Comprehensive guide-lines are given for tackling construction, stressing important points such as the care needed and details to consider in selecting materials, making joints, sealing, baffle mounting the driver units, wadding the cabinet and paying proper attention to electrical connections to guarantee a worthwhile finished product. Twenty-nine designs are described, from small-sized bass reflex cabinets using 12in dia. full range drivers, through folded horns, to monster multi-way high power systems. 1991. 165 pages. 298 x 210mm, illustrated.



Order Code	Type	Price each
WM82D	Spkr Cabinet Designs	£9.95 NV

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Loudspeakers for Musicians

by Vivian Capel

Few musicians can claim also to be sound technicians. Their scene is making music, not delving into the technicalities of the complex equipment that nowadays is needed to produce it, yet the high cost of equipment makes the prospect of constructing your own very attractive. With electronic equipment there is little that can be done in the way of DIY unless you are one of the knowledgeable few. It is a different story with loudspeakers, however. Great savings can be had from building your own, and you do not need to be an electronics expert. Ten designs are included at the end of this book which should give results equally as good as commercial ones at a fraction of the cost. This book looks at the subject from the musician's point of view, and although some technical terms must of necessity be used, they are explained to make them clear to a non-technical reader. It explores the nature of sound, examines different driver designs and types of cabinets, and explains why wadding is used. This is a loudspeaker book written especially for working musicians.

1991. 170 pages, 178 x 111mm, illustrated.
Order Code WT47B **Type** Speakers for Muscns **Price each** £3.95 NV



Public Address Loudspeaker Systems

by Vivian Capel

The loudspeaker system is a critical part of any public address installation. All too often, it is woefully inadequate, resulting in poor intelligibility and unnatural reproduction. This book examines the various systems and their drawbacks, describing LISCA, the Line Source Ceiling Array. This gives astonishing clarity, coverage and reduced feedback, natural source location and even a pseudo-stereo effect. It promises to be the ultimate system for small to medium sized halls. Full step-by-step constructional and installation details are given. Also included: low impedance matching, 100V line systems, transmission lines, and how to design and install inductive hearing-aid loops. Few public address systems could not be improved from the information supplied in this book.

1990. 114 pages, 178 x 110mm, illustrated.
Order Code WT25C **Type** Public Address Spkrs **Price each** £3.95 NV



An Introduction to Loudspeakers and Enclosure Design

by V. Capel

There is more to building a loudspeaker enclosure than just fitting a couple of speaker units into a box. There are many types of enclosure and drive units, each having their own features, good points and snags. This book explores these, and in particular examines the whys and wherefores so that the reader can understand the principles involved and so make an informed choice of design, or even design loudspeaker enclosures for him or herself.

Crossover units are also explained, the various types, how they work, the distortions they produce and how to avoid them. Finally, there is a step-by-step description of the construction of the Kapellmeister loudspeaker enclosure, a design that involves novel features which overcome many of the disadvantages of more conventional types. It is a transmission line speaker that has remarkable stereo imaging, an uncoloured musical sound, occupies minimal floor space and is inexpensive to build.

1988. 148 pages, 178 x 111mm, illustrated.
Order Code WS31J **Type** Intr L/S Encl Design **Price each** £2.95 NV



Digital Audio and Compact Disc Technology

Second Edition

This book is essential reading for audio engineers, students and hi-fi enthusiasts. All modern and proposed sound transmission and storage systems use digital techniques, specifically pulse code modulation (PCM). This book forms a clear and easy-to-follow introduction and includes a technical description of DAT (Digital Audio Tape). The book starts with a short history of audio technology and then goes on to discuss: Principles of digital signal processing; sampling, quantisation, A/D conversion systems; codes for digital magnetic recording, principles of correction; the compact disc, compact disc encoding, optoelectronics and the optical block, servo units in CD players, signal processing; digital audio recording systems, PCM, Video 8, R-DAT, S-DAT.

1992. 247 pages, 246 x 189mm, illustrated.
Order Code WZ53H **Type** DAT/CD Tech **Price each** £17.95 NV



Introducing Digital Audio, CD, DAT and Sampling

Second Edition by Ian R. Sinclair

The compact disc (CD) was the first device to bring digital audio methods into the home, and digital audio tape (DAT) equipment has now appeared. All this development has involved methods and circuits that are totally alien to the technician or keen amateur who has previously worked with audio circuits. This book is intended to bridge the gap of understanding for the technician and enthusiast. The principles and methods are explained, but the mathematical background and theory is avoided other than to state the end product. The aim is to show what is involved in the digital part of audio signals, particularly in the newer devices such as CD, DAT and sampling, rather than go into esoteric details.

1992. 160 pages, 216 x 138mm, illustrated.
Order Code WP95D **Type** Intro Digital Audio **Price each** £7.95 NV

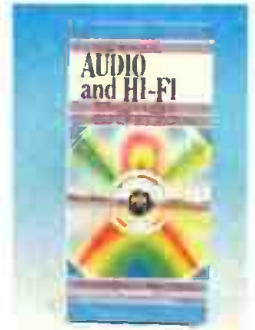


Audio and Hi-Fi Engineer's Pocket Book

Second Edition by Vivian Capel

A concise collection of practical and relevant data for anyone working on sound systems. The topics covered include microphones, gramophones, compact discs, tape recording, high quality radio, amplifiers, loudspeakers and public address. Acoustics is not often dealt with in audio books, so a section has been included dealing with most aspects the technician is likely to encounter, from human hearing to sound insulation.

1991. 209 pages, 196 x 95mm, illustrated.
Order Code WP90X **Type** Audio/Hi-Fi Poket Bk **Price each** £10.95 NV



How to Set Up a Home Recording Studio

by David Mellor

For musicians, recording enthusiasts and students, this book explains how to set up a home recording studio with practical details on equipment, wiring, acoustics and sound-proofing, with a useful glossary of terms and lists of useful addresses. The book describes the setting up of an eight to sixteen track studio with an outline of the musical and recording equipment needed, but concentrates on the techniques of putting that equipment together into an efficient and productive recording studio in the home. Includes invaluable but hard to come by advice on patchbay wiring schemes, and describes how to custom build a rack to suit your own particular requirements. If you already have a studio at home or are thinking about setting one up, there's something in this book for you.

1990. 124 pages, 215 x 136mm, illustrated.
Order Code WS88V **Type** Setup Hme Rec Studio **Price each** £6.95 NV



Acoustic Feedback - How to Avoid It

by Vivian Capel

While feedback cannot be completely eliminated, there are certain things that can be done to reduce it to a level at which it is no longer a problem. Some types of microphones and certain loudspeaker systems can affect feedback, as well as the way the units are positioned. Additionally, live concerts have special requirements which can affect feedback. All these matters are fully explored, as well as electronic aids such as equalisers, frequency shifters and notch filters. Also includes a circuit and layout for an inexpensive, but highly successful, twin-notch filter, with instructions on use.

1991. 98 pages, 178 x 110mm, illustrated.
Order Code WT89W **Type** Acoustic Feedback **Price each** £3.95 NV



ELECTRONIC MUSIC BOOKS

Electronic Music Projects

by R.A. Penfold

Contains circuits and construction details of many not too complex electronic music projects including fuzz-box, waa-waa pedal, sustain unit, reverberation, phaser unit, tremolo generator and many more. 1980. 112 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
XW40T	Book BP74	£2.95 NV

Practical MIDI Handbook

by R.A. Penfold
Second Edition

The Musical Instrument Digital Interface (MIDI) is surrounded by a great deal of misunderstanding, and many of the user manuals that accompany MIDI equipment are quite incomprehensible to the reader. This book is aimed at musicians, technicians and enthusiasts. It explains what MIDI can do and how you can exploit it to the full, with practical advice on connecting up a MIDI system and getting it to work, as well as deciphering the technical information in those equipment manuals. It covers all the MIDI based equipment you can use; keyboards, drum machines, sequencers, effects units, mixers, drum pads and guitars. There's also a section on computer music that covers software, real and step time sequencing, notation/score writing programs, voice filters, etc. And for those of you who want to do your own MIDI programming there are details of the MIDI code numbers. 1992. 152 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
WP96E	Pract MIDI Handbook	£6.95 NV

Advanced MIDI User's Guide

by R. A. Penfold

This book is for those who wish to go beyond the very basic slaving and sequencer set-ups, and who wish to exploit MIDI to the full. The topics covered include: MIDI modes and codes; MIDI signal routing and patch bays; System exclusive messages and their practical uses; MIDI trouble-shooting including, using a computer as a diagnostic tool; MIDI gadgets, channelisers, filters, merge units, pedals etc.; synchronisation using MIDI time code, SMPTE etc.; the basics of MIDI programming; and MIDI hardware specification. Anything within reason can be accomplished with MIDI – this book shows you how. 1991. 192 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
WT52G	Adv Midi User Guide	£9.95 NV

MAPLIN KEY CALL

Phone 01702 556751

MIDI Projects

by R.A. Penfold

MIDI interfacing enables any so equipped instruments, regardless of manufacturer, to be easily interconnected and used as a complete, sophisticated system. This book provides details of how to interface most of the popular home computers with MIDI systems, including all circuit diagrams with operational detail, plus examples of programming used to drive the interface. Machines catered for include the Amstrad CPC464 and 6128, CBM 64 and VIC-20, BBC Model B, MTX and MSX computers, and the Sinclair QL, Spectrum and ZX81. The book also includes examples of interfacing MIDI equipment to analogue and percussion synthesisers. 1986. 103 pages. 178 x 112mm, illustrated.



Order Code	Type	Price each
WP49D	MIDI Projects	£2.95 NV

More Advanced MIDI Projects

by R.A. Penfold

The projects in this book fall into two main categories; those that are designed to overcome a deficiency in an item of equipment in the system and those that are designed to enhance performance of the system or to make it easier to use. Included are circuits for a MIDI indicator, THRU box,



merge unit, code generator, pedal, programmer, channeliser and analyser.

These projects are generally more complex than those featured in the MIDI Projects book, although a few simple units have been included as well. While most of the projects are not suitable for beginners, they should be well within the capabilities of someone who has a reasonable amount of experience in electronics construction. The circuits should also provide some useful electronic building blocks for use in readers' own designs.

1989. 128 pages, 178 x 110mm, illustrated.

Order Code	Type	Price each
WS43W	More Adv MIDI Project	£2.95 NV

Electronic Music Learning Projects

by R. Bebbington

It is a sad fact that electronic hobbyists with little or no knowledge of music often ignore projects that have the slightest hint of musical flavour. The converse is also true. Musicians are often reluctant to consider an electronic project with a musical bias. The projects in this book have been written in a style that attempts to bring together both types of enthusiast. Whether you are interested in music or electronics, or both, then these unusual projects will provide many hours of entertainment. All the projects in the book are powered by a 9V battery. 1993. 120 pages. 173 x 111mm, illustrated.



Order Code	Type	Price each
AA13P	Music Learning Project	£4.95 NV

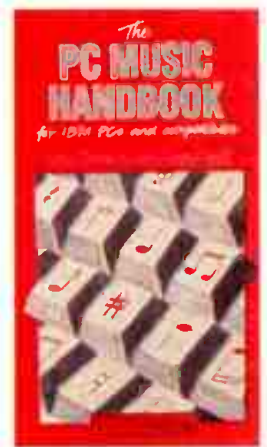
The PC Music Handbook

by Brian Heywood and Roger Evan

This book takes you through the creative possibilities of the PC and is a guide through the twin minefields of choosing software and hardware for making music. It will be of interest to the professional musician, the gifted amateur or the just plain curious. It explains the possibilities of computer music and covers what is currently available in both software and hardware.

It advises which pitfalls to avoid, and suggests a number of possible music systems that could bring out the best in your musical skills or creativity. Contents include: music as text; the MIDI connection; MIDI sequencing on the PC; using the PC for remote control; the PC as a sound source; bits and the PC; and MIDI specifications and on-line communications among the appendices. 1991. 160 pages, 216 x 138mm, illustrated.

Order Code	Type	Price each
WT53H	PC Music Handbook	£8.95 NV



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MAPLIN SERIES – MUSIC PROJECTS **NEW**

by R. A. Penfold

The author's reputation for innovative circuit designs and well-thought out projects is firmly established. His work has been regularly featured in the popular 'Bob's' Mini Circuits' section of Electronics – The Maplin Magazine. This is a collection of his best ideas from the magazine and features projects based on music applications. Components are widely available and the circuits form the basis for further experiments. Circuit diagrams are shown and include parts lists along with photographs of the main circuits. Projects include an accented metronome, a tremolo unit, a guitar compressor, a bass fuzz, a chorus unit and many more. 1994. 200 pages. 216 x 138mm, illustrated.



Electronic Music and MIDI Projects **NEW**

by R. A. Penfold

The projects described in this book are primarily aimed at keyboard players and are easy to build – even complete beginners to project building will find them easy to assemble.



All the projects are explained in detail, with full instructions on assembly. They are accompanied by clear, precise, easy to follow circuit diagrams, schematic drawings, component layouts and lists. The basic mixer, MIDI tester, MIDI lead tester, metronome, electronic swell pedal, THRU box, and MIDI automatic switcher are all well suited to beginners. Other projects included are the analogue echo unit, stereo mixer, MIDI patchbay and the byte grabber. None of the designs require the use of any test equipment in order to set them up – any setting up is very straightforward and described in detail. 1994. 140 pages. 245 x 190mm, illustrated.

Order Code	Type	Price each
AA81C	Music-Midi Projects	£9.95 NV

Electronic Projects for Guitar

by R. A. Penfold

Whether you wish to savemoney or simply have fun building some electronic music gadgets, the designs featured in this book should suit your needs. The projects are all easy to build and include a guitar preamplifier, headphone amplifier, soft distortion effects unit, compressor, auto-waa, waa-waa pedal, phaser, dual tracking effects unit, expander, treble booster, dynamic treble booster, dynamic injection box, improved distortion unit, thin distortion unit and a guitar tuner. Several projects are so simple that even complete beginners at electronic project construction can tackle them with ease. Each project has an introduction, an explanation of how it



works, a circuit diagram and complete instructions on stripboard layout and assembly. All the designs are suitable for any normal guitar pick-ups, both high or low output types. None of the designs requires the use of any test equipment in order to get them set up properly. Where any setting up is required, the procedures are very straightforward, and they are described in detail. 1992. 113 pages. 246 x 190mm, illustrated.

Order Code	Type	Price each
WZ61R	Guitar Projects	£8.95 NV

Musical Applications of the Atari ST's

by R.A. Penfold

The Atari ST computer range is now firmly established as the computers to use in electronic music applications. The range and sophistication of these machines may not be fully realised or understood by most people – this book aims to correct these misunderstandings and present the Atari ST as a useful tool in developing your musical talents. A wide selection of topics are covered – the internal sound chip, the AY-3-8910; MIDI, (musical instruments digital interface); applications programs such as sequencing and score writing etc.; simple but useful add-on projects for MIDI programming. Much of the material is usable by anyone who understands no more than just the basics of an ST, and who does not possess a great deal of electronics expertise. A great many screen photographs of actual programs (Lengeling/Adam, Hybrid Arts Inc) are given to assist the reader. All the subjects are covered in much detail with particular reference to the ST computers. Whatever your interest in music and the ST computer, this book will provide plenty of interesting and practical ideas for you to develop your interest and musical talents to the full. 1988. 90 pages, 263 x 192mm, illustrated.



Order Code	Type	Price each
WS24B	Musical Apps of STs	£5.95 NV

TV & VIDEO BOOKS

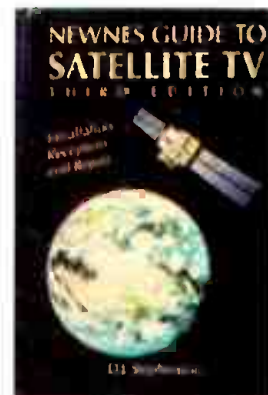
Guide to Satellite TV

Installation, Reception & Repair

Third Edition

by D.J. Stephenson

A practical guide, without excessive theory mathematics, to the installation and servicing of satellite TV receiving equipment, primarily for those involved in the aerial installation and TV trades. The book includes computer programs, written in the simplest Microsoft dialect of BASIC to run on any PC or 8-bit micro, for the calculation of elevation, azimuth, polar and declination angles from any point in Europe for any current or future satellite. Among the many practical matters covered are the problems of 'sparklies', rain, trees, and vandals (the latter solved by the 'two-dunks high' dish-mounting rule!). Contents include an overview of satellite TV, antennae, head units, cables, line amplifiers and connectors, satellite receivers, the 'linked budget' calculation; installation and alignment of antennae and cabling, indoor wiring up, repairs and appendices and glossary. 1991. 381 pages. 240 x 160mm hard cover, illustrated.



Order Code	Type	Price each
WT06G	Guide To Sat TV	£18.95 NV

World Satellite TV and Scrambling Methods

The Technicians Handbook – 3rd Edition from Frank Baylin, Richard Maddox and John McCormack

The purpose of this book is two-fold; to provide a technical training and reference source on home satellite systems, and to provide a troubleshooting manual that can be used on almost any satellite receiving system. Although satellite systems have become a commonplace consumer product, their installation and service are certainly more complex than, for example, stereo or other video entertainment components. This profusely illustrated book assumes that the reader already has an understanding of basic electronics, as well as some knowledge of TV and FM broadcasting. It is indispensable for satellite television system installers, technician engineers or anyone who is interested in acquiring detailed knowledge of satellite systems. 1993. 371 pages. 277 x 214mm, illustrated American book.



Order Code	Type	Price each
WZ75S	World Satellite TV	£29.00 NV

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01702 553935

The Satellite Book

A Complete Guide to
Satellite TV Theory and Practice
Second Edition
by John Breeds

This book provides a broad yet fairly in-depth introduction to satellite related subjects for both technicians and enthusiasts. The chapters are organised into two broad sections; practical, and theoretical. The topic for each chapter was carefully chosen, and the text written by a recognised expert in this particular field. The result is a handbook that is both comprehensive and authoritative. Contains lots of really interesting information about the satellites, signal protocols, scrambling, signal distribution and much more.

1992. 289 pages. 295 x 210mm, illustrated.



Order Code	Type	Price each
WT46A	2 The Satellite Book	£30.00 NV

Satellite Television Installation Guide

Third Edition by
John Breeds

The purpose of this booklet is to help newcomers to correctly align both azimuth/elevation and polar mount dish types. If a polar mount assembly is accurately set up then the dish will be able to automatically track the satellites available now, and those launched in the future. The usual

knowledge and skills normally associated with installing terrestrial UHF aerials are assumed. The booklet provides detailed guidelines on how to install a dish and receive satellite pictures. There are no mathematical explanations or complex formulae involved. The notes and procedures given are based on practical experience. They provide readers with hints and tips, tricks of the trade and other quick but accurate methods of aligning a dish. The challenge of the changing technology must be continually met by all of the support services, and this guide is designed to help installation technicians achieve this, and so is equally useful to the competent home DIY enthusiast.

1992. 60 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
WT45Y	Sat TV Instal Guide	£15.00 NV

Broadcast Television Fundamentals

by Michael Tancock

This book deals with the fundamentals of television with special emphasis given to the techniques used in broadcasting. It is aimed at technicians having a good general knowledge of electronics, including some digital techniques, but who are unfamiliar with the special requirements needed to produce high quality television pictures. Also suitable for graduate electronics engineers who have not previously dealt with the engineering aspects of television. The book begins with the fundamental considerations of the portrayal of motion, deals in some detail with the colorimetry of television, and goes on to look at the very latest techniques such as CCD sensors, high-definition television, MAC coding and serial data communications. The explanations are detailed but deliberately keep the use of mathematics to a minimum. Although specific examples are based upon the UK television system, the NTSC and SECAM systems are also examined in sufficient depth to make the book international in its scope.

1991. 175 pages. 240 x 160mm, hard cover, illustrated.



Order Code	Type	Price each
WT97F	TV Fundamentals	£26.00 NV

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Newnes Guide to TV and Video Technology

by Eugene Trundle

This book represents a breakthrough in terms of value-for-money technical information. Based on two of the most popular Technical Guides, this new edition brings together in depth accounts of television and VCR technology. In twenty one chapters, over 250 illustrations and 400 odd pages, the technicalities of television, video and allied equipment are lucidly and concisely explained for the benefit of technicians, students, laymen and others. Coverage is wide and deep, extending from the camera lens via videotape signal processing and deck management to the very latest TV screen technology. Along the way we look at space satellites, microcomputers and such practical matters as videorecorder servicing and maintenance. Eugene Trundle, a practising video and TV engineer, has a knack of conveying highly technical information in the form of a 'good read'. It is well demonstrated here.

1988. 432 pages. 185 x 128mm, illustrated.



Order Code	Type	Price each
WS34M	Guide TV-Vid Tech	£14.95 NV

Television Receivers

by K. F. Ibrahim

This book sets out to comprehensively explain the use of discrete and IC components in modern TV receivers. The text is profusely illustrated with diagrams, many of which are practical circuits currently used by TV receiver manufacturers. The book provides a thorough coverage of TV receiver theory and practice, starting from basic principles of monochrome and colour reception through to digital processing of TV signals. A full explanation of NICAM digital stereo and computer controlled TV receivers is included, as well as comprehensive coverage of digital techniques, that are used in modern TV receivers. The book will be particularly useful for students studying BTEC level II, III, IV, City and Guilds courses and anyone involved in courses with television reception as a subsidiary topic. The TV servicing engineer will find this book a useful source of reference reading.

1992. 230 pages. 245 x 189mm, illustrated.



Order Code	Type	Price each
WZ91Y	Television Receivers	£11.99 NV

COMPUTER BOOKS

From Chips to Systems

by Rodney Zaks & Alexander Wolfe

A basic text on microprocessors discussing concepts and definitions; how the micro operates, techniques and components needed to implement memory and input/output functions; relative merits of major microprocessor chips; how to assemble the components into a system; applications and how to build for them; interfacing to standard peripherals; and simple programming.

1987. 604 pages. 228 x 190mm, illustrated. American book.



Order Code	Type	Price each
RQ01B	A1 Book Sybex C201	£25.50 NV

An Introduction to Microcomputer Systems

Architecture & Interfacing
by John Fulcher

Provides a thoroughly modern and up-to-date introduction to microcomputer interfacing, as well as a general introduction to the fundamentals of microcomputer architecture. Discussion of the hardware and software aspects of interfacing are woven together and exemplified by reference to two industry standard 16-bit microprocessors, the Intel i8086 and the Motorola 68000.



Continued on next page.

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Continued from previous page.

Contains over 350 diagrams and written in a clear and friendly style, and packed with up-to-date specifications and data. Numerous programming examples are shown based on the two standard 16-bit microprocessors, with self test objectives and summaries provided with each chapter, with self-assessment review questions.

Suitable for students of computer science and electrical and computer systems engineers, and anyone who needs to interface real-world devices and peripherals to their microcomputers. For those with a hardware background, the necessary I/O programming techniques are introduced; for those with a programming background, the relevant hardware concepts are presented.

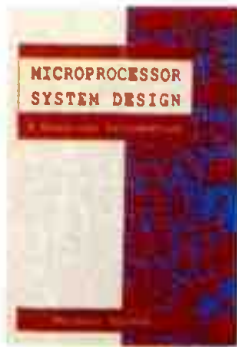
1989. 440 pages, 240 x 160mm, illustrated, hard cover.

Order Code	Type	Price each
WT11M	A2 Intro MCP Systems	£21.95 NV

Microprocessor System Design

A Practical Introduction
by Michael Spinks

This book introduces the essential concepts and techniques that underlie the design of useful electronic circuits, especially microprocessor boards and their peripherals. No previous knowledge of electronics is assumed: new terms and ideas are explained as they arise, and maths and jargon are kept to a minimum, the book concentrates on helping the reader acquire and understand the few relatively simple elements and techniques from which complex circuits are built up. The book is not just about microprocessor systems. There is also plenty of information about other electronic circuits and devices, including op-amps. After an introduction to these electronic circuits, both analogue and digital components, op-amps and PALs, the book goes on to describe how microprocessors work and how they are used in bus-based systems. To conclude, some practical aspects of electronics design are examined.



Order Code	Type	Price each
WZ47B	Micro Sys Design	£19.95 NV

Microcomputer Interfacing

An Experimental Approach using the Z80

by Mike Cavenor & John Arnold

Adopts a highly practical approach in presenting the topic of micro-computer interfacing. The material is based upon the Z80 MPU, an industry standard, and its support peripheral chips. While it is not the most modern microprocessor, the Z80 nevertheless is ideal for learning the fundamentals of this important subject. The subject is most effectively learned when ample opportunity is provided to reinforce theoretical concepts with relevant real exercises. Full notes are provided for up to forty actual experiments. This approach will encourage the reader to carry his design work through to a final operating system stage. In the process, you will have to write much of the



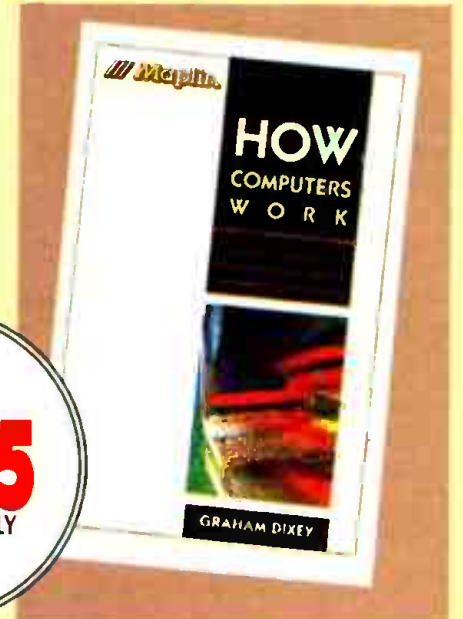
Order Code	Type	Price each
WT98G	A1 Micro Interfacing	£21.95 NV

MAPLIN SERIES – NEW HOW COMPUTERS WORK

by Graham Dixey

In an informative and straightforward manner, the author describes how to turn what might seem an incomprehensible "black box" into a powerful and enjoyable tool that can help you in all areas of your work and leisure. The book explains how computers interact with the world around them and therefore make them a useful tool. Topics covered include descriptions of all the components that make up a computer, principles of data exchange, interaction with peripherals, serial communications, input devices, recording methods, computer-controlled motors and printers. Filled with plenty of handy tips and clear illustrations, this book can improve your computer system.

1994. 200 pages. 216 x 138mm, illustrated.



assembly language programs yourself, however, the book shows how to set about carrying out the construction of real hardware which includes a monophonic organ and pulse and waveform generators, seven segment displays, keyboard interface, digital storage oscilloscope, intruder alarm controller, serial communications and serial links. Australian book.

1989. 382 pages. 234 x 170mm, illustrated.

Order Code	Type	Price each
WS85G	A1 MPU Interfacing	£18.95 NV

Microcomputer Interfacing

A Practical; guide for Technicians, Engineers and Scientists

by Joseph J. Carr

The microprocessor has literally revolutionised the electronic instrument and control system design fields, and has done so in record time. Where instruments designer were once exclusively analogue engineers, today's instrument designer has to be a synergist who can integrate the principles of sensor selection, analogue circuit design and operation. Today, even small instruments are based on microprocessor chips, and for that reason these devices are considered in some detail. There are three basic forms of computer mentioned. first there is of course the IBM PC or compatible type that is now the standard of the industry. But also covered are the Apple II computer and the Z80 chip. The book provides a practical, workbench basis for both electronics engineers and other technicians whose expertise is in fields other than electronics or computing.

1991. 462 pages. 227 x 150mm, illustrated. American Book



Order Code	Type	Price each
WT98G	A1 Micro Interfacing	£21.95 NV

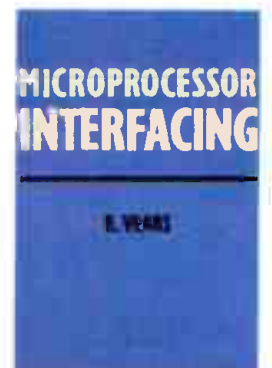
Microprocessor Interfacing

by R. Vears

Principally this book covers the BTEC level NIII Microprocessor Interfacing syllabus U86/335, and can be regarded as a comprehensive textbook on the subject of interfacing microprocessors to external peripherals and sensors. The text concentrates on the widely used 6502, Z80 and 6800/6802 microprocessor families, and so is directly applicable to many 8-bit home microcomputers and 'breadboard' systems using these popular microprocessors. Basic details of typical interfacing devices for each of these are included in the text, but the reader is encouraged to obtain complete data sheets for such a device when the need arises to solve an interface problem. Copious amounts of detailed hardware and software examples are provided covering signal amplification and filtering to condition the output from external sensors and make them logic compatible, D/A and A/D conversion, data transfer techniques including STD and IEEE-488 bus protocols, and parallel and serial I/O including the EIA-RS232 standard. Well recommended for anyone planning a home built microprocessor system, no matter how modest, to communicate with another computer or electronic peripherals including relays, motors, sensors and opto-isolators etc.

1990. 200 pages. 226 x 150mm, illustrated.

Order Code	Type	Price each
WT14Q	MCP Interfacing	£12.95 NV



THE BEST OF SERVICE

Interfacing Standards for Computers

An IEEIE Monograph
by A.C. Maine

This monograph serves as an introduction to the interfacing techniques and standards used by computers. Both computer standard buses and local area networks have been deliberately excluded from the text as due to their breadth, complexity and importance, each deserves a monograph in their own right. With communication being such a vital concept in computing systems, the basics of interfacing never hurt from restating. The opening chapter defines the need to have devices which have to be physically connected and which must recognise a common data format. The book then goes on to discuss RS-232C Serial Interface Standard, the IEEE-488 General Purpose parallel interface bus, the HP-IL Serial Interface Standard and Parallel Interfaces in general. A note upon Character Code Standards and Appendices giving a data transmission Glossary and a Summary of the CCITT recommendations complete the work. This book will ensure that linking is both good practice, good engineering and has regard to the International standards and protocols.



1986. 62 pages, 209 x 147mm, illustrated.

Order Code	Type	Price each
WT60Q	IF Standards Comps	£3.95 NV

Understanding Computer Systems Architecture

The Complete Course Text
by M. Lacy

This book is aimed at those students entering high level computing courses with non-computing backgrounds and those students wishing to make full use of open access facilities, and the requirement for more self-study material. This book aims to provide for students in both of these groups, as well as catering for the person new to computing and wanting to find out more about the subject in general, in all its different forms. There are many books at an introductory level which attempt to cover the whole of computing between the two covers. Then there are the higher level books which act as reference texts on specialist areas of computing. However, this book fills the gap between the two by covering the fundamentals in just one discipline, called Computer Systems Architecture. It starts at a general introductory level, providing the reader with the knowledge and skills which will enable him or her to consult the more advanced texts with confidence. The material covered comprises the essentials of various courses called Computer Systems, Computer Architecture and Computer Technology, as taught by the author to HND, degree and BCS level. The book assumes that the reader is already familiar with the representation and manipulation of numbers in various bases (binary, octal, hexadecimal, etc.), and has had some experience with writing simple programs in a high level language such as BASIC or Pascal.



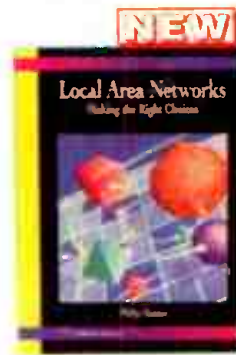
1991. 478 pages. 246 x 188mm, illustrated.

Order Code	Type	Price each
WZ48C A1	Computer Architecture	£10.95 NV

Local Area Networks - Making the Right Choices

by Philip Hunter

Local area networks (LAN) are now an indispensable part of computer installations in small and medium size businesses being the only practical way to share applications and resources such as printers. Without a LAN, it is extremely difficult for companies to exploit information technology (IT) efficiently or competitively. For those who are about to install a LAN, or to upgrade or expand an existing one, then this book will help you choose a LAN system that is compatible with your business requirements and objectives. The book has been written in a non-technical style and is intended to help you to select the most suitable LAN components for your particular requirements or installations.



1993. 340 pages. 233 x 173mm, illustrated.

Order Code	Type	Price each
AA19V	Local Area Networks	£19.95 NV

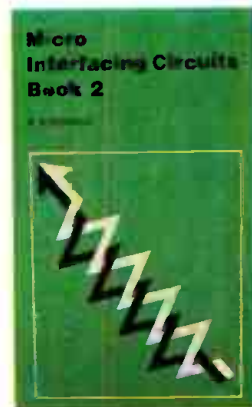


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Micro Interfacing Circuits - Book 2

by R.A. Penfold

Following on from 'Micro Interfacing Circuits Book 1', above, Book 2 deals with practical applications beyond parallel or serial interfacing to the microprocessor. It is about 'real world' interfacing and includes such topics as speech and sound generators, temperature and optical sensors, motor control etc. As with Book 1, practical circuits using real devices are provided with circuit descriptions and any relevant background information, such that anyone with a reasonable knowledge of electronics should be able to use or adapt the provided circuits for their own particular applications.



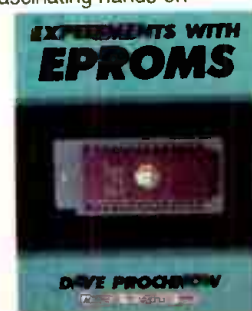
1984. 90 pages. 178 x 110mm, illustrated.

Order Code	Type	Price each
WP12N	Micro I/F Ccts - Bk2	£2.75 NV

Experiments with EPROM's

by Dave Prochnow

This book provides fifteen fascinating hands-on 'EPROM experiments'. Each experiment comprises building different devices to use the EPROM's. These include a 'Boole's box', used for determining the logic levels present on digital IC pins; a keyboard encoder which generates a digit and displays the



character of the key pressed; 'Bit Smasher I' and 'Bit Smasher II', extremely simple and more versatile EPROM programmers; 'Eprogrammer II', a versatile, portable, computer-based EPROM programmer; EPT-EPROM program tester, used to test and debug an EPROM's data before writing the data to the device; 'ROM Drive', and many more.

1988. 240 pages. 233 x 186mm, illustrated. American Book.

Order Code	Type	Price each
WT13P	Exp With EPROMS	£17.95 NV

The Transputer Handbook

by Ian Graham & Tim King

The Transputer Handbook describes the software and hardware implementation of transputer parallel processing systems, bringing together information from a multitude of sources in a readily accessible form. Intended to act as a guide to the capabilities of the transputer family and transputer based systems, the book will show the reader the process of how software and hardware solutions are found for particular problems. Examples of transputer processors mentioned include the T225, T400 and T800 series. An introduction to the OCCAM programming language developed alongside the transputer is introduced, but you will notice several examples alternatively written in 'C'. Not only are example hardware connection circuits provided but also the common transputer assembly language instruction set. If you want to know how transputers work and what they do, you must read this book!



1990. 210 pages, 234 x 172mm, illustrated.

Order Code	Type	Price each
WT27E	Transputer Handbook	£19.95 NV

Computing

An active learning approach
by P. M. Heathcote

The initial aim of this book is to provide the classroom support material needed for computing study courses. It has been designed as an interactive teaching and learning aid, eliminating the need for hand-outs or copious note-taking. This book is also ideal for any reader wanting to get in on the ground floor of computer studies and around which he/she can build a learning programme. There are ten sections covering an introduction to computers and business data processing, programming in Pascal, data structures, databases, systems development, programming languages, compilers and interpreters; internal organisation of computers, operating systems and networks, peripherals, and computer applications and social implications.



1991. 358 pages. 275 x 214mm, illustrated.

Order Code	Type	Price each
WZ44X	Computing	£10.95 NV

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Hard Disk Pocket Book

Second Edition
by Mike Allen & Tim Kay

This book is a comprehensive guide to hard disks, covering every aspect from manufacture, drives and components, organisation, utilities and data security. The utilities include Disk Manager, Norton Utilities, PC Tools, SpinRite II, XTree and Windows 3. Also covers IDE drives and SCSI II technology. In addition floppy drives are introduced and followed by an investigation into what the future might hold for data storage. Also included is an extensive glossary of terms, acronyms and details associated with hard disks. If you own one or are thinking of getting one this book is a must. 1992. 379 pages. 197 x 94mm hard cover, illustrated.



Order Code	Type	Price each
WT03D	Hard Disk Pkt Bk	£12.95 NV

Data Communications Pocket Book

Second Edition
by Michael Tooley

Presenting, in as succinct a manner as possible, information of everyday relevance to the world of data communications. Despite the apparent complexity of the subject, care has been taken to ensure that the book is meaningful to as wide a range of readers as possible. Tabulated reference material has been interspersed with brief explanatory text and relevant diagrams. Invaluable to anyone involved with the interconnection of computer systems: technicians and engineers involved with the installation, commissioning and maintenance of data communications equipment; executives and clerical staff as the 'end users' of data communications related products; and managers involved with the specification and purchasing of such products and systems. Similarly the book should also appeal to the growing number of enthusiasts using data communications for home management and leisure pursuits. 1992. 176 pages. 195 x 95mm hardcover, illustrated.

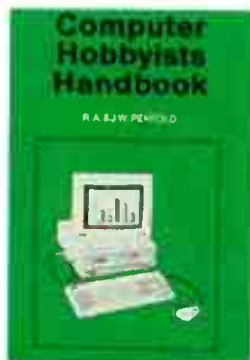


Order Code	Type	Price each
WS77J	Data Comms Pkt Book	£12.95 NV

Computer Hobbyists Handbook

R.A. & J.W. Penfold

The 'Computer Hobbyists Handbook' provides a range of useful reference material in a single source so that it can be quickly and easily located. The subjects covered include microprocessors and their register sets; interfacing serial, parallel, monitor, games and MIDI ports; numbering systems; MIDI codes; operating systems and computer graphics. There is also a useful glossary of computer terms, and appendices covering topics such as ASCII codes, Epson control codes and flowchart symbols. The reader is not simply presented with raw data, but in most cases



there are useful explanations so that the information can be used by beginners as well as more experienced users. Although primarily aimed at the computer hobbyist, no doubt, this book will also prove to be very useful to those involved in computing professionally, as well as being a useful source of information for students. 1989. 120 pages, 264 x 195mm, illustrated.

Order Code	Type	Price each
WS45Y	Comp Hobby Handbook	£5.95 NV

Computer Engineer's Pocket Book

Third Edition
by Michael Tooley

To be able to fully exploit the potential of microprocessors and microcomputers it is becoming increasingly necessary to abandon the old boundaries which have until now existed between what has been called 'hardware' and 'software', simply because it is becoming impossible to work exclusively with one without getting involved somehow with the other. The same is true of any home microcomputer where it is required to be interfaced to the outside world. Includes popular CPU instruction sets, character sets, CMOS and TTL IC pin-outs with internal schematic diagrams, logic symbols, connectors' wiring and a host of glossaries, in fact everything you need to quickly and accurately make up your Veroboard add-ons. 1991. 255 pages. 196 x 95mm, illustrated.



Order Code	Type	Price each
WP69A	Comp Enginrs Pkt Bk	£12.95 NV

The Protection of Computer Software - Its Technology and Applications

Edited by Derrick Grover

Many pieces of commercial software represent the result of many thousands of hours of investment. It is therefore essential for the originator to protect this investment from piracy and corruption. Whilst the law provides certain protection it cannot provide a complete safeguard, and so technical means have emerged. This new edition incorporates chapters on both computer viruses and hacking, covers the state-of-the-art in the technology of software protection, and is intended to create a general awareness of the aims and possibilities of this technology. The book describes techniques which can be implemented to protect programs from being used or copied by the copyright infringer and the software pirate. 1992. 321 pages. 228 x 151mm, illustrated.

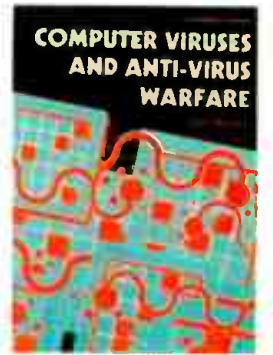


Order Code	Type	Price each
WZ56L	Software Protection	£19.95 NV

Computer Viruses and Anti-Virus Warfare

by Jan Hruska

The virus danger is here to stay. In the U.S., the Far East and Africa it has already reached epidemic proportions, and it is only a matter of time before it becomes more common in the rest of the world. In just the three months of Spring 1989, the number of separately identifiable viruses increased from seven to seventeen. You must read this fascinating book, especially if you own a PC - some examples of the IBM DOS orientated viruses are horrifyingly simple to create and complete in their destructiveness. Read all about 'Trojan horses', 'logic bombs' and 'worms', to begin at the beginning. 1990. 130 pages, 241 x 167mm, illustrated.

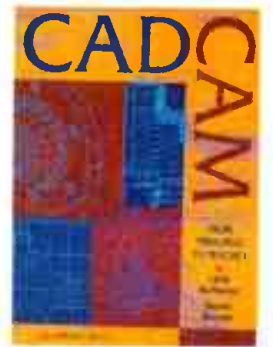


Order Code	Type	Price each
WT39N	Computer Viruses	£17.95 NV

CAD/CAM - From Principles to Practice

by Chris McMahon and Jimmie Browne

The use of computers in the product design and manufacturing process (CAD/CAM) has resulted in some spectacular successes in engineering. This book is intended to give an in-depth understanding of the central techniques of CAD/CAM, by concentrating on both the principles and applications. The reader is taken through the processes of defining with the aid of computers, of developing manufacturing plans and instructions for the product, and of managing the manufacturing system itself. The book is divided into three parts, each part may be looked on as a stand-alone section. Part One, computer-aided design, is concerned with the fundamentals of the modelling process by which designs are defined using computers. Applications of the CAD model within the design process are discussed. Part Two is concerned with activities at the design/manufacture interface, such as the preparation of process plans and manufacturing instructions from the design data. Part Three discusses the planning and control of the flow of work through a factory floor, and considers production planning and control issues at all levels in the factory. The book is intended to provide a tutorial and a reference source for student and professional engineers who have an interest in the application of computers in product design and manufacture. 1993. 515 pages. 241 x 193mm, illustrated. Hardback.



Order Code	Type	Price each
AA06G	CAD/CAM Principles	£19.95 NV

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PCs FOR DUMMIES

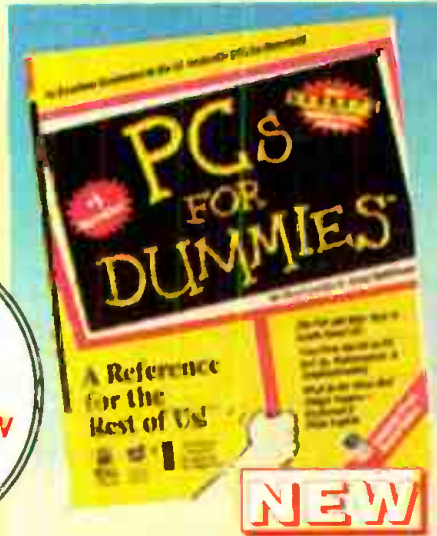
by Dan Gookin & Andy Rathbone

As with other titles in the 'Dummies' series, this book is designed for those people who wish to do the job and not to become computer geniuses. This book is more a reference as each topic is independent and can be read in isolation - cross references are provided for the times when further information is required.

Everything you need to know about your PC is covered in the text, except information on using the software and using DOS.

1992. 395 pages.
235 x 188mm, illustrated.
American book.

SUPER VALUE!
£14.99^{NV}
AA63T



(XT, AT, 80386 etc.); maths co-processors; input devices (keyboards, mice, and digitisers); memory, including both expanded (EMS) and extended RAM; RAM disks and disk drives caches; floppy disk drive formats and compatibility; hard disk drives (including interleave factors and access times); display adaptors, including all standard PC types (C.G.A., Hercules, Super V.G.A., etc.). Contains everything you need to know if you can't tell your E.M.S. from your E.G.A.! 1990. 104 pages, 198 x 128mm, illustrated.

Order Code	Type	Price each
WT26D	Understanding PC Spc	£4.95 NV

Upgrading & Fixing PCs For Dummies

by Andy Rathbone

As with the other books in this series, this book is not really for dummies, but for those people who are short of time and are not really interested in becoming a PC whiz-kid. With the help of this book and suitable screwdrivers, you should be able to repair or upgrade your PC and you will not need to learn anything during the process. This book is more a reference that provides a host of little gems of information. By following the step-by-step instructions and pictures, you can upgrade your computer to run today's most powerful software by adding memory, or a new or bigger hard drive. 1993. 360 pages. 235 x 188mm, illustrated. American book.

Order Code	Type	Price each
AA55K	Upgrade PCs/Dummies	£17.99 NV



The Personal Computer

by J. R. Doyle

There have been many books and articles in the leading PC magazines explaining how to use the modern 'Personal Computer', how it works and describing the system operation. To many readers, the information given has been a case of 'too much, too soon', with many authors showing off their in-depth knowledge and expertise of the subject matter. This book breaks the mould and starts from the very bottom, and explains everything in plain language. When some technical knowledge is given, this is presented as simply, and as concise as possible. The book covers basic fundamentals such as types of hardware, keyboard layout, types of VDUs, mouse, floppies and printers. Several chapters are devoted to using a PC and hopefully, to alleviate the readers fears about their use. A handy little book that should remove many of the problems that many first-time users of PCs experience. 1993. 134 pages. 210 x 148mm, illustrated.



Order Code	Type	Price each
WZ95D	Personal Computer	£8.95 NV

Computing for the Terrified!

by Steve Greenwood

This handy and inexpensive book is not designed to teach you how to operate a wordprocessor or spreadsheet, but it is intended to make the reader feel more comfortable using a machine that is running such applications. The book will provide you with an insight into the many and varied uses such a machine can be put to, as well as a detailed explanation of computer jargon. This well-written book that should be of great benefit and reassurance to the computer novice. 1993. 160 pages. 217 x 151mm, illustrated.

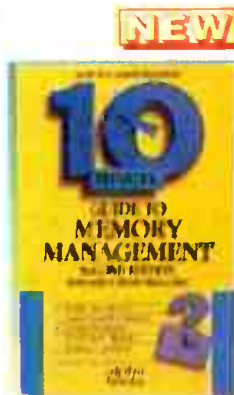


Order Code	Type	Price each
AA52G	Comp F/The Terrified	£6.95 NV

10 Minute Guide To Memory Management - Second Edition

by Jennifer Flynn, revised by Robert Mullen

This handy guide offers a proven approach to learning for people who want results fast, for the concise and accurate text shows you how to improve your PC's memory in a short period of time. The easy-to-follow lessons help you understand and use memory management techniques. You quickly learn to work with extended and expanded memory, RAM disks caches and much more. A detailed glossary provides an easy access to the terms you need to fully understand. The techniques that can be acquired from this book will enable you to overcome the limitations of DOS and to manage memory efficiently. 1993. 178 pages. 214 x 141mm, illustrated. American book.



Order Code	Type	Price each
AA14Q	Mem Management	£9.95 NV

Understanding PC Specifications

by R.A. Penfold

If you require a microcomputer for business applications or a high quality home computer, an IBM PC or compatible is often the obvious choice. They are competitively priced and are backed up by an enormous number of applications programs, hardware add-ons, etc. The main difficulty for the uninitiated is deciding on the specification that will best suit his or her needs. It would be very easy to choose a PC system that is inadequate to run your particular applications efficiently, or one which goes beyond your needs and consequently represents poor value for money. While explaining PC specifications in detail, subjects covered include: differences between types of PC

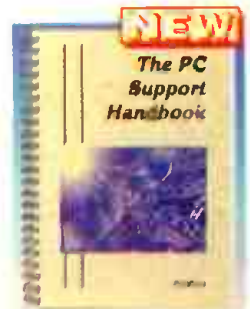


The PC Support Handbook

by David Dick

This British book was written by a Senior Lecturer who specialises in microcomputer technical support. The A4 spiral-bound book offers a more general approach and covers a wide range of material, that includes basic DOS commands (up to DOS 6) to advanced subjects such as disk organisation and memory management techniques. This well written, illustrated book brings together material not normally found in one volume and covers the latest techniques such as clock-doubling, local bus systems, PCMCIA etc. The book is filled with numerous facts, diagrams and explanations and is divided into 15 chapters with each chapter having its own contents page. Also included is a high-density 3 1/2 in. software disk of computer based training material on a wide range of topics plus many diagnostic and other utilities. 1993. 400 pages. 298 x 230mm, illustrated.

Order Code	Type	Price each
AA11M	A2 PC Support Handbook	£22.50 NV



Maplin

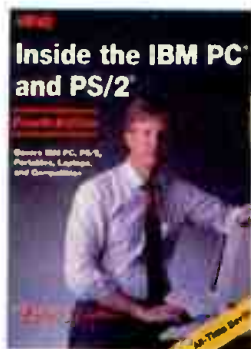
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YOUR GUARANTEE OF QUALITY & SERVICE

Inside the IBM PC and PS/2

Fourth Edition
by P. Norton

This best-seller has been thoroughly updated to include every model of the IBM microcomputer family! Detailed in content yet brisk in style. The book reviews fundamentals and then moves on to discover new ways of using your microcomputer to its fullest potential. Definitive in all respects. Includes a detailed look at all of the special features of the IBM PC family, its 'clones' and their compatibility; the fundamentals of the 80286, 386 and 486 microprocessors, plus the DOS operating system versions 1.1 to 4.0 and BIOS. Programming examples to show how each feature works in BASIC, Pascal, and Assembly Language are included, plus disk drive operation and data storage techniques, how ROM is allocated and much more. 1991. 398 pages. 233 x 188mm, illustrated. American book.

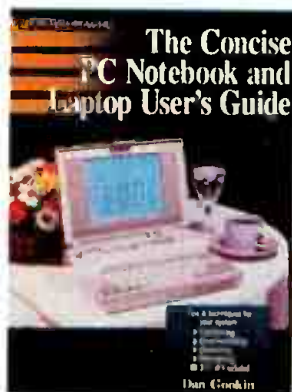


Order Code	Type	Price each
WS68Y A1	Inside The IBM PC	£22.95 NV

The Concise PC Notebook and Laptop User's Guide

by Dan Gookin

Portable computers are rapidly becoming the computer choice for many people who prefer the convenience and flexibility of laptops and 'notebook' computers that weigh less than six pounds. This book brings together all the information you need in order to buy and use a laptop, from setting up a portable with software to communicating with primary desktop PCs. The book comes with its own handy laptop diskette (3 1/2 in). On the disk there are dozens of utilities, batch files, and shareware programs, ideally suited for use on a laptop. If you are a laptop owner, or you are thinking of buying one, then this book will help you take full advantage of your laptop system. Includes 3 1/2 in floppy disk. 1992. 296 pages. 234 x 187mm, illustrated. American book.

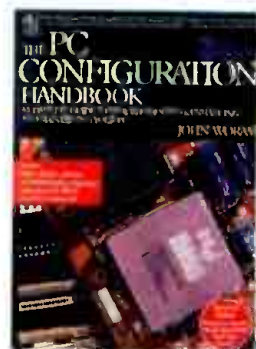


Order Code	Type	Price each
WZ55K	PC Laptop Guide	£16.99 NV

The PC Configuration Handbook

A Complete Guide to Troubleshooting, Enhancing and Maintaining Your PC
Second Edition
by John Woram

Newly revised and updated, this is the only book you'll need to keep your PC, XT, AT, or state-of-the-art 386 or 486 machine running trouble-



BUILD YOUR OWN MULTIMEDIA PC

by Aubrey Pilgrim

Since the introduction of Windows 3.1, Multimedia has become one of the more advanced computer technologies, and is now the fastest growing technology since the PC was first introduced. Multimedia adds a whole new dimension to the PC in business, education, training and entertainment. The aim of this book is to provide everything you need to know about multimedia PCs, - no experience is required.

The book will benefit those businesses that want to better utilise their computers and so contribute towards increased productivity, better presentations and help to create training tools. A CD-ROM is included that provides a wide variety of software that you can try on your new multimedia computer. 1994. 356 pages. 185 x 232mm, illustrated. American book.

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free. The handbook gathers into one place all the relevant facts hidden in the manufacturers' technical reference manuals and translates them in to simple English. The result is a problem-solving book that's essential reading for anyone trying to configure, reconfigure or troubleshoot a PC. Even if you would prefer not to make any repairs yourself, your ability to make a well-informed diagnosis will go a very long way toward helping to get your computer back up and running quickly. Whatever diagnostics you can do

Order Code	Type	Price each
WZ16S A2	PC Config Book	£26.99 NV

How to Expand, Modify and Repair PCs and Compatibles

by R. A. Penfold

Not only are PCs and compatibles very expandable, but before long many users actually wish to take advantage of that expandability and upgrade their PC systems. Some aspects of this can be a bit confusing, but this book provides advice and guidance on the popular forms of internal PC expansion, and should help to make things reasonably straightforward and painless, and little knowledge of computing or computer hardware is assumed. All you need is to have and be able to operate a PC of some description. Topics include a PC overview, memory upgrades, how to add a hard drive, how to add an extra floppy drive, display adaptors and monitors, fitting a maths co-processor, keyboards, ports, mice and digitisers. All are covered in detail with emphasis on practical advice rather than theory. The final two chapters deal with maintenance (including the preventive kind) and repairs and the increasingly popular subject of DIY PCs. 1990. 176 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
WS95D	Mod & Repair PCs	£5.95 NV

PC Data Recovery and Disaster Prevention

by S. Harris and S. Nugus

It is widely believed that data recovery is beyond the scope of all but the most skilled professionals, but fortunately recent software development has provided the tools and programs that are needed for such situations. These programs are easily usable by almost anyone who has a basic knowledge of PCs. However, data recovery is a technological minefield, in which it is very easy to cause irreparable damage to the data being recovered. It is vitally important that anyone who is likely to be involved with any form of data recovery has a good basic knowledge about data recovery. This book provides that basic knowledge, and also demonstrates through the use of examples and case studies how such data recovery problems should be approached to obtain a successful recovery. Chapters deal with using DOS to recover data as well as Norton Utilities and PC Tools. A further chapter takes an in-depth look at computer viruses. 1992. 267 pages. 243 x 170mm, illustrated.

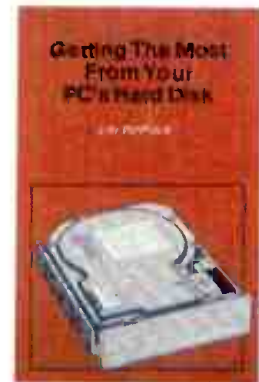
Order Code	Type	Price each
AA12N	PC Data Recovery	£16.99 NV



Getting the Most from your PC's Hard Disk

by J.W. Penfold

For those thinking of adding a hard disk, this book gives the basic information on how a disk is fitted, and how to format it for use. The information on interleave factors and installing DOS may also be useful to those who already have a hard disk. For those with hard disks, this book gives advice on arranging files into subdirectories so that



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they are easy to find, and also on making your applications easy to use. Information and advice on back-up and security procedures is also included, plus a section with technical details of hard disk operations under DOS. A hard disk is not simply a large and fast version of a floppy disk. It needs a wholly different approach to gain the most benefit from it. This book will show you how.

1990. 90 pages, 198 x 130mm, illustrated.

Order Code	Type	Price each
WT41U	Get Most fr PC HDisk	£3.95 NV

Virtual Reality

by Ken Pimentel and Kevin Teixeira

Virtual Reality is a major technological breakthrough that allows you to step through the computer screen into a 3-D artificial world. In the last few years, VR has gone from being an unknown scientific exercise to what many believe will be the future of computing.

This book is designed to provide a guide to VR and is filled with numerous photographs and illustrations. It is divided into three parts aptly titled 'Stepping through the new looking glass', '21st century tools' and 'Brave new worlds'. The first part defines VR and provides an overview along with the developments in the VR field. Part two is a layman's guide to VR technology, and part three gives an insight into what can be done with VR and the future.

1993. 323 pages. 234 x 186mm, illustrated. American book.

Order Code	Type	Price each
AA60Q	Virtual Reality	£20.95 NV

The Virtual Reality Construction Kit

by Joe Gradecki

This is a 'nuts-and-bolts' project book which will introduce the reader to the fascinating world of Virtual Reality (VR). VR technology allows a user to explore and manipulate objects in a virtual world, which exists only in the memory of a computer. The author gives clear, step-by-step instructions, with numerous illustrations, for building 18 inexpensive items of virtual reality equipment, including a 3-D mouse, a head-mounted display, a 3-D sound system, and an arm-based head tracker. No experience in programming or electronics is assumed, or required!

The book comes complete with all of the software required to test and use any equipment that you make, as well as various virtual worlds including a virtual park, a virtual squash court game, a two-player combat game that can be played over modems, and you can even build your own: (virtual) ancient Greek temple.

All software can be run using a conventional mouse/joystick as well as any equipment built, and is supplied on a 3.5-in. disk.

1994. 340 pages. 232 x 190mm, illustrated. American book.

Order Code	Type	Price each
AA99H	Vr Construct Kit	£24.95

Zen and the Art of the Internet

By Brendan P Kehoe

Did you realise that there are over 15 million people world-wide who are interconnected via the Internet? The Internet allows people to 'talk' to each other via computer terminals, and provides numerous other services, including access to a vast amount of information on just about any subject known to man. This book serves as a very comprehensive and readable introduction to the fascinating world of the Internet. Subjects covered include: network basics, electronic mail (e-mail); Anonymous FTP; Usenet News; Telnet; commercial services; data retrieval tools, and many others. Also included are detailed appendices which give information about connecting to other networks, newsgroup creation, and services available via Telnet.

1994. 193 pages. 228 x 152mm, illustrated. American book.

Order Code	Type	Price each
AA88V	Zen: Art of Internet	£18.25

The Internet Navigator

by Paul Gilster

This book was written with the 'individual', or 'dial-up' user in mind, and includes every topic that a newcomer to the Internet is likely to need to 'navigate' the vast amount of information available.

Topics covered include: locating and dealing with 'service providers', including those which offer Internet access to individuals; sending and receiving e-mail (Electronic Mail); making the most of limited access; using Telnet to log on to remote computers; down-loading files from FTP sites; electronic journals; data searching tools, including WAIS, World Wide Web,archie, and veronica; Bitnet; and Usenet News.

There is a very comprehensive directory of 'Internet Resources' included at the back of the book, listing a multitude of sources of on-line information and FTP sites. The appendix lists 'public access UNIX sites' and provides details of Internet access worldwide.

Order Code	Type	Price each
AA97F	Internet Navigator	£21.95

The Virtual Reality Programmer's Kit

by Joe Gradecki

If you have ever wanted to create your own virtual worlds, then this kit will show you how! This book is a natural sequel to *The Virtual Reality Construction Kit*, and provides all of the information and software necessary to design and build your own virtual worlds.

The REND386 programming environment allows novice programmers to create simple VR worlds, and the book has been packed with numerous hints and tips that allow more advanced C programmers to add

3-D sound, animation, and other advanced features to their VR worlds.

Included in the kit are 4 complete virtual worlds, software to test and calibrate equipment, and previously unrealised utilities that make VR object drawing easier. All software is supplied on a 3.5-in. disk.

1994. 544 pages. 235 x 190mm, illustrated. American book.

Please note that this book is not available until December 1994.

Order Code	Type	Price each
AN00A	VR Program Kit	£23.95

The BBS Construction Kit

by David Wolfe

Have you ever used someone's bulletin board system (BBS) and thought 'I could do better than that'? Well this book will show you how! The author has been running his own popular BBS system for several years, and he knows all the tricks to running a BBS and keeping its users hooked.

This book guides you through the entire process, from installing the BBS software, structuring file transfers, setting up doors, automatic system events, virus protection, through to customising your BBS to keep users interested.

The book has been well written, and is somewhat modular in structure; it may be read from cover to cover, or the reader can simply read the chapters of interest. The first four chapters deal with the necessary background technical information, mentioning any hardware required, and the remaining chapters explain how to set up various aspects of a BBS, such as doors, and external transfer protocols, etc. Suitable for anyone with some basic BBS/computer knowledge.

1994. 373 pages. 235 x 190mm, illustrated.

Order Code	Type	Price each
AA98G	BBS Construct Kit	£24.95

ROBOTICS BOOKS

Electronic Circuits for the Computer Control of Robots

by R.A. Penfold

Probably one of the most interesting combinations of home computing and electronics for the hobbyist to experiment with is in the world of robotics. This 'science' need not be over-complicated nor the hardware too expensive, since all that is entailed is to provide some form of interactive machine control by a microprocessor – how complex the function is entirely up to you, and there are robotics kits and a wide range of mechanical components now available for a variety of machines, and many home computers are well suited to the task.

1986. 92 pages. 177 x 110mm, illustrated.

Order Code	Type	Price each
WP66W	Ccts to Cntrl Robots	£2.95 NV

The Robot Builder's Bonanza

99 Inexpensive Robotics Projects

by Gordon McComb

This book offers you a complete and unique collection of tested and proven project modules that you can mix and match to create an almost endless variety of highly intelligent and workable robots.

By using the modular approach there is plenty of leeway for your imagination. 99 different experiments are provided which, in different combinations, enable you to create robots of all shapes and sizes and abilities. There are rolling robots, walking robots, talking robots, robots which can vacuum the floor, serve drinks, teach the kids, protect the family against fire and intruders, in fact almost anything is possible using these modules and a little ingenuity, as none of the projects are very expensive. The book is aimed at both the novice and intermediate robotics enthusiast; the projects include all the necessary information you need to construct the essential building blocks that go into the typical personal robot.

In addition to the abundance of illustrations, schematics, diagrams and parts lists, there is also a listing of tools and equipment required, and computer programs for supplying your creation with more than switches for control.

1987. 335 pages. 234 x 187mm, illustrated.



Order Code	Type	Price each
WT77J	A1 Robot Bonanza	£15.95 NV

CRAFT AND GUIDE BOOKS

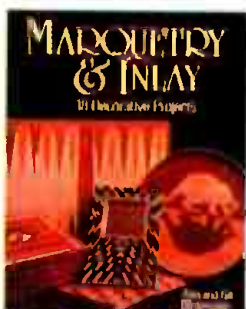
Marquetry & Inlay - 18 Decorative Projects

by Alan & Gill Bridgewater

The art of using marquetry and inlay to decorate wood and other objects is centuries old.

This book describes the art and includes a wide range of decorative projects. Fully illustrated with step-by-step directions, each project includes an explanation of the techniques, a materials list, working grids, an evaluation of the design, and a conclusion of helpful 'hints' for each project. The book describes how you can create unique designs on many household items, including: bookends, jewellery boxes, clock cases, tables and mirrors, picture frames and chopping boards. The book also provides a special section of patterns to inspire the reader to create other projects, and a completely illustrated glossary that defines terms, wood types, and various marquetry and inlay techniques. American book.

1991. 175 pages. 235 x 186mm, illustrated.



Order Code	Type	Price each
BZ03D	Marquetry & Inlay	£14.95 NV

THE BEST OF SERVICE

Decorative Fish Carving

by Rick Beyer

Carving fish offers the widest possible range for artistic originality and expression for the woodcarver. This book is an excellent guide to the craft for those just starting out and an inspiration to all woodcarvers. The book explains which tools and wood types to use for specific pieces and provides explicit instructions for carving fish, paying careful attention to fish anatomy, fin movement and attack positions. Numerous close-up photographs are included along with detailed procedures for achieving special colour effects with paint. The author covers the important concept of design and balance and tells how to mount the completed work. American book.



Order Code	Type	Price each
BZ01B	Dec Fish Carving	£12.95 NV

Through The Telescope - A Guide for the Amateur Astronomer

by Michael R. Porcellino

This book offers an introduction to what can be a richly satisfying new hobby as an amateur astronomer. The book provides information on viewing the skies through binoculars, as well as through a telescope; practical guidance on the various types of amateur telescopes including advantages and disadvantages, information on lenses, mounts, and filters, and tips on proper usage. If you already own a telescope, then there are practical suggestions for making your own equipment to enhance telescope performance: aperture masks to help resolve the images of unequal double stars, setting circles for star hopping, and a device to help collimate your system. Details are provided on observing the moon, the planets, comets, and meteors, as well as in-depth guidance in viewing the stars. You will learn how to see and identify double stars, variable stars, and deep-sky objects such as star clusters, nebulae, and supernovae. Special techniques for safely observing the sun are also provided. The author has included several appendices that contain the different charts and statistics you need to help find your way round the sky in this well illustrated book. American book.

1989. 350 pages. 233 x 185mm, illustrated.



Order Code	Type	Price each
BU99H	A1 Through Telescope	£19.95 NV

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BOOKS FOR BEGINNERS

Introduction to Electronics

by Pam Beasant

This book is an introduction to the basic principles of electronics, and ideal for the younger beginner. The bulk of the book comprises many simple, practical experiments. Each experiment is designed to illustrate an important principle of electronics and demonstrate how each different component works. This ranges from the very basic through transistors, use of tools and soldering. 1990. 48 pages. 240 x 170mm, illustrated in colour.



Order Code	Type	Price each
WP50E	Intro Electronics	£4.99 NV

200 Illustrated Science Experiments for Children

by Robert J. Brown

This book is a fascinating collection of science experiments suitable for children of all ages. An ideal source book for parents, teachers and anyone who is fascinated with the wonders of science. The experiments cover air, sound, vibration, water, mechanics, chemistry, light, heat, biology, electricity and magnetism. The book is designed to make learning basic scientific principles exciting and fun - a good way to introduce youngsters of all ages to the world of science. N.B. Many of the experiments MUST be performed under strict adult supervision since electricity, chemicals and heat are involved. American book.

1987. 190 pages. 210 x 130mm, illustrated.



Order Code	Type	Price each
BZ02C	Science Experiments	£8.95 NV

Mastering Electronics

by John Watson

A comprehensive handbook containing all the essential information required to learn and master the principles of electronics. Arranged as a complete self-contained course, for individual or classroom use, it includes basic theory as well as more advanced subjects such as Radio & TV, computers etc. Tested projects are featured to provide the reader with practical experience. This reasonably priced book is recommended for the beginner in electronics. 1991. 441 pages. 215 x 135mm, illustrated.



Order Code	Type	Price each
WM60Q	Mastering Electronic	£7.50 NV

Electronics – Build and Learn

2nd Edition
by R.A. Penfold

Electronics is a practical subject, but a certain amount of theoretical knowledge is necessary if you are to become proficient in it. This book combines theory and practice so that you can 'learn by doing'. Full constructional details of a circuit demonstrator unit are given which is used in subsequent chapters to introduce common electronic components. Later chapters describe how these components are built into useful circuits, oscillators, bistables and logic circuits. At every stage there are practical tests and experiments that you can carry out to investigate the points described and to help you understand the principles involved. 1988. 110 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
WP97F	Elec Build/Learn	£6.95 NV

Adventures with Electronics

by Tom Duncan

To start you don't need to know anything about electronics. But by the end of this book, you will find that you have learned quite a bit about this vital area of modern science and industry. The 'bits and pieces' needed for making all these models can be bought inexpensively as a complete kit, or you can search for them separately at radio hobby shops. Full details are given of both methods. And no soldering is required, which will be especially good news for beginners. Projects include a parking light, rain detector, fire alarm, flashing lamp, morse buzzer, burglar alarm, electronic organ, electronic metronome, wailing siren, intercom, three types of radio, electronic timer, and a (binary) 'computer counter'. 1978. 64 pages. 246 x 190mm, illustrated.



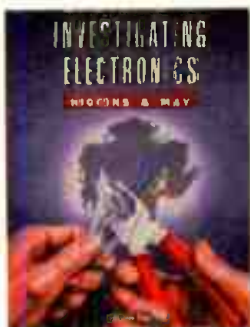
Order Code	Type	Price each
WS53H	Adventures Elctrnics	£7.25 NV

Investigating Electronics

Volume 1
by R. Higgins and A. J. C. May

This book is intended for readers wishing to be introduced to practical electronics. Little or no previous electrical or electronic knowledge is assumed and it provides a basis on which the reader can build up a knowledge of electronics slowly and steadily from first principles. To help achieve this goal, text has been kept at a minimum while exercises and diagrams have been used extensively.

This book along with volume two, *Electronics and Investigating Digital Electronics*, give adequate coverage of the EITB TR21 basic training requirement in electronics. Other groups who may find the books useful include those studying 'Design and Technology' in schools and students taking BTEC Engineering



courses having a practical electronics content designed to meet the 'common skills' element of their course.

The layout of this book, and its contents, make it an invaluable source of reference to students of all ages embarking on electronic study.

1991. 130 pages. 245 x 189mm, illustrated.

Order Code	Type	Price each
WZ82D	Investigat Elec Vol1	£7.99 NV

Investigating Digital Electronics

Volume 2
by R. Higgins and A. J. C. May

This book is intended for readers who have completed volume one 'Investigating Electronics' or those who have some basic electronic knowledge. It is written in the same style with text kept to a minimum and extensive use made of diagrams to explain important concepts. Practical exercises and self-assessment questions are provided to build confidence as the reader progresses through the chapters.

A straightforward and informative text that will be welcomed by students of ETIB and BTEC courses containing a practical electronics content, and students of 'Design and Technology' who have a basic understanding of components and circuitry. 1991. 131 pages. 245 x 189mm, illustrated.



Order Code	Type	Price each
WZ83E	Invest Dig Elec Vol2	£8.99 NV

Adventures with Digital Electronics

by Tom Duncan

This book of entertaining and instructive projects is designed for students in schools and colleges, and also for hobbyists and electronics club enthusiasts. It is a follow-up to *Adventures with Microelectronics* and provides a stepping-stone to the microprocessor. A first part deals with the properties of some basic 'chips' used in digital electronics such as logic gates, multivibrators, flip-flops, counters, shift registers, memories, adders, magnitude comparators, code converters and displays. The second part gives details of how to build eight devices – an electronic shooting gallery, quiz-game switches, an electronic fruit machine, computer space invaders game, two types of two-way traffic lights, pedestrian crossing signals and an electronic adder. For each project there is an explanation of 'how it works' and also suggestions for 'things to try'. Construction is on two standard circuit boards (no soldering required), using a 9V battery as the power supply. 1982. 64 pages. 245 x 188mm, illustrated.



Order Code	Type	Price each
WS55K	Advent Dig Elctrnics	£7.25 NV

Digital Electronics Projects for Beginners

by Owen Bishop

Contains 12 digital electronics projects suitable for the beginner to build with the minimum of equipment. The projects cover a wide range of topics from instrumentation to home security, and a few 'fun' projects as well. With just one exception, all the projects are battery powered, and so are completely safe for the beginner. The introductory chapter and the detailed explanations of the workings of each project make this not just a book of practical, useful projects, but also an introduction of the simplest basic theory and applications of digital electronics. Each project is provided with a circuit diagram, a drawing of the stripboard layout and full construction details complete with instructions for testing the circuit at each stage. The appendix explains how to solder and how to build circuits on stripboard. 1990. 120 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
WT08J	Dig Elec Projects	£6.95 NV

30 Solderless Breadboard Projects Book 1

by R.A. Penfold

An ideal book for beginners because all the components used are carefully described in a 20 page section at the beginning. The projects can all be built on a Verobloc and wherever possible the components are common to several projects. Thus it is possible, with a small number of relatively inexpensive components, to build in turn every project shown. 1982. 160 pages. 178 x 110, illustrated.



Order Code	Type	Price each
WA51F	Book BP107	£2.95 NV

The Secret Life of Quanta

by Dr. M. Y. Han

This down-to-earth book sets out to explain to non-scientists how the laws of quantum physics operate in high technology devices and processes, with which we have almost daily contact. The author has focused on electrons and atoms, which are at the bottom of everything around us. An understanding of the fundamental concepts of atomic structure and of the physical nature of the chemical bond that holds atoms in molecules together. The author goes on to describe the basic principles that are used by scientists and engineers everyday in the creation and development of the remarkable new technologies that regularly appeared, such as lasers, fibre optics, microprocessors and superconductors. The book avoids mathematical equations, and is written in a very enjoyable way, and will be invaluable to anyone who wishes to acquire a greater understanding of quantum physics. Highly recommended. 1990. 190 pages. 228 x 153mm, illustrated. American book.



Order Code	Type	Price each
WZ88V	The Life of Quanta	£11.95 NV

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01702 553935

CONSTRUCTOR GUIDES

How to Design and Make Your Own PCB's

by R.A. Penfold

This book should enable you to familiarise yourself with both the simple and more sophisticated methods of producing PCB's. The emphasis is very much on the practical aspects of design and construction, and is highly recommended to all newcomers to electronics. 1983. 66 pages. 177 x 110mm, illustrated.

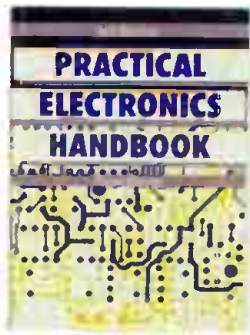


Order Code	Type	Price each
WVK63T	Make And Design PCBs	£2.50 NV

Practical Electronics Handbook Third Edition

by Ian Sinclair

This book has been designed to include, within a reasonable space, most of the information which is useful in electronics together with brief explanations which are intended to serve as reminders rather than instructions. The book is not, of course, intended as a beginner's guide to the whole of electronics, but the beginner will find much of interest, as well as a compact reminder of electronic principles and circuits. The constructor of electronic circuits and the service engineer should find the data in this book of considerable assistance. The professional design engineer will also find items of frequent use, which are usually only available in collected form in much larger volumes.

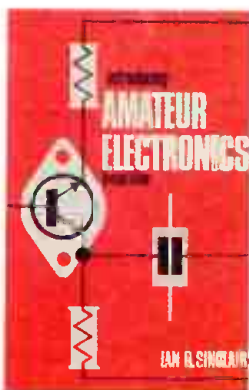


Order Code	Type	Price each
WG01B	Book NB447	£14.95 NV

Introducing Amateur Electronics

by Ian R. Sinclair

Designed as an introductory text for anyone wanting to build electronic projects, the book assumes no previous knowledge and teaches the skills of constructing electronic circuits. Details of a number of actual practical experiments are given showing how components work and behave. 1981. 96 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
WG44X	Book AG600	£4.95 NV

Beginner's Guide to Building Electronic Projects

by R.A. Penfold

This book will help the complete beginner to tackle the projects in the popular magazines with confidence. Covers component identification, tools, soldering, constructional methods, cases, legends, etc. 1977. 108 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
RF09K	Book BP227	£1.95 NV

DATA BOOKS

Newnes Radio & Electronics Engineer's Pocket Book

by Keith Brindley

An invaluable compendium of facts, figures and formulae, including common transistor and diode data and pin-outs, TTL and CMOS details, radio and TV frequencies, metric conversions, wire gauges and much, much more, plus a superb index. 1989. 341 pages. 196 x 95mm, illustrated.



Order Code	Type	Price each
RL06G	Book NB0740	£10.95 NV

Newnes Electronic Engineer's Pocket Book

by Keith Brindley

This pocket book now includes the latest aspects of semiconductor technology, namely LSI integrated circuits and microprocessors and their support chips, as well as operational amplifiers and communications devices. Commencing with electron theory, and semiconductors, manufacture of semiconductor devices and ICs, the book goes on to illustrate essential circuit design for amplifiers and oscillators for most applications, AF and RF. A large proportion of the book is given over to digital techniques and computer systems and their construction, optoelectronics, servo and control mechanisms and power supplies. 1993. 315 pages. 196 x 95mm, illustrated.



Order Code	Type	Price each
WP67X	Elec Pocket Book	£12.95 NV

Practical Electronic Calculations & Formulae

by F.A. Wilson

This book aims to bridge the gap between complex technical theory and trial and error practical methods. It is in six sections: units and constants, DC circuits, passive components, AC circuits, networks and theorems, and measurements. 1981. 250 pages. 180 x 108mm.

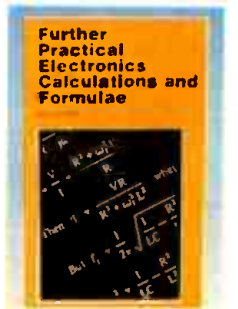


Order Code	Type	Price each
RQ23A	Book BP53	£3.95 NV

Further Practical Electronic Calculations and Formulae

by F.A. Wilson

A companion volume to the original reference book Practical Electronics Calculations and Formulae, this version continues on from where the other finishes. Where the first book deals with components, elementary circuit analysis, networks and measurements, this book encompasses many aspects of electronics where a knowledge and familiarity of the appropriate formulae is essential for a fuller understanding of the subject, in order to achieve the desired results. Written in the same style as the first volume, but which it does not replace, this is a practical workshop manual. 1986. 450 pages. 178 x 110mm, illustrated.

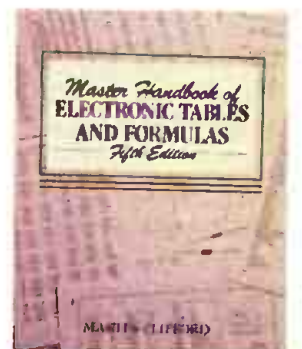


Order Code	Type	Price each
WP68Y	Further Elec Calcs	£4.95 NV

Master Handbook of Electronic Tables and Formulas

by Martin Clifford

This book features all the latest developments in electronics technology and has been logically organised and fully indexed to give instant access to the formulas and vital component data needed when working on an electronic project. There is information on everything from resistance formulas, meter multipliers, and sine waves to capacitance, impedance vectors, decibels, and much, much more. A wide range of topics are covered, including microphones, magnetic data, modulation methods, filters, and analogue-to-digital and digital-to-analogue technology, as well as updated material on audio and video recording, antennas, TV broadcasting, computer logic and more. An indispensable reference book for hobbyists as well as professionals. 1992. 566 pages. 235 x 188mm, illustrated. American book.



Order Code	Type	Price each
WZ58N	Tables & Formulas	£20.95 NV

TOP QUALITY PRODUCTS AT SUPER LOW PRICES!

Coil Design and Construction Manual

by B. B. Babani

1960 (Revised 1974).
106 pages. 180 x 108mm,
illustrated.



Order Code	Type	Price each
RH53H	Book BP160	£2.50 NV

INTEGRATED CIRCUIT DATA BOOKS

Audio IC Circuits Manual

by R.M. Marston

A vast range of audio and audio-associated ICs are readily available for use by amateur and professional design engineers and technicians. This manual is a guide to the most popular and useful of these devices, with over 240 diagrams. It deals with ICs such as low frequency linear amplifiers, dual pre-amplifiers, audio power amplifiers, charge coupled device delay lines, bargraph display drivers, and power supply regulators, and shows how to use these devices in circuits ranging from simple signal conditioners and filters to complex graphic equalisers, stereo amplifier systems, and echo/ reverb delay line systems, etc. This book deals with its subject matter in an easy-to-read and non-mathematical manner, presenting the reader with many practical applications and circuits. It is specifically written for the practical design engineer, technician, and the experimenter, as well as electronics students and amateurs. Most of the ICs and other devices used in the practical circuits are modestly priced and readily available types, with universally recognised type numbers. 1989. 168 pages, 260 x 135mm, illustrated.



Order Code	Type	Price each
WS22Y	Audio Circuit Manual	£13.95 NV

video interface, analogue switches and filters. Volume three covers voltage regulators/supervisors comparators and special function devices i.e. voltage-to-frequency converters. Finally, a section is included on thermal considerations in the design of power supplies. 1992. 3,220 pages. 235 x 190mm, illustrated. American books.



Order Code	Type	Price each
WZ73Q	D7 TI Linear Data Books	£11.00 NV

TTL Pocket Guide

Volume 1:

7400 to 74200

Provides a comprehensive listing of all commonly used TTL ICs from 7400 to 74200 as available from all the major manufacturers. All the current families, Standard, Low Power, Schottky, Low Power Schottky, Advanced Schottky, Advanced Low Power Schottky, High Speed and Fast Schottky are covered. The Pocket Guide extracts all the essential data from the manufacturers' own data books and presents it in a clear and concise format, and is invaluable as an aid to choosing a device or identifying an unfamiliar component. English translation of the German original. 1990. 288 pages. 185 x 105mm, illustrated.



Order Code	Type	Price each
WT21X	TTL Pocket Guide 1	£11.95 NV

TTL Pocket Guide

Volume 2:

74201 to 74640

This is the second volume of the TTL pocket guide providing a comprehensive listing of all commonly used TTL integrated circuits, including products from all major manufacturers. All the current families are covered, i.e. standard, low power, Schottky, low power Schottky, advanced Schottky, advanced low power Schottky, high speed and fast Schottky. Each page describes one component only and is divided into eight sections. There is a manufacturers' index at the back of the book, showing in tabular form which companies manufacture each device. The guide extracts all the essential data from the manufacturers' own data books



and presents it in a clear and concise format. English translation of the German original. 1991. 348 pages. 185 x 105mm, illustrated.

Order Code	Type	Price each
WT49D	TTL Pocket Guide 2	£11.95 NV

TTL Pocket Guide

Volume 3:

74641 to 7430640

This is the third and final volume of three guides providing a comprehensive listing of all commonly used TTL integrated circuits, including TTL products from all major manufacturers. All current families are covered: Standard, Low Power, Schottky, Low Power Schottky, Advanced Schottky, Advanced Low Power Schottky, High Speed and Fast Schottky. In format and content, the TTL Pocket Guide is easy to use. Each page describes one component only and is divided into eight sections. The guide extracts all the essential information from the manufacturers' own data books and presents it in a clear and concise format. English translation of the German original. 1991. 320 pages. 185 x 105mm, illustrated.



Order Code	Type	Price each
WT88V	TTL Pocket Guide 3	£11.95 NV

The TTL Data Book, Volume 1

Texas Instruments

Full data sheets covering TI's very large range of TTL, Schottky and Low Power Schottky IC's. Contains internal circuits, pin-out diagrams and specifications of over 400 device types. 1989. 1184 pages. 210 x 148mm, illustrated. American book.



Order Code	Type	Price each
WA14Q	B3 TI TTL Data Vol 1	£14.95 NV

The TTL Data Book, Volume 2

Texas Instruments

Packed with the design data, internal circuit and pin-out diagrams, and dynamic parameters information for some 400 Advanced Low-Power Schottky (ALS) and Advanced Schottky (AS) logic IC's. Included in this volume is a functional index to all types of bipolar digital devices available or under development showing the available technologies for each type, TTL, Schottky, AS, ALS etc. There is also a short explanatory section on logic symbols for new circuit diagrams. 1989. 1278 pages. 210 x 150mm, illustrated.



Order Code	Type	Price each
WP31J	B3 TI TTL Data Vol 2	£14.95 NV

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Linear Circuits Data Books - Volumes 1, 2 and 3

Texas Instruments

Volume one has a full and detailed data section, covering TI's extensive range of operational amplifiers. Many of the entries include applications data, performance characteristics - in fact just about everything you need to know about each device. Volume two covers general purpose ADCs and DACs, video and high-speed ADCs and DACs, DSP analogue interface and conversion,

★ All prices include VAT. A, B etc. indicates there is an additional carriage charge for this item: see end of catalogue for details. ★

CMOS Pocket Guide

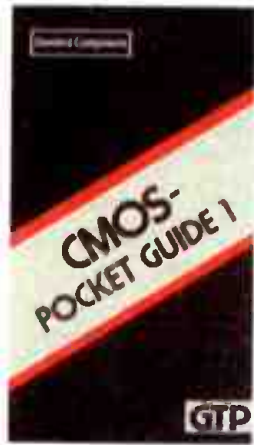
Volume 1:

Standard 4000 series

Provides a comprehensive listing of all commonly used 4000 series CMOS logic ICs available from all the major manufacturers. The Pocket Guide extracts all the essential data from the manufacturers' own data books and presents it in a clear and concise format, and is invaluable as an aid to choosing a device or identifying an unfamiliar component. Translated from the German original.

1991. 234 pages. 185 x 105mm, illustrated.

Order Code	Type	Price each
WT34M	CMOS Pocket Guide 1	£11.95 NV

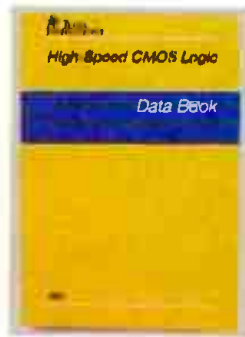


High Speed CMOS Logic Data Book

Texas Instruments

This comprehensive volume lists all types of high-speed silicon-gate HCMOS logic family currently in common use. Information includes parameter and function tables, pin-outs, logic symbols and internal logic diagrams, and tips on device interfacing and applications for designers.

Order Code	Type	Price each
WS01B	A2 HCMOS Data Book	£12.50 NV



Operational Amplifiers

by G.B. Clayton, BSc, FInstP.

Provides an insight into the capabilities of modern operational amplifiers, and also discusses in detail the problems encountered in practical applications. 1979. 416 pages. 222 x 145mm, illustrated, hardback.

Order Code	Type	Price each
RR28F	A2 Book NB2028	£19.95 NV



CMOS Pocket Guide

Volume 2:

AD7501 to 45434

The CMOS Pocket Guide Volume 2 (special components) covers all the commonly used special devices currently on the market. The guide, as with others in the series, is clear and easy to use. Data which applies to the CMOS series as a whole is not repeated for every device, but is presented in an introductory section. Each page describes one component only and is divided into eight sections. Translated from the German original.

1991. 314 pages. 185 x 105mm, illustrated.

Order Code	Type	Price each
WZ41U	CMOS Vol2	£11.95 NV



Z80 Family Data Book

Contains full data sheets for the CPU, PIO, DMA CTC, DART, GLU, MPU and SIO. The book also contains over 125 pages of applications information. American book. 1991. 750 pages. 228 x 178mm, illustrated.

Order Code	Type	Price each
RQ54J	A2 Z80 Data	£6.95 NV



The MOS Memory Data Book

Full data sheets for TI's range of dynamic RAM's, EPROM's, ROM's and memory systems. An inter-changeability guide is included. American book. 1991. 1016 pages. 235 x 190mm, illustrated.

Order Code	Type	Price each
WA06G	A2 TI MOS Memory Data	£12.50 NV



The Interface Circuits Data Book

Full data sheets for TI's range of data transmission and control circuits, peripheral drivers, power actuators and display drivers. Contains internal circuits, pin-out diagrams and specifications of over 275 device types. 1990. 1376 pages. 214 x 150mm, illustrated.

Order Code	Type	Price each
WA13P	B3 TI Interface Data	£14.95 NV



How to Use Op-Amps

by E.A. Parr

This designers' guide covering many operational amps serves as a source book of circuits and a reference book for design calculations. The book covers basic circuits, oscillators, audio circuits, filters, power supplies, and a large selection of miscellaneous circuits. There is also a short section of constructional notes and fault finding details.

1982. 160 pages. 176 x 110mm, illustrated.

Order Code	Type	Price each
WA29G	Book BP88	£2.95 NV



Op-Amp Circuits Manual

by R.M. Marston

One of the most popular and versatile 'building blocks' of our time is the operational amplifier or 'op-amp'. The 'standard' type is generally the most familiar, but you will also find described in this book the less well-known 'Norton' and OTA types. In addition a total of over 300 practical circuits, with diagrams and tables, are provided for the practical design engineer, technician and experimenter alike. 1989. 211 pages. 215 x 138mm, illustrated.

Order Code	Type	Price each
WS47B	Op-Amp Circuits Man	£13.95 NV



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HCMOS Pocket Guide

Covers all the commonly used HCMOS special devices currently available. It also sticks to a format which follows a clear and easy style with one device per complete page. Data which applies to the HCMOS series as a whole is not repeated for every device, but is presented in an introductory section. Each page describes one device only and is divided into eight sections. The guide extracts all the essential information from the manufacturers' own data books and presents it in a clear and concise format. As space within the package outlines is limited for diagrams, the internal schematic is necessarily simplified as far as possible and in block form. This may mean that in some instances the proper circuit symbols could not be used. Translated from the German original.

Order Code	Type	Price each
WZ46A	HCMOS	£11.95 NV



Linear and Interface Circuit Applications Volume 1

by D.E. Pippenger and E.J. Tobaben

The first in a series of books showing applications using Texas Instruments' linear integrated circuits. This book covers op-amps and comparators, video amplifiers, voltage regulators, switching power supplies, power supply supervision and protection and timers. The book shows complete designs and how to design your own circuits in great detail. 1986. 312 pages. 210 x 148mm, illustrated.



Order Code	Type	Price each
WP45Y	Lin Cct Applctns 1	£8.00 NV ⁶⁰⁶⁶

Linear and Interface Circuit Applications Volume 2

by D.E. Pippenger and E.J. Tobaben

In part two, display drivers for LED's, DC and AC plasma, vacuum fluorescent and AC thin film electroluminescent display drivers from Texas Instruments are covered. The remaining half of the book shows circuits and design parameters for data transmission line circuits including RS232C, RS423A, RS422A and RS485. IEEE488, IBM360370 series and general purpose line circuits are also discussed. 1986. 216 pages. 210 x 148mm, illustrated.



Order Code	Type	Price each
WP59P	Lin Cct Applctns 2	£8.00 NV ⁶⁰⁶⁹

Operational Amplifier User's Handbook

by R. A. Penfold

This book deals with the properties and applications of modern operational amplifiers. Chapter one covers the standard operational amplifier building blocks, with the emphasis on the improvements that can be made by using modern devices. Chapter two deals with practical applications using the devices, such as very low noise, precision DC, high output current and wide bandwidth types. Many practical circuits are included such as low noise tape and RIAA preamplifiers, audio power amplifiers, DC power controllers, the audio millivolt meter, temperature monitor and many more. A useful and invaluable book for all those involved in electronics. 1994. 126 pages. 177 x 112mm, illustrated.



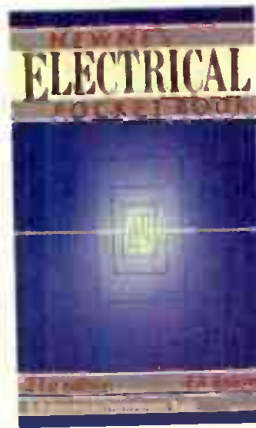
Order Code	Type	Price each
AA78K	OpAmp Users H/Book	£4.95 NV ⁵⁸⁰⁹

ELECTRICAL BOOKS

Newnes Electrical Pocket Book

21st Edition
Edited by E. A. Reeves, DFH (Hons), C. Eng, MIEE

A thorough guide to electrical engineering practice, which remains an indispensable reference book for the engineer and for all who require handy, concise yet comprehensive information on a wide range of electrical subjects. 1992. 522 pages. 165 x 101mm, illustrated.

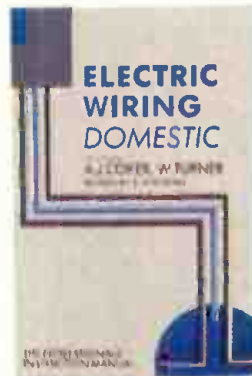


Order Code	Type	Price each
RL27E	Book NB147	£12.95 NV ⁵⁸

Electric Wiring: Domestic

by A. J. Coker & W. Turner

A clear and reliable guide to the practical aspects of domestic wiring. Provides essential up-to-date information on modern methods and materials in a simple and concise way. Contents include wiring circuits, ratings, cable sizes and circuit protection; domestic installation practice, lighting points, socket outlets and portable appliances, fixed appliances, survey of modern wiring systems, installation of conduit systems, using PVC sheathed and MICS cable, prefabricated systems, earthing, inspection and testing. 1989. 198 pages. 234 x 155mm, illustrated.



Order Code	Type	Price each
WS82D	Elect Wiring Domestic	£12.95 NV ⁶¹

Wire It

by Robert Henley

This book is intended for the average DIY person wanting to undertake some simple electrical modifications. The book explains the basics of home wiring and how the electricity meter, the mains switch and the ring main system help deliver light and power. Simple guides to topics such as fuses and meter reading are complemented with one or two projects such as outdoor wiring and adding extra sockets. A good mixture of diagrams and colour illustrations explain some of the jargon including the reasons why amps, volts and watts are so important. The book is well scattered with safety advice and warnings, also ways and means of dealing with electric shock. Amply demonstrating how important safety is in this area. It makes an ideal present for the novice or those moving into a first or new home. 1989. 31 pages, 225 x 165mm, colour illustrations.



Order Code	Type	Price each
WT55K	Wire It	£1.99 NV ⁶⁰⁷¹

Wiring and Lighting

by Albert Jackson and David Day

This book will help anyone wanting to undertake household electrical tasks. It covers things as diverse as mending fuses and changing plugs through to good advice on complete rewiring. The diagrams and instructions here are full, many are step by step, and a lot of the matters left hanging in the small book are explained. There are also a number of extended special sections which discuss the wiring of fixed appliances, the basic home electricians toolkit and how to reduce the cost of electricity – legally! A short glossary explains some of the more basic terms as well as covering such matters as PME and ELCB. This is the book for the serious home electrician. 1988. 64 pages, 258 x 212mm, full colour illustrations.



Order Code	Type	Price each
WT56L	Wiring & Lighting	£6.99 NV ⁶⁰⁹⁶

IEE Wiring Regulations

Regulations for Electrical Installations – 16th Edition

This edition supersedes the fifteenth edition from the 1st January 1993, and is based on the plan agreed internationally for the agreement of safety rules for electrical installations. Also, the technical substance of the parts of the IEC Publications 364 so far published, and of the corresponding agreements reached in CENELEC, have been taken into account. The opportunity has also been taken to revise certain regulations for greater clarity or to take account of technical developments. Considerable reference is made throughout the Regulations to publications of the British Standards Institute, both specifications and codes of practice. These publications are conveniently listed in Appendix 1 with their full titles, whereas throughout the Regulations they are referred to only by their numbers. The book is divided into seven parts. Part one details the scope, object and fundamental requirements for safety; part two covers definitions; part three the assessment of general characteristics; part four covers protection for safety; part five details selection and erection of equipment; part six covers special installations or locations and part seven covers inspection and testing. 1991. 266 pages. 296 x 210mm, illustrated.



Order Code	Type	Price each
WZ90X	IEE Wiring Regs	£34.00 NV ⁵⁵⁰

Maplin

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On-Site Guide

This Guide is concerned with limited application of the Regulations in accordance with '1.1 Scope'. The booklet is split into 11 sections which includes: introduction, the service position, protection, bonding and earthing, isolation and switching, labelling, conventional final circuits, special locations giving rise to increased risk of electric shock, inspection and testing, guidance notes on initial testing of installations, operation of residual current operated devices. The appendices covers a variety of related topics, including; cable capacities of conduit and trunking, resistance of copper and aluminium conductors under fault conditions, current-carrying capacities and voltage drop for copper conductors etc. 1992. 115 pages. 216 x 155mm, illustrated.



Order Code	Type	Price each
WZ97F	IEEE On Site Guide	£10.00 NV

Guidance Notes to the 16th Edition IEE Wiring Regulations

A series of guidance notes that have been issued by the Wiring Regulations Committee of the Institute of Electrical Engineers (IEE). These booklets are designed to enlarge upon and amplify some of the requirements in the 16th Edition of the IEE Wiring Regulations (WZ90X). The principle section numbers that each guide relates to, are shown in the left hand margin, with the relevant Regulations and Appendices noted in the right hand margin. The Notes may also include material that was included in earlier editions, but may not be in the 16th Edition. Additionally, the Guidance Notes contain references to other relevant information. A very useful range of booklets that all electricians in the electrical installation and maintenance industries should find extremely useful.

Number 1 - Selection and Erection

Number One in the series is concerned with Part 5 - Selection and Erection. The eight sections cover the topics: selection and erection of equipment; protection against electric shock; external influences; installation of cables; the sizing of cables; other influences; installation of equipment. A comprehensive appendices covers related topics. 1992. 122 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
WZ98G	Selection & Erection	£12.00 NV

Number 2 - Isolation and Switching

Number Two in the series is concerned with Chapter 46 - Isolation and Switching. The six sections in this booklet cover: statutory requirements; the regulations for electrical installations, definitions and principles; isolation; switching off for mechanical maintenance; emergency switching and emergency stopping; and fireman's switches. 1992. 30 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
WZ99H	Isolation & Switch	£9.00 NV

Number 3 - Inspection and Testing

Number Three in the series deals with Part 7 - Inspection and Testing. The booklet is divided into three parts: part one covers initial inspection, testing and verification; part two covers periodic inspection and testing; part three covers reference tests for initial and periodic testing, and includes polarity tests, earthing and residual current operated devices. 1992. 92 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
AA00A	Inspection & Testing	£12.00 NV

Number 4 - Protection Against Fire

Number Four in the series deals with Chapter 42 - Protection against thermal effects. The five sections cover the statutory requirements; wiring regulations; thermal effects; use of the installation and alterations and additions; and finally other related topics (safety services, fire alarms, emergency lighting, smoke detectors, lightning etc.). 1992. 23 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
AA01B	Protect Against Fire	£9.00 NV

Number 5 - Protection Against Electric Shock

Number Five in the series covers Chapter 41 - Protection against electric shock. The eight sections deal with wiring regulations, protection against direct contact; protection against indirect contact; protection by means of extra-low voltage; earthing; circuit protective conductors; bonding and special installations or locations. 1992. 85 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
AA02C	Protect Against Shck	£12.00 NV

Number 6 - Protection Against Overcurrent

Number Six in the series is concerned with Part 4 - Protection for Safety. The eight sections in this booklet deal with the regulations concerning protection against overcurrent; protection against overload; protection against fault current; determination of fault current; equations for the calculation of short-circuit currents; equations for the calculation of earth-fault current; selection of conductor size and finally a note on 'fault current withstand of flexible cords.' 1992. 87 pages. 297 x 210mm, illustrated.



Order Code	Type	Price each
AA03D	Protect Again O/crt	£12.00 NV

THE BEST OF SERVICE

IEE Wiring Regulations Explained and Illustrated Second Edition by Brian Scaddan

Written primarily for the student electrical technician or installation contractor who needs to understand the Wiring Regulations and how to apply them, but this knowledge is also essential for anyone contemplating domestic electrical wiring. Full of really useful and practical advice for the electrician, clearly explaining the background to the design principles as set out in the Regulations and concentrating on the key areas of earthing and bonding, protection and circuit design. Topics include safety requirements, earthing, protection, control, circuit design and testing procedures. 1991. 99 pages. 146 x 210mm, illustrated.



Order Code	Type	Price each
WS81C	IEE Wiring Regs Expl	£8.95 NV

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Snags and Solutions – Electrical Installation Practice

4th Edition
NICEIC

This handy little book, now in its 4th edition, has been prepared by members of the National Inspection Council for Electrical Installation Contracting (NICEIC) and is intended to provide practical advice on the application of the 16th edition of the IEE Wiring Regulations (WZ90X). The answers to the many problems that are encountered daily by electricians and electrical installation contractors are provided, also emphasises the wiring problems found by NICEIC inspecting engineers in the course of their visits to various establishments throughout the country. An invaluable aid for all electricians and electrical installations contractors.



Order Code	Type	Price each
WZ93B	Snags & Solutions	£9.95 NV

Electrical Installation Designs

by Bill Atkinson

The majority of electrical contractors have an understanding of the requirements that are related to their own, regular, everyday activities. Normally, work is carried out using rule-of-thumb methods and repetitive designs. There is nothing wrong with using standardised designs and this book is a varied collection of typical projects that are examined to produce designs that will fit current standards. The installer may select a suitable design that corresponds as near as possible to the contract in hand and can use it accordingly. The designs illustrate methods that could be used for particular types of installation, ranging from a house to an industrial workshop. Electrical installations contractors, students and non-electrical associates in the construction industry will appreciate the user-friendly approach, but this book is not intended as a do-it-yourself for the untrained person.

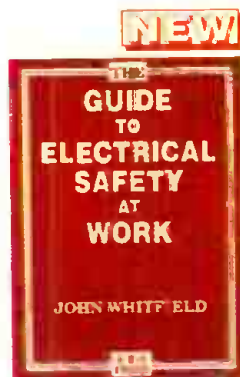


Order Code	Type	Price each
AA68Y	Elect Install Design	£14.99 NV

The Guide to Electrical Safety at Work

by John Whitfield

The Electricity at Work Regulations 1989 became effective in Great Britain on 1st April 1990 and in Northern Ireland on 1st January 1992. The purpose of the regulations is to ensure that all necessary precautions are taken in work related activities to prevent death or personal injury from electricity. They are statutory Regulations made under the Health and Safety at Work Act 1974. This book is intended to answer questions that are likely to arise for people at work who need to know about the Regulations. The employer and self-employed will find this a very useful book to have permanently to hand. Equally, the employed person will find the book extremely useful. The material has been presented in a non-technical manner so that the book will be useful for all. Highly recommended.



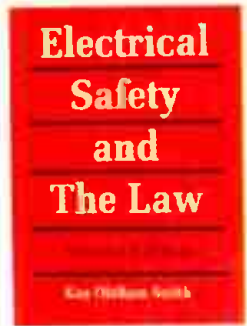
Order Code	Type	Price each
AA64U	Guide Elect Safety	£9.95 NV

Electrical Safety and The Law

Second Edition

by Ken Oldham Smith

This book summarises EC and British electrical safety regulations, including the Electricity at Work Regulations and the non-statutory Institute of Electrical Engineers Wiring Regulations. This latest edition takes into account the recent changes in legal requirements and deals extensively with the 16th Edition of the IEE Regulations. The book is primarily intended for the electrician, electrical engineer and safety officer and presents the facts in a simple and practical manner. It deals with electrical hazards and how they arise, accident and dangerous occurrence reporting, safety precautions, testing flammable atmospheres and the particular problems associated with underground cables and construction.

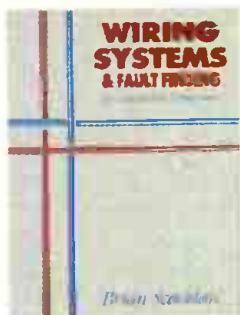


Order Code	Type	Price each
AA66W	Elec Safety And Law	£22.50 NV

Wiring Systems and Fault Finding For Installation Electricians

by Brian Scaddan

This book particularly welcomed by all those, including both installation and plumbing contractors, self-employed heating engineers and the home electrician, who need to be able to trace faults in circuits whether they be domestic, commercial or industrial systems. The book covers the interpretation of wiring circuit diagrams, wiring systems and the principles and practice of testing for fault diagnosis. Diagrams which are closely linked with comment and explanation lead the reader from the basic symbols and circuit/wiring diagrams, through more complex circuitry and various types of wiring systems, to the logical and methodical approach to the pinpointing of circuit faults.



Order Code	Type	Price each
WZ50E	Wiring Systems	£9.95 NV

Electrical Installation Calculations

by B. D. Jenkins

The 16th Edition of the Wiring Regulations from the IEE has been accompanied by many supplementary guidance materials and numerous books explaining the 16th Edition. However, very few, if any, deal with the calculations involved in circuit design for compliance with the IEE Wiring Regulations. This book is intended to fill the gap, and includes worked examples with the minimum discussion of theory. The extensive use of worked examples and avoidance of unnecessary theory, will make invaluable reading for all electrical contractors, as well as students and plant engineers.



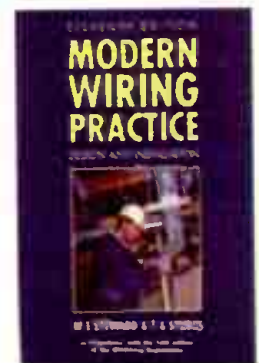
Order Code	Type	Price each
AA54J	A1 Elec Installat Calcs	£22.50 NV

Modern Wiring Practice

11th Edition

by W. E. Steward and T. A. Stubbs

A completely revised edition of Modern Wiring Practice taking into account the requirements of the 16th edition of the IEE Regulations for Electrical Installations. Includes new procedures developed since the ninth edition was published. Both the design of electrical installation systems and the practical work itself are covered, and the authors have many years' experience of electrical installation. An absolute must for all electrical engineers, apprentices, contractors and architects etc., and an invaluable reference for DIY wiring at home.

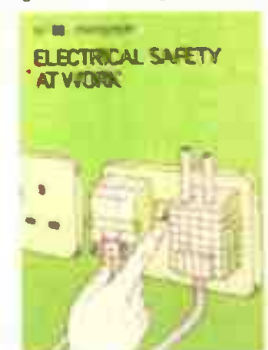


Order Code	Type	Price each
WP64U	Mod Wiring Practice	£14.95 NV

Electrical Safety at Work

An IEEIE Monograph

This volume is intended as a guide to the regulations covering electrical safety at work, with emphasis on the Electricity at Work Regulations 1989. The eight chapters are written by specialists in their particular field, and the monograph covers such areas as general inspection and the testing requirements to satisfy HSE regulations, the role of the electrical contractor, periodic testing, safety testing of appliances, local RCD protection, electrical safety in schools and hazardous areas. Appendices list the relevant safety regulations and standards, together with their sources. This is an obligatory book for the professional electrician, serious contractor or very advanced DIY person.



Order Code	Type	Price each
WT57M	Safety at Work	£5.50 NV

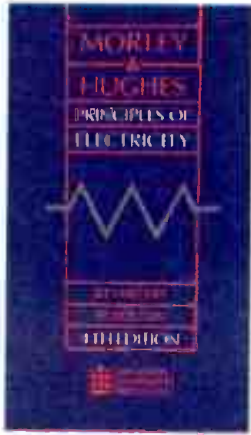
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Principles of Electricity

4th Edition
A. Morley and E. Hughes,
revised by W. Bolton

This standard text, now in its fourth edition, has been expanded and revised to give complete and current coverage of the electrical principles required by technicians. The text is ideal for students studying for BTEC National Certificates, or Diplomas, in Electrical Engineering, Electronics, Telecommunications and related subjects. The additional chapters cover transformers, circuit theorems, DC, transients and three-phase supply and the material on electronics has been completely rewritten to cover semiconductors. The chapter on electrical measurements has been extended to give coverage of a greater range of measurements and the graphical symbols used in the circuit diagrams have been revised to bring them in-line with BS 3939. The book contains 83 worked examples and 435 problems, most of which have been taken from past examination papers, with the answers at the end of the book. A very useful section on symbols, abbreviations and definitions, conveniently located at the front of the book.
1992. 480 pages. 214 x 137mm, illustrated.



Order Code	Type	Price each
WZ86T	Principles of Elect	£12.99 NV

Specification Clauses for Electrical Installations

An IEEIE Monograph

This technical monograph is intended to assist contractors and designers by providing guidance to the selection of appropriate wording for specification clauses in electrical installation contracts. Such clauses relate to utilisation features, technical requirements and definitions of requirements on performance factors for equipment. The booklet covers such areas as statutory regulations and standards, building construction, switchgear and fusegear, cable and wiring systems, wiring accessories, lighting and hazardous locations. Thorough knowledge of this book and the material behind it will ensure that contractors and designers word their specifications in a way which ensures that the high standards set by the IEE are maintained, operate and are universally recognised as best practice.
1988. 72 pages, 209 x 147mm, illustrated.

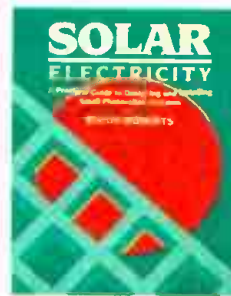


Order Code	Type	Price each
WT58N	Elec Inst Specs	£4.50 NV

Solar Electricity

by Simon Roberts

A Practical Guide to Designing and Installing Small Photovoltaic System. Whether you are interested in solar power for a lamp, radio, workshop application or whatever, this guide provides you with the methods you need to design solar electric systems and components. The non-technical language makes this book suitable for the lay person, but it is also suitable for students on undergraduate courses in power systems and solar electricity. The book is divided into three parts. Part one gives an introduction to solar electricity, describes solar modules, battery storage of electricity, control units, distribution at low voltage and electrical appliances, inverters and lighting. Part two covers planning, installation, operation and maintenance. Part three describes the building of electronic units associated with solar electric power. The first chapter gives an introduction to electronic components and circuit building, and is followed by chapters dealing with the construction of expanded-scale voltmeters, voltage adaptors, charge regulators for nickel-cadmium cells and control units for appliance circuits. The Maplin Catalogue contains a wide range of solar cells and panels that may be suitable for projects described in this book.
1991. 440 pages. 234 x 173mm, illustrated.



Order Code	Type	Price each
WZ67X	Solar Electricity	£15.99 NV

Automobile Electrical and Electronic Systems

A 'Haynes' Manual
by Tony Tranter

This book meets the need for a clear explanation of modern electronic equipment used in the car, and has been written with the co-operation of the major manufacturers. The book sets out to explain how electrical and electronic equipment works, while at the same time no prior knowledge is assumed on the reader who progresses logically to an understanding of the latest technology. Specific equipment and vehicles are referred to by way of illustration and the text is an ideal combination of theory and practice. Topics include batteries, starting and charging systems, fuelling, ignition and combustion, engine management, lighting and instruments, electromagnetic interference, vehicle wiring, general fault diagnosis, test equipment, and includes latest developments in fuel injection, pollution control, engine and body electronics, and braking and anti-skid systems.
1990. 264 pages, 279 x 214mm, illustrated, hard cover.



Order Code	Type	Price each
WT19V A2	Automobile Elec Sys	£12.95 NV

Microwave For Certain

by James Garrod and
Annemarie Rosier

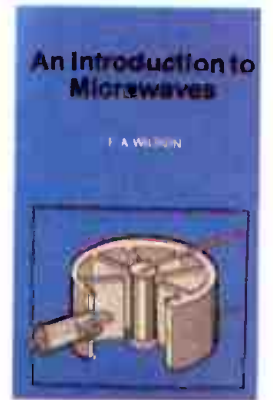
It is important for microwave ovens to be used intelligently. Some people quickly take to microwave, whilst others have difficulty breaking away from the familiar heat and temperatures. The microwave story as told in this book should leave no cause for doubt or confusion, and it may be an eye-opener even to the most successful microwave cook. The chapter on how to look after a microwave oven and recognise whether or not it needs attention is particularly good. This is the first publication to offer comprehensive advice along those lines. Engineers are often called out to microwave ovens which are in no way faulty. Everyone who uses a microwave oven has something to gain by reading this book, especially if they follow it through right from the beginning. It is strongly recommended they do just that.
1990. 89 pages. 210 x 148mm, illustrated.



Order Code	Type	Price each
WT50E	Microwave for Certn	£4.45 NV

An Introduction to Microwaves
by F. A. Wilson

This is an introductory book and no background in microwave technology is needed, although some elementary electronics experience is assumed. The mathematics required are little more than ordinary algebra. Organisation of the book is straightforward. Brief reminders and technical explanations of those facets of electronics important for an appreciation of microwaves are followed by chapters on microwave generators and amplifiers. This leads on to the practical uses of microwaves in communications generally, mobile communication and television. The book ends with a look at radar and heating, and includes notes on the domestic microwave cooker.
1992. 144 pages. 178 x 111mm, illustrated.



Order Code	Type	Price each
WZ42V	Intro Microwaves	£3.95 NV



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ELECTRONICS HANDBOOKS

The Art of Electronics

by Paul Horowitz and Winfield Hill

This is a text/reference book that emphasises electronic circuit design techniques and scientific measurement. Written in a down-to-earth manner it takes the reader from basic principles through to a reasonable degree of proficiency in circuit design. Included in the chapters are; transistors, feedback, operational amplifiers, active filters, regulators, digital/analogue techniques, computing and measurement, active filter designs, switched-capacitor filters, quadrature oscillators, low-dropout regulators, switching supplies, crowbars, isolation amplifiers, SCR latchup, 'ground bounce,' dynamic power dissipation, optoelectronics, RS-232 interfacing, modems, memory chips, schematic capture, AM detection, battery characteristics, sensor linearization.

1989. 1125 pages. 254 x 176mm, illustrated.

Order Code	Type	Price each
WS20W B4	Art of Electronics	£35.00 NV



Basic Skills - Electronics

by Tom Duncan

This book is suitable for anyone taking an introductory course in electronics, at school, college, or by study at home, or for anyone who wants to gain a knowledge and understanding of some of the basic principles of electronics. This book will meet the needs of those working for the Associated Examining Board's Basic Test in Electronics. Theory is covered in Part 1, while Part 2 provides practical course work in the form of experiments and projects, and provides an opportunity to become familiar with some basic components.

1988. 120 pages. 245 x 188mm, illustrated.

Order Code	Type	Price each
WS54J	Basic Skills Elect	£6.25 NV



The Electronics Workbench

Tools, Testers and Tips for the Hobbyist
by Delton T. Horn

This book is a complete guide to selecting electronic test and circuit design equipment, and provides you with a complete overview of everything you will need to know to design a permanent or portable workbench that best suits your specific needs. The following major categories are covered: multimeters, frequency meters, signal injectors and tracers, digital test equipment, oscilloscopes, LCR bridges and capacitance meters, signal generators and semiconductor testers and much more. Warning: references may be made to the American standard 110V AC mains supply. You should translate these into the English 240V AC mains standard and take the appropriate precautions with the higher voltage level.

1991. 253 pages. 235 x 187mm, illustrated. American book.

Order Code	Type	Price each
WZ20W	Electronics Workbnch	£16.95 NV



Practical Electronics for GCSE

by Owen Bishop

This course of practical electronics by the author of many successful books in computing and electronics, is designed for GCSE Electronics and the Electronics component of Technology courses. It offers the most comprehensive course of fully documented electronics practicals yet made available at this level. It is completely up to date with current techniques, equipment and approaches, with an extensive range of practical exercises, projects and open-ended investigations accompanied by the background information and essential theory required. The ideal workshop companion.

1989. 208 pages. 280 x 207mm, illustrated.

Order Code	Type	Price each
WS56L A1	Practical Elect GCSE	£8.99 NV



GCSE Electronics

by Tom Duncan

This book is fully up to date with current developments in electronics. It is designed to meet the requirements of all GCSE Electronics and the Electronics component of Technology courses. The text develops the subject logically from first principles through to electronics systems, with reinforcement questions (and answers) throughout. Has useful references for practical aspects of the course. Contains check lists of learning objectives and additional banks of questions (with answers and explanations) at core and further levels, so that students can monitor the progress throughout the course.

1989. 180 pages. 280 x 210mm, illustrated.

Order Code	Type	Price each
WS42V	GCSE Electronics	£8.99 NV



Digital and Analogue Electronics for HNC

by G. C. Loveday

This book primarily covers the required BTEC syllabus topics for electronic engineering at HNC/HND level, and in particular for BTEC units Analogue Electronics 13768B and Digital Electronics 13679B. Undergraduate students on electronic engineering degree courses will also find this book very useful as supplementary reading to their main course texts. The author has adopted an engineering approach to text presentation, providing the student with many analysis and design examples, as well as exercises and solutions to consolidate the theory discussed in the text. Emphasis is placed on the fundamental principles of electronic theory.

1993. 238 pages. 246 x 187mm, illustrated.

Order Code	Type	Price each
AA20W	Dig & Analogue Elec	£14.99 NV



Electronic Hobbyists Handbook

by R.A. Penfold

This book provides an inexpensive single source of easily located information that the amateur electronics enthusiast is likely to need for the day to day pursuance of this fascinating hobby. The characteristics and pin-outs of many popular semiconductor devices are given, including various types of logic IC's, operational amplifiers, transistors, FET's, unijunctions, diodes, rectifiers, SCR's, diacs, triacs, regulators and SMD's, etc.

1987. 88 pages. 265 x 195 mm, illustrated.

Order Code	Type	Price each
WP84F	Elec Hobby Handbook	£4.95 NV



Electronics For You

by Michael McLoughlin

This book provides the reader with a practical course for GCSE, TVEI or CPVE, backed up by clear exposition. The text is based on analysis of all current GCSE Electronics syllabuses. The book contains over 70 interesting projects, each of which are carefully introduced. Sections of work are graded on three levels. There are over 1000 questions and 600 line diagrams, cartoons and photographs.

1989. 256 pages, 271 x 200mm, illustrated.

Order Code	Type	Price each
WS72P A1	Electronics For You	£9.99 NV



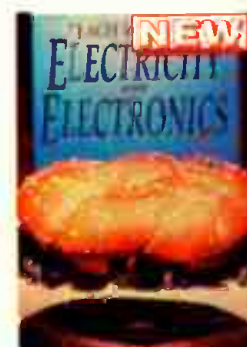
Teach Yourself Electricity and Electronics

by Stan Gibilisco

This book has primarily been written for those people who want to learn basic electricity and electronics without taking a formal course, but it can also serve as an introductory classroom text. The book is easy to follow as nothing is very advanced, starting with simple, general concepts and moves to more specialised topics. It is not necessary to have a mathematical or scientific background to make use of the book, as secondary school level mathematics and physical science should suffice. The style of the book does require a certain amount of self-discipline on the part of the reader, but the book is easy to read and follow, and the reader can set his/her own pace. A highly recommended book.

1993. 678 pages. 234 x 188mm, illustrated. American book.

Order Code	Type	Price each
AA24B A2	Electric & Electron	£22.95 NV



Protection of Electronic Equipment

Edited by
W.S.E. Mitchell

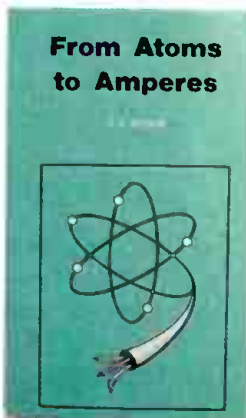
This technical monograph, is intended as a guide for the protection of electronic equipment against the potentially harmful effects of wide-ranging environmental and electrically-induced conditions. Individual chapters are written by specialists in their particular fields, covering such areas as protection against climatic and mechanical environments, hazardous areas (chemical etc.), electromagnetic and RF interference, electrostatic discharge, surges and transients on power or signal lines, thermal protection and management and special requirements relating to micro-electronic devices. There is good advice on correct wiring procedures, so you should be able to design and make up well thought-out cable looms taking all these precautions into account and not simply string things together with haphazard wiring! 1989. 96 pages, 210 x 148mm, illustrated.



Order Code	Type	Price each
WT23A	Protect Elec Equip	£5.00 NV

From Atoms to Amperes
by **F.A. Wilson**

This book explains in crystal clear terms the absolute fundamentals behind electricity and electronics. Really helps you to discover and understand the subject. Have you ever: Wondered about the true link between electricity and magnetism? Felt you could never understand the work of Einstein, Newton, Boltzmann, Plank and other scientists? Just accepted that an electron is like a little black ball? Got mixed up with e.m.f. and p.d.? Then help is at hand with this inexpensive book, in as simple a way as possible and without too much complex mathematics and formulae. 1989. 244 pages. 178 x 110mm, illustrated.

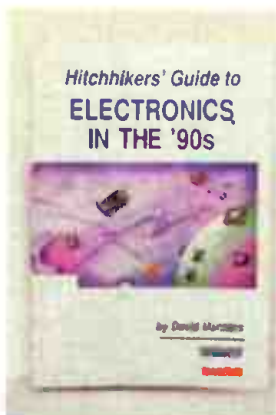


Order Code	Type	Price each
WS39N	From Atoms to Amps	£3.50 NV

Hitchhikers' Guide to Electronics in the '90s

by **David Manners**

This highly readable book puts the advances in electronics in a historical context, looks at the microchip technology which is at the heart of all technological advances, and surveys the major industrial electronics power houses, and finally peeks into the future of both the technology and the emerging markets. Chapters include a discussion on the impact of electronics, how it is shaping politics and the world; the 'chip wars' technology race and how Japan won; brief history of



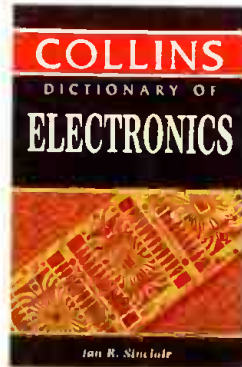
electrical discoveries and electronics; jargon; electronics industry and consumers; the chip business and the main worldwide companies, who and where they are; trends for the '90s, the pressing need for both the U.S. and Western Europe to rebuild technological and industrial strength, and whether Eastern Europe will become a serious market or producer. A really interesting book. 1990. 220 pages, 210 x 148mm.

Order Code	Type	Price each
WT22Y	Guide to ELEC in 90s	£12.95 NV

Collins' Dictionary of Electronics

by **Ian R. Sinclair**

This dictionary is designed for all who need a guide to the subject, including advanced school students and those embarking on further education courses, as well as technicians and hobbyists. Contains over 2,000 entries, from *aberration to zero error*. Includes over 1,000 diagrams, with lists of symbols used in electronics; microprocessor technology, digital electronics, telecommunications, hi-fi, radio and television. The form of the dictionary has been set out so as to make it easier to find an explanation of a device or principle under one heading. In addition cross references guide the reader to other related entries. 1988. 378 pages. 202 x 130mm, illustrated.

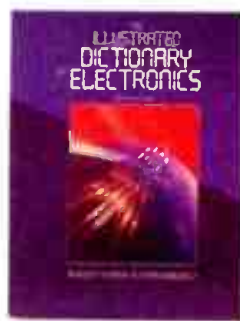


Order Code	Type	Price each
WT38R	Dictionary of Elec	£5.99 NV

The Illustrated Dictionary of Electronics

by **Rufus P. Turner and Stan Gibilisco**

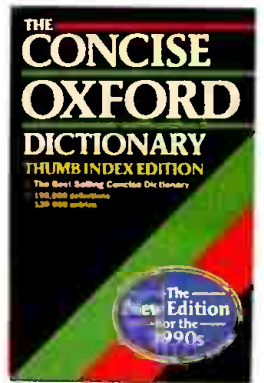
This collection of terms is the most comprehensive dictionary available. Including all practical electronics and computer terms. Tables and data on subjects most often consulted for projects and experiments are included. Other conversion tables include English/metric and metric/English conversions for units of measure of energy, power, and volume, and Fahrenheit/Celsius temperature conversion charts. Setting this edition apart from other electronic dictionaries is its emphasis on illustration. Featuring more than complete definitions, this fifth edition is packed with over 450 detailed drawings and diagrams. It's all here - more than 27,000 terms used in electronics today! 1991. 730 pages. 234 x 188mm, illustrated.



Order Code	Type	Price each
WS27E B2	Dictionary of Elec	£25.95 NV

Oxford Dictionary 8th Thumb Index Edition

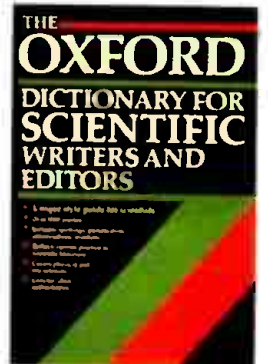
The eighth edition of The Concise Oxford Dictionary is a thorough revision of the foremost authority on current English. The text has been expanded and largely rewritten, with the emphasis on ease of use and coverage of contemporary English. It marks a radical departure from previous editions with many more words and phrases given separate articles, and definitions written in a clear, straightforward style. The use of special symbols and abbreviations has been kept to a minimum and explanations of grammar and word origins have been considerably revised and clarified. Many more derivatives are given. There are 120,000 entries (including compounds, phrases, derivatives, abbreviations, and a generous coverage of inflections) and 190,000 definitions. Special attention has been paid to the vocabulary of science and technology, including newer fields such as environmental studies and the information sciences. Other features new to this edition include generous treatment of English used throughout the world, pronunciations given in the standard International Phonetic Alphabet, and articles on the English language and dictionary writing. With this edition the dictionary enters the computer age. The text has been compiled from the extensive records of words and usage held by the Oxford Dictionary Department, including the continuously updated database of The Oxford English Dictionary. The result is an unrivalled account of the English language in general use today. 1992. 1488 pages. 242 x 167mm, hard cover.



Order Code	Type	Price each
MJ61R	Dictionary	£15.95 NV

The Oxford Dictionary for Scientific Writers and Editors

This dictionary provides scientists, science writers and all who work in scientific publishing with a clear and concise style guide for the presentation of scientific information. It reflects widely accepted usage and follows the recommendations of international scientific bodies such as IUPAC and IUPAP. The dictionary gives clear guidance on such matters as spellings (US and UK), punctuation, abbreviations, prefixes and suffixes, units and quantities, and symbols. Over 9,500 entries cover the fields of physics, chemistry, botany, zoology, biochemistry, genetics, immunology, microbiology, astronomy, mathematics, and computer science. There are also extensive supplementary tables including SI units, mathematical symbols, the electromagnetic spectrum and the periodic table. This guide sets out an up-to-date and consistent style for scientific material intended for publication. The contributors to this dictionary are all scientists or science writers from a variety of disciplines. The editors have cast their net wide in the hope of making the book as comprehensive and useful as possible. 1992. 389 pages. 204 x 140mm, hard cover, illustrated.



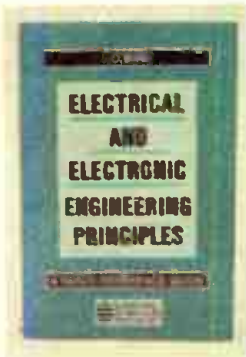
Order Code	Type	Price each
MJ62S	Science Dictionary	£14.95 NV

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Electrical and Electronic Engineering Principles – A Ready-Reference Guide

Compiled by J. O. Bird

The study and practice of electrical and electronic engineering involves the use of a large number of important formulae, as well as the various quantity definitions, units and symbols. The aim of this handy ready-reference guide is to present, concisely, the most common quantities, units, symbols, definitions, formulae and circuit diagram symbols used in the field of electrical and electronic engineering. Some 150 graphical symbols selected from the British Standards Institute are included. This well laid out and presented book will be extremely valuable for students and lecturers in colleges, polytechnics and universities, as well as technicians and engineers in the electrical and electronic engineering industries.



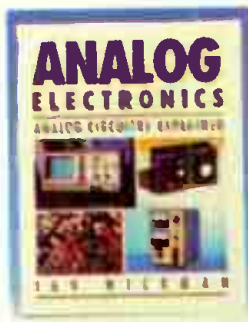
Order Code	Type	Price each
WZ85G	Elec&Electr For PcpI	£5.99 NV

Analog Electronics

Analog Circuitry Explained

by Ian Hickman

Many young designers are lured away from fundamental electronics to the more 'glamorous' digital work. Yet there are still many simple requirements for which a purely analogue realisation is cheaper and more reliable than a microprocessor based solution. In this book the author includes many examples from his large collection of circuits built up over many years, selected for their usefulness in a wide range of applications. They are practical analogue circuits, complete with component values in many cases, representing over a quarter of a century of working experience packed into a single volume. But the book is also completely up-to-date and with the latest developments and techniques, and will enable the reader to acquire an easy familiarity with the circuitry and how it works – and also why it fails if it should do so. The book is intended for anyone already involved in electronics, either as a hobby or professionally – amateurs, students, technicians, graduates and even chartered engineers will all benefit from reading this book.



Order Code	Type	Price each
WT07H A2	Analog Electronics	£14.95 NV

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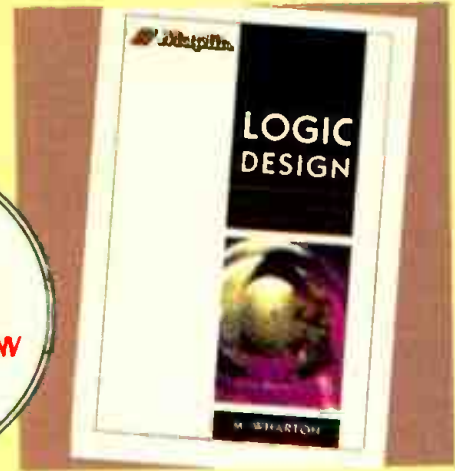
MAPLIN SERIES – LOGIC DESIGN

NEW

by M. Wharton

This book offers a clear and concise introduction to logic circuit design and is based on a collection of feature articles that originally appeared in *Electronics – The Maplin Magazine*. As well as providing a first guide for the beginner, the volume includes practical information and reference material for the more experienced electronics enthusiast or student.

1994. 200 pages. 216 x 138mm, illustrated.

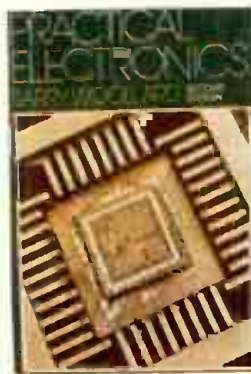


Practical Electronics

by Barry Woollard

This book covers many electronic components, detailing their attributes, ratings and typical applications. There are sections on Resistors and Capacitors, Inductors and Transformers, Power Supplies, Transistors, Thyristors and Triacs, Pulse Shaping, Amplifiers, Logic and Digital Electronics, and also Measurements and Fault Diagnosis. Each section is complemented by a series of practical exercises for which typical results are given later in the book. This book is ideal for Students and Teachers alike.

1984. 260 pages. 230 x 150mm, illustrated.



Order Code	Type	Price each
WP05F	Pract Electronics	£11.95 NV

Practical Electronic Timing

by Owen Bishop

This book is essentially a project book of practical electronic timing circuits, that employ several different types of specialised IC. Each group of projects has an introductory discussion highlighting the problems of timekeeping and the methods of solving such problems by using electronics. There are projects that are suitable for beginners as well as the more experienced electronics constructor – the projects being suitably identified as either beginners, average or advanced. All the projects will operate from batteries, making them safe to build and operate – especially important for young beginners. In fact, there are several low-cost projects, that are specifically aimed at the beginner and younger enthusiast.

1993. 174 pages. 178 x 110mm, illustrated.

Order Code	Type	Price each
AA28F	Electronic Timing	£4.95 NV



Practical Electronic Design Data

by Owen Bishop

This book is a comprehensive reference manual for electronics enthusiasts of all levels, be they hobbyists, students or professional electronic engineers. A major section of the book covers the main types of components, including surface-mounted devices. For each component, the book lists the most useful and readily available types, complete with details of their electronic characteristics, pin-outs and other useful information. A special feature of this section is the easily followed charts and tables which suggest how to select the best type of component for any particular purpose. Basic electronic units are defined, backed up by a fully explained compendium of the most often required formulae.

1992. 332 pages. 178 x 111mm, illustrated.

Order Code	Type	Price each
WZ70M	Prct Electr Design	£4.95 NV



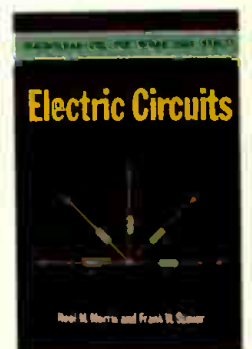
Electric Circuits

by Noel M. Morris and Frank W. Senior

This book is one of a series for use by students, not only as a text book but also as a guide to good practice in the solution of problems. The topics reflect the most popular areas in first year HND and HNC courses in Electrical and Electronic Engineering. While much of the mathematics is on the heavy side, many electrical engineering terms and circuit theory analyses are clearly and concisely described and illustrated in this very detailed book.

1991. 370 pages. 275 x 215mm, illustrated.

Order Code	Type	Price each
WZ07H A2	Electric Circuits	£9.99 NV



Instrumentation Electronics

by P. P. L. Regtien

We are all aware that electronics has penetrated deeply into our daily life, for electronic systems can be observed almost everywhere. There are hardly any appliances, tools or instruments that do not contain electronic parts, and designers of technical systems must be fully-aware of the possibilities and limitations of modern electronics. It is equally important that users of electronic systems have at least some basic knowledge of electronic principles to exploit fully the possibilities of an instrument, to be aware of any limitations and to correctly interpret measurement results. This book is designed to offer the basic knowledge to obtain these skills, and covers the basic properties of both analogue and digital components and circuits, as used in electronic measurement systems. This well written book is based on electronic and electronic instrumentation courses, and requires a basic knowledge of mathematics and physics to first year degree level, or equivalent. No knowledge of electronics is required.



1992. 490 pages. 233 x 173mm, illustrated.

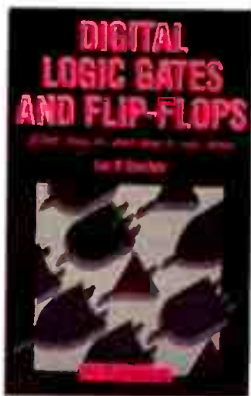
Order Code	Type	Price each
WZ87U	Instrument Electron	£18.95 NV

THE BEST OF SERVICE

Digital Logic Gates and Flip-Flops

by Ian R. Sinclair

This book, intended for enthusiasts, students and technicians, seeks to establish a firm foundation in digital electronics by treating the topics of gates and flip-flops thoroughly. This is not a constructor's book in the sense of presenting circuits to build and use, it is for the user who wants to design and troubleshoot digital circuitry with considerably more understanding of principles than the constructor, and who wants to know more than a few rules of thumb about digital circuits. Topics such as Boolean algebra and Karnaugh mapping are explained, demonstrated and used extensively, and more attention is paid to the subject of synchronous counters than to the simple but less important ripple counters. No background other than a basic knowledge of electronics is assumed, and the more theoretical topics are explained from the beginning, as also are many working practices. The book concludes with an explanation of microprocessor techniques as applied to digital logic.



1989. 198 pages. 216 x 138mm, illustrated.

Order Code	Type	Price each
WS36P	Dgtl Logic Gates & FF	£8.95 NV

Electronic Circuits Pocket Book

Volume 1

by Ray Marston

This information packed book is a single-volume applications guide to the most popular and useful linear ICs, and presents a total of 625 diagrams, tables, and carefully selected practical circuits, backed up by over 50,000 words of highly informative text. It deals with many strictly linear ICs such as op-amps, audio pre-amplifiers, power amplifiers, signal conditioners and power supply regulators, etc., as well as various 'hybrid' configurations, which use a mixture of linear and digital devices, such as the 555 timer IC, bargraph display drivers, CCD delay lines, function and waveform generators, phase-locked-loops (PLLs), and power control ICs. Each subject is treated in an easy-to-read, concise, highly practical and non-mathematical manner. Great emphasis is placed on practical 'user' information and circuitry throughout, and most of the ICs and other devices used in the practical circuits are modestly priced and readily available, with universally recognised type numbers. 1991. 336 pages. 197 x 95mm hard cover, illustrated.



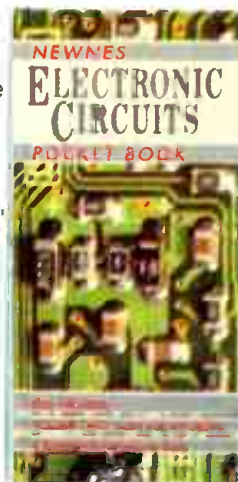
1991. 336 pages. 197 x 95mm hard cover, illustrated.

Order Code	Type	Price each
WZ49D	Electronic Circuits	£12.95 NV

Electronic Circuits Pocket Book - Volume 2

by Ray Marston

This volume complements the best-selling volume one, and is produced in the same informative style. Covering passive electrical components, transducers and simple discrete semiconductor devices, this book has a total of 670 diagrams, tables and carefully selected practical circuits. The informative text explains the basic features and important details of modern passive components such as resistors, capacitors, inductors, switches etc., as well as relays, loudspeakers, 'phones, diodes, transistors, SCRs and TRIACs etc. The text is non-mathematical and highly practical, and is aimed at engineers, technicians, students and experimenters who can build a design directly from a circuit diagram.



1993. 375 pages. 197 x 95mm, illustrated.

Order Code	Type	Price each
AA25C	Electronic Circuits2	£12.95 NV

Electric Circuits

by Noel M. Morris

and Frank W. Senior

This book is one of a series for use by students, not only as a text book but also as a guide to good practice in the solution of problems. The topics reflect the most popular areas in first year HND and HNC courses in Electrical and Electronic



Engineering. While much of the mathematics is on the heavy side, many electrical engineering terms and circuit theory analyses are clearly and concisely described and illustrated in this very detailed book. 1991. 370 pages. 275 x 215mm, illustrated.

Order Code	Type	Price each
WZ07H	A2 Electric Circuits	£9.99 NV

Electronics

by Harry Kybett

The second edition of this self teaching guide that leads you through the basic principles of modern electronics without going into complicated mathematics. The guide shows you how to design your own working circuits. American book.



Order Code	Type	Price each
WG11M	1 Book JW748	£11.45 NV

A Practical Introduction to Electronic Circuits

2nd Edition

by Martin Hartley Jones

This book dispels much of the mystery which surround electronics with its down to earth practical approach in presenting the various building blocks of electronics. Mathematics is limited to a basic understanding of Ohm's Law and a little calculus. Fourteen chapters covering amongst other subjects; amplification, thermionic valves, negative feedback, impedance matching, differential amplifiers, power supplies, integrated analogue and digital building blocks, pulse circuits and microcomputer circuits. 1985. 278 pages. 245 x 174mm, illustrated.



Order Code	Type	Price each
WS19V	Intro Elect Circuits	£14.95 NV

Electronics

by G. Waterworth

This book is primarily intended as a text for electrical engineering students, but is equally useful for the amateur hobbyist and is a companion volume to 'Electric Circuits', WZ07H. It describes all the common semiconductor devices, how they work and how they are used in various circuit schemes. The topics are arranged in the traditional order for semiconductor devices: diodes, BJTs, FETs and op-amps, followed by their applications in a variety of electronic subsystems such as amplifiers, oscillators, non-linear circuits, power amplifiers, regulated power supplies, power electronics systems, combinational and sequential logic circuits. 1991. 257 pages. 275 x 210mm, illustrated.



Order Code	Type	Price each
WZ17T	A1 Electronics	£9.99 NV

Circuit Source Book 1

by R. A. Penfold

This book has been written to help the reader create and experiment with their own electronic designs by combining, and using, the various standard building block circuits described in the book. To widen the possible use of some circuits, advice is given on how to alter the circuit parameters. Many simple projects can be built up from standard circuit blocks, and this book will be invaluable to those who are embarking on electronic project design. To the more experienced circuit designer, it will be a very useful reference source, for all the circuits are tried and tested, and are not just theoretical circuits. Example values are given, together with advice on how to alter the values of components so as to alter the circuit parameters e.g., to vary the value of a filter frequency, or amplifier gain etc. Explanation of circuit block functions and what they do, is not given in great detail, for the book is only intended for those who have some knowledge of electronics. However, no advanced mathematics is required in order to make use of this book.

A very useful and handy book for all professionals, students and hobbyists to have in their book collection.



Order Code	Type	Price each
WZ92A	Circuit Source Book1	£4.95 NV

Circuit Source Book 2

by R. A. Penfold

This book provides a number of electronic circuits which make useful 'building blocks' for designers of electronic projects. The book is divided into four chapters with the first chapter covering oscillators and includes 555 astables, op amp oscillators, sinewave and function generators, V. C. O.s, CMOS oscillators and RF oscillators. Chapter two covers monostables and timers, and includes precision timers. Chapter three discusses digital circuits and covers A-to-D, and D-to-A circuits as well as many other types of digital circuits. Finally, chapter four describes power supplies. The book is really only intended for those that have some background knowledge in electronics. However, no advanced mathematics is required in order to make use of this book. Over 170 circuits are provided which should provide a useful reference source for those involved in circuit design and applications, whether they are professional, student or a keen hobbyist.



Order Code	Type	Price each
AA05F	Circuit Source Book2	£4.95 NV

A Reference Guide to Practical Electronics Terms

by F. A. Wilson

This inexpensive reference guide explains briefly and succinctly, many of the underlying electronics features of practical devices, most of which, to a certain extent, control our lives.

This book is in effect more than just a dictionary of practical electronics terms, it goes a stage further in also getting down to fundamentals. Accordingly the number of terms may be limited but the explanations of the many which are included are designed to leave the reader more competent and satisfied.

Complicated mathematics has been avoided as this can be confusing on first reading. The entries are in alphabetical order, and where necessary, entries have references for further reading. The references are no more than enlightened suggestions, and the reader can choose which, if any, should be explored further.

This practical reference guide is ideal for everybody concerned with electronics. 1992. 442 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
WZ59P	Guide Electr Terms	£5.95 NV

Practical Electronic Filters

by Owen Bishop

Filters play a vital part in almost all electronic circuits, this book deals with the subject in a non-mathematical way. It reviews the main types of filter, explaining in simple terms how each type works and how it is used. The book also presents a dozen filter-based, practical projects with applications in and around the home or in the constructor's workshop. These include a number of audio projects such as a rhythm sequencer and a multi-voiced electronic organ. Project descriptions include circuit diagrams, explanations of their operation, and detailed instructions for building them. Concluding the book is a practical step-by-step guide to designing simple filters for a wide range of purposes, with circuit diagrams and worked examples. 1991. 204 pages. 178 x 111mm, illustrated.



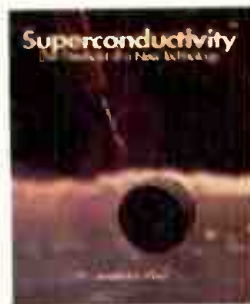
Order Code	Type	Price each
WZ22Y	Pract Elec Filters	£4.95 NV

Superconductivity

by Jonathan L. Mayo

This book is written in an easy-to-follow terminology which covers the full spectrum of superconductivity and superconductive applications. The book explains the properties of superconductivity, describing what it is, what it can and cannot do, as well as its advantages and drawbacks. The most recent advances are included (high-temperature superconductivity) and a thorough history is provided to help you fully understand and appreciate the science. 1988. 144 pages. 234 x 188mm, illustrated.

American book.



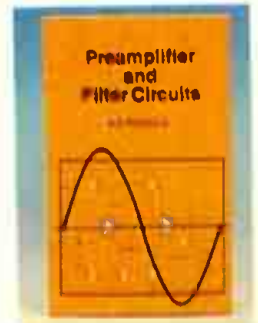
Order Code	Type	Price each
WS30H	Superconductivity	£13.95 NV

Preamplifier and Filter Circuits

by R. A. Penfold

This book provides both circuits and background information for a range of preamplifiers, together with tone controls, filters and mixers etc. to go with the amplifiers. The use of modern, low noise operational amplifiers and a specialist, high performance audio preamplifier IC results in designs having excellent performance but which are still quite simple. All the circuits featured can be built at quite low cost, in most cases, for just a few pounds. In fact, everything you need to put together your own, custom preamplifier system is in this book.

1991. 92 pages. 178 x 110mm, illustrated.



Order Code	Type	Price each
WZ19V	Preamps & Filters	£3.95 NV

Filter Handbook - A Practical Design Guide

by Stefan Niewiadomski

This book is a guide to electronic filter design and implementation, clearly written and without the enormous amount of mathematics usually found in books on this subject. With many outstanding features, the handbook covers passive and active filters, and contains computer programs to aid the design process. Outlines practical problems of implementing filters and how to overcome them, using simulation and measured results. Contains many working examples of filter designs for use at radio and audio frequencies. Explains the principles in a way that requires no advanced mathematical knowledge. Helps in the selection of the optimum filter response to meet a design requirement. Deals with switched capacitor and switched resistor filters. Includes a useful catalogue of pre-calculated tables. 1989. 195 pages. 253 x 190mm, illustrated.

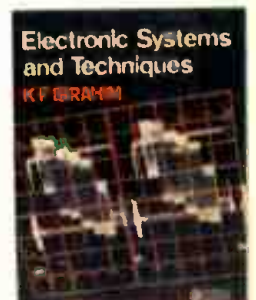


Order Code	Type	Price each
WS75S	Filter Handbook	£30.00 NV

Electronic Systems and Techniques

by K. F. Ibrahim

Covers the Level 2 and 3 syllabus of the BTEC and City and Guilds 224 Electronics Servicing course, but makes a useful reference guide for those interested in designing and building their own circuits. The book starts from the basic knowledge of Ohm's Law, waveform and generation technology, progressing to a sound understanding of electronic equipments. It is a good textbook for radio, television, audio and power generation, containing over 300 line drawings. 1987. 276 pages. 246 x 189mm, illustrated.



Order Code	Type	Price each
WP09K	A1 Elec Syst & Tech	£11.99 NV

MAPLIN SERIES – NEW STARTING ELECTRONICS

by Keith Brindley

This text provides an important introduction for the new-comer to the fascinating world of electronics. Essentially practical, all the bits and pieces that an experimenter will meet when tackling projects and building circuits are introduced and explained. Detailed and practical explanations of components are combined with clear descriptions and methods to give a thorough grounding in the basics. This is the essential primer for all electronics enthusiasts and a valuable guide for students. 1994. 200 pages. 216 x 138mm, illustrated.



practical rather than the theoretical. The book is conveniently divided into three parts. Part One, components, covers power semiconductor devices, thermal design, power semiconductor components, EMC, and power semiconductor protection. Part Two, circuits, discusses static switches, AC line control, phase-controlled rectification and inversion, direct AC frequency converters, forced commutation techniques. DC to DC converters and DC link frequency converters. Part Three describes some of the applications of power semiconductor circuits, such as power supplies, electrical machine control, heating and lighting and electromechanical applications. A list of symbols used, a glossary of terms and a bibliography are provided in the book. The book is profusely illustrated and will be of great interest to the power electronics engineer and student. 1993. 418 pages. 231 x 154mm, illustrated.

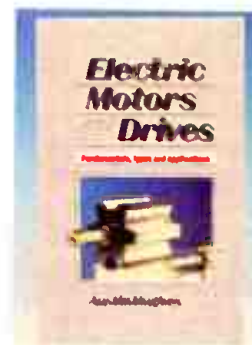
Order Code	Type	Price each
AA07H	Power Electron Hdbk	£19.95 NV

Electric Motors and Drives

by Austin Hughes

This book explores most of the currently widely-used modern types of motor and electronic driving methods, including conventional and brushless DC, mains and inverter fed induction motors, stepping motors, mains and converter fed synchronous motors, and reluctance motors.

Applications are deliberately spread throughout the text in order to emphasise the fact that there is no longer any automatic correlation between motor type and application. If you need to do anything with an electric motor you must read this super book first. 1990. 320 pages. 203 x 135mm, illustrated.



Order Code	Type	Price each
WS84F	Electric Mtr & Drivs	£15.95 NV

Electric Motors

by Jim Cox

This book sets out in simple terms the essential characteristics and operating limitations of the principle motor and generator types. The approach is essentially practical in nature with few calculations needing anything more than simple arithmetic, giving basic operation and installation information to the first time user. The book shows you how to apply automotive, industrial and domestic motors in home-made applications, and identify their ratings; less common motor and generator types such as servo and stepper motors are included. Readily available in the surplus market, the unusual types can be extremely useful in special applications. The book includes data about motor starting systems, electronic speed control and motor braking. 1990. 134 pages. 209 x 148mm, illustrated.



Order Code	Type	Price each
WT92A	Electric Motors	£6.95 NV

Electronic Signals and Systems

Television, Stereo, Satellite TV, Automotive
by Stan Prentiss

This book presents a detailed study of signal analysis as it applies to the operation and signal generating capabilities of today's most advanced electronic devices, including: spectrum analysers, digital storage oscilloscopes, logic analysers, high-end multimeters, frequency counters; transmission coaxial cable, fibre-optics, AM and FM modulation, stereo multiplexing, vectors, television antennas; satellite earth terminals, data traffic, transponder waveforms; mono and stereo audio, harmonic distortion, stereo separation; and multiple and satellite master antenna systems. The book provides a fresh insight into both the commercial and consumer aspects of electronics that you won't find in any other volume. 1991. 325 pages. 235 x 188mm, illustrated.



Order Code	Type	Price each
WT80B ^{A1}	Signals & Systems	£17.95 NV

Power Control Circuits Manual

by R. M. Marston

Electronic Power Control techniques are used to control (either manually or automatically) the brilliance of lamps, the speed of electric motors, the temperature of heating elements, the loudness of audio signals and so on. This control can be achieved using electro-mechanical means via switches and relays, or by electronic components such as transistors, SCR's, TRIAC's and power IC's. This book takes an in-depth look at the whole subject of electronic power control, and presents the reader with a vast range of useful circuits and diagrams. Subjects covered include basic principles, switch and relay circuits, CMOS switches and selectors, AC power control and DC power supply methods, and including audio power amplifiers and some used for in-car systems. The manual is primarily aimed at the practical design engineer, technician and experimenter as well as the electronics amateur enthusiast. 1990. 206 pages. 214 x 136mm, illustrated.



Order Code	Type	Price each
WT05F	Power Control Manual	£13.95 NV

Power Electronics Handbook – Components, Circuits and Applications

by F. F. Mazda

The aim of this book is to provide the power electronics engineer with all the information to design power circuits for a variety of applications. It describes the characteristics of power semiconductor devices, and how they are used in power circuits. The book sets out to give the maximum amount of information in a concise form, with the emphasis being on the



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A Beginners Guide to Modern Electronic Components

by R. A. Penfold

This book describes the basic functions of components but is not an electronics text book. Instead it deals with the practical aspects such as colour codes, deciphering code numbers and the suitability of components for given applications. Some of the components covered include Resistors (including Potentiometers), various types of capacitors, inductors, diodes (including Zeners and Varicaps). Transistors both silicon and germanium, opto electronic devices, operational amplifiers, logic integrated circuits, loudspeakers and microphones and meters. The book cleverly divides the components into Passive, semiconductors integrated circuits and The Rest which includes connectors, switches and multiway components. A useful index has to be used in conjunction with the contents pages, but does enable much of the detail about components to be tracked down.



Order Code	Type	Price each
WT61R	Guide to Elec Comps	£3.95 NV

Understanding Telephone Electronics

by Stephen J. Bigelow

This takes the reader step-by-step from the simplest explanation of telephonic principles through to an intermediate level of telecoms learning. It covers signalling, switching, digital types, modems and cordless telephones. American book.



1991. 368 pages. 235 x 188mm, illustrated.

Order Code	Type	Price each
WK45Y	Undrstn Phone Ectrn	£22.95 NV

Telecom Circuits Data Book

After we have all got used to the introduction of the telephone, and the way in which it has changed our way of living, there is now a second telecommunications revolution going on – for what was once the exclusive purview of the electro-mechanical is now being pervaded by the electronic. This book contains all data and specifications for the latest integrated circuits and applications from Texas, covering the telephone set, exchange and switching, and signal transmission. The book also includes lots of information for designers.



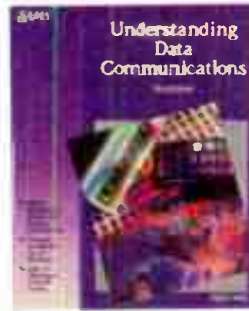
Order Code	Type	Price each
WP24B A1	Telecom Circuits	£15.50 NV

Understanding Data Communications

Third Edition

by Gilbert Held

Data communications – the transmission of words or symbols from a source to a destination – is no longer exclusive to the business world. You can learn the basic principles in this easy-to-understand book, and a whole lot more. Ten chapters cover basic concepts and fundamentals of transmission and reception, asynchronous and synchronous, protocols, error control & networking. Subjects include two wire and coaxial cable communication, waveguides, modems, fibre optics and satellite communication to name a few.



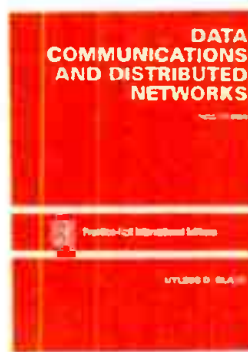
1993. 380 pages. 230 x 180mm, illustrated.

Order Code	Type	Price each
WP28F	Data Communications	£22.95 NV

Data Communications and Distributed Networks

by Uyles D. Black

Even though the many components that form data communications systems and distribute networks may appear to be complex, the purpose of this technology is to transport user data between and among user machines. This book sets out to provide a practical yet detailed explanation of the data communications system networks with special reference to software and data bases. The book is written using as few formulae and as little technical jargon as possible, however, sufficient detail is provided to remove the mystery and confusion that often surround these topics. The book includes the new standards such as some of the IEEE 802 LAN standards and some of the CCITT ISDN standards, and frame relay and broadband ISDN. The book contains material on distributed systems and internetworking, with the emphasis on internetworking of personal computers and client-server operations. This book is ideal for the beginner and the more advanced reader who is interested in obtaining a good understanding of data communications and networks.



1993. 430 pages. 233 x 178mm, illustrated. American book.

Order Code	Type	Price each
AA04E	Data Comms & Dis Net	£20.95 NV



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Electronic Circuit Design Art and Practice

by T.H. O'Dell

The theme of this textbook is the practical element of electronic design. There is more to circuit design than a good theoretical foundation augmented by a considerable amount of laboratory experience. Where do new circuit ideas come from? This question is followed in the first chapter, and the discussion is maintained throughout the following eight chapters dealing with high and low frequency, small-signal amplifiers, optoelectronic circuits, digital circuits, oscillators, translinear circuits and power amplifiers. One or more experimental circuits are described in each chapter in detail for the reader to build, a total of thirteen project exercises in all. The last chapter draws some conclusions about the fundamental problem of design in the light of the circuits that have been dealt with in the book.

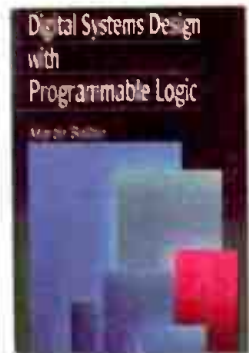


Order Code	Type	Price each
WT29G	Electronic Cct Dsgn	£13.95 NV

Digital Systems Design with Programmable Logic

by Martin Bolton

Programmable logic devices (PLD's) bring indispensable benefits in terms of speed, flexibility and reliability to digital systems design. This book provides a clear and careful introduction to modern, structured digital systems design from a programmable logic perspective. Extensively covering synchronous and asynchronous techniques, a 'top-down', implementation-independent approach to design is taken throughout. Topics covered include extensive coverage of state machine design, an appendix listing all known PLD's, test objectives, summaries and problems with each chapter, and a very comprehensive bibliography.



1990. 384 pages. 240 x 160mm, illustrated, hard cover.

Order Code	Type	Price each
WT10L A1	Digi Sys Prog Logic	£23.95 NV

International Transistor Equivalents Guide

by Adrian Michaels

A listing of over 10,000 transistors from over 100 manufacturers around the world with equivalents and typical use of each type clearly shown.



1981. 320 pages. 180 x 108mm.

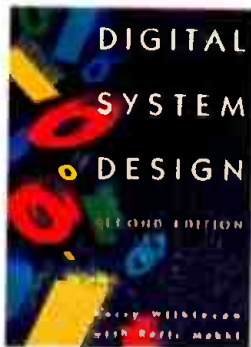
Order Code	Type	Price each
WG30H	Book BP85	£3.95 NV

Digital System Design

2nd Edition

by Barry Wilkinson with Rafic Makki

This book introduces the fundamental topics of digital system design, and can be used as a text for undergraduate electrical engineering, computer engineering, and computer science courses in logic design and microprocessor systems. The book has three parts. The first part deals with logic design, while part two is devoted to the components of a microprocessor system. The last part contains further aspects of digital system design, and extends topics introduced in the other two parts. In this second edition, the treatment of logic design has been expanded, and the text on microprocessors has been up-dated. A major new chapter on VLSI systems design and testing has been included.



1992. 558 pages. 235 x 174mm, illustrated. American book.

Order Code	Type	Price each
WZ65V	Digital Syst Design	£19.99 NV

Electronic Power Supply Handbook

by Ian R. Sinclair

This book covers the often neglected topic of electronic power supplies. All types of supplies that are used for electronics purposes are covered in detail, starting with cells and batteries and extending by way of rectified supplies and linear stabilisers to modern switch-mode systems, IC switch-mode regulators, DC-DC converters and inverters.



The action of rectifiers and the reservoir capacitor is emphasised, and the subject of stabilisation is covered. The book includes some useful formulae for assessing the likely hum level of a conventional rectifier and reservoir supply. An invaluable book on an often neglected subject.

Order Code	Type	Price each
WS89W	Elec Pwr Supplies	£7.95 NV

Towers' International Transistor Selector Update 4

by T. D. Towers, MBE, BSc, C.Eng, MIERE

Knowing just the type number, readers can find voltage, current and power ratings, and other characteristics including case details, terminal identification, application and manufacturer of nearly 29,000 transistors of American, British, West and East European, and Japanese origin along with possible substitutes. There is also a surface mount device cross index.



Order Code	Type	Price each
RR39N	A2 Towers Transistor Bk	£19.95 NV

How to Get Your Electronic Projects Working

by R.A. Penfold

We have all built circuits from magazines and books only to find that they do not work correctly, or at all, when first switched on. Chapter 1 deals with mechanical faults and describes construction of a tri-state continuity tester. Chapter 2 deals with linear analogue circuits and describes construction of a signal injector. Chapter 3 shows how to check common components with the aid of only a limited amount of test gear. Chapter 4 deals with TTL and CMOS circuits and includes construction details of a pulse generator.

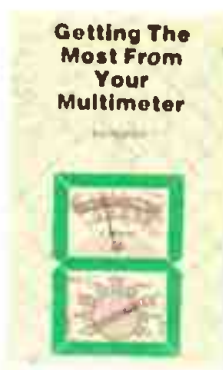


Order Code	Type	Price each
WA53H	Book BP110	£2.95 NV

Getting the Most from Your Multimeter

by R. A. Penfold

The first piece of test equipment that most electronic hobbyists normally buy is a multimeter. The basics of analogue and digital multimeters are covered, discussing their relative merits and limitations. Various methods of component checking are described, including tests for transistors, thyristors, resistors, capacitors and diodes. Circuit testing is also covered with subjects such as voltage, current and continuity checks. Using these simple techniques the reader should be able to confidently tackle servicing of most equipment.



Order Code	Type	Price each
WP94C	Get Most Multimeter	£2.95 NV

More Advanced Uses of the Multimeter

by R.A. Penfold

This book is primarily intended as a follow-up to 'Getting The Most From Your Multimeter' and also anyone who already understands the basics of voltage testing and simple component testing. Thoroughly testing some components requires specialised and expensive equipment. In some cases there would not seem to be equipment of the right type available at any price. By using the techniques described, you can test and analyse the performance of a range of components. Designs for simple add-ons are given to make the multimeter even more useful: An active RF probe, a high resistance probe, an AC sensitivity booster and a current tracer.

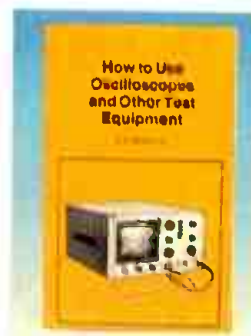


Order Code	Type	Price each
WS63T	Adv Use Of M/meter	£2.95 NV

How to Use Oscilloscopes and Other Test Equipment

by R. A. Penfold

Advances in electronics over recent years have brought some quite advanced pieces of test equipment within the scope of many electronics hobbyists. This book explains the basic functions of an oscilloscope giving a detailed explanation of all the standard controls, with advice on choosing an oscilloscope. A separate chapter deals with using the instrument for fault-finding both linear and logic circuits, with plenty of example waveforms. The function and use of other pieces of test gear are also covered, including signal generators, logic probes, logic pulsers, and crystal calibrators.



Order Code	Type	Price each
WS65V	How to Use Scopes	£3.50 NV

Oscilloscopes

How to Use Them, How They Work Third Edition by Ian Hickman

An enormous range of different models is available, and choosing an instrument suitable for your needs has never been easy, particularly for the hobbyist beginner. Includes new material on storage CRTs, DSOs (Digital Storage Oscilloscopes), sampling oscilloscopes, oscillographs, X/Y, X/T and X/Y/T plotters, both stand-alone and as existing oscilloscope accessories; UV recorders, laser recorders, and use of dot matrix printers as output devices. In this case PCs are used with 'plug-in' oscilloscope and logic analyser cards. There is also additional material on network analysers, intrinsically safe oscilloscopes, display oscilloscopes and fibre-optic TDRs. A new appendix covers the considerations relating to achievable measurement accuracy in various types of oscilloscope voltage, time, frequency, rise-time etc.; electronic cursors, coupled DVMs etc.



Order Code	Type	Price each
WT75S	How Scopes Work	£15.95 NV

CALL CASHTEL NOW PHONE 01702 552941

MAPLIN SERIES – **NEW** AUDIO IC PROJECTS

Each of the circuits in this book is based on those appearing in the popular 'Data Files' feature in *Electronics – The Maplin Magazine*. 'Data Files' are building blocks which constructors can use to experiment with components and use as a starting point for further development. Each of the circuits is based around readily available chips, and provide an excellent way to become familiar with the characteristics of the chip as well as providing constructional details of useful projects. Each project includes pinouts and pin designations, output waveforms, parts lists, circuit diagrams, PCB layouts and photographs of the boards. This book will provide a useful toolkit for building audio systems and circuits based on readily available components using straightforward techniques. 1994. 200 pages. 216 x 138mm, illustrated.

GREAT VALUE!
£9.95^{NV}
AA89W



Instrumentation and Test Gear Circuits Manual

Primarily, this book is a manual of modern instrumentation and test gear circuits that will be of immense value to the industrial, commercial, or amateur electronics engineer or designer. This book is filled with nearly 500 varied and extremely useful carefully selected practical circuits, diagrams, graphs and tables. The diverse range of practical circuits cover; attenuator and filter circuits, basic meter and multimeter circuits, electronic analogue meter circuits, digital panel meter circuits, waveform generator circuits, scope trace doubles, timebases, and digital frequency meters, power supply circuits and many more. The majority of the semiconductors specified in the designs are reasonably priced and readily available.



Order Code	Type	Price each
AA37S	Test Gear Crct Man	£16.95 NV

Electronic Test Equipment Handbook

by Steve Money

In this book the principles of the various types of test instrument are explained in simple terms with a minimum of mathematics. The problem is going to be what to choose given a limited budget. Here you will find described a wide selection of test instruments ranging in complexity from the humble continuity tester through analogue and digital multimeters to the next most popular item, the oscilloscope, followed by signal generators and finishing with computer controlled testing equipment. 1990. 206 pages, 216 x 134mm, illustrated.



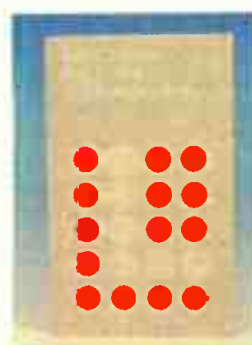
Order Code	Type	Price each
WT18U	Elec Test Equip Hdbk	£8.95 NV

PROJECTS BOOK

Electronic Projects For Beginners

by F.G. Rayer

Includes a number of projects which can be built without any need for soldering. The book is divided into four sections: 'No Soldering' projects, miscellaneous devices, radio and audio frequency projects and power supplies. Also included are some component & wiring layouts to aid beginners.



Order Code	Type	Price each
RQ28F	Book BP48	£1.95 NV

Electronic Projects for Your PC

by R.A. Penfold

This handy little book provides a number of useful PC add-ons including: digital input/output ports, analogue to digital and digital to analogue converters, voltage and current measurement circuits, resistance meter, capacitance meters, temperature measurement interface, constant voltage model train controller, pulsed model train controller, position sensors, stepper motor interface, relay and LED drivers and triac mains switching interface. The ports and projects featured utilise the basic eight bit PC expansion bus, and are therefore suitable for use with any PC or compatible which has the standard ISA or EISA expansion bus. In practice, this means anything from the original PC through to the modern 386 and 486 PCs.



The book assumes that the reader has a certain knowledge of PC computer interfacing. 1992. 105 pages. 178 x 110mm, illustrated.

Order Code	Type	Price each
WZ76H	Electr Pjts For PC	£3.95 NV

Electronic Modules and Systems for Beginners

by Owen Bishop

Forget having to 're-invent the wheel' as it were, and design electronic systems using already established and developed circuit designs. Many oscillators, bistables, monostables and amplifier stages use time honoured techniques that are known to work. This book describes over 60 electronic circuit modules; how they work, how to build them and how to use them. In the process of working with these 'building blocks' you will learn the basic fundamentals of many established designs. Many modern electronics engineers are systems, not circuit, designers. Become such a systems' designer and combine the modules together to make hundreds of different electronic systems, both analogue and digital. To show you how over 25 actual electronic systems are described in detail, covering such diverse applications as timing, home security, measurement, audio, including a simple radio receiver, games and remote control. Although a book aimed at beginners, introducing the principles and practice of electronics, there are plenty of circuit ideas for the more experienced constructor too. 1989. 208 pages. 178 x 110mm, illustrated.



Order Code	Type	Price each
WS79L	Elect Modules & Syst	£3.95 NV

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OUR PRICE &
QUALITY –
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01702 553935**

Popular Electronic Projects

by R.A. Penfold

A selection of the most popular projects, 27 in all, divided into four sections. Radio projects including MW radio, MW/LW radio, short wave converter and receiver, and radio control equipment. Audio projects including pre-amps, 10W power amp, filters and a mixer. Household projects including intercom and metal detector. Test equipment projects including a voltmeter, transistor tester and AF signal generator. 1978. 136 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
RQ29G	Book BP49	£2.50 NV

The Maplin Electronic Circuits Handbook

by Michael Tooley

This book contains a unique collection of practical working circuits together with supporting information so that circuits can be produced in the shortest possible time and without recourse to theory. The circuits have been thoroughly tested and, wherever possible, a range of commonly available, low-cost components is used. The circuits can be readily modified and extended by the reader to meet his or her own application. Related circuits are grouped together and cross referenced within the text and an index, identifying which common types can be interconnected and produce more complex systems. As far as is possible a common range of supply voltages, signal levels and impedances have been adopted. The book assumes that the reader has an elementary understanding of electrical principles and is familiar with common units and quantities. A selection of Maplin projects is included. 1990. 288 pages. 246 x 189mm, illustrated.



Order Code	Type	Price each
WT02C A1	Maplin Elec CCTS Hbk	£12.95 NV

50 Projects Using Relays, SCR's and Triacs

by F. G. Rayer

Includes circuits of model train controllers, timers, auto emergency light, alarms, drill speed controller and many more. 1977. 102 pages. 180 x 108mm, illustrated



Order Code	Type	Price each
RH30H	Book BP37	£2.95 NV

Remote Control Handbook

by Owen Bishop

This book includes many new circuits which have never been published before. There are circuits for interfacing to computers, use of fibre-optics and for using the domestic mains supply as a means of transmission. There are also circuits for frequency to voltage conversion and voltage to frequency conversion.

In this book the circuits have been designed as far as possible, to be modular in concept, i.e. they can all be linked together in many different configurations to produce exactly the type of remote control system to suit the individual taste. Whatever type of system you require this book has a great deal to offer. 1988. 226 pages. 178 x 111mm, illustrated.



Order Code	Type	Price each
WS23A	Remote Control Hndbk	£3.95 NV

Power Supply Projects

by R.A. Penfold

Gives details of stabilised, un-stabilised, fixed and variable power supplies and explains how to design your own power supplies. There are also circuits for train controller, ni-cad charger, electronic fuse, shaver inverter and others. 1980. 96 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
XW52G	Book BP76	£2.50 NV

More Advanced Power Supply Projects

by R.A. Penfold

This book is the companion volume to 'Power Supply Projects' and should be of interest to any one who has a reasonable knowledge of power supply basics and would like to learn about recent developments and more advanced designs. The practical and theoretical aspects of the circuits are covered in some detail, and the reader is not assumed to have an in-depth knowledge of electronic circuit design. However it is recommended that any one who is not familiar with the fundamentals of power supply design and operation should obtain the introductory book first. Topics covered include switched mode power supplies, precision regulators, dual tracking regulators and computer controlled supplies. 1988. 92 pages. 178 x 111mm, illustrated.



Order Code	Type	Price each
WP92A	More Advanced PSUs	£2.95 NV

Cost-Effective Electronic Construction

by John Watson

Originally printed under the title 'Cost-Effective Projects around the Home,' this revised edition contains 10 detailed projects with full circuit descriptions; automatic porch light, TV switch off, drill speed controller, counter and display, stereophoner, xenon strobe, ray gun, freezer/boiler alarm, computer I/O port, radio control system. In addition there are many simple but useful building block type circuits. One major project is for a complete multi-channel radio control system, using linear and CMOS IC's wherever possible for compactness.

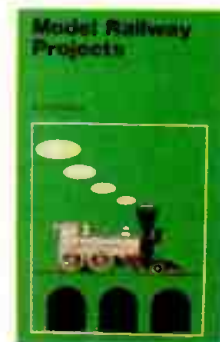


Order Code	Type	Price each
XW30H	Cost Effectv Constrc	£10.50 NV

Model Railway Projects

by R.A. Penfold

Contains complete circuit and construction details of a number of different model train controllers and accessories. The accessories include a point controller, automatic signal, signal controller and various sound effects. 1981. 112 pages. 175 x 110mm, illustrated.

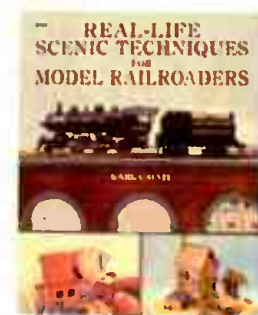


Order Code	Type	Price each
WG60Q	Book BP95	£2.95 NV

Real-Life Scenic Techniques for Model Railroaders

by Carl Caiati

If you are a model railway enthusiast who will not settle for the ordinary, run-of-the-mill layout, then this complete, step-by-step guide is for you. It opens the door to hundreds of tips, hints, and techniques for creating elaborate, multi-level scenic layouts that are accurate to every last detail. The book, backed by numerous photos and drawings, describes in detail how to create scenic backdrops, mountains, tunnels, terrain, trees, foliage, fences, and water that will make your layout approach state-of-the-art realism. Whether you want your trackwork to look rustic and weathered, modern and industrial, or all natural, you will find all the instructions you need in this invaluable guide. American Book. 1987. 176 pages. 233 x 188mm, illustrated.



Order Code	Type	Price each
BZ00A	Scenic Railway	£13.95 NV

40

TOP QUALITY PRODUCTS AT SUPER LOW PRICES!

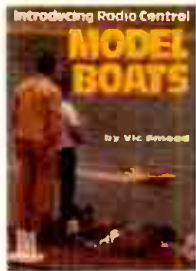
RADIO CONTROL BOOKS

Introducing Radio Control Model Boats

by Vic Smeed

The book covers all aspects – including radio control equipment, boats and competition classes, construction, power options, equipment installation, pre-launch checks and operation.

A useful discussion of maintenance and fault finding concludes the book, which should ensure that the modeller does not have to wade out too far to deal with equipment failure. The existence of 33 classes of models for competition means that the scope for getting involved in this long established but popular sport is vast. Certainly the experience passed on in this book should mean the transition from the modelling bench and bath-tub trials, to an enjoyable afternoon boating, is a quick one. 1989. 95 pages, 210 x 145mm, illustrated.



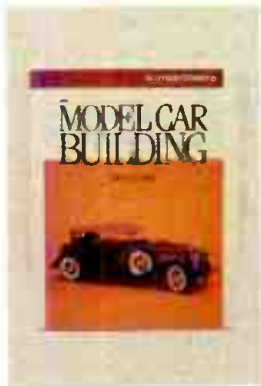
Order Code	Type	Price each
WT68Y	Model Boats	£5.50 NV

Getting Started in Model Car Building

by Dennis Doty

While this book has nothing to do with electronics directly, it would however, be very useful for anyone interested in building radio controlled models for example. While concentrating on static model cars, the chapters constitute a complete guide to the materials and tools you will need, descriptions of various painting methods, and details on realistic finishing applications for both plastic and metal components, and includes hints and tips from an author having many years experience behind him, enabling you to produce authentically detailed models. American book.

1989. 128 pages. 233 x 188mm, illustrated.



Order Code	Type	Price each
WZ24B	Model Cars	£8.95 NV

Aero Modellers' Handbook

by Les Netherton

Getting a model aircraft to fly successfully is not difficult, but in addition to possessing the right tools and a certain amount of manual skill, it does require a basic knowledge of what keeps an aeroplane in the air, and how its controls work. These basic principles are the starting point at the beginning of the book,

which also explains all the essential principles so that the construction of the first model proceeds on a sound footing. Different methods of assembly are discussed using different materials for fuselages, wings and tail-planes, plus undercarriage construction, making propellers from scratch, and covering and painting the model. Different types of



aircraft are also considered, including gliders, rubber-powered models, diesel, glowplug and electric motors, radio control and control line systems. Fully illustrated with drawings, diagrams and photographs, the book is both a first-class primer for the beginner and a sound reference source for the more experienced modeller. 1990. 218 pages. 241 x 163mm hard cover, illustrated.

Order Code	Type	Price each
WT85G	A1 Aero Modellers Hbook	£14.99 NV

Introducing Radio Control Model Aircraft

Bill Burkinshaw

This book from the former editor of RCM&E magazine knows the areas which may bemuse or baffle the newcomer. He therefore takes us step by step through the theory of flight, how aircraft will be controlled, into radio equipment, through engines, construction finishing and installation, and finally into the flying of powered aircraft. He also describes flying helicopters and flying gliders to complete the book.

1989. 95 pages, 210 x 145mm, illustrated.



Order Code	Type	Price each
WT65V	Model Aircraft	£5.95 NV

BOOKS ABOUT HOME SECURITY

Electronic Alarm Circuits Manual

by R. M. Marston

Includes full circuit details of burglar alarms, car alarms, temperature-operated and light-sensitive alarms, as well as power failure alarms, over-voltage alarms etc. etc. This book is packed with useful circuits. 1988. 132 pages. 216 x 138mm, illustrated.



Order Code	Type	Price each
RB10L	Book NB269	£13.95 NV

Electronic Security Devices

by R.A. Penfold

The book covers switch activated burglar alarms with exit and entry delays, infra-red, ultrasonic and Doppler shift systems as well as smoke and gas detectors, water temperature and baby alarms. All the circuits are fairly simple and Veroboard layouts are given. 1979. 102 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
RL43W	Book BP56	£2.95 NV

More Advanced Electronic Security Projects

by R.A. Penfold

Intended primarily as a sequel to 'Electronic Security Devices' this book provides a number of slightly more complex projects that, it is hoped, should be within the capabilities of most electronics hobbyists including beginners. Ease of construction should be ensured as in all cases stripboard layouts have been provided. Although the projects are not substantially more complex than those in the earlier book they do use more advanced techniques. The projects include a passive infra-red detector that can be used with a variety of lens systems, a fibre-optic loop alarm, computer based alarms and an unusual form of ultrasonic intruder detector.

1988. 95 pages, 178 x 111mm, illustrated.

Order Code	Type	Price each
WS25C	Adv Elect Sec Proj	£2.95 NV



Electronic Projects for Home Security

by Owen Bishop

This book deals with many aspects of home security, covering intruder, fire and flood protection, with the emphasis on how to make the best use of electronic devices that you can build yourself. There are 25 constructional projects, ranging in complexity from a single-door protection circuit that can be built in an hour or two, to a sophisticated, multi-channel security system, that most intruders will find very difficult to beat. The projects can be readily undertaken by the beginner. Even the multi-channel system starts at a simple level and is expandable later as the constructor's experience grows. 1991. 141 pages. 216 x 135mm, illustrated.

Order Code	Type	Price each
WZ31J	Home Security Prjcts	£6.95 NV



Practical Electronic Sensors

by Owen Bishop

This book describes various types of sensors and the ways in which they are used to monitor almost every aspect of the environment, how each type works and how its signals are processed electronically to produce a meaningful result.

A dozen constructional projects, with functions which apply to the domestic environment in and around the home, and include: sunshine duration meter; temperature alarm; passive infra-red intruder; car/bicycle alarm; wind direction indicator; inductive proximity detector; sound level meter; sound controlled switch; tachometer; gas alarm; water level controller; and model speed controller. 1991. 180 pages. 179 x 111mm, illustrated.

Order Code	Type	Price each
WZ00A	Prctcl Elec Sensors	£4.95 NV

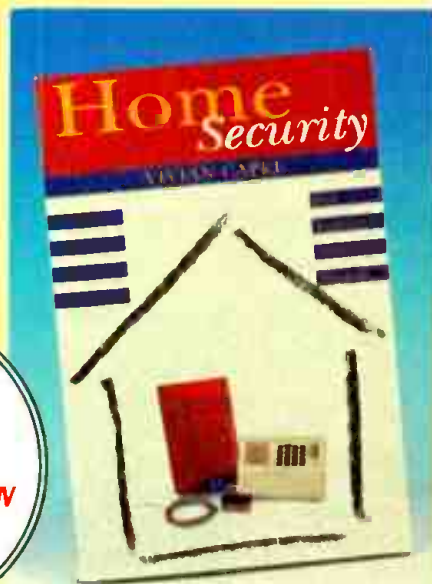


HOME SECURITY NEW

by Vivian Capel

The purpose of this book is to provide practical, independent advice and guidance on securing the home. It shows the burglar's preferred methods of entry, the weak points he looks out for, many of the tricks he uses, and what you can do to thwart him. This book explains the pros and cons of an alarm system, discusses which features are important, and clears away the mystery surrounding those technical terms and expressions. It shows how to install a system, how to prevent faults, and what to do if any occur. Other security devices are given a critical scrutiny along with further measures to avoid becoming a victim of crime. 1994. 186 pages. 234 x 150mm, illustrated.

AMAZING VALUE!
£14.95^{NV}
AA86T



buying components, designing PCBs, substituting components, building and testing projects and finally putting your completed instruments to work. There are projects for everyone, from the beginner to the seasoned professional, all accompanied by simple, easy to follow instructions, photographs and diagrams. American book. **Warning:** references may be made to the American standard 110V AC mains supply. You should translate these into the English 240V AC mains standard and take the appropriate precautions with the higher voltage level. 1991. 300 pages. 234 x 187mm, illustrated.

Order Code	Type	Price each
WZ28F	Build Own Test Equip	£14.95 NV

More Advanced Test Equipment Construction

by R.A. Penfold

Describing some slightly more advanced test equipment projects for readers who have some amount of experience at project building. Full circuit diagrams plus notes on construction are provided. Detailed notes on any necessary setting up are also provided, together with information on using the projects to best effect. Projects included are: digital voltmeter, digital capacitance meter, digital transistor tester, digital heatsink thermometer, bench power supply, dynamic transistor tester, A.F. digital frequency meter, digital resistance meter, digital current tracer, crystal calibrator and pulse generator. When finished the projects provide a very useful range of test gear for future project development and servicing, and the building of them should prove an interesting and rewarding pastime in its own right. The projects are not strictly suitable for complete beginners, but anyone possessing a modicum of hands-on construction experience should have little difficulty. 1989. 112 pages. 178 x 110mm, illustrated.

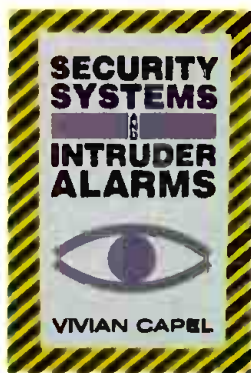


Order Code	Type	Price each
WS78K	More Adv Test Equip	£3.50 NV

Security Systems and Intruder Alarms

by Vivian Capel

This book is divided into two sections; a general section showing how alarm systems work, what they do, how they can be planned, and how proposed systems can be checked. It also describes countermeasures against other hazards such as shoplifting, employee theft, fire, fraud, liability claims etc., examining control equipment, various types of sensors, going up to closed-circuit TV monitoring and domestic systems. The technical section is more specific dealing with installing and testing intruder and fire alarms, fault-finding and maintenance and the British Standards. Primarily written for managers and business people and installation engineers but will be of interest as a general reference to anyone planning to install a security system. 1989. 280 pages. 240 x 190mm hardcover, illustrated.



Order Code	Type	Price each
WS83E A1	Security Sys & Alarm	£30.00 NV

TEST GEAR PROJECTS

Test Equipment Construction

by R.A. Penfold

This book describes in detail how to construct some simple and inexpensive, but extremely useful, pieces of test equipment. Stripboard layouts are provided for all designs, together with wiring diagrams where appropriate, plus notes on their construction and use. The following designs are included: AF Generator, Test Bench Amplifier, Audio Millivoltmeter, High Resistance Voltmeter, Transistor Tester, Capacitance Meter, AF Frequency Meter, Analogue Probe, CMOS Probe, TTL Probe. Apart from providing the home constructor with a useful range of test gear, building these projects should also be an interesting and rewarding exercise in its own right. The designs are suitable for both newcomers and more experienced hobbyists alike. 1989. 104 pages. 178 x 110mm, illustrated.

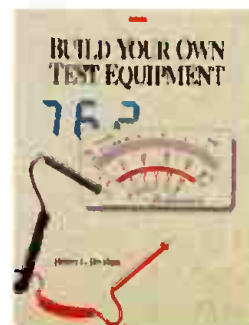


Order Code	Type	Price each
WS40T	Test Equip Construct	£2.95 NV

Build Your Own Test Equipment

by Homer L. Davidson

Learn how to build and use instruments for troubleshooting TVs, stereos, computers, CD players, 'ham' radios, microwave ovens, camcorders, electric motors, power supplies, cables and more. The book tells you all you need to know about constructing inexpensive, high-capacity, trouble-shooting equipment for almost any purpose, leading you step-by-step through the entire process of finding and



INTEGRATED CIRCUIT PROJECT BOOKS

IC 555 Projects

by E.A. Parr, BSc., C.Eng., MIEEE

Describes dozens of circuits using the NE555 timer, including car wiper delay, rev counter, emergency flashers, model railway shuttle service, station stop/start, computer voice, signal generator, police siren, 'Star Trek' siren etc. etc. 1981. 176 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
LY04E	Book BP44	£2.95 NV

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Diode, Transistor and FET Circuits Manual

by R.M. Marston

This is primarily a manual of circuits based on 'discrete' semiconductor components such as diodes, transistors, FETs and associated devices, and as such it presents a total of over 340 carefully selected and outstandingly useful practical circuits, diagrams, graphs and tables. It deals with its subject in an easy-to-read, down-to-earth, non-mathematical but very comprehensive style.

The manual is specifically aimed at the practical design engineer, technician and experimenter, but will also be of interest to the electronics student and the amateur. 1991. 247 pages. 215 x 138mm, illustrated.



Order Code	Type	Price each
WZ18U	Diode/Trans Manual	£13.95 NV

Timer/Generator Circuits Manual

by R. M. Marston

This book is mainly concerned with waveform generator techniques and circuits. Waveform generators are used somewhere or other in most types of electronic equipment, and thus form one of the most widely used classes of circuit. They may be designed to produce outputs with sine, square, triangular, ramp, pulse, staircase, or a variety of other forms. The generators may produce modulated or unmodulated outputs, and the outputs may be of single or multiple form. The book is divided into 11 chapters presenting over 300 practical circuits, diagrams and tables. These comprise basic principles, sine wave generators; pulse generators; 'timer IC' generator circuits; triangular and sawtooth generators; multiple waveform generation; waveform synthesiser ICs; special waveform generators; phase-locked loop circuits; and miscellaneous '555' circuits.

1990. 278 pages. 215 x 138mm, illustrated.



Order Code	Type	Price each
WT44X	Timer Generator Ccts	£13.95 NV

A Beginner's Guide to CMOS Digital ICs

by R. A. Penfold

This handy, inexpensive little book introduces the reader to the basics of simple logic circuits and then progresses to specific CMOS logic integrated circuits. The circuits described in the book are practical applications of CMOS logic.

1993. 130 pages. 178 x 111mm, illustrated.



Order Code	Type	Price each
AA22Y	CMOS Digital ICs	£4.95 NV

OPTO ELECTRONIC BOOKS

50 Simple LED Circuits

by R.N. Soar

Circuits using LED's and Displays. 50 different ones are described. 1977. 64 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
RF12N	Book BP42	£1.95 NV

50 Simple LED Circuits Book 2

by R.N. Soar

A useful sourcebook of circuits using LED's. Fifty are shown including LED test circuit, battery monitor, flasher, diode and transistor testers, magic boxes and many more. 1981. 64 pages. 180 x 108mm, illustrated.



Order Code	Type	Price each
WG43W	Book BP87	£1.95 NV

Lasers: Principles and Applications

by J. Wilson and J.F.B. Hawkes

This book provides the reader with a grounding in laser physics, an analysis of laser technology and a wide survey of laser applications. Suitable for professional engineers wishing to increase their knowledge of laser applications and for students seeking an up-to-date introductory text. 1987. 308 pages, 228 x 150mm, illustrated.

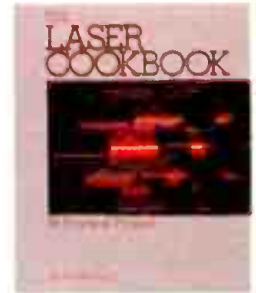


Order Code	Type	Price each
WS67X	Laser Principles	£17.95 NV

The Laser Cookbook

by Gordon McComb

This book gives you the opportunity to investigate, first hand, a relatively new and evolving science. With this book you can create and experiment with simple to advanced level lasers that have real, practical applications! The 88 laser based projects presented here are geared toward the workshop experimenter on a limited budget. Spanning a wide range of disciplines, the projects vary from experimenting with laser optics and constructing a laser optical bench to using lasers for light shows, gunnery practice, even beginning and advanced holography. **Warning:** This is an American book and references to mains voltages do not apply in the UK. 1988. 404 pages. 234 x 189mm, illustrated. American book.



Order Code	Type	Price each
WS35Q	A1 Laser Cook Book	£19.95 NV

Build Your Own Working Fibre-Optic Infra-red and Laser Space-Age Projects

by Robert E. Iannini

This American book contains many do-it-yourself projects for exploring the possibilities of the current laser technology, by building a variety of lasers including the gallium arsenide infra-red, optical helium-neon and ruby rod types, through to the carbon dioxide laser, complete with its collection of somewhat involved support equipment. Also included are designs for 'plasma tomado' special effects generators, but bear in mind that any special items mentioned may not be available in the UK and suppliers mentioned are USA only. 1987. 264 pages. 233 x 187mm, illustrated.



Order Code	Type	Price each
WP77J	A1 Build Fibop/Lasr Prj	£16.95 NV

Optical Communications

by M. J. N. Sibley

This book serves as an introduction to the subject of optical communications, and is presented with the assumption that the reader is familiar with Maxwell's equations and certain elements of communications theory. A detailed account is given of the various components and subsystems that make up an optical link, including light sources, optical fibres, detectors and preamplifiers. A typical optical transmission system is then analysed in detail and practical links are described. Current developments, including advanced components and systems, are also considered. 1990. 152 pages. 235 x 156mm, illustrated.



Order Code	Type	Price each
WZ08J	Optical Comms	£14.99 NV

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Homemade Holograms

The Complete Guide to Inexpensive Do-It-Yourself Holography
by John Iovine

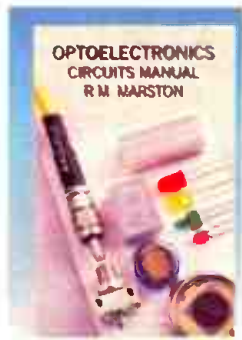


This book provides a solid foundation in holography, describing how to produce various types of holograms from the simplest to the more elaborate. In addition there are plans to construct suitable lasers and a lightweight table (if required), and simple magnetic optical mounts and component holders designed for use on the lightweight table. Written in a very easy to understand style, and includes a simple introductory explanation of how holography works. Projects are included allowing you to continually improve your technique, and there are guidelines for the safe disposal of chemical waste, and a complete source list of publications and holographic equipment suppliers is also included. American book.

Order Code	Type	Price each
WZ25C	Homemade Holograms	£13.95 NV

Optoelectronics Circuits Manual

by R. M. Marston

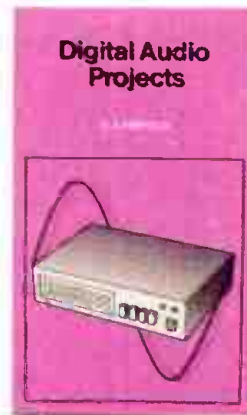


Optoelectronics is the study of any devices that produce an electrically-induced optical (visible or invisible light) output, or an optically-induced electrical output, and of the electronic techniques and circuitry used for controlling such devices. This manual is a useful guide to the optoelectronics device user, and is especially aimed at the practical design engineer, technician, and experimenter, as well as the electronics student and amateur. 1988. 182 pages. 215 x 137mm, illustrated.

Order Code	Type	Price each
WP93B	Opto Circuits Manual	£13.95 NV

Digital Audio Projects

R.A. Penfold



The first section of this book takes a look at the basic principles involved in converting an audio signal into digital form and then converting it back to an audio signal again. It also deals with some practical aspects that have to be borne in mind when considering digital audio projects. The second section contains some useful and extremely interesting, practical circuits for constructors to build and experiment with. By current standards the projects are not highly complex, but are probably beyond the scope of beginners and are more suited for someone with a moderate amount of experience in electronic project building. 1989. 81 pages, 178 x 112mm, illustrated.

Order Code	Type	Price each
WS46A	Dgtal Audio Projects	£2.95 NV

Audio Amplifier Construction

by R.A. Penfold



Circuits of a wide range of preamplifier and power amplifier designs, from low noise microphone & tape head preamps to 100W MOSFET amps, are provided in this book. The projects are relatively easy to construct using the PCB or stripboard designs given. Setting up and testing procedures are described, although in most cases no test gear is required. 1983. 99 pages. 178 x 110mm, illustrated.

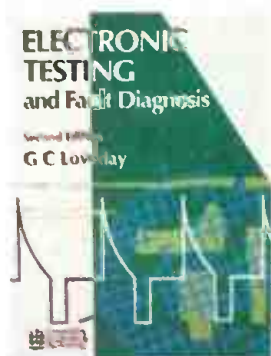
Order Code	Type	Price each
WM31J	Audio Amp Constrct	£2.95 NV

ELECTRONIC SERVICING

Electronic Testing and Fault Diagnosis

Second Edition

by George Loveday



The ability to rapidly diagnose the causes of faults in electronic equipment and circuits is one of the important skills that can be acquired by the electronics technician. The exercises throughout this book are designed to assist the student in acquiring this ability. The text mainly concentrates on component failure occurring in particular types of circuit. Techniques for localising faults in complete electronic instruments or systems, is covered briefly. 1989. 257 pages. 245 x 185mm, illustrated.

Order Code	Type	Price each
WP08J	Elec Fault/Test Diag	£13.99 NV

Mobile Radio Servicing Handbook

by Roger Belcher, Mike Fitch, David Ogley and Geoff Varrall



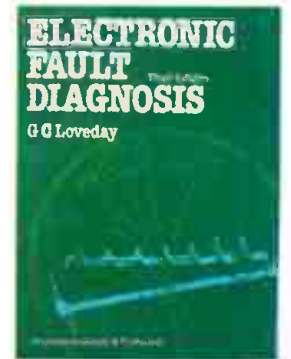
An authoritative and practical information source-book on the servicing and repair of VHF and UHF mobile radios and base stations, together with the maintenance and support requirements of the overall radio system, including antenna and mast installations. The book covers the impact of data over radio, cellular radio, and trunking technologies on servicing, diagnosis and repair procedures. Essential background topics covered include radio theory, amplitude (AM) and frequency (FM) modulation, radio wave propagation, reception and demodulation, fundamentals of receiver and transmitter systems, principles of transmitter and receiver design, synthesiser techniques, selective tone signalling and the digital signalling control and access protocols of cellular and trunked radio. 1989. 298 pages. 240 x 160mm hard-cover, illustrated.

Order Code	Type	Price each
WS92A	Mobile Radio Svcing	£45.00 NV

Electronic Fault Diagnosis

Third Edition

by G. C. Loveday



The ability to rapidly diagnose the causes of faults in electronic equipment and circuits is one of the important skills that can be acquired by the electronic technician or mechanic, including the hobbyist. The text concentrates mainly on component faults occurring in particular types of circuit rather than the fault-finding techniques used for localising faults in complete electronic equipment or systems. However, there is a section that deals briefly with system fault-finding methods. A basic introduction to fault-finding microprocessor based systems is included, showing an example designed around an 8-bit microprocessor using readily available chips. The book also reflects other important trends in the field of electronics, and includes notes and exercises on optoisolators, timer ICs, SMPU designs and power FETs. 1988. 131 pages. 245 x 189mm, illustrated.

Order Code	Type	Price each
WZ02C	Elec Fault Diagnos	£11.99 NV

BOOKS OF HI-FI PROJECTS

Audio Projects

by F.G. Rayer



The book covers the construction of a wide range of audio projects including pre-amps, mixers, power amps, tone controls, matching and a range of miscellaneous projects including audio tracer, level meters, sine wave source, dummy load, audio limiter, light modulator, VOX unit etc. 1981. 96 pages. 180 x 108mm, illustrated.

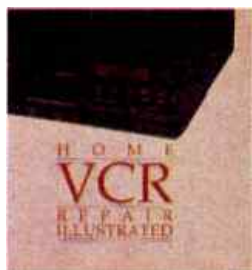
Order Code	Type	Price each
WG46A	Book BP90	£2.50 NV

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Home VCR Repair Illustrated Service & Repair Your Own VCR and Save a Bundle by Richard Wilkins & Cheryl A. Hubbard

This book was based on an accumulation of ideas and the experience of the author gained in VCR repair. The methods described are simple and safe to use on any VCR, if you follow the instructions carefully. The book is designed to teach you



how to do-it-yourself in your own home, using household items and basic tools and step-by-step instructions. No test equipment is involved. The book is broken down into sections that correspond to each particular section of a VCR, so you can easily proceed to the relevant section. Most chapters contain a review section, providing step-by-step instructions to assist in diagnosis and repair. This also acts as a checklist so you don't miss any important steps when carrying out repairs. The examples discussed and shown in the photographs try to cover every commercial possibility and at no time is any example a specific make or model of VCR. **Warning:** references may be made to the American standard 110V AC mains supply. You should translate these into the English 240V AC mains standard and take the appropriate precautions with the higher voltage level. 1991. 398 pages. 234 x 188mm, illustrated. American book.

Order Code	Type	Price each
WZ32K A1	Home VCR Repairs	£13.95 NV

The Washing Machine Manual Second Edition

A 'Haynes' Manual
by Graham Dixon

The householder's complete DIY guide to plumbing-in, maintaining and repairing of automatic, front-loading washing machines, including the latest type of washer/dryer 'laundry centres'. All popular



makes and models spanning at least a decade are covered. In the Haynes tradition detailed step-by-step instructions are linked to photographs and fault finding flow charts, enabling the do-it-yourselfer to diagnose and repair faults quickly, saving money on call-out charges and maintenance contracts. Several useful chapters deal with stain removal, the latest information on textile care labelling codes and jargon. 1992. 190 pages. 276 x 214mm hard-cover, illustrated.

Order Code	Type	Price each
WS98G	Wash Machine Manual	£12.95 NV

The Dishwasher Manual

A 'Haynes' Manual
by Graham Dixon

The householder's complete DIY guide to plumbing-in, maintaining and repairing domestic dishwashing machines. All popular makes and models, spanning at least a decade, are covered. As with Haynes' well known car and motorcycle owners' workshop manuals, this book places great emphasis on the experience gained through actually doing the jobs on the machine in question and overcoming problems as they occur. This book is designed to help in the understanding, functioning, maintenance and repair of all domestic

dishwashers irrespective of their country of origin or maker's name. As with washing machines, dishwashers are produced in many countries and are exported worldwide, hence this book is invaluable for dishwasher owners all over the world. There are chapters full of useful facts such as a table showing the hardness of water around the British Isles. a table of international symbols of the icon type now commonplace around the world (e.g. a picture of a wine glass meaning 'fragile') as might be found on a dishwasher to describe its capabilities, and a list of 'jargon' words and their meanings.

1990. 112 pages. 276 x 214mm hard-cover, illustrated.

Order Code	Type	Price each
WS97F	Dishwasher Manual	£12.95 NV

The Home Electrical Appliance Manual

A 'Haynes' Manual
by Graham Dixon

Each year sees an increase in the number and variety of small electrical appliances for use in the home and garden. All these appliances have one thing in common, at

sometime they will fail to function correctly. Often lack of maintenance is responsible for the failure of both new and old equipment. Although mass production and large volume sales have made many of these items very low cost, it may still be a practical proposition to effect a repair, even though the lack of spares outlets for these items makes it difficult. This book helps you understand how many of our household items work, and from this you can understand how and why faults occur and how to prevent them.

1991. 182 pages. 276 x 212mm hardcover, illustrated.

Order Code	Type	Price each
WT79L A1	Appliance Manual	£12.95 NV

SOFTWARE, ASSEMBLY AND MACHINE LANGUAGE PROGRAMMING BOOKS

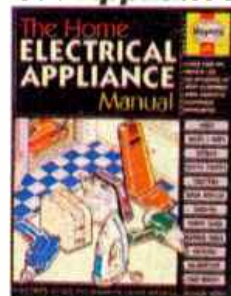
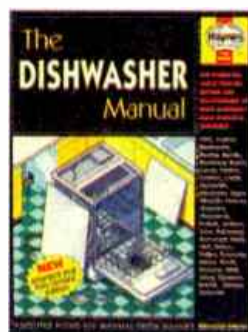
An Introduction to 6502 Machine Code

by R.A. & J.W. Penfold

The 6502 microprocessor is used in many popular home computers including the Electron, BBC models A and B, VIC-20, ORIC-1/Atmos and Atari models. This book illustrates how to use machine code programming with such machines, which enables a vast increase in running speed, instead of using a built-in high-level computer language such as BASIC. The programming does become somewhat more complex however, although it is not as difficult as might be supposed. The book includes some simple demonstration programs which will run on the above computers.

1984. 108 pages. 177 x 110mm, illustrated.

Order Code	Type	Price each
WM92A	Intro 6502 Mach Cde	£2.95 NV



Assembly Language Subroutines for the 6809

by Lance Leventhal & Sally Cordes

This book serves as both a source and a reference for 6809 assembly language programs, containing a collection of useful subroutines described in a standard format, accompanied by an extensive documentation package covering parameters, results, execution time and memory usage. The collection emphasises common tasks that will be required in many applications including code conversion, array and bit manipulation, data structure management, I/O routines, sorting and searching, and routines handling common family chips such as parallel and serial interfaces and timers. This book will save you much time and effort by not having to write and de-bug your own standard routine library, instead just choose the specific routines required and get on with the main task of completing your programs. Each routine is provided with test data to verify correct assembly. Recommended. 1989. 365 pages, 235 x 171mm, illustrated.

Order Code	Type	Price each
WT20W A1	6809 Assembly Subs	£19.95 NV

Assembly Language Subroutines for the 68000

Routines to Run on the 68000/010/020/030
by Lance Leventhal & Fred Cordes

This book is intended as both a source and reference for the 68000 assembly language programmer. It contains a collection of useful subroutines described in a standard format and accompanied by extensive documentation. The documentation covers the procedure, parameters, results, execution time, memory usage and each showing at least one example of execution which provides known test data. The routines will also run on related microprocessors such as the 68008, 68010, 68020 and 68030.

The nature of the library emphasises common tasks that occur in many applications. These tasks include code conversion (integer/hex, decimal, BCD); array manipulation, 16-bit and BCD arithmetic, bit manipulation, shifting functions, string handling, data structure management, sorting and searching. 1989. 416 pages, 235 x 170mm, illustrated.

Order Code	Type	Price each
WT33L A2	68000 Assmby Subs	£19.95 NV

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The Maplin Magazine

An Introduction to 68000 Assembly Language

by R.A. & J.W. Penfold

The 68000 series microprocessor is currently in use in the Commodore Amiga, Atari ST, Apple Macintosh and Sinclair QL etc. This book explains the operation of the 68000 and its associated hardware and then details how to write its assembly language.

Once learned, your programs will run at greatly enhanced speeds over high-level languages like BASIC.

1986. 112 pages. 178 x 110mm, illustrated.



Order Code	Type	Price each
WP54J	Intro 68000 Ass Lnge	£2.95 NV

Programming the M68000

by Tim King & Brian Knight

This comprehensive guide explains how to program the M68000, which is one of the most advanced microprocessors available at the present time. It is written in a clear and readable manner and provides a wealth of information. The basic M68000 architecture is introduced and then each instruction is explained. Many practical programs are given and readers are encouraged to write effective programs. A complete small monitor program which will handle input and output, test programs etc. is also included. In the new edition the 68010 and 68020 are also covered.

1986. 288 pages. 235 x 156mm, illustrated.



Order Code	Type	Price each
WM76H	Programming M68000	£21.95 NV

IBM PC Assembly Language and Programming

by Peter Abel

The spread of microprocessors has also caused a renewed interest in assembly language, because a program written in assembly requires considerably less memory space and execution time. Secondly, a knowledge of assembly language and its resulting machine code provides an understanding of the machine's architecture that no high level language, even such as Pascal or C, can possibly provide. This second edition book can act as both a tutorial and a permanent reference, including DOS feature through to version 4.01, information unique to the IBM PS/2 series, features of Borland's turbo assembler, features of Intel's 80386 and 80486 processors, the use of simplified segment (addressing) directives and later additional interrupts, memory management, program overlays and keyboard buffer details.

1991. 560 pages. 234 x 176mm, illustrated. American book.



Order Code	Type	Price each
WT32K	A2 IBM PC Assembly Lang	£19.95 NV

Programming the Z80

by Rodney Zaks

A thorough introduction to machine language programming from basic concepts to advanced data structures and techniques. With detailed examples and numerous programs, the reader will gain not only an understanding of the Z80 programming language, but also a detailed understanding of the way a microprocessor actually executes instructions.

1982. 626 pages. 228 x 150mm, illustrated.



Order Code	Type	Price each
XW72P	A2 Book C280	£24.50 NV

PROGRAMMING BOOKS

Understanding PC Software

by R.A. Penfold

This book is concerned with the software side of PC computing, and it assumes that you have very little previous knowledge of computer software, but something about the hardware side of things, and that you can get the computer up and running. All main types of business computer software are covered in this book, including word processors, graphics programs such as CAD, desktop publishing, databases and spreadsheets. Once you understand the basis of these programs it becomes fairly obvious which are the best for you, and you can avoid costly mistakes that are almost certain to occur as a result of stumbling around in the 'software maze'.

1991. 134 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
WZ03D	PC Software	£4.95 NV

BASIC Programming

Third Edition

by B. J. Holmes

The aim of this book is to present to the reader the many facets of the BASIC language, in the context of a college-based course on computer programming. The book has already proved to be very popular with those students studying for computer examinations, where BASIC is the preferred language. In addition, the home-computer enthusiast who wishes to progress beyond the 'game-playing' stage will also find this text invaluable in understanding how to program a computer. This book, however, has not been written for any one dialect, but deliberately for use with any computer that uses BASIC. However, the dialect differences between Microsoft BASIC as used on the IBM PC and compatibles and the BBC/Electron BASIC are included by way of illustration.

1989. 287 pages. 245 x 190mm, illustrated.



Order Code	Type	Price each
WZ27E	BASIC Programming	£7.95 NV

Visual Basic

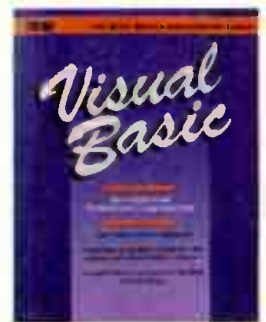
by Steven Holzner and Peter Norton

Visual Basic is a tremendous toolbox of programming resources.

This book explains how to create your own screen display windows, beginning with the essentials, and following the natural course of Windows programming development starting with a simple blank window, and then adding colour, graphics, 'buttons' and text boxes, which Visual Basic calls 'controls'. Dialogue boxes, messages and menus can also be added, going onto more advanced topics that real Windows applications deal with, the clipboard, bitmaps, icons and error handling. There are chapters on debugging and dynamic data exchange, allowing the user to communicate with other Windows applications like those from Microsoft. Getting Windows programs running and producing real results is simply a matter of designing what you want on screen and then letting Visual Basic handle the details. To use the book properly, some familiarity with BASIC is required. Also needed are Windows V3.0 or later; a mouse; and a copy of the Visual Basic software, any version. The book includes over 100 ready-to-run programs.

1991. 449 pages. 235 x 187mm, illustrated.

American book.



Order Code	Type	Price each
WZ21X	A2 Visual BASIC	£23.45 NV

PASCAL Programming

The Complete Course Text

by B. J. Holmes

The aim of this book is to help the reader acquire and develop the skill of computer programming in a block-structured language and foster an understanding of the related topics of data structures and data processing. It can be regarded as a complete text on programming and the use of data structures. The contents are sufficient to give confidence to any reader who is taking Computer Studies to GCE A, BTEC National and higher national awards, first year undergraduate level and British Computer Society Part 1 examinations. The book is also ideally suited to those requiring a knowledge of programming, yet whose major course of study is not computing. All programs have been compiled and tested, using Borland's 'Turbo Pascal 5.5', on an IBM compatible PC. However, the reader is directed throughout the text to differences between this dialect and that of Sheffield Pascal, which conforms more to Standard Pascal.

1991. 463 pages. 243 x 190mm, illustrated.

Order Code	Type	Price each
WZ30H	A1 PASCAL Programming	£11.95 NV

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BASIC and PASCAL in Parallel

by S.J. Wainwright

This book takes the two languages and develops programs in both simultaneously. Emphasis is placed on structured programming by the systematic use of control structures, and modular program design is used throughout. Example programs are used to illustrate the program structures as they are introduced, and the reader can learn by example. As the title suggests the book is intended as a bilingual introduction to programming which can be used to learn both languages simultaneously, and to learn programming techniques which are compatible with both languages.



Order Code	Type	Price each
WK53H	Book BP126	£1.50 NV

BASIC and FORTH in Parallel

by S.J. Wainwright

Forth is a very different language from BASIC, but this book takes both languages and investigates how things are done in each of them. BASIC is used as a familiar 'handle' with which to grasp the various programming techniques. A FORTH-Stack simulator program is included which runs on a 16K or 48K Spectrum computer. The Stack is central to the operation of FORTH and an understanding of the Stack is fundamental to the FORTH programmer.



Order Code	Type	Price each
WM95D	Basic & Forth	£1.95 NV

BASIC and FORTRAN in Parallel

by S.J. Wainwright & A. Grant

A novel book which can be used to learn FORTRAN or BASIC, or both! It is therefore a very useful language to learn. BASIC needs no introduction – this book covers the two languages, at a very reasonable price. An appendix includes a FORTRAN interpreter written in Sinclair Spectrum BASIC, which supports most of the common features of the language and makes it possible to 'get the feel' of writing FORTRAN programs.



Order Code	Type	Price each
WM66W	Basic/Fortran	£1.95 NV

Learning to Program in C

by N. Kantaris

This book is a guide to C programming. C statements are introduced and explained with the help of simple, but completely working programs. Graded problems are set at the end of each chapter, some with a financial or scientific bent, so that the users can choose their own level of problem difficulty on which to practice with some additional choice in preference of the field of application. Full working solutions appear at the back of the book.



1989. 128 pages. 198 x 130mm, illustrated.

Order Code	Type	Price each
WS38R	Learn to Prog in C	£4.95 NV

Mastering C Programming

by W. Arthur Chapman

This book is intended as a first course in C programming. It is equally suitable for anyone new to programming as it is for those already familiar with another language. Access to a computer running C is assumed, and with this condition the text is conducive to self study, and all the examples have been tested using Turbo C V2.0 running on a PC, but the transportability of C should make them equally acceptable to other C compilers.



1991. 307 pages. 234 x 155mm, illustrated.

Order Code	Type	Price each
WZ09K	Mastering C	£6.99 NV

SPECIALISED SOFTWARE BOOKS

A Concise Introduction to GEM

J.W. Penfold

If you have a computer which uses GEM, this book is designed to help you get the most from it. Though much of GEM is straightforward, you will find those parts which are not explained here. Not just written as an introduction for new users, it has also been structured to provide a convenient, compact source of reference for more experienced users, and serves to refresh the finer points for anyone who has not used GEM for sometime.

The book describes GEM and its capabilities, how it can be used for the housekeeping of both hard and floppy disk files, how to configure and run applications from the GEM desktop to the best advantage. All versions of GEM up to release 3.01 and including the versions supplied with the Amstrad PC and Atari ST machines are covered, and all the GEM menus, graphics and other special features available to users within GEM applications programs.



1989. 80 pages. 195 x 130mm, illustrated.

Order Code	Type	Price each
WS51F	Cons Intro Gem	£2.95 NV

A Concise Introduction to OS/2

by N. Kantaris

If you are a multi-tasking PC user and want to get the most out of your computer in efficiency and productivity, then you must learn its OS/2 operating system. With this Concise Introduction to OS/2 you will learn to do just that in the shortest and most efficient way. The more experienced user can start from any section. The book explains: How the OS/2 operating system is structured so that you understand what happens when you first switch on your computer. How to use the OS/2 commands to perform various house-keeping operations on your disk files. How directories and sub-directories can be employed to organise the way you keep files on your disk so that your system's efficiency is maximised. How to use the editor to fully configure your system by writing your own CONFIG.SYS, STARTUP.CMD and AUTOEXEC.BAT files. How to write batch files to automate the operation and use of your system. How to manage your system's environment. The book covers both the command-line mode of processing and the Presentation Manager of OS/2 Standard Edition 1.1 as implemented by IBM and Microsoft.



1989. 72 pages. 198 x 130mm, illustrated.

Order Code	Type	Price each
WS41U	A Ccse Intro to OS/2	£2.95 NV

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DOS For Dummies

A Reference book for the Rest of Us!
2nd Edition
by Dan Gookin

The basic idea of this book is very simple – you are an intelligent person, but don't know anything about DOS. What's more, you have absolutely no intention of becoming a DOS wizard. If you just want to be using your PC, then this is the book for you. It covers 100% of all the things you will be doing with your computer. All the common activities, the daily chores, the painful things that go with living with a computer are all described in plain English. The book is meant to be treated like a reference and not read from cover to cover. The book is essentially written for DOS 5 and 6, but is also relevant for earlier versions 4.0/1 and 3.3. Highly recommended, and amusing. Includes free DOS command reference.



1993. 340 pages. 234 x 188mm, illustrated. American book.

Order Code	Type	Price each
WZ45Y	DOS for Dummies	£14.99 NV

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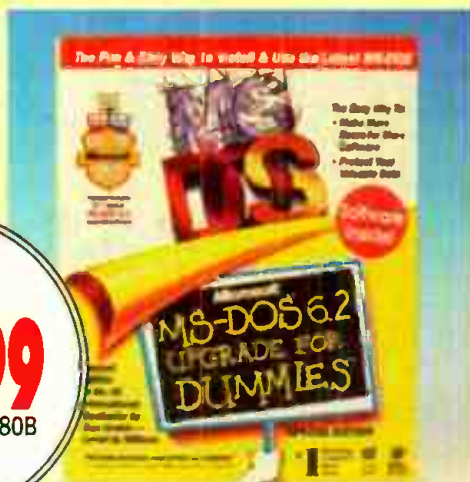
NEW

INCLUDES GENUINE MICROSOFT SOFTWARE!

by Dan Gookin

This special edition in the highly regarded Dummies Series comes complete with genuine Microsoft MS-DOS 6.2 Upgrade Software, and includes a detailed chapter on installing the software. The upgrade program is supplied on three 3 1/2 in. high-density disks, which are to be found in special wallets at the rear of the book. 1993. 406 pages. 235 x 186mm, illustrated. American book.

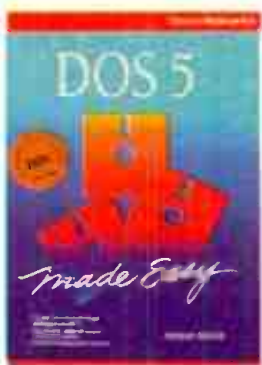
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DOS 5 Made Easy

by Herbert Schildt

This book is for anyone who wants to learn how to use DOS version 5. No prior experience with computers is necessary for learning DOS using this book. If you have previous experience running an older version of DOS, you will be able to advance quickly through the first few chapters, concentrating mostly on the new features of DOS 5, and there are many. DOS is a complex program with many commands and options. This book distils its most useful components and concentrates on getting you running DOS as quickly and easily as possible. After reading just the first three chapters, you will be able to begin using your application programs. By the time you finish this book, you will be running DOS like a professional user. 1991. 412 pages. 235 x 187mm, illustrated. American book.



you need it. In one volume this comprehensive user guide covers the entire spectrum of Quattro Pro features, including important information for all the new features of Version 4.0. Its tips and shortcuts will show you how to make your work easier and help you unlock Quattro Pro's hidden power. These topics include Quattro's powerful new SpeedBar, which allows you to build custom menus; 'WYSIWYG' capabilities with enhanced font support; custom styles; 2D and 3D graphics features, including the new 'Intelligent Graphs'; linking and consolidating multiple spreadsheets; the macro command language; extensible @function libraries; linking to other Borland programs such as Paradox and dBASE; and 'slide show' and other presentation tools. The book forms a good desktop reference and will almost certainly increase your productivity. 1992. 893 pages. 235 x 178mm, illustrated.

Order Code	Type	Price each
WZ29G A1	DOS 5 Made Easy	£15.95 NV

Quattro Pro 4.0 Handbook

The Official Borland Book

4th Edition

by Mary Campbell

This is the definitive guide to Quattro Pro 4.0. Borland International's new Quattro Pro 4.0 spreadsheet provides a host of powerful new features that expand your ability to manipulate, analyse and present data. This major revision shows you in clear detail how to master the program's features, both old and new, and provides an in-depth tutorial covering the program's features and commands. It also includes a complete reference that will let you quickly find information as

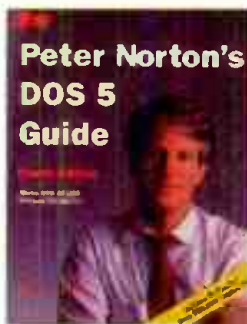


Peter Norton's DOS 5 Guide

Fourth Edition

by Peter Norton

This book is about getting started with DOS – the disk operating system for the family of IBM and compatible personal computers – but it doesn't stop with DOS. The book also teaches you how to become an effective user of a small PC. On the one hand this book tells you about DOS and how to make good use of the commands that are built into it. On the other, it also gives you information on such topics as how to choose intelligently among the hundreds of programs offered for sale. In these pages, you'll find out how to make your PC work for you. 1991. 498 pages. 234 x 187mm, illustrated.



Order Code	Type	Price each
WT96E A2	DOS 5 Guide	£21.70 NV

FoxPro 2.5 for DOS

Made Easy

by Edward Jones

NEW!

In this third edition of the acclaimed FoxPro Made Easy, you will find a complete step-by-step guide that is simple, yet thorough. You'll find easy-to-follow chapters on database creation, data manipulation and entry form creation. The later chapters deal with programming with FoxPro, where the reader will learn to create command files (or programs) to perform tasks in FoxPro, together with learning how functions, variables, expressions, and operators can be used within a FoxPro program. For those of you who are familiar with FoxPro, all the new features of Release 2.5 are explained and discussed in great detail. The appendices comprehensively cover a glossary of FoxPro commands and functions for beginners and those who are reasonably familiar with FoxPro.



1993. 714 pages. 230 x 185mm, illustrated. American

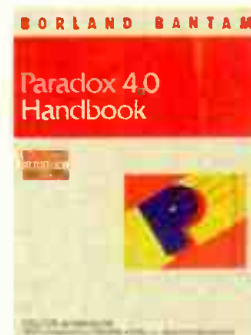
Order Code	Type	Price each
AA73Q A2	FoxPro 2.5 For Dos	£19.95 NV

Paradox 4.0 Handbook

The Official Borland Book

by Celeste Robinson

Officially endorsed by Borland International, this handbook offers comprehensive coverage of the latest version of the Paradox database management system. A complete reference and application guide it provides users and developers with useful and time-saving techniques for entering, querying, analysing and printing data. The book also shows novice and intermediate users how to use the Paradox Application Language (PAL) to automate database tasks. Advanced database developers can quickly familiarise themselves with the Paradox application development environment. The handbook will help you quickly become an expert on using the new Paradox windowing interface; creating databases of related information tables; designing custom forms and reports; using queries to find, relate and update data; making use of validity checks, table lookups and other features to help you maintain data integrity; and using PAL scripts and the new Applications Workshop to develop custom applications. Whether you want to become familiar with the basics of Paradox or you want to master the program's most sophisticated concepts, the Paradox 4.0 Handbook is an invaluable source of tips, tricks and techniques. 1992. 647 pages. 234 x 180mm, illustrated.



Order Code	Type	Price each
MJ60Q	Paradox 4.0 H/Book	£27.99 NV

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First Look at Paradox NEW for Windows

by Bret Ellis

Paradox for Windows is one of the leading database packages for the PC. This book provides a self-paced, hands-on tutorial that covers the essential and most commonly used features of Paradox for Windows. The book has been written such that it can be used as a short course on Paradox for Windows, or as a supplement in a PC applications course, and in a variety of business courses, or as a self-paced guide to Paradox for Windows. 1994. 192 pages. 233 x 186mm, illustrated.



Order Code	Type	Price each
AA65V	Paradox For Windows	£7.95 NV

First Look At Lotus 1-2-3 for DOS Release 3.1+ NEW

by Alan Skinner

The aim of this book is to provide simple step-by-step instructions that enable the reader to become competent in Lotus 1-2-3 in the shortest possible time. The book commences with the lesson on Understanding Lotus 1-2-3 and proceeds with more advanced features in each succeeding lesson. Each lesson incorporates the same learning-aid features which enhance the reader's comprehension of the topics discussed. This is a book that the beginner and the more experienced user of Lotus 1-2-3 will find extremely useful. 1993. 176 pages. 232 x 186mm, illustrated. American book.



Order Code	Type	Price each
AA72P	Lotus 123 For DOS	£7.95 NV

The Complete Idiot's Guide to 1-2-3 NEW

by Peter Aitken

Lotus 1-2-3 is probably the most popular spreadsheet program ever written for the PC. However, it is not particularly obvious how to use Lotus 1-2-3, and the reference manuals can be very daunting. This book is not really for idiots, but for intelligent capable people, who know very little about computers and even less about Lotus 1-2-3, but do have a need to learn enough about 1-2-3 to get some useful work completed in the shortest possible time. The book adopts a very practical approach as to what topics to cover and those to skip - concentrating on those topics that are needed most often. It is not necessary to memorise information as techniques are easy to find and are described in plain English that is very enjoyable to read. 1993. 285 pages. 230 x 185mm, illustrated. American book.



Order Code	Type	Price each
AA27E	Idiots Guide 123	£13.95 NV

A Concise Introduction to Lotus 1-2-3

by N. Kantaris

If you are a PC user and want to get to grips with Lotus 1-2-3, then this book will teach you how to do just that, in the shortest and most effective way. The book was written with the non-expert, busy person in mind and, as such, it has an underlying structure based on 'what you need to know first, appears first'. The more experienced user can start from any section. The book explains:— how Lotus 1-2-3 can be used to build up simple spreadsheet examples, edit, save and retrieve them. How to format labels, enter and format numbers, change the default width of cells, enter formulae and Lotus 1-2-3's in-built functions, and print a worksheet. How to freeze titles on screen. use a non-continuous address range, inset, erase and move blocks, add graphs to a worksheet, add legends and titles to graphs, view and print graphs. How to set up a database management system, sort and search a database, use the find and extract commands to query information held in a database. How to create a simple macro. The book lists all Lotus 1-2-3 indicators, functions and macro commands so that it is self-contained and can be used as a reference book long after the reader becomes an expert in the use of the program. 1989. 144 pages. 198 x 128mm, illustrated.



Order Code	Type	Price each
WS64U	Concse Lotus 1-2-3	£3.95 NV

A Concise User's Guide to Lotus 1-2-3 Release 3.1

by N. Kantaris and P. R. M. Oliver

If you are a PC user and want to upgrade to Lotus 1-2-3 Release 3.1, then this book will teach you how to do just that in the shortest and most effective way. It was written with the existing spreadsheet user in mind, and has been designed so that you don't have to start at the beginning and go right through to the end. The more experienced user can start at any section as these were designed to be self-contained. You will find out how to generate and manipulate 3-dimensional worksheets and link files together; how to generate and add graphs to a worksheet, edit, preview and print worksheets; how to use the WYSIWYG add-in to produce top quality displays; how to set up a database management system, sort and search a database, use the find, extract and modify commands; how to create macros and custom menus, use macro keywords and debug a macro. The book lists all the Lotus 1-2-3 3.1 indicators, functions and macro commands so that it is self-contained and can be used as a reference long after you become an expert in the use of the program. 1991. 112 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
WZ43W	Concise Lotus 1-2-3	£3.95 NV

A Concise Introduction to Microsoft Works

by N. Kantaris and P. R. M. Oliver

'Microsoft Works' is an easy to use, integrated package for a PC which incorporates four modules: word processing, spreadsheet with graphics, database, and communications. The modules are downward compatible with earlier versions (version 3.0 is dealt with in this book). The package comes with its own front-end graphic interface and full documentation. This book was written to help the beginner, and the material is presented on a 'what you need to know first appears first' basis, although the underlying structure is such that you don't need to start at the beginning. Experienced users can go to any of the self-contained sections for reference. 1993. 158 pages. 198 x 130mm, illustrated.

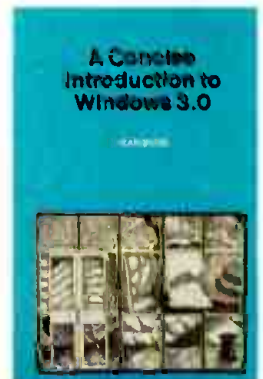


Order Code	Type	Price each
WT42V	Microsoft Works	£4.95 NV

A Concise Introduction to Windows 3.0

by N. Kantaris

If you are a PC user and want to get to grips with Microsoft's Windows 3.0 then this book will teach you how to do just that in the quickest and most effective way. The book was written with the busy, non-expert, person in mind. However, the more experienced user can begin at any section, as the sections were designed to be self-contained. The book explains hardware requirements needed to run Windows 3.0 successfully, and how to install, customise and fine-tune the program; how to manipulate Windows' screens and how to run Windows and DOS applications under the Windows Graphical User Interface (GUI) environment; how to use the Windows Triple Management system, Program Manager, File Manager and Print Manager to advantage; how to use the word processor accessory 'Write' to type, edit, format, print and save documents. Also explained is the use of 'Paintbrush' and its tools to draw and edit drawings, and how to set up, sort and search a Cardfile database and exploit its autodial feature. How to use the Windows Calendar to enter appointments, add special times and alarms, and how to use the Terminal accessory to connect to remote systems. 1991. 128 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
WT91Y	Intro Windows 3.0	£3.95 NV

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Quattro Pro for Windows Handbook

The Official Borland Book

by Mary Campbell

A single-source tutorial and command reference, this is a comprehensive guide to the latest Windows-based release of Borland International's powerful spreadsheet package.

Aimed at the novice to intermediate user, the book provides an in-depth tutorial to the product features and commands, along with a complete reference guide to increase productivity. Special attention is given to 'Quattro Pro for Windows Spreadsheet Notebooks', the revolutionary new object-oriented metaphor for intuitively organising your data. Quattro Pro's stunning graphics capabilities and powerful macro command language are fully explained. Also stressed are Quattro Pro's abilities to support custom applications with its User Interface Management System, to tap into databases using the DataBase Desktop, and to share live data via the Windows OLE feature. The book provides you with powerful applications and techniques for creating and storing spreadsheet data in notebooks, adding and modifying SpeedBars to include custom features; using DDE and OLE links, as well as the Clipboard, to share data; changing cell and spreadsheet features with the powerful Object Inspector; creating professional slide shows with Quattro Pro's built-in graph-making capabilities; linking with Paradox or dBASE through the DataBase Desktop; customising your applications with the User Interface Management System; creating and extending @functions and macro functions. Covered in detail are the customisable icon palette, dynamic linking between pages, and the new Object Editor. Quattro Pro for Windows also makes it easy to use data from other applications by directly opening and saving data in the most popular spreadsheet, database, and text formats. Advanced users will find the information on debugging and macro programming using PowerButtons essential. 1992. 904 pages. 234 x 178mm, illustrated.



Order 780
Code **Type** **Price each**
 MJ58N QP Windows £27.99 NV

Windows for Dummies

by Andy Rathbone

This book, like others in the 'Dummies' series, is aimed primarily at those people who are more concerned at getting the work done, than becoming computer supremos. The book has no difficult technical computer jargon, and there is nothing to learn or memorise. The comprehensive index allows the reader to find a particular topic, that will easily show how to solve your problem - it is not necessary to read the book from cover to cover. It is divided into six self-contained parts, the first being a very basic introduction followed by using Windows, and others that discuss using Windows applications, working with DOS and DOS based programs and help! Part six provides a useful list of tips etc.



A book well worth having on the bookshelf, be it for the computer enthusiast or the computer user. 1992. 350 pages. 234 x 188mm, illustrated. American book.

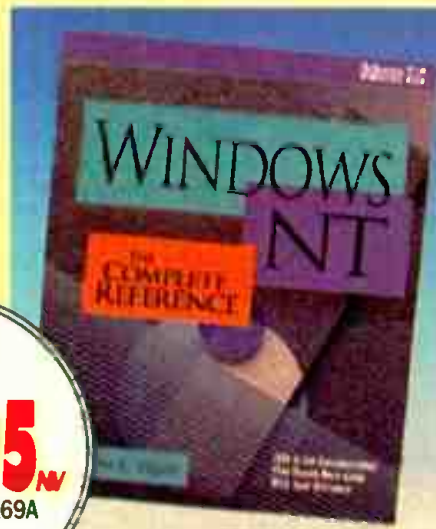
Order 5800
Code **Type** **Price each**
 AA61R Windows For Dummies £14.99 NV

WINDOWS NT - THE COMPLETE REFERENCE

NEW

by Allen L. Wyatt

Windows NT is the long-awaited and highly regarded operating system from Microsoft, being a direct descendent of Microsoft Windows. NT provides fresh competition for the OS/2 and Unix operating systems, but with the advantage of being able to draw from the huge base of Windows users. This book is carefully designed to teach you all you want to know about the Windows NT operating system. It offers an excellent and detailed tutorial on all aspects of the topic. The book provides total coverage from installation and basic commands to advanced operating systems, so allowing a successful change to Windows NT. 1993. 660 pages. 185 x 230mm, illustrated. American book.



GREAT VALUE!
£21.95_{NV}
 AA69A
 [A1]

Windows 3.1 the Pocket Reference

by Allen L. Wyatt

This small, compact book is designed to serve as a memory jogger or a quick reference, and is divided into three sections. The first section gives information that is fundamental to understanding Windows 3.1 and fully absorbing the information in the other two sections. For the reader who is familiar with Windows, this section can be skipped, or just scanned. The second section is the Command Reference section, and covers, in alphabetical order, the most commonly used Windows 3.1 commands. Discussed, again in alphabetical order, in the third section are Task Reference commands. This pocket reference book is a handy memory jogger for the newest release of Windows, that you will not want to be without. 1992. 220 pages. 202 x 118mm, illustrated. American book.



Order 798
Code **Type** **Price each**
 WZ64U Windows 3.1 Pckt Ref £7.95 NV

Windows 3.1 - The Visual Learning Guide

by David C. Gardner and Grace Joely Beatty

This book is designed for the busy users who are either new to Windows or upgrading to the latest version. The book will teach you to understand, customise and get the maximum benefit from working in the Windows environment. Hundreds of full-colour graphics combined with an innovative 'point-and-click' layout make it virtually impossible for the reader to get lost or confused as progress is made through the book. 1992. 286 pages. 233 x 186mm, illustrated. American book.



Order 806
Code **Type** **Price each**
 WZ77J Windows 3-1 Visual £18.45 NV

Windows - In Easy Steps

by Harshad Kotecha

The advent of 'Windows' for the PC has certainly made using a PC much more user-friendly. Software designed to run under Windows has the same consistent 'look and feel', so once you have mastered one Windows package, it is much easier to learn another. One of the many features of Windows is 'multitasking' which, when used on a suitably equipped PC, allows several programs to be available simultaneously. This facility allows you to print a large document from your wordprocessor and whilst this task is going on, open another application, such as a spreadsheet. 1992. 128 pages. 227 x 186mm, illustrated.



Order 5777
Code **Type** **Price each**
 AA16S Windows In Easy Step £9.95 NV

A Concise User's Guide to Windows 3.1

by N. Kantaris

This book was written to help the newcomer to Windows 3.1, consequently the material is presented on the 'what you need to know first, appears first' basis. However, it is not necessary to start at the beginning of the book and go right through to the end. Each section of the book has been designed to be self-contained, so the more experienced user can start at any section. Windows not only acts as a graphical front-end to your PCs disc operating system (DOS), but also contains its own word processor, database, communications, and electronic calendar modules, to name but a few, all of which are examined in this book. An understanding of Windows cuts down the learning curve on other available packages specifically designed to run under



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the Windows environment. With the help of this Concise Guide, you should be able to get the most out of your computer, when using Windows, in terms of efficiency and productivity – in the shortest, most effective and informative way. 1992. 150 pages. 198 x 130mm, illustrated.

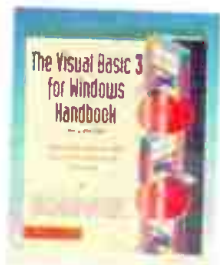
Order Code	Type	Price each
WZ71N	Guide To Windows 3.1	£4.95 NV

The Visual Basic 3 for Windows Handbook

NEW!

by Gary Cornell

Before Visual Basic, developing Windows applications was much harder than developing DOS applications. Programmers had to worry about too much, such as what the mouse was doing, where the user was inside a menu, and whether the user was clicking or double clicking at a given place. Developing a Windows application needed expert C programmers, and even they had trouble.



Visual Basic has changed this situation, such that sophisticated Windows applications can now be developed in a fraction of the time previously needed. Programming errors (bugs) do not happen as often – and if they do, they are a lot easier to detect and fix. This book is a comprehensive hands-on tutorial to all the ins and outs of Visual Basic programming that does not assume you have programmed before. However, those that are familiar with QuickBasic or another structured programming language will have an easier time of it. As you work through the book and build your skills with hands-on exercises and examples, you should soon be writing sophisticated Windows applications that would once have taken weeks to create.

1993. 912 pages. 232 x 186mm, illustrated. American book.

Order Code	Type	Price each
WZ66W	Windows Visual Basic	£23.95 NV

A Concise Introduction to MS-DOS

by N. Kantaris

PC users who want to get the best out of their computer in terms of efficiency and productivity must learn its PC/MS-DOS operating system. This book will help you to do just that in the shortest and most effective way. The book provides enlightenment about such things as what happens when the computer is first switched on, and the files it uses as it 'auto-boots' from a system disk, how to use 'EDLIN.COM' to write your own 'CONFIG.SYS' and 'AUTOEXEC.BAT' files (and also what to write!), and how to organise your disk storage using sub-directories. Covers all versions of 3.x and 4.x of both PC-DOS and MS-DOS as implemented by IBM and other manufacturers of 'compatibles' including Amstrad.



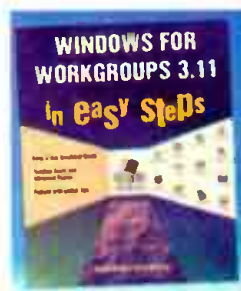
1992. 98 pages. 198 x 128mm, illustrated.

Order Code	Type	Price each
WS94C	Cnse Intro MS-DOS	£2.95 NV

Windows for Workgroups 3.11 in Easy Steps

by Harshad Kotecha

Windows is the most popular graphical environment being used on personal computers (PCs) and Windows for Workgroups 3.11 is the latest version of Windows. It provides an easy to use networking facility as well as much improved performance for Windows users. Like other titles in the 'Easy Steps' series, the book is enjoyable to read and provides a cost-effective training guide. By combining stunning Windows screen shots, exactly as they appear in the software, with simple, clear instructions on how to perform specific tasks, the book is easy to follow and understand. Text is clear and concise with no unnecessary long winded explanations.



1994. 200 pages. 227 x 186mm, illustrated.

Order Code	Type	Price each
AA94C	Win for Wkgroups3.11	£14.95 NV

The New MS-DOS Primer

by Martin Thomson

MS-DOS, Microsoft's Disk Operating System, has become the world standard for microcomputers. It is the software that turns your machine into a functioning computer. Covering MS-DOS versions 3, 4 and 5, this book is written for the beginner. It uses simple straightforward language and everyday examples to teach the most frequently used features of MS-DOS. The chapters are short and logically organised, each ending with a summary emphasising the main concepts covered. The mystery is removed and technical jargon is avoided wherever possible. Perhaps most importantly of all, the book covers disk formatting and the storage of files on disks, and gives details on how to copy, rename, delete and move files from disk to disk. The making of security copies is fully covered, so that you can insure against the loss of your valuable data. Guidance is given on how to avoid the destruction of your data by computer viruses, and what to do if your computer becomes infected. With this book you will learn how to use MS-DOS and release the power of your computer.



1991. 223 pages. 215 x 135mm, illustrated.

Order Code	Type	Price each
WZ52G	MS DOS Primer	£8.50 NV

A Concise Advanced User's Guide to MS-DOS

by N. Kantaris

If you are a PC user and are at ease with the routine usage of its PC/MS-DOS operating system, but are looking for ways to improve your system's efficiency and productivity, while learning something new, then this book will help you to do just that, in the shortest and most efficient way. The book explains how to write both simple and advanced customised batch files which allow you to display what you want, and in the form you want it. How the ANSI.SYS display and keyboard commands can be used to position the cursor on any part of the screen, change the intensity of the displayed characters or change their colour, or re-define the keyboard keys so that by pressing such a key a complete command can be

issued as if it were typed at the keyboard. How the EDLIN line editor can be used to enter ESCape (ANSI.SYS) commands in to a file so that simple menus can be built. How the DEBUG program can be used to create, see and change the contents of any file, including those of programs written in assembler code. How to find your way around the names and tasks of the CPU registers and the meaning of some simple assembler mnemonics. How to write programs in assembly code, using DEBUG, which can control your screen and keyboard. How to design and set up interactive professional looking menu screens so that you or others can run programs or applications packages easily. This book is relevant to both the PC-DOS and MS-DOS flavours of DOS including MS-DOS 5, as implemented by IBM, and other manufacturers of 'compatible' microcomputers. It covers all versions of 2.x, 3.x, 4.x and 5.x.



1992. 140 pages. 198 x 125mm, illustrated.

Order Code	Type	Price each
WS44X	Concise Advnce MSDOS	£4.95 NV

A Concise User's Guide to MS-DOS 5

by Noel Kantaris

Like many of the books in the 'Concise User's Guide' series, this informative guide is written for the beginner on a 'what you need to know first appears first' basis. The book is circular, which means that you don't have to start at the beginning and go to the end. The more experienced user can start from any section as each section is self-contained. Topics dealt with in this informative guide include; how the DOS operating system is structured so that you can understand what happens when you first switch on your computer; directories and subdirectories and how they can be employed to structure your hard disc for maximum efficiency; how to manage disc files and how to use the MS-DOS Editor to fully configure your system by writing your own CONFIG.SYS and AUTOEXEC.BAT files; how to optimise your system by either increasing its conventional memory or increasing its speed; how to write batch files to automate the operation of your system. At the same time, this handy little guide has been written in such a way as to also act as a reference guide, a summary of the MS-DOS operating system commands are given in the penultimate section of the book. The commands are explained with relevant examples and, as such, the section can serve as a quick reference guide.



1992. 135 pages. 118 x 130mm, illustrated.

Order Code	Type	Price each
WZ72P	Guide To MS-DOS 5	£4.95 NV

FAX YOUR ORDER NOW!
01702 553935

MS-DOS 6 Explained

NEW

by **N. Kantaris & P. R. M. Oliver**

This book deals with the latest version of the PC operating system MS-DOS version 6 and includes the very latest 6.2 update. No previous knowledge of DOS is assumed, and each section is self-contained, so that the more experienced user will also find this book very useful. The book is not intended to replace the documentation that is supplied with MS-DOS 6 but to supplement and explain it. Additionally, the book covers the enhancements to be found in versions 6.0 and 6.2 of MS-DOS, several aspects of which are new. As with other books in this series, it is not necessary to read several hundred pages that cover every aspect of the subject, when a few selected pages are more than adequate. The book seeks to highlight the simplicity of the MS-DOS operating system by presenting with examples, the principle of what you need to know, when you need to know it. 1993. 209 pages. 197 x 128mm, illustrated.



Order Code	Type	Price each
AA57M	MSDOS 6 Explained	£5.95 NV

A Concise Introduction to WordPerfect

by **R.A. Penfold**

WordPerfect has now become the most popular word processor for the IBM PC range and the numerous "compatibles" currently in use around the world. The WordPerfect user has a tremendously powerful writing tool at his or her disposal. A word processor of this quality enables you to work quickly but still produce well formatted and accurate documents. Although software of this complexity can be a bit daunting for the beginner, with the aid of this small book you will soon learn to master most aspects of WordPerfect. The book is aimed at beginners to word processing, and assumes a minimal amount of knowledge about computers and running applications programs. Areas covered include how to enter and edit text, and move quickly around the large documents. How to perform block operations including move, copy, delete, case change and printing. How to format text ready for printing including the use of advanced features such as newspaper columns and graphs, as well as basic formatting, such as line spacing and setting margins. How to install printers and print out documents using various fonts and printing effects. How to use the mail-merge facilities to customise standard letters. How to exploit useful facilities such as the spelling checker, Thesaurus and sort routine. Up to WordPerfect version 5.0 are covered. 1989. 106 pages. 198 x 129mm illustrated.



Order Code	Type	Price each
WS80B	Cons Int WordPerfect	£3.95 NV

A Concise Introduction to Word for Windows

NEW

by **N. Kantaris & P. R. M. Oliver**

Microsoft's Word for Windows is the best selling Windows wordprocessor, and is naturally fully integrated with Microsoft's Windows environment. In all the Windows versions Word has been biased towards desk top publishing (DTP), featuring a WYSIWYG mode with full edit capability. Additionally, the package features the ability to manipulate full colour graphics, making this a powerful wordprocessing package. Although, Version 2.0 and above have been designed to make full use of the improved features of Windows 3.1, they are equally at home with Windows 3.0. The text is written with an emphasis on what the authors consider to be the most important aspects of the program, such as page layout, paragraph styles and the use of frames etc. 1993. 160 pages. 198 x 130mm, illustrated.



Order Code	Type	Price each
AA23A	Intro Word For Win	£5.95 NV

WordPerfect 5.1 Made Easy

Covers Versions 5.0 and 5.1

by **Mella Minberg**

This book is for the beginner or newcomer to WordPerfect or the intermediate user, and covers version 5.0 and 5.1. In here you will find everything you need to complete your documents, from instructions for installation, to directions for printing your text with fancy fonts and special characters. Version 5.1, released in November 1989, offers additional features to make the program even easier to use: mouse support, pulldown menus and new features enabling the user to create the correct layout for mathematical equations, produce tables and import spreadsheets. The capabilities of both versions are described in this book; those that refer to only one or the other version are clearly marked as such. 1990. 1071 pages. 234 x 185mm, illustrated. American book.



Order Code	Type	Price each
WZ12N	B3 WordPerfect 5.1	£20.95 NV

WordPerfect 6 For Windows - The Complete Reference

NEW

by **Allen L. Wyatt, Steve Dyson, Daniel J. Fingerman, Stephen Cobb and Kirsty Clason**

For many years, WordPerfect has been the best-selling word processor for all types of computers, but now this established program is available in a revised version for Windows. Whether you are a newcomer to WordPerfect, or an old hand, this version - WordPerfect 6 for Windows - provides a wide range of new and improved features to enhance



performance and significantly improve productivity. This book is much more than just a complete reference, that is, an alphabetical reference list of command names and features, for it contains useful examples of common applications, with information organised according to task. Extremely helpful notes and tips are liberally placed throughout the book to help the beginner and experienced WordPerfect user understand the many features of the program. In general, each section and chapter is self-contained with references to other chapters where necessary. 1993. 829 pages. 231 x 187mm, illustrated. American book.

Order Code	Type	Price each
AA29G	A3 W/Perfect 6 For Win	£23.95 NV

WordPerfect: The Joy of Six

by **Darren Ingram**

While at least over 600 new features have been added to WordPerfect 6.0, this book is not designed to be a guide to every feature, quirk or tool of WordPerfect 6.0. The more commonly-used and useful commands are explained in a clear, easy to understand way that should allow the reader to grasp the concepts quickly. After reading this book, a novice or an experienced wordprocessor user, should be able to produce more effective documents. It answers commonly asked questions and explains the significant new and enhanced features, of WordPerfect 6.0 such as 'Network Setup Utility', 'Page Mode', etc. 1993. 160 pages, 230 x 185mm, illustrated.



Order Code	Type	Price each
AA67X	W/Perfect Joy of Six	£11.95 NV

DTP for the PC User

NEW

by **Mark Houghton**

It was the early 1980s that saw the introduction of the Apple Macintosh computer with its user friendly graphical user interface (GUI). It was this advantage over the PC that saw the Apple Mac become the dominant machine for desk top publishing (DTP). However, with the drop in price and the rapid advance in microprocessors, PCs are now in a comparable position especially with the introduction of modern software such as Windows. This book concentrates exclusively on PC based desktop publishing, for a cheap-and-cheerful PC can be equally as effective for DTP as the Mac. But how do you find out what additional hardware and software you will require? This is where this book will be of great assistance, recommending the type of PC to buy for serious DTP work, together with the essential printers and scanners to complete your system. A wide range of software packages are reviewed from the low-cost PagePlus to QuarkXPress for Windows, as well as graphics packages from GST's Designworks to CorelDRAW! Finally, a comprehensive list of hardware and software suppliers in the UK are listed. If you are planning to set up your own DTP system, or are hoping to expand an existing system, then this book is for you. It will provide you with information needed to assess what are the best possible combinations of hardware and software for your requirements and budget. 1993. 240 pages. 229 x 152mm, illustrated.



Order Code	Type	Price each
AA21X	DTP For The PC User	£12.95 NV

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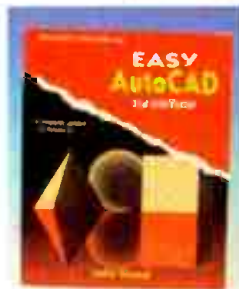
Easy AutoCad – 3rd Edition

by John Hood

The third edition of this informative textbook now covers AutoCad Releases 11, 12 and Windows for AutoCad. This edition, as before, has been written in a way that immediately involves the student in the drawing process. This edition now includes the use of pull-down menus and dialogue boxes along with the standard screen menu. The text is composed of a series of tutorial projects each about three hours in length which are designed to bring the novice user, with no experience, to the level of a fully-trained CAD operator in a short period of time. The student should be able to master all the powerful features of AutoCad such as dimensioning, layering, isometric drawing, 3-D drawing, attributes, solid 3-D modelling, multiview drawings, blocks and much more.

1993. 386 pages. 233 x 188, illustrated. American book.

Order Code	Type	Price each
AA18U	Easy AutoCad	£22.95 NV



NEW

Desktop Design Getting the Professional Look

by Brian Cookman

This is a teaching book primarily intended for those readers who want to learn and practise the art of 'Computerised Integration of Text and Graphics'. The Desktop Publishing system (DTP) replaces smelly adhesives, ever-blunting scalpels and the eternally shaking drawing pen.

In the second edition of his book Brian Cookman sets out the best way to use a desktop system with regard to design. He includes many of the tricks of the trade, that he has picked up over the years, which will hopefully alleviate hours of frustration.

This book is full of illustrations to back up what the author has written. Ideally suitable for all levels of DTP users as it will not only inform the beginner, but will refresh the memory of the expert. The book is not intended to be for any particular system, as most of those available will handle the designs without any trouble.

1993. 126 pages. 210 x 206mm, illustrated.

Order Code	Type	Price each
AA74R	Desktop Design	£19.99 NV



NEW

Pagemaker 5 – In Easy Steps

by Scott Basham

DTP systems based on PCs are now being used to create virtually any kind of document previously associated with traditional publishing. Pagemaker 5 has many helpful facilities to import text and artwork from other computer applications packages, as well as the ability to generate directly from within the software itself. This enjoyable guide covers all the essential features of Pagemaker 5 for Windows and includes: drawing and



NEW

manipulating shapes; importing text and graphics; cropping, skewing, reflecting and rotating objects; story and table editing; kerning and tracking; producing contents table and index pages; working with colour and printing; how to create and work with a publication, and useful tips and techniques for good document design.

1993. 125 pages. 227 x 186mm, illustrated.

Order Code	Type	Price each
AA17T	Pagemaker 5	£14.95 NV

An Introduction to Desktop Publishing

by R.A. & J.W. Penfold

Desktop publishing is one of the most exciting developments in computing in recent years. It puts all the facilities of document design and typesetting at the disposal of anyone with a suitable microcomputer. This opens up the field of written communication as never before.

The book introduces the software and hardware required for 'DTP', and shows that it does not necessarily require very expensive equipment, though this may be desirable for best results. It shows how a start can be made with modest computers and printers.

The book shows you how to create and lay out documents, how to use fonts and typography, and how to add illustrations, both drawn and scanned graphics. Also included is an extensive glossary of DTP, computing and printing terms.

1991. 94 pages. 263 x 194mm, illustrated.

Order Code	Type	Price each
WT78K	Intro Desktop Pub	£5.95 NV



CorelDRAW! 4 Made Easy

by Emil Ihrig, Sybil Ihrig, Martin S. Matthews and Carole Boggs Matthews

CorelDraw! 4 has become one of the most widely used graphics software packages for the PC, as probably no other drawing package offers so many powerful drawing, text handling, autotracing, colour separation, and special effects facilities in one package. Version 4 adds a new range of desktop publishing features including multipage documents, text control, extensive bullets and improved colour styles with auto-trapping. There are many new artistic features including powerlines, textures and fills, artistic styles to manage complex drawings and weld capability to join the outlines of existing objects. In addition, there is a completely new technical illustrator, that includes dimensioning, clones that mirror their master, attaching data to objects and drag and drop symbol manipulation. Finally, a multimedia animation package called CorelMOVE! has been incorporated, that provides the combination of sound, graphics and two dimensional animation for use in a presentation.

1993. 686 pages. 231 x 187mm, illustrated. American book

Order Code	Type	Price each
AA26D	A2 CorelDraw 4	£21.95 NV



NEW

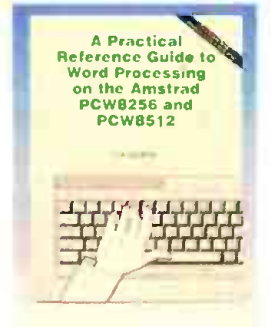
A Practical Reference Guide to Word Processing on the Amstrad PCW8256 and PCW8512

by F.A. Wilson

With the PCW8256 and 8512 Amstrad have now brought word processing within the reach of everyone. These machines are capable of manipulating letters and words in practically every conceivable way, and what can be achieved with them is probably limited only by the user's ingenuity. This indispensable book includes easy to follow step-by-step charts to guide the inexperienced through many complex procedures. The book includes a comprehensive reference section for the manuals, and has itself been entirely prepared by the author for the final printed pages, using a PCW8256.

1986. 192 pages. 264 x 196mm, illustrated.

Order Code	Type	Price each
WP42V	Word Proc on Amstrad	£5.95 NV



Easy Add-On Projects for Amstrad CPC 464, 664, 6128 and MSX Computers

by Owen Bishop

Seventeen projects which can be used with the Amstrad CPC 464, 664, 6128 or MSX computers.

The projects include a Picture Digitiser, Five-Key Pad, Model Controllers, Bleeper, Lamp Flasher, Magnetic Catch, Lap Sensor, Photo-Flash, Games Control, Data Selector and six more projects that make up a Weather Station. All of the projects are fairly simple and inexpensive to build, and a complicated Address Decoder does not need to be made first since the computer is accessed via its joystick or printer ports.

1986. 154 pages. 178 x 112mm, illustrated.

Order Code	Type	Price each
WP43W	Proj for Amstrad/MSX	£2.95 NV



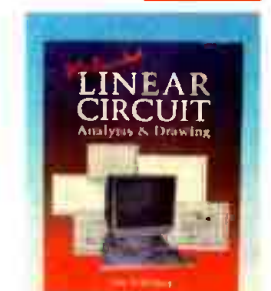
PC-Assisted Linear Circuit Analysis & Drawing

by Ian Sinclair

This book introduces the principles of linear circuit analysis and explains what is required to analyse a variety of common circuits, by following a large number of examples. In addition, the effects of stray capacitance, and source and load resistance values are illustrated. The book uses Aciram and AutoSketch as example software. By using a low-cost CAD program such as AutoSketch, it is possible to automate the process producing precise and printable circuit diagrams of a very high standard.

1993. 280 pages. 246 x 189mm, illustrated.

Order Code	Type	Price each
AA62S	Lin Circuit Analysis	£14.95 NV



NEW

Encapsulated PostScript

Application Guide for the Macintosh and PC
by Peter Vollenweider

This book presents a detailed and clear introduction to the PostScript language, including information on how text, graphics and images may be mixed at the PostScript level using the Encapsulated PostScript file (EPSF) format as an interchange standard: EPS files may be imported for example by Aldus PageMaker, or Xerox Ventura Publisher. The contents of this book include detailed information on Adobe's latest version (2.0) of the Encapsulated PostScript file (EPSF) and version 3.0 of the document structuring convention specifications; includes a look at colour support, the HyperCard application, LearnPS, the Adobe Type Manager (ATM) and the Art Importer by Altsys; EPS effects by SmartArt and TypeAlign, and the PostScript interpreter operating on the IBM mainframe; and concentrates on the mixing of PostScript files, and the PostScript-related Macintosh and IBM PC programs, and provides information on networking PostScript based hardware. This is a practical instruction book written for all desk top publishers at all levels of expertise. PostScript designers and programmers, and those dealing with computer communications between minis, micros and mainframes with a graphics emphasis. Students of computing, graphics, art and design who are learning page description languages and PostScript as an introduction to programming will find the material contained within this book both easy to understand and enjoyable to use, and it will remain a quick and easy reference guide. In addition PostScript is important to anyone at all involved in DTP at any level, for whom this book will be very instructive.

1990. 243 pages. 235 x 173mm, illustrated.
American book.

Order Code	Type	Price each
WZ11M	Encap PostScript	£13.99 NV

PostScript Language Reference Manual

Second Edition
Adobe Systems Incorporated

The PostScript language has fuelled a revolution in the world of visual communications. This powerful and flexible language efficiently describes the appearance of text, sampled images, and graphics on a printed page or display. PostScript language interpreters have been incorporated into some of today's most innovative printers, typesetters, film recorders and computer display environments. This reference manual, from Adobe Systems Incorporated, who created the language, is the official reference to PostScript. This entirely new and up-to-date second edition offers the most comprehensive coverage of the entire PostScript language, including the recent advancements of PostScript Level 2. PostScript is becoming part of the basic fabric of the printing, publishing and computing industries. If you have anything even remotely to do with any of these subjects, you ignore PostScript at your peril.

1990. 764 pages. 232 x 187mm, illustrated.

Order Code	Type	Price each
WZ04E 83	PostScript Manual	£26.95 NV

PostScript Language Tutorial and Cookbook

Adobe Systems Inc.

PostScript, a revolutionary, device-independent page description language, is quickly becoming the industry standard for printing high-quality integrated text and graphics. It is a powerful, flexible language that has the ability to efficiently describe the appearance of text, images, and graphic material on the printed page. Already PostScript has been incorporated into some of today's most innovative printers, including the LaserWriter from Apple. The PostScript Language Tutorial and Cookbook is a thorough and clearly written guide to PostScript that outlines the features and capabilities of the language and shows practical ways to create useful PostScript programs. Using numerous annotated examples and short programs, the tutorial provides a step-by-step guided tour of PostScript, highlighting those qualities that make it such a unique and powerful language. The cookbook offers a collection of some of the most useful techniques and procedures available to PostScript programmers. The book is a companion to the PostScript Language Reference Manual (WZ04E). PostScript is fast becoming an international standard for DTP and publishing generally.

1985. 243 pages. 234 x 187mm, illustrated.

American book.

Order Code	Type	Price each
WZ13P	PostScript Tutorial	£16.95 NV

PostScript Language Program Design

Adobe Systems Inc.

The PostScript language has become the industry standard for printing high-quality graphics and text. This powerful language has the ability to describe efficiently the appearance of text, images and graphics on a printed page. The PostScript language is currently incorporated into over 30 different products, including phototypesetters and high-speed laser printers from many well-known computer systems vendors. From Adobe Systems Incorporated, the inventors of the PostScript language, here is the definitive guide to designing efficient PostScript programs. It teaches the programming principles that are unique to the PostScript language with numerous, usable sample programs and examples of efficient code. In this book, programmers learn techniques for such tasks as setting text, constructing graphics, writing emulators, debugging programs and more. The sample programs are also available on a disk directly from Adobe Systems. The book is a companion volume to the two other books written by Adobe Systems, the PostScript Language Reference Manual (WZ04E) and the PostScript Language Tutorial and Cookbook (WZ13P).

1988. 238 pages. 233 x 187mm, illustrated.

American book.

Order Code	Type	Price each
WZ14Q	PostScript Program	£21.95 NV

Adobe Type 1 Font Format

Version 1.1 Adobe Systems Incorporated

The PostScript language has become the industry standard for imaging high quality graphics and text for all kinds of professional publications. This powerful language has the ability to efficiently describe the appearance of text, sampled images and graphics on a printed page or display. Since letters are used so frequently in the description of a page, the PostScript language has special facilities to handle collections of letter shapes conveniently and efficiently. These collections are called fonts. Written by Adobe Systems, the inventors of the PostScript language, this is the official specification for the Type 1 font format. This new, updated version describes the syntax of the Adobe Type 1 format, including complete information regarding font and character level hints, character outline encoding, new flex procedure (V1.1), 'eexec' encryption, charstring encryption, and New Expansion Factor hint (V1.1). Companion volumes by Adobe Systems are also available through Maplin, including the 'PostScript Language Reference Manual' (WZ04E), a definitive guide to the language; the 'PostScript Language Tutorial and Cookbook' (WZ13P), a practical and accessible introduction to the language and its capabilities with examples, while 'PostScript Language Program Design' (WZ14Q) is the proven guide to designing efficient PostScript programs.

1990. 108 pages. 231 x 187mm, illustrated.

American book.

Order Code	Type	Price each
WZ15R	PostScript Font Fmt	£14.95 NV



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BATTERY TESTERS

Battery Tester



A liquid crystal battery tester for use with 1.5V cells (not Ni-Cad types). The tester is a clear flexible plastic strip which is folded around the battery so that the two silvered spots on the back of the tester make contact with the positive and negative terminals of the battery. The coloured marks on the face of the tester then "light up" to show the condition of the battery. Full instructions for use are printed on the tester.

Order Code	Type	Price each
FP60Q	Battery Tester	79p

Battery Checker



A low-cost and compact battery tester suitable for determining the state of both dry and NiCd cells. The state of the cell is shown as 'Replace/Recharge', 'Low' and 'Good' on the integrated moving coil meter. The spring loaded arm is used for testing 'N', 'AAA', 'AA', 'C' and 'D' cells and all similar 1.5V cells, while PP3 batteries are held against two contacts on the side of the unit. In addition, the spring loaded arm can also be used to test button cells from watches and calculators.

Order Code	Type	Price each
DM75S	Handy Battery Tester	£3.99

Car Battery Analyzer



A handy device for checking the state of a car's battery and charging circuit. Simply plug the device into the car's cigar lighter socket and read the display. For testing the battery turn the engine off and leave the car with the lights on dipped beam for one minute. Now connect the device and read the display. If the battery is defective the meter will register low. To check the alternator/dynamo state just check the meter scale after driving for more than 15 minutes. A healthy charging circuit will register in the middle of the scale. The legend on the meter is easy to read, and colour coded to show easily, which areas of the scale are healthy and which are bad. Suitable for negative ground electrical systems.

Order Code	Type	Price each
RJ91Y	Car Battery Analyzer	£3.99

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DRY BATTERIES

NEW!

GP

A range of quality batteries with consistent discharge performance, leakage resistance, shelf life, and reliability in extreme conditions. Three different ranges are presented here, comprising zinc carbon, 'environmentally friendly' zinc chloride and alkaline. None of these batteries contain any mercury and are therefore environmentally safe in use and disposal.

Heavy Duty General Purpose



A basic range of zinc carbon batteries, suitable for all electronic devices, including toys, photographic equipment, data banks, calculators, audio appliances, remote controllers and paging machines. AAA and AA sizes are only sold in packs of 4. C and D sizes are only sold in packs of 2. PP3 size is sold singly.

Mercury Free Extra Heavy Duty Range



A range of batteries whose main electrolyte comprises zinc chloride. Suited to heavier duty, high drain applications, these batteries are also 'environmentally friendly'.

Continued on next page.

THE BEST OF SERVICE

Continued from previous page.

friendlier' as they contain no mercury. Also suitable for all electronic devices, including toys, photographic equipment, data banks, calculators, audio appliances, remote controllers and paging machines. AAA and AA sizes are only sold in packs of 4. C and D sizes are only sold in packs of 2. PP3 size is sold singly.

Alkaline Range



Alkaline batteries are now more widely used in place of other types for their high current and high capacity performance with minimum supply degradation for modern electronic circuitry. These batteries use an alkaline manganese chemical system, and contain no mercury or cadmium. Suitable for all electronic devices, especially for those requiring a heavy current drain, including toys, paging machines and alarm clocks. All alkaline cells are sold singly.

Characteristics

Type	IEC Size	Mass	Nominal capacity
Carbon AAA	R03	9g	0.3Ah at 15Ω for 4.6hrs to 0.9V
Carbon AA	R6	18.1g	0.4Ah at 3.9Ω for 1.3hrs to 0.8V
Carbon C	R14	46g	1.1Ah at 3.9Ω for 3.6hrs to 0.8V
Carbon D	R20	100g	3.75Ah at 2Ω for 6.25hrs to 0.9V
Carbon PP3	6F22	35.5g	0.3Ah at 620Ω for 26hrs to 5.4V
Chloride AAA	R03	9g	0.34Ah at 15Ω for 4.28hrs to 0.9V
Chloride AA	R6	18.7g	0.48Ah at 3.9Ω for 1.58hrs to 0.9V
Chloride C	R14	49.5g	1.8Ah at 3.9Ω for 5.9hrs to 0.9V
Chloride D	R20	102g	3.8Ah at 2.2Ω for 7hrs to 0.9V
Chloride PP3	6F22	38g	0.35Ah at 620Ω for 30hrs to 5.4V
Alkaline N	LR1	8.9g	0.6Ah at 20Ω for 11.6hrs to 0.9V
Alkaline AAA	R03	10.7g	0.8Ah at 20Ω for 14.3hrs to 0.9V
Alkaline AA	R6	23g	1.89Ah at 10Ω for 15.8hrs to 0.9V
Alkaline C	R14	68g	5.2Ah at 3.9Ω for 17hrs to 0.9V
Alkaline D	R20	138g	7.5Ah at 2Ω for 12.5hrs to 0.9V
Alkaline PP3	6F22	47g	0.45Ah at 180Ω for 11hrs to 5.4V

Where batteries are supplied in bubble pack sets of more than one battery, they will be indicated as such by the quantity in the pack following the description, e.g. 'x 2', 'x 4', etc.

Order Code	Type	Price each
YU64U	Carbon AAA x 4	£1.29
YU65V	Carbon AA x 4	89p
YU78K	Carbon C x 2	89p
ZB30H	Carbon D x 2	99p
ZB34M	Carbon PP3	99p
ZB35Q	Chloride AAA x 4	£1.40
ZB36P	Chloride AA x 4	£1.40
ZB42V	Chloride C x 2	£1.09
ZB43W	Chloride D x 2	£1.29
ZB44X	Chloride PP3	£1.36
ZB45Y	Alkaline N	80p
ZB46A	Alkaline AAA	65p
ZB47B	Alkaline AA	65p
ZB48C	Alkaline C	£1.30
ZB50E	Alkaline D	£1.68
ZB52G	Alkaline PP3	£2.29

DURACELL BATTERIES



A range of alkaline batteries by Duracell. The alkaline system takes its name from the electrolyte, which is a highly conductive aqueous solution of potassium hydroxide. The electrodes are high purity manganese dioxide and granulated zinc, a combination which gives a superior, yet economic, battery capable of operating efficiently at both high and low rates of discharge and over a wide range of duty cycles. The operating voltage range is 1.3 to 0.8V per cell under most load and temperature conditions. Maximum open circuit voltage is typically 1.56V per cell. The recommended exhausted voltage level of a single cell in use is 0.8V, increasing to 0.9V per cell if 6 or more are used in series, at which point they must be replaced.

The alkaline battery excels at powering continuous, heavy loads. There is no distinct upper load limit, and the chemistry is typically capable of supplying, intermittently, loads up to 2A at normal room temperature.

Duracell batteries are leak-proof under all normal conditions of operation and storage, however, the following should be avoided to prevent damage and possible leaks: wrong polarity; short circuit; reversed drive of series cells; or attempts at recharging. The alkaline system operates efficiently over a temperature range of -30°C to +70°C, subject to load and duty cycle regimes. High relative humidity may cause external corrosion and should be avoided. All batteries are fully sealed and highly resistant to differences in external air pressure, even down to a vacuum.

Characteristics

Type	Mass	Nominal capacity
Size N	8.3g	0.91Ah at 100Ω for 70 hrs to 0.8V
Size AAA	11g	1.1Ah at 10Ω for 8.5 hrs to 0.8V
Size AA	22g	2.6Ah at 10Ω for 20.2 hrs to 0.8V
Size C	67g	6.5Ah at 10Ω for 50 hrs to 0.8V
Size D	141g	15.6Ah at 10Ω for 120 hrs to 0.8V
Size PP3	45g	0.55Ah at 470Ω for 36 hrs to 4.8V

Order Code	Type	Price each
JY51F	Duracell N	99p
JY50E	Duracell AAA	79p
JY48C	Duracell AA	80p
JY47B	Duracell C	£1.49
JY46A	Duracell D	£1.59
JY49D	Duracell PP3	£2.99

Lighting and General Purpose



Batteries for a wide range of general purpose and miscellaneous applications, such as doorbells and burglar alarms etc.

Voltage	Dimensions (mm)	Type	Terminals
3V	21.8 dia. x 74.6 high	No.8	Stud
4.5V	62 x 22 x 67 high	312G	Flat Spring
4.5V	103 x 35 x 92 high	126	Screw
6V	67 x 67 x 102 high	908S	Coiled Spring
6V	137 x 73 x 127 high	918S	Screw
6V	67 x 67 x 110 high	HP992	Screw

Technical Information

Type	Mass	Nominal capacity
No.8	42.5g	1.12Ah at 300Ω for 4 hours/day to 1.8V
312G	113g	2.3Ah at 225Ω for 4 hours/day to 2.7V
126	369g	5.76Ah at 75Ω for 4 hours/day to 2.7V
908S	600g	6.4Ah at 8.2Ω for 30 mins/day to 3.6V
918S	1080g	15Ah at 10Ω for 30 mins/day to 3.6V
HP992	581g	6.19Ah at 10Ω for 30 mins/day to 3.6V

Order

Code	Type	Price each
FK68Y	Gen Purpose No.8	75p
ZB63T	312G	99p
FK70M	Gen Purpose 126	£3.85
ZB65V	908S	£2.99
ZB66W	918S	£4.99
YJ23A	A2 Gen Purpose HP992	£5.99

Transistor Power Packs



A range of batteries especially developed for transistorised equipment where maximum performance in the minimum space is required.

Voltage	Dimensions (mm)	Type	Terminals
9V	36 x 34.5 x 70.4 high	PP6	Like PP3
9V	46 x 46 x 62.2 high	PP7	Like PP9
9V	66 x 52 x 81 high	PP9	PP9-type

Technical Information

Type	Mass	Nominal capacity
PP6	111g	0.83Ah at 900Ω for 4 hours/day to 5.4V
PP7	193g	1.95Ah at 450Ω for 4 hours/day to 5.4V
PP9	265g	4.25Ah at 450Ω for 4 hours/day to 5.4V

Order

Code	Type	Price each
FM03D	Trans Pwr PP6 9V	£2.30
FM04E	Trans Pwr PP7 9V	£2.30
ZB67X	Trans Pwr PP9 9V	£2.25

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A Guide To Battery Choice

Daily Use

	Radio	Appliance	Flashgun
	Torch	Hand Lamp	Motorwind
	Calculator	Cycle Lamp	Hi-fi Cassette
	Shaver	Small Cassette	Table-top Game
	Toothbrush	Motorised Toy	Radio-controlled Toy
		Hand-held Game	

Up to 1 hour
1 to 4 hours
Over 4 hours

Zinc carbon
Zinc chloride
Zinc chloride

Zinc chloride
Zinc chloride
Alkaline

Alkaline
Alkaline
Alkaline

Use zinc chloride also for clocks, doorbells and gas ignition.

Types Available

Voltage	Equivalent types	Dimensions (mm)	Zinc Carbon	Zinc Chloride	Alkaline
1.5V	N, UM5, Lady	30 x 12	-	-	N (LR1, MN9100)
1.5V	HP16, AAA, UM4, Micro	44.5 x 10.5	-	-	AAA (LR03, MN2400)
1.5V	HP7, AA, UM3, Mignon	50.5 x 14.5	AA (R6B)	AA (R6S)	AA (LR6, MN1500)
1.5V	HP11, C, UM2, Baby	50 x 26.2	C (R14B)	C (R14S)	C (LR14, MN1400)
1.5V	HP2, D, UM1, Mono	61.5 x 34.2	D (R20B)	D (R20S)	D (LR20, MN1300)
9V	PP3, Neda 1604, 006P, 6F22, E-Block, 6R61	26.5 x 17.5 x 48.5 high	PP3 (PP3B)	PP3 (PP3S)	PP3 (6LF22, MN1604)

Photographic and Test Meter Batteries

Ever Ready/GP



A range of alkaline cells as used in photographic equipment and many test meters, key-fob remote controllers, electronic cigarette lighters, etc. See also Mercuric Oxide and High Capacity Mercuric Oxide ranges below.

Voltage	Dimensions (mm)	Type
6V	10 dia. x 16	GP11A
6V	13 dia. x 25	GP476A
12V	7.7 dia. x 28	GP27A
12V	10 dia. x 28	GP23A
15V	14.3 dia. x 35	BLR154
15V	27 x 16 x 37	BLR121
22.5V	27 x 16 x 51	BLR122

Technical Information

Type	Mass	Nominal capacity
GP11A	4g	33mAh at 10kΩ for 66hrs to 3.6V
GP476A	10g	105mAh at 6kΩ for 125hrs to 3.6V
GP27A	4.4g	18mAh at 20kΩ for 35.5hrs to 8V
GP23A	7.5g	33mAh at 20kΩ for 66hrs to 6V
BLR154	13.2g	40mAh at 180kΩ for 24hrs/day to 12V
BLR121	16.1g	40mAh at 180kΩ for 24hrs/day to 12V
BLR122	23.6g	40mAh at 270kΩ for 24hrs/day to 18V

Order Code	Type	Price each
ZB53H	GP11A	99p
ZB54J	GP476A	£2.99
ZB55K	GP27A	£2.99
ZB56L	GP23A	86p
FM09K	BLR154	£4.49
FM07H	BLR121	£4.49
FM08J	BLR122	£5.79

Mercuric Oxide Batteries



Recommended for use in a wide range of electronic, photographic, scientific and test equipment applications where the small size, stable voltage characteristics and long life are particularly suitable. These batteries are also for use in hearing aids.

Voltage	Dimensions (mm)	Type
1.35V	7.9 dia. x 3.6 high	HG3
1.35V	11.6 dia. x 3.1 high	HG10
1.35V	11.6 dia. x 4.2 high	HG12
1.35V	11.6 dia. x 5.4 high	HG13
1.35V	16 dia. x 6.2 high	HD625

Technical Information

Type	Mass	Nominal capacity	Replaces types
HG3	0.75g	40mAh	RM312, 325, 507, 5, RW57, MR41
HG10	1.3g	100mAh	
HG12	1.8g	130mAh	354, 508, 4, RW54, MR43
HG13	2.7g	180mAh	PX675, 313, 501/4677, 13, RW52, MR44, H-C
HD625	4.6g	360mAh	RM625, 4625, MR9, H-D

Order Code	Type	Price each
JG87U	Merc Batt HG3	34p
JG88V	Merc Batt HG10	40p
JG90X	Merc Batt HG12	48p
FM24B	Merc Batt HG13	48p
FM18U	Merc Batt HD625	52p



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High Capacity Mercuric Oxide GP



High capacity zinc mercuric oxide cylindrical cells of varying sizes, designed for use in calculators, electronic toys, cameras and other photographic equipment.

Voltage	Dimensions (mm)	Type
1.35V	15.8 dia. x 11.1	GPPX640
1.35V	15.8 dia. x 16.5	GPPX1
2.7V	16.8 dia. x 15.5	GP14PX
5.6V	15.3 dia. x 20	GP23PX
5.6V	12.9 dia. x 20.5	GP27PX

Technical information

Type	Mass	Nominal capacity	Replaces types
GPPX640	7.5g	500mAh	MR52, EPX640, V640PX, PX640
GPPX1	12.3g	1000mAh	MR50,
GP14PX	10g	300mAh	PX14, EPX14, 2MR9, V14PX
GP23PX	9.2g	150mAh	PX23, EPX23, 4NR42, V23PX
GP27PX	9.2g	150mAh	PX27, EPX27, 4NR43, V27PX

Order

Code	Type	Price each
ZB57M	GPPX640	£1.49
ZB58N	GPPX1	£1.49
ZB59P	GP14PX	£1.69
ZB60Q	GP23PX	£1.99
ZB62S	GP27PX	£1.69

Silver Oxide Batteries



Especially recommended for quartz watches and small calculators where the long and stable discharge characteristics are important. Nominal voltage of all types 1.5V.

Type	Dimensions (dia. x h mm)	Nominal capacity	Mass
CX521	5.8 x 2.1	10mAh	0.3g
SG1	6.8 x 2.1	12mAh	0.34g
CX626/SG4	6.8 x 2.6	20mAh	0.4g
CX721	7.9 x 2.1	16mAh	0.45g
SG2	7.9 x 2.6	23mAh	0.5g
SG3	7.9 x 3.6	30mAh	0.7g
SG5	7.9 x 5.4	58mAh	1.1g
CX921	9.5 x 2.1	25mAh	0.6g
CX926	9.5 x 2.6	34mAh	0.75g
CX936	9.5 x 3.6	52mAh	1.0g
SG8	11.6 x 2.1	35mAh	0.9g
SG10	11.6 x 3.1	64mAh	1.3g
SG12	11.6 x 4.2	110mAh	1.8g
SG13	11.6 x 5.4	150mAh	2.7g

Type Will directly replace types

CX521	SR521SW, 379, 50
SG1	SR621SW, 364, 51, 531, D364, RW320, SR60
CX626	SR626SW, 377, 37, SG4
CX721	SR721SW, 361/362, 19/46, 532, D361, RW310/RW410, SR58

Continued on next page.

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Continued from previous page.

Type	Will directly replace types
SG2	396/397, 26/29, 536/556, D396, RW311/RW411, SR59
SG3	384/392, 2/10/49, 547, D384/D392, RW37/RW47, SR41
SG5	309/393, 15/16, 526/546, D309/D393, RW38/RW48, SR48, WS6
CX921	SR920SW, 371, 30, 537, RW316, SR69
CX926	SR926SW, 395/399, 25/35, 523/543, RW313/RW413, SR57
CX936	SR936SW, 394, 27, 524, D394, RW33, SR45
SG8	SR1120SW, 381/391, 23/24, 533/553, D381/D391, RW30/RW40, SR55
SG10	SR1130SW, 389/390, 11/17, 534/554, D389, RW39/RW49, SR54, SW10
SG12	301/386, 1/6, 528/548, D301/D386, RW34/RW44, SR43
SG13	303/357, 7/9, 521/541, D303/D357, RW32/RW42, SR44, WS14

These cells are also superior replacements for types marked LR instead of SR where SR is shown in above lists, e.g. LR44 is a lower quality version of SR44 which is our model SG13.

Order Code	Type	Price each
JK33L	Silver Batt CX521	60p
FM36P	Silver Batt SG1	55p
JG83E	Silver Batt CX626	65p
FM33L	Silver Batt CX721	60p
FM35Q	Silver Batt SG2	50p
FM30H	Silver Batt SG3	60p
FM32K	Silver Batt SG5	65p
FS76H	Silver Batt CX921	65p
FS75S	Silver Batt CX926	65p
FS74R	Silver Batt CX936	65p
FS73Q	Silver Batt SG8	60p
FM31J	Silver Batt SG10	65p
FM29G	Silver Batt SG12	80p
FM28F	Silver Batt SG13	99p

Zinc Air Batteries

GP



A battery system specifically designed for use in hearing aids, where it will give twice the life of mercury types. A zinc-air battery is interchangeable with any similarly numbered mercuric oxide battery, and is activated by removing the sealing tab on the base immediately prior to use.

Type	Voltage	Dimensions (mm)
ZA312	1.4V	7.8 dia. x 3.56 high
ZA13	1.4V	7.8 dia. x 5.33 high
ZA675	1.4V	11.56 dia. x 5.33 high

Type	Mass	Nominal capacity
ZA312	0.8g	90mAh
ZA13	0.9g	200mAh
ZA675	1.7g	520mAh

Order Code	Type	Price each
ZB70M	ZA312	99p
ZB69A	ZA13	99p
ZB68Y	ZA675	99p

Lithium Batteries

GP



Lithium manganese cells all having a nominal voltage of 3.0V. Suitable for use where very low quiescent currents need to be maintained for very long periods, with only occasional demands for high current drain. Seven types are available.

Type	Dimensions (mm) dia. x height	Voltage	Nominal capacity max. (mAh)
CR1220	12.5 x 2	3.0V	38
CR1616	16 x 1.6	3.0V	42
CR2016	20 x 1.6	3.0V	72
CR2025	20 x 2.5	3.0V	160
CR2032	20 x 3.2	3.0V	220
CR2430	24.5 x 3	3.0V	280

Order Code	Type	Price each
ZB77J	CR1220	£1.48
ZB81C	CR1616	£1.48
ZB71N	CR2016	£1.48
ZB73Q	CR2025	£1.48
ZB74R	CR2032	£1.48
ZB76H	CR2430	£1.48

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Camera Batteries

GP



Long-life, 3V and 6V lithium manganese dioxide batteries (except GP1412AP, which is alkaline). Suitable for use with many automatic cameras.

Voltage	Dimensions (mm)	Type
3V	17 dia. x 34.2	CR123A
6V	34 x 19.5 x 36	CR-P2
6V	34 x 17 x 45	2CR5
6V	35.6 x 9 x 48.3	GP1412AP

Type	Mass	Nominal capacity
CR123A	16g	1300mAh
CR-P2	37g	1300mAh
2CR5	37g	1300mAh
GP1412AP	37g	1300mAh

Order Code	Type	Price each
AQ44X	CR123A	£5.75
AQ45Y	CR-P2	£8.49
AQ46A	2CR5	£8.49
ZB87U	GP1412AP	£2.29

RECHARGEABLE LEAD-ACID BATTERIES

Rechargeable Lead-Acid Battery for Cyclic Operations

Yuasa



A rechargeable lead-acid battery similar in construction to the Yuasa 'NP' series but specifically designed for cyclic operations. The battery has been designed to withstand 500 charge/discharge cycles but, with care, should handle many more. As with the 'NP' series this battery is classed as 'non-spillable', having the same unique sealing properties and gas recombinant system. This battery is ideally suited for such duties as powering wheelchairs, golf carts, lawn mowers, communications, robots, remote pumps, and other equipment needing a compact, resilient, self-contained source of power. It is recommended that a stabilised, constant voltage charger is used with current limiting to restrict the current flow to the permitted maximum. *Car battery type chargers must never be used.* This battery should never be left in a severely discharged condition. Optimum charging time for this battery is 9 hours with a maximum charging time not exceeding 20 hours. This means that the optimum charging current should be in the region of 2 1/2 A, falling steadily to a trickle charge. However, maximum permitted charging current is 6A, allowing boost charging if necessary. If it is going to be stored out of use for any length of time this battery should first be fully charged; if stored at 20C, the battery should be recharged once every nine months – more frequently at higher temperatures.

Specification	
Voltage:	12V DC
Capacity:	24Ah
Charging voltage:	14.6V to 14.8V DC
Maximum charge current:	6A at 25°C (77°F)
Optimum charge current:	2.6A
Optimum charge time:	9hrs
Maximum charge time:	20hrs
Optimum discharge current:	Less than 24A
Maximum discharge current:	72A
Discharged voltage limit:	Not less than 11.8V

Order Code	Type	Price each
RT77J	H20 24Ah L/Acid CBat 12V	£69.99

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Rechargeable Lead-Acid Batteries

Yuasa



A range of maintenance free, sealed construction lead-acid batteries combining small size with high output and long life, in 4V, 6V and 12V versions from 1Ah to 38Ah. The batteries are classified as 'non-spillable', having unique sealing techniques to guarantee that no electrolyte leakage can occur. The batteries are provided with a means of recombining gas internally during normal usage, and in the event that a build-up

of gas at excessive pressure should occur, a low pressure venting system, operating at 7 to 10 psi, will dispel the excess and reseal itself.

The 'non-spillable' feature of these batteries means that they can be operated in any position, unlike the usual form of vented lead-acid battery which is strictly 'one-way-up'. A service life of 5 years should be expected if the batteries are used most often in the 'floating' or 'standby' modes of operation, where top-up trickle charging is regular and discharge is infrequent. The batteries also feature a low 'self discharge' rate of only 3% of rated capacity per month, allowing the battery to be left unused for some time without loss of efficiency or any appreciable deterioration of performance.

Charging

Because these lead-acid batteries are sealed, some care has to be exercised whilst charging, and it is recommended that a stabilised, constant voltage source should be used, with current limiting proportional to the battery's Ah rating.

Car battery type chargers must never be used.

Battery performance and service life will be directly affected by the choice and efficiency of the charging circuit used. Constant voltage charging is the most suitable method, and the output must be within 2.25 to

2.30 volts per cell for trickle charging, or in the case of 'cyclic' use (regular discharging) 2.40 to 2.50 volts per cell. It is also recommended that the current output be normally limited to a maximum of 0.25 x rated capacity of the battery (where Ah represents a ratio of current output versus time, e.g. 10Ah = 1 ampere discharge over 10 hours, or 10 amperes over 1 hour). Charging outside these limits will seriously damage the battery.

These batteries, unlike some other makes, can recover full capacity even after they have been subjected to extreme overdischarge unless left standing in a totally discharged state for a long period.

Terminations

The 4V, 6V and 12V batteries YJ65V to XG77J have a pair of moulded-in blade terminals which can accept the 1/4 in. push-on connectors shown in the Connectors section. XG78K to XG80B have terminals with which M5 bolts and nuts are used. These are supplied.

Suitably sized metric solder tags for use with these fittings may be found in the Hardware & Sundries section — though note that neither of these methods of termination may be able to adequately cope with the maximum short duration discharge current from any battery.

All batteries are encased in grey high impact ABS plastic resin, with black sealed top covers

Code	Type	Dimensions	Weight	Voltage	Capacity	Short duration max. discharge	Preferred constant V charging @ A max.	
							For Cycle use:	For Standby use:
YJ65V	NP 3-4	90 x 65 x 35mm	430g	4V	3Ah	100A	4.8 - 5.0V @ 0.75A max.	4.5 - 4.60V @ 6A max.
YJ66W	NP 1-6	51 x 55 x 42mm	250g	6V	1Ah	45A	7.2 - 7.5V @ 0.25A max.	6.75 - 6.90V @ 2A max.
YJ67X	NP 1.2-6	97 x 54 x 25mm	300g	6V	1.2Ah	45A	7.2 - 7.5V @ 0.3A max.	6.75 - 6.90V @ 2.4A max.
YJ68Y	NP 2.8-6	134 x 64 x 34mm	560g	6V	2.8Ah	100A	7.2 - 7.5V @ 0.65A max.	6.75 - 6.90V @ 5.2A max.
XG70M	NP 4-6	70 x 108 x 46mm	850g	6V	4Ah	120A	7.2 - 7.5V @ 1A max.	6.75 - 6.90V @ 8A max.
XG71N	NP 7-6	151 x 98 x 33mm	1.28kg	6V	7Ah	180A	7.2 - 7.5V @ 1.75A max.	6.75 - 6.90V @ 14A max.
XG73Q	NP 10-6	151 x 98 x 50mm	2kg	6V	10Ah	300A	7.2 - 7.5V @ 2.5A max.	6.75 - 6.90V @ 20A max.
YJ69A	NP 1.2-12	97 x 55 x 47mm	600g	12V	1.2Ah	45A	14.4 - 15V @ 0.3A max.	13.5 - 13.8V @ 2.4A max.
XG74R	NP 2.1-12	178 x 66 x 34mm	830g	12V	2.1Ah	75A	14.4 - 15V @ 0.475A max.	13.5 - 13.8V @ 3.8A max.
YZ64U	NP 2-12	150 x 90 x 20mm	700g	12V	2Ah	80A	14.4 - 15V @ 0.5A max.	13.5 - 13.8V @ 4A max.
XG75S	NP 2.8-12	134 x 64 x 68mm	1.1kg	12V	2.8Ah	100A	14.4 - 15V @ 0.65A max.	13.5 - 13.8V @ 5.2A max.
XG76H	NP 4-12	90 x 105 x 70mm	1.75kg	12V	4Ah	120A	14.4 - 15V @ 1A max.	13.5 - 13.8V @ 8A max.
XG77J	NP 6-12	151 x 98 x 65mm	2.4kg	12V	6Ah	180A	14.4 - 15V @ 1.5A max.	13.5 - 13.8V @ 12A max.
XG78K	NP 15-12	180 x 167 x 76mm	5.9kg	12V	15Ah	400A	14.4 - 15V @ 3.75A max.	13.5 - 13.8V @ 30A max.
XG79L	NP 24-12B	175 x 125 x 165mm	8.65kg	12V	24Ah	500A	14.4 - 15V @ 6A max.	13.5 - 13.8V @ 48A max.
XG80B	NP 38-12	196 x 170 x 165mm	13.8kg	12V	38Ah	500A	14.4 - 15V @ 9.5A max.	13.5 - 13.8V @ 76A max.

Order Code	Type	Price each
YJ65V	3Ah Lead Acid Bat 4V	£9.99
YJ66W	1Ah Lead Acid Bat 6V	£8.99
YJ67X	1.2Ah Ld Acid Bat 6V	£8.49
YJ68Y	A1 2.8Ah Ld Acid Bat 6V	£10.99
XG70M	A2 4Ah Lead Acid Bat 6V	£11.99
XG71N	A3 7Ah Lead Acid Bat 6V	£14.99

Order Code	Type	Price each
XG73Q	B4 10Ah Ld Acid Bat 6V	£17.49
YJ69A	A1 1.2Ah L/Acid Bat 12V	£14.99
XG74R	A2 2.1Ah L/Acid Bat 12V	£17.99
YZ64U	A1 2Ah L/Acid Bat 12V	£20.99
XG75S	A2 2.8Ah L/Acid Bat 12V	£18.99

Order Code	Type	Price each
XG76H	B3 4Ah Ld Acid Bat 12V	£26.49
XG77J	C5 6Ah Ld Acid Bat 12V	£27.99
XG78K	G13 15Ah L/Acid Bat 12V	£53.99
XG79L	H19 24Ah L/Acid Bat 12V	£59.99
XG80B	H29 38Ah L/Acid Bat 12V	£89.99

12V Sealed Lead Acid Battery Charger

Yuasa



A 12V lead acid battery charger for batteries in the capacity range 1.2Ah to 6Ah. The charger plugs into the mains and has a 1.5m twin flying lead that has two push-on spade connectors, suitably colour coded, which push on to the battery terminals. The unit has a red LED to indicate the battery is being charged, and a green LED which illuminates when the battery is between 90 - 100% charged. A fully discharged 1.2Ah battery should take about 6.5 hours to be fully charged and a 6Ah battery should take 30 hours. The unit is protected against short circuit connection and against reverse polarity connection, for both these conditions the green LED will be continuously illuminated while the mains voltage is applied. The charger can recharge most deeply discharged lead acid batteries. This operation will take many hours depending on the degree of battery sulphation.

Order Code	Type	Price each
KR76H	12V Charger	£29.99

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Supplied flat packed for easy carriage, the unit can be assembled to your requirements by means of straightforward push-fit joints. Overall assembled dimensions: 325(H) x 340(W) x 138(D)mm. Colour: black.

Sealed Lead Acid Battery Charger

NEW!

Yuasa

A 12V 4A 3-stage battery charger specifically intended for sealed lead acid batteries types 12V 24Ah cyclic battery (RT77J), 12V 24Ah (XG79L) and 12V 38Ah (XG80B). The charger has LED indication of float and bulk charge (float indicates 95% approx charged), reverse polarity protection with LED indication, short circuit and over voltage protection. Manufactured to BS 415, BS 3456, IEC 335, UL 1236.



Specification

Input: 100, 110, 220, 240V AC
±10%, 50/60Hz ±5%

Output: 13.8V ±1% temperature compensated float charge
14.5V nominal bulk charge
<600mV (resistive load)

Ripple: Bulk to float transition current: 900mA ±20%

Overvoltage protection: operates >16V

Dimensions: 200 x 96 x 173mm

Order Code	Type	Price each
AQ19V	D5 S/Lead Acid Batt Chg	£79.99

Sealed Lead-Acid Battery Charger

Yuasa



A constant voltage battery charger which takes stepped down AC on the input and provides regulated and accurate DC at the output for charging our range of sealed lead acid batteries. For use in float charge applications, providing the battery with regulated DC even under fluctuating load conditions, which should ensure maximum battery life. Available in both 6V and 12V output versions. Input must be in the range 11 to 13V AC or 12 to 15V DC and for 12V version 17 to 19V AC. Output is 6.9V DC with a max. current of 700mA and 13.6V DC with a max current of 500mA. This charger is only suitable for batteries up to 8Ah, Size 71 x 45 x 25mm.

Order Code	Type	Price each
JY65V	SLA Charger 6V	£24.99
JY64U	SLA Charger 12V	£24.99

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Sealed Nickel Cadmium Batteries

NEW!

GP



Nickel cadmium (NiCd) cells will replace dry batteries in most medium and high current applications. They are very economical in applications where dry batteries constantly need replacing. They must be recharged using special constant current chargers but, even if the cost of the charger is added to the cost of the batteries, they still show a considerable saving over dry batteries after just a few changes. NiCd cells are not suitable for use in very low-power applications such as clocks, or any similar application where a dry cell would only need replacing once a year.

Internal Description

These high quality cells have sintered plates to give a very low internal resistance. The positive is nickel hydroxide, the negative is cadmium, and the electrolyte is potassium hydroxide. The cells are fitted with a resealing, one-way safety vent that relieves any excess internal pressure caused by a fault or abuse. It opens at about 200psi and closes again at about 175psi. Typical abuse conditions would be charging at too high a current, or excessive reverse charging. Cells are usually supplied discharged in case they are accidentally shorted in transit. It is important that you never short circuit nickel cadmium cells, because their very low internal resistance allows very high currents to flow (several tens of amperes), which may damage the cell.

Charging Guidelines

NiCds have a very flat charge/discharge curve, and it is advisable to fully discharge the cell prior to charging. However, when dealing with packs of cells, such a method can cause damage to an individual cell that is part of a pack, because the low cell is reversed. For this reason, most discharge arrangements limit the discharge to 1V per cell per battery pack, to avoid the possibility of a weak cell in a pack being reversed. If the nickel side is exhausted first, then hydrogen gas is formed, causing permanent loss of electrolyte and storage capacity. If recharging at the original I_{10} rate then takes place, further damage can occur after full charge. This 'avalanche' effect will soon destroy the cell.

NiCds will absorb overcharging at a limited rate, i.e. I_{10} . If charging continues beyond the point needed to restore the nickel side, oxygen ions are produced but, having no material to oxidise, they eventually return to the negative side, the cadmium. Current thus passes through the cell harmlessly. The voltage will rise to 1.3V when this occurs, and hold steady at that point. NiCds should be used regularly. Cells which are left dormant for long periods lose their capability, hence the 'loss of charge' or 'memory effect'. During prolonged disuse the cadmium crystalline structure 'grows', developing fine filaments which can extend to eventually cause a short circuit inside the cell. It is possible to rescue such cells by giving them a high flash current to remove the short, then a fast charge to half capacity, followed by a similar discharge. This may need repeating several times but, when the cell has been recovered, a lengthy charge of I_{10} for 20 hours or so can be applied. The gentle overcharging seems to finalise the recovery process.

Below the freezing point of the electrolyte (about

-30°C) the NiCd battery will not function. However, at low temperatures, the charging process becomes more efficient, and for continuous charging under these conditions an upper charge voltage limit of 1.55V per cell is often imposed. This means charging circuits are designed so that as this voltage is approached the charging current will decrease, and the upper voltage limit is not exceeded. This will greatly reduce the possibility of gassing under these conditions. Temperature will also affect retention of charge on standing, this being much better at lower temperatures.

All the batteries in the range should have a minimum life of at least 500 full charge/discharge cycles. Providing that the charge rate never exceeds the maximum current stated and the discharge rate never exceeds twice the current, the life should be around 3,000 full charge/discharge cycles. Cells may be charged at any current up to the maximum stated, but will take progressively longer to charge at lower currents. No harm will result if the cells are charged for longer periods.

In the following list AG21X is a 'tagged' version of AG22Y, i.e. having solder tag terminals for making up rechargeable battery packs, and AG28F is a Nickel Metal Hydride (NiMH) type (see NiMH batteries for a description of this type).

The 'odd' sizes shown below are to be found in an increasing number of new consumer products, such as electric shavers, etc.

Order Code	Cell size	Nominal capacity (mAh)	Dimns Dia. x Height (mm)	Weight (g)	Standard charge for 14 hours (mA)
AQ47B	N	150	12.0 x 29.0	8	15
AG25C	AAA	220	10.5 x 44.5	10	22
AG11M	1/3AA	130	14.6 x 16.7	6	13
AG12N	2/3AA	400	14.6 x 30.5	12	40
AG17T	7/5AA	1100	14.6 x 66.0	30	110
AG13P	AA	500	14.6 x 50.0	19	50
AG14Q	AA	700	14.6 x 50.0	22	70
AG16S	AA	850	14.6 x 50.0	25	85
AG28F	AA	1200	14.6 x 50.0	30	120
AG15R	2/3AF	700	17.0 x 29.0	18	70
AG18U	4/5AF	1200	17.0 x 43.0	28	120
AG24B	7/5AF	2000	17.2 x 66.0	43	200
AG23A	AF	1400	17.0 x 50.0	33	140
AG26D	C	1600	26.2 x 50.0	40	160
AG19V	C	2000	26.0 x 50.0	45	200
AG22Y	SUB-C	1200	22.7 x 42.1	55	120
AG21X	SUB-C Tagged	1200	22.7 x 42.1	55	120
AG27E	D	1600	34.2 x 61.5	50	160
AG20W	D	4000	33.0 x 61.0	55	400
AG33L	PP3	120	48 x 25 x 16	45	12

Order Code	Type	Price each
AQ47B	N 150	£2.49
AG25C	AAA 220	£1.99
AG11M	1/3AA 130	£1.36
AG12N	2/3AA 400	£1.60
AG17T	7/5AA 1100	£2.99
AG13P	AA 500	£1.80
AG14Q	AA 700	£2.20
AG16S	AA 850	£2.49
AG28F	AA 1200	£4.99
AG15R	2/3AF 700	£1.86
AG18U	4/5AF 1200	£2.99
AG24B	7/5AF 2000	£4.49
AG23A	AF 1400	£3.29
AG26D	C 1600	£2.99
AG19V	C 2000	£4.99
AG22Y	SUB-C 1200	£2.69
AG21X	SUB-C 1200 Tagged	£2.99
AG27E	D 1600	£3.29
AG20W	D 4000	£6.49
AG33L	PP3 110	£5.49

Nickel Cadmium Button Cells

Rechargeable button cell batteries with a life expectancy of 500 to 1000 charge/discharge cycles, much above the requirement of IEC standard. They have a high charge retention, and at 20°C the cells still retain 40% of the nominal capacity after 12 months of idleness, thus they are suitable for portable instruments that are used infrequently. A voltage level of 1.2V or more is maintained during 80% of the discharge cycle. Built-in chemical protection is provided if cell polarity is reversed, or the cell is otherwise misused. These cells exhibit no 'memory effect' and are suitable for continuous trickle charging, they will not experience voltage drop or lowered capacity during discharge.

Order Code	Nominal capacity (mAh)	Dimensions Dia. x Hght (mm)	Weight (g)	Standard charge for 14 hours (mA)
AG34M	60	15.45 x 6.2	4	6
AG35Q	170	25.1 x 6.7	10	17
AG36P	280	25.1 x 9	14	28

Order Code	Type	Price each
AG34M	Button NiCd 60	99p
AG35Q	Button NiCd 170	99p
AG36P	Button NiCd 280	99p

Nickel Metal Hydride (NiMH) Batteries



The new generation of rechargeable 'NiMH' or Nickel Metal Hydride cells, free of toxic or hazardous elements such as cadmium, lead, mercury or lithium, which can be used repeatedly and disposed of safely when finally thrown away. A service life of 500 to 1000 charge/discharge cycles can be expected, and the capacity related performance is normally 30 to 50% better than that of the best equivalent NiCd cells. Moreover, the absence of cadmium in the formulation means that NiMH cells are free of the undesirable memory effect. Voltage level is maintained at 1.2V or more during 80% of the discharge cycle, and up to 100% of the nominal capacity at a rate of 3C₁₀A is possible. A resealing safety vent guards against possible misuse.

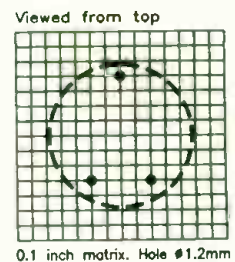
Order Code	Nominal capacity (mAh)	Cell size	Dimns Dia. x Height (mm)	Weight (g)	Standard charge for 14 hours (mA)
AG28F	1200	AA	14.6 x 50.0	30	120
AG29G	900	2/3AF	17.0 x 29.0	19	90
AG30H	1500	4/5AF	17.0 x 43.0	30	150
AG31J	1800	AF	17.0 x 50.0	35	180
AG32K	2500	7/5AF	17.2 x 66.0	46	250

Order Code	Type	Price each
AG28F	AA 1200	£4.99
AG29G	2/3AF 900	£3.29
AG30H	4/5AF 1500	£4.99
AG31J	AF 1800	£5.99
AG32K	7/5AF 2500	£7.99

PCB Mounting Batteries

Ever Ready

Specially designed as a cost effective power back-up, these batteries offer extended working life combined with a sealed leak-proof construction. With a nominal capacity of 110mAh and excellent charge-retention characteristics they offer good protection against extended supply interruption. Their lower internal resistance also makes them suitable for high-current power back-up applications. Charge may be maintained by a trickle current of 0.5 to 1.0mA with no requirement for regulation or smoothing.



Nominal capacity at 22mA discharge rate: 110mAh/2.7V
 Nominal voltage: 3.6V
 Max. charging current: 11mA
 Trickle charge: 1mA
 Discharge current: 165mA max.
 Height x diameter: 13.3 x 23.5mm
 Pulse: 1.5A for 2 sec. max.

Order Code	Type	Price each
RK46A	PCB Mountg 3.6V Bat	£4.99

Replacement Batteries for Cellular Telephones

GP



A range of replacement battery packs for popular models of cellular 'phones. All battery packs are supplied in a discharged state, and should be given a first charge at the standard (C10) rate for 16 to 20 hours. Thereafter, recharging can be performed at the standard (C10) or rapid (C1) rates. Brands of cellular 'phones mentioned in the following list are registered trademarks of the respective manufacturers.

Order Code	Type No.	Colour	Fits cellular 'phone model
AG56L	M1301	Dk Grey	Ericsson Hotline/GH197
AG58N	M515	Black	Mitsubishi MT7/MT8/4000/MT996
AG59P	M216	Black	Motorola Micro-Tac I & II, 900 Classic, BT Diamond, Mercury M300, Ford Compact
AG60Q	M212	Black	Motorola 9800, BT Opal & Smartone 901
AG62S	M115	Dk Grey	NEC P100
AG63T	M111	Dk Grey	NEC P3/P300, BT Marble, Talkland T60, Racal VP40
AG64U	M114	Dk Grey	NEC P4/P600, BT Quartz
AG65V	M716	Dk Grey	Nokia 101/121, TP4 TP415 Mobiria Cityman, Technophone PC405

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Continued on next page.

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Order Code	Type No.	Colour	Fits cellular 'phone model
AG66W	M709	Dk Grey	Nokia 1011
AG67X	M715	Black	Nokia Cityman 100/190, Mobiria Cityman, Technophone PC405
AG68Y	M416	Dk Grey	OKI 1150
AG69A	M814	Black	Panasonic I series, KJ3630, EU2000
AG70M	M812	Black	Panasonic F series, EB-KJ3515, 3610, BT Ebony
AG71N	M1911	Dk Grey	Sony CM-H333

Order Code	Voltage	Composition	Capacity (mAh)	Standby time (hours, estimated)	Talk time (minutes, estimated)
AG56L	6.0V	NiCd	850	13	90
AG58N	6.0V	NiCd	850	20	110
AG59P	6.0V	NiCd	1,200	24	150
AG60Q	7.2V	NiCd	1,400	26	120
AG62S	6.0V	NiCd	850	24	120
AG63T	6.0V	NiCd	850	22	100
AG64U	6.0V	NiCd	850	24	150
AG65V	7.2V	NiCd	850	23	90
AG66W	7.2V	NiCd	200	28	180
AG67X	7.2V	NiCd	850	23	60
AG68Y	6.0V	NiCd	1,200	24	160
AG69A	6.0V	NiCd	850	23	150
AG70M	6.0V	NiCd	850	19	100
AG71N	4.8V	NiCd	900	24	90

Order Code	Type	Price each
AG56L	M1301	£20.99
AG58N	M515	£20.99
AG59P	M216	£20.99
AG60Q	M212	£26.99
AG62S	M105	£20.99
AG63T	M111	£20.99
AG64U	M114	£22.99
AG65V	M716	£24.99
AG66W	M709	£42.99
AG67X	M715	£20.99
AG68Y	M416	£22.99
AG69A	M814	£24.99
AG70M	M812	£20.99
AG71N	M1911	£22.99

Replacement Batteries for Cordless Telephones **NEW!**

GP



A range of battery packs for popular cordless telephones. Nine types are available as replacement packs for the following makes and models:

GP280K2A3H

Betacom Cruiser; Fidelity CTP300; Goodmans GT10, GT12.

GP280BNK3AMU

Bell South Vagabond 9512; Midland 80-207B, 80-201, 80-207, 80-220, 80-275; Nomad 450; North Western Bell Excursion 6000; Phonetime 689.

GP280BNK3TMU

Dialatron Dialect; GEC Envoy 2, Esprit 1042H, Envoy 1041, Esprit 1042; Vuraphone MP51; Panasonic KXT3805.

GP280BNK4SMU

Uden Liberty.

GP30AAK3BMU

Answercall Ranger 1000, Ranger 2000; Audiovox AT21B; AT & T HT3400, HT5200, HT5300, HT4400, HT4410; Betacom Venture XT, XT2; GE 700, 2-9520A, 5-2102, 5-2104, 5-2102, 1000; GTE 2000, 100; Midland 80-200B, 200S; Nomad 3000, 4000; Pacific Bell 800, 810, 820; Radio Shack 43-555; Sentinel Deluxe 99603; Sony SPP22H; Tel Mate 19AG2; Tele Concepts TC Phone; Listrion EX2600, 2700 & 8050; Webcor 518.

GP30AAK4BMU

Audiovox AT22B; BT Curlew; Freedom Phone 1500, 4000, 5000, 3000; Geemarc Alcom; GPT AT22; Harrier Harrier; Midland 80-200; Vuraphone MP301; Nippon 820; Pacer Phone 8510; Plessey PBT 2200; Radio Shack ET330; Ultima 1.

GP60AAK3BMU

Ace T9090, T9600, CR2000, CR2050; Bell Phone 31001, 32001, 32011; Betacom C1000, C2000, C7000, C8000; BT Freelance, Freelance II, Freeway; Code-a-Phone 730C; Cobra CP15, CP99, CP100SA, CP110, CP110SA, CP115SA, CP120, CP120SA, CP130, CP130SA, CP140, CP140SA, CP200SA, CP205, CP260S, CP301S, CP302S, CP320S, CP330, CP355S, CP440S, CP445S, CP447S, CP450S, CP460S; Comdial 2100T; Commtel 829, 830; Elite 8080; Extend-a-Phone SA300A, FRCP2, FTC100; Fanon 200, 250, 200A, 200A2, 200S; Freedom Phone 200, 300, 350, 700, 750, 1100, 1700, 500, 550, 555; Pine DP15, KL700; GE 5-2201B, GCL822; GEC Equerry 1045; KKO KD1G; Key Service VA7020; Keytronics 610P, 9100P; Krako ENT KP6001H, KP6002, KP6200; Keyphone KP6002, KPS100DX; Vuraphone M400, MP401; North Western Bell Excursion 32011, Excursion 6000; Panasonic KXT3815, KXT3821, KXT8325, KXT3831, KXT3842, KXT3845, VA7020; Pierre Cardin Ambienx; QC KP6002; QT & T QT1500; Quasar 2100; Record-a-Call CAT300, CAT400; Radio Shack ET268; Sony SSP100, 200 & 300; South Western Bell 650, 1150; Tandy ET1100, ET1200; Technoyne Go Phone; Teleservices 2110T; Universal 2000 Tote & Talk, TEL3400; Listrion EX309, 900, 1000, 1100, 1150, 2100, 2101, 3000, 3100, 3101, 3102, 3300, 3500, 3800, 3810, 4000, 4100, 4102, 4500, 4800, 5000, 5900, 7000 & 7700; Webcor 512, 516; Westin 727A; Windsor OT218; Zeta 510.

GP60AAK4BMU

Cobra CP200S, CP91, CP91SB, CP92S, CP93, CP454S, CP470S, CP471S, CP472S, CP474S, CP474, CP474S, CP475S, RP740SA, RP780SA; Phonemate 1120, 1121, 1140; Tancom GCL802; Technoyne GF250.

GP280S WPC

Goodmans GT10, GT12; Fidelity CTP300; Betacom Cruiser.

Order Code	Type	Price each
AG37S	GP280K2A3H	£4.99
AG38R	GP280BNK3AMU	£5.99
AG39N	GP280BNK3TMU	£5.99
AG40T	GP280BNK4SMU	£6.99
AG41U	GP30AAK3BMU	£6.99
AG42V	GP30AAK4BMU	£7.99
AG43W	GP60AAK3BMU	£6.99
AG44X	GP60AAK4BMU	£7.99
AG45Y	GP280S WPC	£4.99

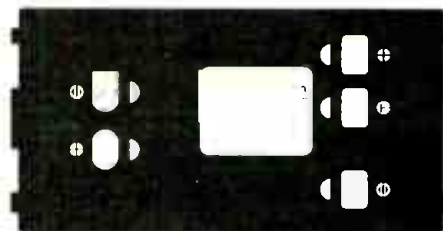
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Phone 01702 552941

Camcorder Batteries

Premium Gold



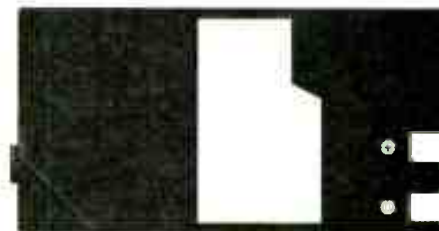
A range of camcorder battery packs to suit most popular camcorders. Type D601-N is an economy 6V two-way design suitable for Sony, Panasonic, Sharp and most others, equivalent to Sony NP55 and NP77, etc. The C601-N is an economy equivalent to the Canon BPE77. The D605 is a higher capacity version of the D601-N, whilst the C605 is a higher capacity version of the C602-N. Both the C601-N and the C605 include an extension strap to allow you to extend the length of your hand strap if the battery mount is located in the grip of your camcorder. In this event replacement packs may protrude more than the original packs, requiring a longer hand strap. The H601-N is an economy pack to fit Hitachi, RCA, Minolta etc. The D605 is an extended capacity version of the 6V D601 or D605. The J961 is a 9.6V pack equivalent to JVC NBP6U or NPB8U.



D Models

Capacities

Type	Voltage	Capacity	Notes
D601-N	6V	1700mAh	Economy
H601-N	6V	1700mAh	Economy
C602-N	6V	1700mAh	Economy with strap
D605	6V	2400mAh	High capacity
H605	6V	2400mAh	High capacity
C605	6V	2400mAh	High capacity with strap
D608	6V	3200mAh	Extended capacity
J961	9.6V	1400mAh	VHS-C battery



C Models

There is one drawback with the Ni-Cd battery which is familiarly known as the 'memory effect'. If a Ni-Cd is not charged frequently from a condition other than fully discharged, the capacity will be significantly reduced. It is therefore always recommended to refresh a Ni-Cd battery by discharging it fully before recharging.



H Models

Order Code	Type	Price each
GW78K	D601-N 6V 1700mAh	£23.99
GW79L	H601-N 6V 1700mAh	£23.99
GW80B	C602-N 6V 1700mAh	£23.99
GW81C	D605 6V 2400mAh	£41.99
GW82D	H605 6V 2400mAh	£41.99
GW83E	C605 6V 2400mAh	£41.99
GW84F	J961 9.6V 1400mAh	£27.99
GW85G	D608 6V 3200mAh	£54.99

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Camcorder Batteries

GP

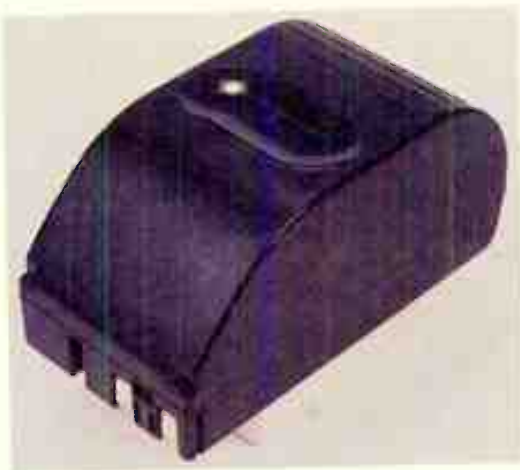
Rechargeable replacement batteries compatible with original equipment portable VCR's and Camcorders. The batteries are supplied discharged for transit and must be charged before use. Each battery (except type VP77) includes a 'charge marker' beneath a small sliding cover which indicates the battery's state of charge and which can be red (discharged) or black (fully charged) and may be switched over after use to indicate that the pack is discharged. Seven types are available as follows:

VP66



6V 1200mAh and 1800mAh. Replacement for Fisher FVC901, Fuji F610, Nikon VN9000, Pentax PVC840, PVC840E, Ricoh R610, R630, Sanyo VMD3, VMD5, Sony CCDV88, CCDV90, CCDV95, CCDF330, CCDF335, CCDF340, SP5, Tamron CX7. Equivalent replacement for Sony NP55, NP77, Fuji NP55, NP77, Sanyo NP55, NP77, Tamron NP77, Pentax PVBT810, PVBT820, Ricoh NP55.

VP10



6V 1200mAh and 2400mAh. Replacement for Panasonic MS70, NV-S1, NV-G1, NV-G2, NV-G3, VBS1E, VBS2E, PV-10, NVM10, PV-BP15, PV-20, PV-40, MS70, NV-MS70E. Ferguson FC31. JVC GR-AX2, GR-AX7, GR-SX9, GR65, Minolta C-606, C-660, Philips VKR6847, VKR6875. Equivalent replacement for battery models Panasonic VW, and others.

VP77



6V 1200mAh and 2400mAh. Replacement for Canon A1, A-1H1, A1-H1B, A-2-H, A-9, A-10, A-11, BP-E77, BP-E77K, BP-E718, BP-E722, E6, E30, E51, E57, E60, E70, E77, E80, E90, E440, E640, E660, E680, E708, E800H1, E808, EX1H1, H460, Bauer/Bosch C81, VCC810, and others. Equivalent replacement for battery models Canon BPE77.

VP962



9.6V 1300mAh. Replacement for Bauer Bosch VCC606AF, VCC616AF, VCC656AF, Ferguson FC05, FC06, FC07, FC08, FC15, JVC GRC9, GRC11, GRC30, GRC45, GRC60, GRS77E, Minolta C50, Nordmende 2201, RP3000, Philips VKR6835, VKR6841, Panasonic VMC6, VMC10, MS50, Telefunken VM2895, VM2892, VM4000, VM4100, Toshiba A1420BK. Equivalent replacement for Bauer Bosch, Ferguson VA314, VA315, JVC 3NV6GU, Panasonic VWVBC1E, Telefunken V2932, Nordmende AC1100, Minolta VBP501, VBP500.

Order

Code	Type	Price each
AG50E	VP66 1200mAh	£19.99
AG49D	VP66 1800mAh	£19.99
AG52G	VP10 1200mAh	£19.99
AG51F	VP10 2400mAh	£32.99
AG54J	VP77 1200mAh	£19.99
AG53H	VP77 2400mAh	£32.99
AG55K	VP962 1300mAh	£26.99

HOT TIP

Mercury Oxide, Silver Oxide and Zinc Air Batteries

Be careful how you handle these batteries, as touching them whilst inserting them into equipment can cause corrosion and premature discharge. This is because the properties of your skin are detrimental to the battery. So when handling the battery, use a clean handkerchief or use a small piece of 'Bio-Tack' to pick up the battery and place it in the equipment.

Dual Function Camcorder Battery Charger



This multi-function charger is suitable for a wide range of camcorder battery packs. It will charge 6V, 7.2V and 9.6V Ni-Cad packs of 800mA or higher capacity, and various physical shapes, e.g. Sony 6V and JVC 9.6V types. It can be used from the mains adaptor included. The charger stops automatically when charging is complete to prevent batteries from overcharging; an LED status indicator decreases in brightness as charging proceeds and extinguishes when charging is completed. It takes about 5 to 6 hours to completely charge a 1000mA battery. A long lead with a wide range of connectors is included, as is a plug and lead to connect to a car's cigar lighter socket. The charger comes complete with a soft, black vinyl case and operating instructions.

Dimensions of charger: 152 x 68 x 53mm
Weight: 175g.

Order

Code	Type	Price each
KC83E	A1 Camcharger	£25.99

Universal Camcorder Battery Discharger



This universal, fully automatic, simple to use discharger is a compact portable unit that is suitable for 90% of the Ni-Cds currently in use. The unit will accept 6V, 7.2V and 9.6V batteries, and is supplied as a main discharger base with a 6V multi-batteries adaptor plate. Both items are housed in black plastic mouldings.

Specification

Discharge current:	Constant current 500mA
Discharge cut-off level:	At 1V per 1.2V Ni-Cd cell
Suitable for battery types:	Sony NP55 77 Panasonic/JVC VBS1 Canon BPE722/77 Hitachi BP83 Panasonic/JVC/Sharp 9.6V grip

Order

Code	Type	Price each
KC84F	Battery Discharger	£15.99

Battery Packs for Notebook Computers and Printers

GP



Replacement rechargeable battery packs for common makes and models of notebook computers and printers.

Order Code	Type No.	Fits model
Computers		
AG72P	B101	Toshiba T1200-XE
AG73Q	B102	Toshiba T1000-LE/SE/XE
AG74R	B201	Panasonic 170/270/370
AG75S	B301	AST 286/12, 386SX/20/25
AG76H	B402	Macintosh Powerbook 140/145/160/165C/170/180
AG78K	B601	Compaq LTE-286, Twinhead 386, Dell NX-20/200-L
AG79L	B703	Compaq Contura 3/20, 3/25
Printers		
AG80B	T101	Canon Bubble Jet BJ-10e/ex/20, Brother HJ-100i, Starjet SJ-48

Order Code	Voltage	Capacity (mAh)	Composition
AG72P	7.2V	1,400	NiCd
AG73Q	7.2V	2,000	NiCd
AG74R	12.0V	1,400	NiCd
AG75S	4.8V	5,000	NiCd
AG76H	6.0V	2,800	NiCd
AG78K	4.8V	5,000	NiCd
AG79L	12.0V	2,300	NiMh
AG80B	6.0V	1,300	NiCd

Order Code	Type	Price each
AG72P	B101	£42.99
AG73Q	B102	£49.99
AG74R	B201	£59.99
AG75S	B301	£69.99
AG76H	B402	£69.99
AG78K	B601	£69.99
AG79L	B703	£79.99
AG80B	T101	£29.99

Racing Packs

GP

NEW



Top quality nickel cadmium racing packs available in 4.8V, 7.2V and 9.6V combinations. The 4.8V and 9.6V packs are high capacity types, the 7.2V pack is standard density. All packs are shrink-wrapped in heavy duty PVC and are supplied complete with silicone coated, high temperature leads and standard racing pack plug.

The packs may be charged as follows: for standard cells, 16 hours at 120mA for full charge, thereafter indefinitely with no harm; 7 hours at 240mA for full charge, thereafter continuing for approximately 10 days with no harm. For high capacity cells, 16 hours at 140mA for full charge, thereafter indefinitely with no harm; 4 hours at 420mA for full charge, thereafter continuing for approximately 10 days with no harm.

Order Code	Type	Price each
AG46A	7.2V Race Pack	£14.99
AG48C	4.8V Race Pack	£5.99
AG47B	9.6V Race Pack	£8.99

NICKEL CADMIUM BATTERY CHARGERS

8 Cell NiCd Battery Charger

Calvyn Industrial

NEW



A mains powered eight cell battery charger that automatically adjust for either AAA or AA NiCd batteries. The charger will accept from one to eight batteries and, depending on the type of battery in use (AAA or AA), the current level is selected automatically. Typical charge currents are 28mA for AAA or 90mA for AA. There are 4 LED's (one for each set of two cells) to indicate that the battery has been inserted correctly and is being charged. This unit must only be used to charge nickel cadmium type rechargeable batteries. It is not suitable for use with any other type of battery.

Dimensions 185mm x 75mm x 55mm.

Specification Charge Time	Battery Type and Capacity	
	AAA	AA
8h:	180mAh	500mAh
10h:	220mAh	600mAh
12h:	—	700mAh

Order Code	Type	Price each
RZ07H	8C Charger	£8.99

Automatic NiCd Charger and Discharger

Calvyn Industrial

NEW



A compact automatic charger/discharger for AAA and AA NiCd batteries. A slide switch on the base of the unit selects the charge rate and battery type. The batteries are discharged first before being fast charged. A built-in timer automatically changes from fast charge to trickle charge. This discharge/charge cycle helps to prevent 'memory' effect. Each cell has an LED which indicates the state of the charge/discharge process. The unit will accept one to four batteries.

Dimensions: 125 x 85 x 50mm.

Specification

Charge Time	Battery Type and Capacity	
	AAA	AA
3h:	—	500mAh
3h 45m:	180mAh	600mAh
4h 15m:	220mAh	700mAh

Order Code	Type	Price each
RZ14G	A1 Auto Charger/Discharger	£12.99



BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750

Maplin

Stockist of Assessed Capability

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Heatshrink Sleeving for Radio Control Models

A heat-shrinkable crosslinked polyolefin material that will shrink to 50% of its original diameter when heated to over 121°C. For more rapid shrinking, higher temperatures may be used without detrimental effect. Shrinkage can be achieved by hot air guns, gas flame etc. The sleeving is self-extinguishing and has a high tensile strength and is resistant to solvents, acids, alkalis, fuel and oil. Breakdown voltage 11kV. Colour is black.

Size as supplied 50.8mm diameter.

Minimum diameter after shrinkage 25.4mm.

Minimum wall thickness after shrinkage 1.14mm.

Supplied in 200mm lengths.

Order Code	Type	Price each
XS11M	Race Pk Heatshrink	£1.49

Fast NiCd Charger with Discharger

Calvyn Industrial

NEW



A fast, compact NiCd charger that will charge 2 or 4 AAA or AA type batteries in 2h. A slide switch selects either the charge or discharge function. After the batteries have been discharged, they are fast charged for 2h and then automatically switched to a trickle charge mode. This sequence will prevent the 'memory' effect that is often found in NiCd batteries. The unit will automatically adjust for AA or AAA type batteries – 380mA for AA, and 100mA for AAA with a trickle charge of 20mA. LEDs indicate when the unit is in the fast trickle or discharge mode. Dimensions 125 x 85 x 50mm.

Order Code	Type	Price each
RZ08J	4C Charge/Discharge	£9.99

Fast 8 Cell NiCd Charger with Discharger

Calvyn Industrial

NEW



A fast, eight cell NiCd battery charger for AAA or AA type batteries that will fully charge 500mAh batteries in 2h. After this time the batteries are charged at the 20mA trickle rate. Batteries are charged in pairs, and four LEDs indicated that each pair is being charged correctly. A selector switch on the base of the unit selects different battery capacities. Dimensions 125mm x 85mm x 50mm.

Specification	Battery Type and Capacity	
Charge Time	AAA	AA
2h:	—	500mAh
2h 24m:	180mAh	600mAh
2h 48m:	220mAh	700mAh

Order Code	Type	Price each
RZ10L	8C Charge/Discharge	£14.99

Universal NiCd Battery Charger and Discharger

Calvyn Industrial

NEW

A very high quality universal automatic NiCd charger that has a discharge cycle built-in, and accepts AAA, AA, C, D and PP3. The charger will automatically select the correct charge/discharge rate for the different size batteries. Fast charge will not happen until all the batteries have been fully discharged, and a built-in timer automatically changes from fast to trickle charge. This process will help to prevent 'memory' effect. The unit will charge all the cells (except PP3) in 4h and will accept just one or groups of cells. One or two PP3 will be charged at the standard rate. Each cell (except PP3) has an LED which indicates the state of the charge/discharge process. This charger is designed for NiCd batteries only and is not suitable for other types of cells.



Dimensions: 225 x 65 x 115mm

Specification

Battery type	Capacity	Charging Time
C/D:	600mAh	4h
AA:	200mAh	4h
AAA:	60mAh	4h
PP3:	11mAh	4h

Order Code	Type	Price each
RZ18U	Uni Charge/Discharge	£19.99

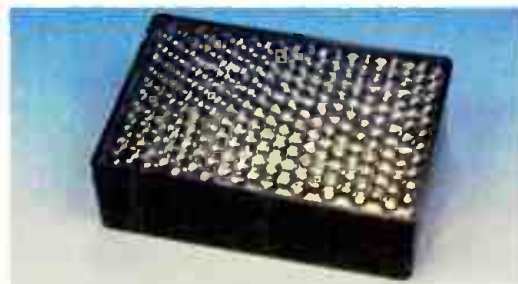
AA Charger with Fast Charge

A nickel-cadmium battery charger capable of charging 2 or 4 AA cells simultaneously. A switch permits charging at standard rate 14 to 16 hours, or fast rate 3 hours max. Charge current at standard rate is 45mA approx and at fast rate 150mA. Two LED's are provided, one for each pair of cells and the LED lights when charging is in progress. The unit has 1.8m mains lead. Overall size: 99 x 72 x 42mm. This charger is ONLY for use with nickel-cadmium rechargeable cells.



Order Code	Type	Price each
YN28F	AA Nicad Charger	£4.99

'AA' Solar Battery Charger



A small, neat solar powered battery charger which will accommodate up to four AA size Ni-Cd cells. Very simple to use; simply place your AA batteries into the battery compartment of the charger, and set the lid, which carries the solar panel, to face the sun rays. A single battery can be charged in 2 to 3 hours, 2 batteries, 4 to 6 hours; 3 batteries, 7 to 10 hours; 4 batteries, 10 to 14 hours. Times will vary depending on the strength of the sunlight and/or the depth of discharge of the batteries. For best results, batteries should be recharged at the first sign of 'weakness'. Batteries will last up to 4 times longer if charged after only 50% discharge. Dimensions of unit (closed): 95 x 65 x 28mm.

Order Code	Type	Price each
CJ35Q	4AA Solar Charger	£6.99



BS 5750 Part 2 1987
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RS12750

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Count Giuseppe Antonio Anastasio Alessandro Volta

(1745 to 1827) was an Italian physicist. A pioneer in the sphere of electricity, he invented the 'electrophorus', a device to accumulate electricity, and the voltaic pile (1800). Thankfully, we now use a shortened version of his name (Volt) in our calculations.

One volt is the SI unit of electric potential and electromotive force, equal to the difference in electric potential between two points on a conducting wire carrying a constant current of one ampere when the power dissipated between the points is one watt.

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Mains and 12V Rapid Ni-Cd Charger for Radio Control Models



A fast charger for recharging 7.2V 1200mAh nickel-cadmium radio control battery packs. The charger can be powered from either 240V AC mains or from 12V DC car accessory socket (the charger must not be plugged into 24V DC sockets found on lorries). The charger incorporates a timer that will fast charge a battery pack for 20 minutes and then switch to trickle charge. This prevents battery packs from being overcharged, yet continues to top up the charge at a low enough rate such that it could be left on indefinitely without harming the battery pack. 90% of full charge will be reached during fast charge, the remaining charge to 100% is obtained by safe trickle charging. To use: connect the charger's connector to the battery pack. Plug the charger into the power source (either 240V AC or 12V DC), the red LED will illuminate indicating fast charging. After 20 minutes the LED will extinguish and the charger switches automatically to trickle charge. When charging is completed, disconnect the charger from the power source and detach the battery pack. It is essential to disconnect the charger before recharging another battery pack to allow the timer to reset. Battery packs should not be recharged when they are warm (i.e. straight after removal from a model after racing) nor should battery packs be recharged whilst still fitted in a model. During charging both battery pack and charger will become warm, this is normal. The charger is fitted with a mains lead (13A plug not supplied), a 12VDC power lead and accessory plug, and a battery connector lead to suit standard battery packs.

Overall dimensions: 81 x 67 x 131 (excluding leadouts).
Charging current: 2.4A.
Charging voltage: 7.2V.

Order Code	Type	Price each
YP89W B2	Rapid Charger	£24.99

Standard Charger



A nickel-cadmium battery charger capable of charging between 1 and 4, AA, C or D cells singly or simultaneously in any combination. In addition one PP3-size ni-cad can also be charged. Five LED's are provided which light to show which charge positions are in use. Also one position may be used to test the cells (not PP3). With the cell in this position throw the switch provided to "test" and the strength of glow of a special lamp shows the cell condition. If the lamp fails to glow or is very dim, charge the cell fully. If the lamp shines strongly the cell is charged. The unit has 1.7m mains lead. Overall size: 214 x 108 x 56mm.

Charge rates for full charge

AA	14 to 16 hours
C Commercial	20 to 25 hours
C Industrial	35 to 40 hours
D Commercial	20 to 25 hours
D Industrial	70 to 75 hours
PP3	14 to 16 hours (24 hours max)

This charger must ONLY be used with nickel-cadmium rechargeable cells and batteries.

Order Code	Type	Price each
WY22Y A1	Ni-Cad Charger	£7.49

Universal Charger



A nickel-cadmium battery charger capable of charging AAA, AA, C, D, PP3 and rechargeable button cells singly or simultaneously in numerous combinations. There are two charge sockets for PP3 batteries and either one or two may be charged together. There are two positions where AAA or AA cells may be charged and four positions where AA, C or D cells may be charged. In addition there are two positions for rechargeable button cells, diameters 16mm, 11.6mm or 8mm, but note that it is VERY DANGEROUS to attempt to recharge mercuric oxide, zinc-air or silver oxide cells. All ten charge positions may be used simultaneously or in any combination. Each of the eight main charge positions (i.e. not the button cells) has an LED associated with it which lights when charging is in progress. In addition three test positions are provided, one for AAA and AA, one for C and D cells and one for PP3 batteries. When the charging switch is off, depressing the test button for the test position in use allows the meter to show if the battery is flat. The unit has 1.7m mains lead. Overall size: 185 x 155 x 56mm.

Charge rates for full charge

AAA in position marked UM3,4,5	5 to 7 hours
AA in position marked UM3,4,5	13 to 17 hours
AA in position marked UM1,2,3	5 to 7 hours
C Commercial	13 to 17 hours
C Industrial	22 to 28 hours
D Commercial	13 to 17 hours
D Industrial	45 to 55 hours
Button cells	5 to 7 hours
PP3	11 to 13 hours (20 hours max)

Note that of the 6 positions for AA cells, four will give a fast charge and two a standard charge.

This charger must ONLY be used with rechargeable cells and batteries. It must NOT be used to charge silver oxide, zinc-air, mercuric oxide, alkaline, zinc-chloride or zinc-carbon cells.

Order Code	Type	Price each
YN27E A	Deluxe Nicad Charger	£10.99

12 VOLT POWER ADAPTORS



An easy-to-use car voltage step-down converter and regulator which simply plugs into any cigar lighter socket and converts the car battery supply to any of seven levels, 1.5V, 3V, 4.5V, 6V, 7.5V, 9V or 12V DC. The output is selected by a 7-way slide switch and max current rating for each voltage is as follows:

12V	800mA	9.6W
9V	700mA	6.3W
7.5V	500mA	3.75W
6V	400mA	2.4W
4.5V	350mA	1.58W
3V	300mA	900mW
1.5V	250mA	375mW

Fitted with a 1.7m long lead terminated with a moulded 2-pin line socket. To this any one of six little right-angled adaptor plugs can be connected in either polarity. These comprise a 3.5mm jack, then miniature 1.3mm, standard 2.1 and 2.5mm, 'narrow sleeve' 2.1mm (5mm o/d), and 'fat sleeve' 1.3mm (5.5mm o/d) power plugs, one of which should fit nearly all items using these types of connectors. (For 2.5mm use a 3.5/2.5mm adaptor.) A flexible plastic keeper strip has six holes to hold all adaptors. All power plugs are long reach type for both short and long reach sockets. Max. insertion depth of car plug, 55mm; diameter 20mm. Dimensions of regulator unit 80 x 55 x 28mm.

Order Code	Type	Price each
JY53H	Car Power Adaptor	£6.99

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CAR BATTERY TO 240V MAINS CONVERTER

A very efficient and compact 12V car battery to 240V AC converter, that can be used to power domestic appliances up to 200W. Designed to be permanently installed in the vehicle with direct connections to the battery, by two heavy duty leads. A third low current signal lead taken to the ignition switch turns the unit on and off via an internal electronic relay. The mains output, indicated by a neon light, is by a standard 13A socket. The unit is fitted with an audible warning that sounds when the battery is becoming discharged. The warning tone gets louder as the battery voltage falls, and if the battery voltage falls below a critical level, the unit will switch off. The unit is designed to operate with the car engine idling when supplying high power continuously. Over current protection is provided, so that if the unit is plugged into unsuitable equipment, for a short time, it will not be damaged.

A mounting bracket kit for permanent installation of the 12V DC to mains converter is also available.

Order Code: KR65V £5.99



GREAT VALUE!
£109.99
 KR64U
 [B1]

Specification

Voltage input: 11V to 15V DC, 12V nominal
 Input current: 1A approx. for every 10W of load
 0.3A approx. with no load
 Output voltage: 240V AC RMS nominal, 216V to 255V RMS over continuous load range up to 1.1A
 Power output: 200W continuous, 250W short term, 500W surge
 Size: 141 x 94 x 45mm
 Weight: 800g.

MAINS ADAPTORS

Mains adaptor/battery eliminators which plug directly into standard 13A sockets. Each unit has approximately 1.75m of lead terminated in a multiplug unit having 2.5mm and 3.5mm jack plugs and 2.1mm and 2.5mm dc power plugs to suit most battery powered equipment. Polarity is reversible on all types.

Regulated 12V 1A DC



This unit has a single regulated output of 12V DC at 1A (max), the presence of which is shown by a power 'on' indicator. Power output is fed through a flying lead approx. 6ft. long. The end of the flying lead is terminated in a 2-pole socket. The unit is supplied with eight plug-in adaptors to mate with the 2-pole socket. Overall size of body is 120 x 76 x 67mm.

Order Code	Type	Price each
CC10L B3	Adaptor 12V 1A	£9.99

12V Regulated Power Supply



A fully regulated mains adaptor style power supply especially suitable for musical electronic keyboards and any application which requires stringent low noise supply regulation. It is double insulated and connection to the mains supply should be made via a 13A plug fitted with a 3A fuse. The output is supplied through a 4-way multiplug combination providing 2.5 and 3.5mm jack plugs and 2.1 and 2.5mm power plugs, plus a 1.3mm Walkman type power connector. An inline reversible 2-pin plug is also included in the output lead.

Specification

Input: 240V AC @ 50Hz
 Output: 12V DC @ 600mA max.

NB: the max. current drain of 600mA should not be exceeded. Complies with BS 4435.

Order Code	Type	Price each
YZ21X	Reg PSU 12V 0.6A	£9.99

12 Volt 500mA Regulated PSU



A quality 12V regulated mains adaptor conforming to BS 3535 for use with personal computers, radios, calculators, cassette players and other battery operated equipment. The adaptor features short circuit and overload protection, and thermal overload protection. The regulated output ensures constant DC output with minimal ripple. The output is via a 2m long flying lead terminated in a standard 2.1mm power plug.

Specification

Input: 240V AC at 50Hz
 Output: 12v DC at 500mA max.
 Please note: Centre of connector is positive.

Order Code	Type	Price each
ZF51F	12V Reg PSU 0.5Amp	£15.99

Regulated 300mA

Uniross



This unit is regulated to keep the output voltage constant at all currents up to 300mA, and which is switchable for 3, 4.5, 6, 7.5, 9 and 12V DC output.

Order Code	Type	Price each
YB23A	AC Adaptor Regulated	£9.99

Unregulated 300mA



This unit has outputs of 3, 4.5, 6, 7.5, 9 and 12V DC at 300mA (max). Unit is not stabilised and therefore at low current drains the voltage rises. At less than 150mA this rise could be considerable. If you wish to use this adaptor at current drains less than 150mA you

Continued on next page.

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should increase voltage slowly from the lowest voltage setting until the input is at the required voltage. (A meter placed across any of the 3 spare spider connections will allow you to monitor the voltage.)

Order Code	Type	Price each
XX09K	AC Adptr Unreg 300mA	£4.99

Unregulated 800mA



This unit has outputs of 3, 4.5, 6, 7.5, 9 and 12VDC at 800mA (max). There is a power 'on' indicator and a polarity switch. In addition to the four standard output plugs, the unit has a 1.3mm Walkman-type plug as well. Overall size of body 98 x 67 x 57mm. Note that this unit is unregulated and therefore at low current drains, the voltage can approach double the full load voltage.

Order Code	Type	Price each
YM85G	AC Adptr Unreg 800mA	£6.99

Fixed Voltage Regulated Mains Adaptors



A range of four fixed voltage regulated mains adaptors for personal computers, radios, calculators, TV games, cassette players, small televisions and other battery operated equipment. The adaptors feature a 'power on' indicator, short circuit protection, plus automatic thermal and overload cut-off. The IC regulated output ensures a constant DC output with minimal ripple. The output is via a 6ft approx. flying lead and has a set of six different plug-in connectors comprising of 2.5 and 3.5mm jack plugs, and 1.2, 1.4, 2.1 and 2.5mm power plugs.

Output voltage	Output current
3V	300mA
6V	300mA
9V	500mA
12V	500mA

Order Code	Type	Price each
BZ82D	3V Regulator	£5.99
BZ81C	6V Regulator	£5.99
BZ84F	9V Regulator	£7.49
BZ83E	12V Regulator	£8.99

MAINS POWER SUPPLIES

13.8V Regulated Mains Power Units



A range of four power units with a fixed 13.8V output, ideally suited for powering CB radios, communications transceivers and other devices that require a 13.8V supply. The power supplies are available in 3A, 5A, 7A and 10A versions (continuous rated output current). All four power supply units are finished in a smart black steel enclosure, with illuminated rocker-type on/off switch and two terminal posts (black and red) for the 13.8V output. A mains protection fuse is housed in a fuse holder on the rear panel. The power supplies have over load and short circuit protection.

Specification

Input:	240V AC 50Hz
Output voltage:	13.8V
Output current	3A: 3A continuous, 5A surge 5A: 5A continuous, 7A surge 7A: 7A continuous, 9A surge 10A: 10A continuous, 12A surge
Voltage regulation	3A: <0.5V 5A: <0.5V 7A: <1% 10A: <1%
Ripple voltage	3A: <3mV 5A: <3mV 7A: <1mV 10A: <1mV
Overall size	3A: 141 x 141 x 82mm 5A: 141 x 141 x 82mm 7A: 187 x 181 x 113mm 10A: 187 x 181 x 113mm
Weight	3A: 1.95kg 5A: 2.9kg 7A: 3.8kg 10A: 5.25kg

Order Code	Type	Price each
XM20W C4	3A 13.8V DC PSU	£24.99
XM22Y C6	5A 13.8V DC PSU	£34.99
XM21X E8	7A 13.8V DC PSU	£44.99
XM19V G12	10A 13.8V DC PSU	£59.99

Switched Mode Power Supply Modules

Switched mode power supply PCB ('Open Frame') modules for installation in cases, or on chassis for powering computer equipment. Outputs are standardised at 5V and 12V in three versions, with total output powers of 28W, 50W and 65W respectively. The mains input can range from 90V to over 260V AC with no need for voltage selector switching. These supplies are extremely efficient and feature excellent line and load regulation. Forced air-cooling is recommended for confined spaces and the 65W version includes on-board connections for a 12V fan and a power-on LED.

The 28W version has a +5V DC output for logic and a +12V DC output for drive motors, etc. In addition, the 50W version has a -12V output, while the 65W version also includes a -5V output. All PCBs have four mounting holes for fixing to a chassis with pillars, etc. On the 50 and 65W types one of these links PCB earth to chassis ground.

All mains inputs are via 3-way PCB latch plugs (L, N and E, except 50W type which only has Live and Neutral pins). All outputs are via same style PCB plugs, and each voltage output has a corresponding 0V pin, but ALL 0V pins are commoned.

Please note that where a minimum load current is quoted, this MUST be drawn by the load otherwise the module may be damaged.



Specification 28W Version

Input voltage:	90 to 264V AC
Input frequency:	47 to 440Hz
Inrush current (cold):	20A @ 115V AC, 40A @ 230V AC
Operating temperature range:	0 to 50°C
Efficiency:	70% minimum
Hold-up time:	20ms minimum
Electromagnetic interference:	Meets FCC class B
Overload:	Fold back within 150% of rated load
Overvoltage (+5V output):	6.2V DC ±0.5V
Dimensions of module:	150 x 50 x 30mm
Fixing centres:	140 x 35 x 3.5mm dia.

Output voltage	Load Min	Load Rated	Load Max	Tolerance	Ripple & noise	Regulation Line	Regulation Load
+5V	0A	-	1.9A	±2%	50mV	±1%	±3%
+12V	0A	-	1.6A	±2%	100mV	±1%	±5%

Output connections

Pin No. 1	+12V
Pin No. 2	0V
Pin No. 3	0V
Pin No. 4	+5V



Specification 50W Version

Input voltage:	90 to 264V AC
Input frequency:	47 to 440Hz
Inrush current (cold):	20A @ 115V AC, 40A @ 230V AC
Operating temperature range:	0 to 50°C

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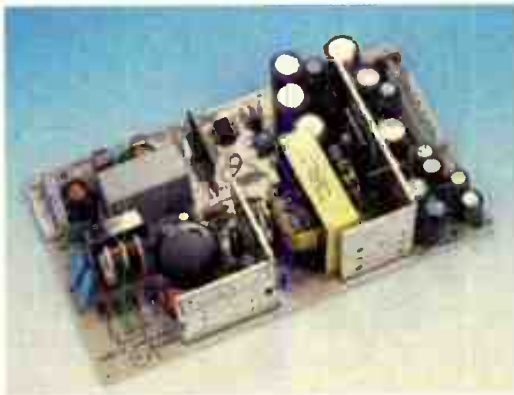
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Efficiency: 70% minimum
 Hold-up time: 20ms minimum
 Electromagnetic interference: FCC class B
 Overload: Fold back within 150% of rated load
 Overvoltage (+5V output): 6.2V DC \pm 0.5V
 Dimensions of module: 127 x 76 x 30mm
 Fixing centres: 117 x 65.5 x 3.5mm dia.

Output voltage	Load Min	Load Rated Max	Tolerance	Ripple & noise	Regulation Line Load
+5V	0.2A	3A	\pm 2%	50mV	\pm 1% \pm 3%
+12V	0A	1.7A	\pm 2%	100mV	\pm 1% \pm 5%
-12V	0A	0.3A	\pm 2%	100mV	\pm 1% \pm 5%

Output connections

Pin No. 1	+5V	Pin No. 4	0V
Pin No. 2	+5V	Pin No. 5	+12V
Pin No. 3	0V	Pin No. 6	-12V



Specification 65W Version

Input voltage: 90 to 264V AC
 Input frequency: 47 to 440Hz
 Inrush current (cold): 20A @ 115V AC, 40A @ 230V AC
 Operating temperature range: 0 to 50°C
 Efficiency: 70% minimum
 Hold-up time: 20ms minimum
 Electromagnetic interference: FCC class B
 Overload: Fold back within 150% of rated load
 Overvoltage (+5V output): 6.2V DC \pm 0.5V
 Dimensions of module: 152 x 89 x 35mm
 Fixing centres: 122 x 80 x 6mm dia.

Output voltage	Load Min	Load Rated Max	Tolerance	Ripple & noise	Regulation Line Load
+5V	0.2A	5-5A 10A	\pm 1%	50mV	0.5% 1%
+12V	0A	2.5A 6A	+5%	100mV	1% 5%
-12V	0A	0.5A 1A	\pm 10%	100mV	2% 10%
-5V	0A	0.5A 1A	+10%	50mV	2% 10%

Output connections

Pin No. 1	+5V	Pin No. 5	+12V
Pin No. 2	+5V	Pin No. 6	+12V
Pin No. 3	0V	Pin No. 7	-12V
Pin No. 4	0V	Pin No. 8	-5V

Order Code	Type	Price each
CC07H	H 28W SMPS Module	£42.99
CC08J	H 50W SMPS Module	£51.99
CC09K	H 65W SMPS Module	£62.99

DC/DC CONVERTERS

DC-DC Converters

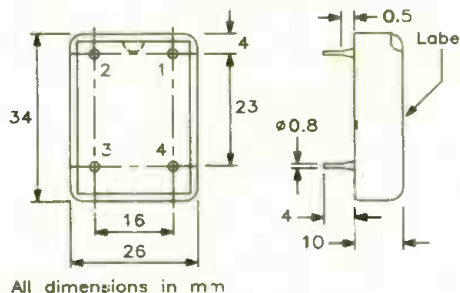
Astec



A low-cost high-efficiency DC to DC converter for generating low-current additional power rails from a main +5V DC supply. Simply supply +5V input and the output will give -15V DC. Power output up to 1W is possible, and perfect regulation due to an in-built filter capacitor.

Specification

Input voltage: +5V DC \pm 20%
 Efficiency: 75%
 Temperature coefficient: 0.08%/°C
 Line regulation: 0.8%
 Load regulation: 1%
 Output ripple: 500mV peak-to-peak

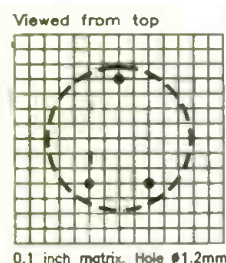


All dimensions in mm

Pin Assignments

Pin 1: -V in (common)
 Pin 2: +V in
 Pin 3: -V out
 Pin 4: +V out (common)

For some circuits it may be necessary to connect a series inductor in the region of 1 μ H, between load and regulator. On the load side of the inductor a filter capacitor of 47 μ F can be used. Both these precautions help to improve ripple and immunity to noise spikes.



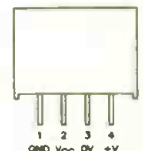
Order Code	Type	Price each
FE59P	DC/DC Conv -15V	£5.99

Miniature PCB Mounting

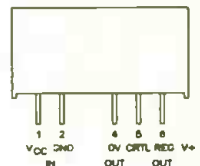
Newport Components

A range of miniature and sub-miniature, high-efficiency DC/DC converters, the outputs of which are isolated to 1000V DC relative to the input, made possible through the use of tiny toroidal ferrite transformers. With efficiencies of up to 80% and a physical bulk down to the scale of a logic IC, these devices are ideal for eliminating complex power busses on PCBs, or special (and inconvenient) provisions for extra odd supply lines from the main PSU, by providing them anywhere where the additional or isolated power rail is required locally. Furthermore any number of them can be used together in a system. All converters are 100% 'burned-in' and triple tested. They feature a high power to density ratio equivalent to 1.4W per cm², which is probably the highest currently available. Derating at temperatures above 70°C is required. The operating temperature range is -50°C to +125°C. In all cases a switched mode method is employed at a typical frequency of 100kHz, with a no-load power consumption of 100mW. This efficiency makes them compatible with battery powered applications. The packages are SIP (Single Inline Pin) with full epoxy encapsulation rated to UL94-VO within a flame retardant, polyurethane case. Any converter can be soldered into place just like any other IC or SIL array, and no heatsinks are necessary for the rated performance. Input voltages are 5V or 12V DC depending on type. Pin '1' is marked with a dot. Pins are spaced 0.1in. and are 3mm long on all types.

Single Output Types



The NME range operate from a 5V or 12V DC input, and provide an isolated single positive output of 5V, 12V or 15V DC, depending on type. The delivered power is 1W total and up to 200mA is available from a 5V output, 84mA from a 12V output, and 67mA from a 15V output. Each device is contained in a 4-pin inline package measuring only 11.5 x 6 x 10mm high.



The NMF0513S operates from 5V DC input and produces +12.75V DC out. The delivered power is 1W total, and up to 78mA is available from the output. The device is contained in a 6-pin (pin 3 is excluded, not used) inline package measuring only 19.5 x 6 x 10mm high, and includes the extra facility of having a control input (pin 5), which must be open circuit to allow the full 12V to be available at the output. If pin 5 is pulled low to 0V, the output is reduced to 1.2V. The facility is aimed at supporting CMOS 'flash memory' devices, providing the required stability for the programming voltage. The control pin can be driven by an open collector transistor switch.

Type	Input voltage	Output voltage	Output current mA	Load regulation
NME0505S	5V (7 max.)	5V	200	10%
NME0512S	5V (7 max.)	12V	84	10%
NME1205S	12V (15 max.)	5V	200	10%
NME1212S	12V (15 max.)	12V	84	10%
NME1215S	12V (15 max.)	15V	67	10%
NMF0513S	5V (7 max.)	12.75V	40	1.5% max.

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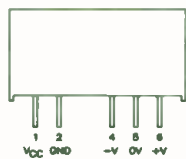
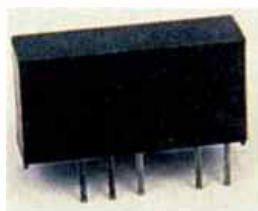
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Dual Output Types



Each of the NMA range provides dual $\pm 5V$, $\pm 12V$ or $\pm 15V$ DC supply rails with centre-tapped 0V from a single 5V or 12V DC input, depending on type, with a total power throughput of 750mW. Up to 100mA is available from each of the 5V outputs, 42mA from each of the 12V outputs and 25mA from each of 15V. The device is contained in a 6-pin inline package (pin 3 is excluded, not used) measuring only 19.5 x 7 x 10mm high.

These devices are contained in a 6-pin inline package (pin 3 is excluded, not used) measuring only 19.5 x 7 x 10mm high.

Type	Input voltage	Output voltage	Output current mA	Load regulation
NMA0505S	5V (7 max.)	$\pm 5V$	100	10%
NMA0512S	5V (7 max.)	$\pm 12V$	42	10%
NMA0515S	5V (7 max.)	$\pm 15V$	34	10%
NMA1205S	12V (15 max.)	$\pm 5V$	100	10%
NMA1212S	12V (15 max.)	$\pm 12V$	42	10%
NMA1215S	12V (15 max.)	$\pm 15V$	25	10%

Order Code	Type	Price each
AH18U	NME0505S	£7.70
JY55K	NME0512S	£7.70
AH19V	NME1205S	£7.70
AH20W	NME1212S	£7.70
JY57M	NME1215S	£7.70
JY58N	NMF0513S	£8.10
AH13P	NMA0505S	£8.10
AH14Q	NMA0512S	£8.10
AH15R	NMA0515S	£8.10
AH16S	NMA1205S	£8.10
AH17T	NMA1212S	£8.10
JY54J	NMA1215S	£7.19

BATTERY CLIPS

PP9 Type

Standard separate press-stud type clips for PP9 size batteries and battery packs. Diameter of stud: 15mm. Wire length: 180mm. Suitable for use with batteries PP1, 4, 7, 8, 9 etc.



Order Code	Type	Price each
HF27E	PP9 Clips	58p

PP3 Type



Dual miniature clip for PP3, 6 etc. Insulated overall with twin wire lead approximately 14cm long.

Order Code	Type	Price each
HF28F	PP3 Clip	14p

DUMMY BATTERY



A plastic spacer with straight through metal contact for use as a dummy in our AA size battery holders and nickel cadmium battery chargers. The dummy is exactly the same size as an AA(HP7) size battery.

Order Code	Type	Price each
YX92A	Dummy Battery	70p

BATTERY HOLDERS

PP3 Battery Holder

Vero



A clip-in battery holder moulded in grey polypropylene and designed to accept one PP3 9V battery. Will fit panels from 18swg to 10swg and a 58.5 x 24.5mm cut out is required. The cover, moulded as part of the holder, opens easily for battery changing and snaps shut securely. The holder comes complete with PP3 battery-clip and lead. Overall size 67.5 x 27.5 x 34mm deep. Depth behind front of panel: 29mm.

Order Code	Type	Price each
XX33L	PP3 Battery Holder	£1.85

PP3 Battery Box

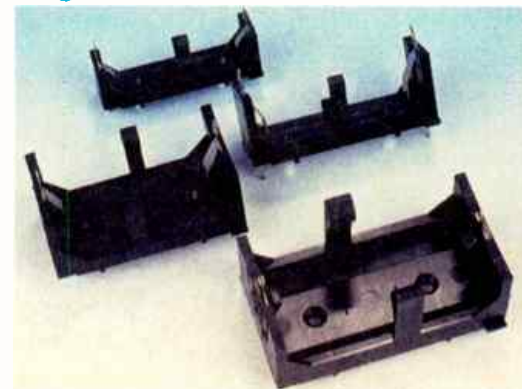
A black plastic battery box that securely holds one PP3 battery. Three countersunk holes in the base allow the box to be screwed to a suitable surface. A suitable battery clip, HF28F is not supplied. Overall size: 49 x 29 x 20mm.



Order Code	Type	Price each
CK65V	PP3 Batt Box	83p

High Grade PCB Battery Holders for AAA, AA, C and D Cells

Bulgin



A range of high quality, PCB mounting battery holders for the standard range of round cells. All types have solder tags in addition to 1mm wide PCB pins, and are attached to the PCB with countersunk M3 screws. Each type holds one cell only; holders can be stacked for two or more cells.

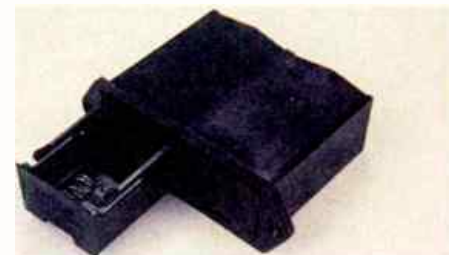
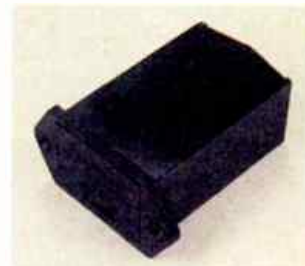
Code	Cell Size	Type	Standard Battery Voltage	Ni-Cd Battery Voltage	Overall Size (mm)	Fixing Centres
MJ47B	AAA	AAA PCB Batt Box	1.5V	1.2V	52x14x24	28mm
MJ48C	AA	AA PCB Batt Box	1.5V	1.2V	60x18x32	33mm
MJ49D	C	C Batt Box	1.5V	1.2V	58x30x34	32mm
MJ50E	D	D Batt Box	1.5V	1.2V	71x38x36	35mm

Order Code	Type	Price each
MJ47B	AAA PCB Batt. Box	99p
MJ48C	AA PCB Batt Box	99p
MJ49D	C PCB Batt Box	£1.22
MJ50E	D PCB Batt Box	£1.35

High Grade PP3 Battery Compartments

Bulgin

Chassis mounting battery holders for PP3 batteries having a removable drawer in which the PP3 is placed; when the drawer is re-inserted an internal spring presses the top contacts of the battery against the contacts at the rear of the compartment. These connections are brought out to solder tags at the rear. The compartment body is designed to be mounted in a rectangular hole in a panel and fixed with two countersunk M3 screws, making battery changing very quick and simple. Single and dual PP3 versions are available, the dual version has separate drawers. All drawers are keyed so accidental reversal is impossible.



Code	Type	Overall Depth	Panel Cutout	Fixing Centres
MJ45Y	Single	65mm	34.5x24.5mm	43mm
MJ46A	Dual	65mm	67x24.5mm	75mm

Order Code	Type	Price each
MJ45Y	Single PP3 Ch Holder	£1.72
MJ46A	Dual PP3 Ch Holder	£3.55

FOR TOP QUALITY & VALUE

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01702 553935

PCB Mounting PP3 Battery Holder

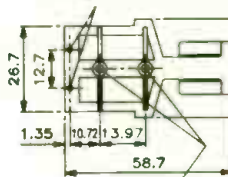
Bulgin



A pcb mounting battery holder for PP3 9V batteries. Connections are via the pcb pins or solder tags either of which may be easily clipped off if not required. The moulding is clearly marked positive and negative. Moulded in nylon with nickel-silver contacts.

Viewed from below. Dimensions in mm.

2 x PCB pins. Holes in board Ø1.4



2 x holes. Fit M3 C'SK Hd screws x 10mm

Overall size 58.7 x 29.8 x 38.5mm high
Height above pcb: 33.8mm with solder tags.
26.8mm without solder tags.

Order Code	Type	Price each
JK65V	PP3 PCB Batt Holder	99p

Versatile Battery Holder

Vero



A battery holder in grey polypropylene that will accept two PP3 batteries or four AA cells in a '4AA Battery Box' (HF29G). The holder has a hinged cover (overall size 60.5mm wide x 48mm high) which opens easily for battery change and snaps closed securely. The holder will clip into any panels with a 1.5mm or 3mm gauge or it may be screw fixed (M3) to any thickness panel. A 45.25mm square cut-out is required in the panel. The battery holder (overall depth 70mm) is supplied with two PP3 battery snaps.

Order Code	Type	Price each
HY32K	Large Batt Hldr	£3.35

Holders for N, AAA, AA, C and D Cells



A range of battery holders to suit the standard range of small round cells. The holders are moulded in black polythene.

Cell size	Equivalent types
N	UM5, R1, MN9100, Lady, E90
AAA	UM4, HP16, R03, MN2400, Micro, E92
AA	UM3, HP7, R6, MN1500, Mignon, E91
C	UM2, HP11, R14, MN1400, Baby, E93
D	UM1, HP2, R20, MN1300, Mono, E95

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Cell size	No. of cells	Standard battery voltage	Ni-cad battery voltage	Overall size (mm)	Connector required	Layout	Type	Order code
N	1	1.5V	1.2V	36 x 14 x 14	Solder to tag	-	N Batt Box	JB84F
N	2	3V	2.4V	34 x 22 x 14	Solder to tag	Side-by-side	2N Batt Box	JG80B
AAA	1	1.5V	1.2V	51 x 14 x 14	Solder to tag	-	AAA Batt Box	JY45Y
AAA	2	3V	2.4V	51 x 24 x 13	Solder to tag	Side-by-side	2AAA Batt Box	JB83E
AAA	4	6V	4.8V	51 x 25 x 24	PP3 Clip	Side-by-side x 2	4AAA Batt Box	JG79L
AA	1	1.5V	1.2V	56 x 16 x 13	Solder to tag	-	AA Batt Box	YR59P
AA	2	3V	2.4V	57 x 30 x 15	PP3 Clip	Side-by-side	2AA Batt Box	YR60Q
AA	3	4.5V	3.6V	57 x 48 x 16	PP3 Clip	Side-by-side	3AA Batt Box	YR61R
AA	4	6V	4.8V	57 x 30 x 27	PP3 Clip	Side-by-side x 2	4AA Batt Box	HF29G
AA	4	6V	4.8V	109 x 26 x 16	PP3 Clip	2 x 2	Long 4AA Batt Box	HF94C
AA	6	9V	7.2V	58 x 44 x 28	PP3 Clip	Side-by-side x 2	9V Batt Holder	HQ01B
AA	6	9V	7.2V	156 x 25 x 16	PP3 Clip	3 x 2	Long 9V Batt Holder	JG78K
AA	8	12V	9.6V	58 x 59 x 29	PP3 Clip	Side-by-side x 2	12V Batt Box	RK44X
AA	10	15V	12V	58 x 75 x 29	PP3 Clip	Side-by-side x 2	12V Ni-cad Batt Box	RK45Y
C	1	1.5V	1.2V	61 x 29 x 25	Solder to tag	-	C Single Box	BK45Y
C	2	3V	2.4V	60 x 55 x 24	PP3 Clip	Side-by-side	C x 2 Batt Box	JG75S
C	3	4.5V	3.6V	160 x 29 x 25	Solder to tag	Inline	C x 3 Batt Box	YU27E
C	4	6V	4.8V	109 x 53 x 25	PP3 Clip	2 x 2	C x 4 Batt Box	HF95D
C	6	9V	7.2V	157 x 54 x 25	PP3 Clip	3 x 2	C x 6 Batt Box	JG76H
C	8	12V	9.6V	108 x 53 x 52	PP3 Clip	2 x 2 x 2	C x 8 Batt Box	JG77J
D	1	1.5V	1.2V	68 x 35 x 27	Solder to tag	-	D x 1 Single Box	BK46A
D	2	3V	2.4V	70 x 70 x 31	PP3 Clip	Side-by-side	D x 2 Batt Box	JG72P
D	3	4.5V	3.6V	115 x 70 x 28	PP3 Clip	Side-by-side	D x 3 Batt Box	YU28F
D	4	6V	4.8V	130 x 70 x 32	Solder to tag	2 x 2	D x 4 Batt Box	JK34M
D	6	9V	7.2V	202 x 73 x 32	PP3 Clip	3 x 2	D x 6 Batt Box	JG73Q
D	8	12V	9.6V	138 x 72 x 58	Solder to tag	Side-by-side x 2	D x 8 Batt Box	JG74R

Order Code	Type	Price each
JB84F	N Batt Box	21p
JG80B	2N Batt Box	26p
JY45Y	1AAA Batt Box	21p
JB83E	2AAA Batt Box	31p
JG79L	4AAA Batt Box	41p
YR59P	AA Batt Box	20p
YR60Q	2AA Batt Box	25p
YR61R	3AA Batt Box	40p
HF29G	4AA Batt Box	39p

Order Code	Type	Price each
HF94C	Long 4AA Batt Box	39p
HQ01B	9V Batt Holder	46p
JG78K	Long 9V Batt Holder	51p
RK44X	12V Battery Box	54p
RK45Y	12V Ni-cad Batt Box	60p
BK45Y	C Cell x 1 Batt Box	36p
JG75S	C Cell x 2 Batt Box	43p
YU27E	C Cell x 3 Batt Box	49p
HF95D	C Cell x 4 Batt Box	62p

Order Code	Type	Price each
JG76H	C Cell x 6 Batt Box	70p
JG77J	C Cell x 8 Batt Box	87p
BK46A	D Cell x 1 Batt Box	40p
JG72P	D Cell x 2 Batt Box	53p
YU28F	D Cell x 3 Batt Box	68p
JK34M	D Cell x 4 Batt Box	70p
JG73Q	D Cell x 6 Batt Box	95p
JG74R	D Cell x 8 Batt Box	£1.15

CABLES

Burglar Alarm Cable	474	Heat Resist Sleeve	486	Ribbon Cable	474
Cable Clips	488	High Temperature Cable	471	Satellite Dish Cable	484
Cable Markers	487	House Wiring Cable	477	Scart Cable	485
Cable Protector	489	IDC Cable	475	Screened Cable	479
Cable Ties	487	Lacing Cord	488	Sleeving	485
Conduit	479	Loudspeaker Cable	472	Telephone Cable	474
Earth Bonding Wire	478	Mains Cable	476	Tinned Copper Wire	472
Earth Sleeving	478	Meter Tails	478	Trailer Cable	474
EHT Wire	472	Microphone Cable	481	TV Aerial Cable	484
Enamelled Copper Wire	472	Multicore Cable	482	Video Cable	485
Extra-Flexible Wire	471	RF Cable	483	Wire	470

WIRE

Wire-Wrapping Wire (1/0.25)



A solid-core single silver-plated copper conductor designed especially for wire-wrapping. Insulation resists shrinkage when soldering.

Single core:	1/0.25mm silver-plated 30AWG. (33SWG)
Sheath:	0.125mm Kynar
Overall diameter:	0.5mm
Nom. conductor area:	0.05mm ²
Max. working voltage:	300V RMS
Max. current:	0.4A
Colours:	Black, red and white

On 25m reels only.

Order Code	Type	Price each
BL77J	Wire-Wrap Black	£2.15
BL82D	Wire-Wrap Red	£2.15
BL83E	Wire-Wrap White	£2.15

Light-Duty Connection Wire (10/0.1)



A flexible wire, which is ideal for signal interconnections within apparatus where it is necessary to pack a large number of wires into a small space.

Stranded core, single:	10/0.1mm copper
Sheath:	0.3mm PVC
Overall diameter:	0.9mm
Nom. conductor area:	0.0785mm ²
Max. working voltage:	1000V RMS
Max. current:	0.5A
Colours available:	Black, Blue, Green, Orange, Red, White, Yellow.

On 25m reels only.

Order Code	Type	Price each
BL46A	L/C Wire Black	£1.36
BL47B	L/C Wire Blue	£1.36
BL49D	L/C Wire Green	£1.36
BL51F	L/C Wire Orange	£1.36
BL53H	L/C Wire Red	£1.36
BL55K	L/C Wire White	£1.36
BL56L	L/C Wire Yellow	£1.36

Solid Core Wire (1/0-6)

A wire having a single solid core ideal for plate-wiring (running wires across a chassis with all wires straight or at right-angles to one another) because wire stays exactly in formed shape without ties.



Single core:	1/0-6mm copper 22AWG (23SWG)
Sheath:	0.3mm PVC – conforms to DEF61-12 (part 6) Type 2
Overall diameter:	1-2mm
Nom. conductor area:	0-28mm ²
Max. working voltage:	1000V RMS
Colours:	Black, Blue, Green, Orange, Red, White, Yellow.

In 10m packs and on 100m drums.

Order Code	Type	Price each
BL85G	Bell Wire Black	45p
PA56L	100m Bell Wire Blk	£3.25
BL86T	Bell Wire Blue	45p
PA57M	100m Bell Wire Blu	£3.25
BL88V	Bell Wire Green	45p
PA59P	100m Bell Wire Grn	£3.25
BL90X	Bell Wire Orange	45p
PA60Q	100m Bell Wire Orn	£3.25
BL92A	Bell Wire Red	45p
PA61R	100m Bell Wire Red	£3.25
BL94C	Bell Wire White	45p
PA62S	100m Bell Wire Wht	£3.25
BL95D	Bell Wire Yellow	45p
PA63T	100m Bell Wire Yel	£3.25

Hook-Up Wire (7/0-2)



A flexible wire for general interconnections within apparatus.

Stranded core, single:	7/0-2mm copper
Sheath:	0.3mm PVC – conforms to DEF61-12 (part 6) Type 2
Overall diameter:	1-2mm
Nom. conductor area:	0-22mm ²
Max. working voltage:	1000V RMS
Max. current:	1-4A
Colours:	Black, Blue, Brown, Green, Grey, Orange, Pink, Red, Violet, White, Yellow.

In 10m packs, 100m reels and 1000m drums.

Order Code	Type	Price each
BL00A	7/0.2 Wire 10M Blk	42p
PA45Y	100m 7/0.2 Wire Blk	£3.15
PA28F	D6 1000m 7/0.2 Wire Blk	£26.99
BL01B	7/0.2 Wire 10M Blu	42p
PA46A	100m 7/0.2 Wire Blu	£3.15
PA29G	D6 1000m 7/0.2 Wire Blu	£26.99
BL02C	7/0.2 Wire 10M Brn	42p
PA47B	100m 7/0.2 Wire Brn	£3.15
PA30H	D6 1000m 7/0.2 Wire Brn	£26.99
BL03D	7/0.2 Wire 10M Grn	42p
PA48C	100m 7/0.2 Wire Grn	£3.15
PA31J	D6 1000m 7/0.2 Wire Grn	£26.99
BL04E	7/0.2 Wire 10M Gry	42p
PA49D	100m 7/0.2 Wire Gry	£3.15
PA32K	D6 1000m 7/0.2 Wire Gry	£26.99
BL05F	7/0.2 Wire 10M Orn	42p
PA50E	100m 7/0.2 Wire Orn	£3.15
PA33L	D6 1000m 7/0.2 Wire Orn	£26.99
BL06G	7/0.2 Wire 10M Pnk	42p
PA51F	100m 7/0.2 Wire Pnk	£3.15
PA34M	D6 1000m 7/0.2 Wire Pnk	£26.99
BL07H	7/0.2 Wire 10M Red	42p
PA52G	100m 7/0.2 Wire Red	£3.15
PA35N	D6 1000m 7/0.2 Wire Red	£26.99
BL08J	7/0.2 Wire 10M Vio	42p
PA53H	100m 7/0.2 Wire Vio	£3.15
PA36P	D6 1000m 7/0.2 Wire Vio	£26.99
BL09K	7/0.2 Wire 10M Wht	42p
PA54J	100m 7/0.2 Wire Wht	£3.15
PA37Q	D6 1000m 7/0.2 Wire Wht	£26.99
BL10L	7/0.2 Wire 10M Yel	42p
PA55K	100m 7/0.2 Wire Yel	£3.15
PA38R	D6 1000m 7/0.2 Wire Yel	£26.99

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Hook-Up Wire (16/0.2)



A flexible wire for general purpose and heavy duty interconnections within apparatus.

Stranded core, single: 16/0.2mm copper
 Sheath: 0.3mm PVC – conforms to DEF61-12 (part 6) Type 2
 Overall diameter: 1.6mm
 Nom. conductor area: 0.5mm²
 Max. working voltage: 1000V RMS
 Max. current: 3A
 Colours: Black, Blue, Brown, Green, Orange, Red, White, Yellow.

In 10m packs and 100m reels.

Order Code	Type	Price each
FA26D	16/0.2 Wire 10M Blk	78p
PA64U A1	100m 16/0.2 Wire Blk	£5.65
FA27E	16/0.2 Wire 10M Blu	78p
PA65V A1	100m 16/0.2 Wire 3lu	£5.65
FA28F	16/0.2 Wire 10M 3rn	78p
PA66W A1	100m 16/0.2 Wire 3rn	£5.65
FA29G	16/0.2 Wire 10M Grn	78p
PA67X A1	100m 16/0.2 Wire Grn	£5.65
FA31J	16/0.2 Wire 10M Orn	78p
PA69A A1	100m 16/0.2 Wire Orn	£5.65
FA33L	16/0.2 Wire 10M Red	78p
PA71N A1	100m 16/0.2 Wire Red	£5.65
FA35Q	16/0.2 Wire 10M Wht	78p
PA73Q A1	100m 16/0.2 Wire Wht	£5.65
FA36P	16/0.2 Wire 10M Yel	78p
PA74R A1	100m 16/0.2 Wire Yel	£5.65

Power Connection Wire (32/0.2)

A flexible wire, for earth and power interconnections within apparatus.

Stranded core, single: 32/0.2mm copper
 Sheath: 0.6mm PVC – Conforms to DEF61-12 (Part 6) Type 3
 Overall diameter: 2.5mm
 Nom. conductor area: 1.0mm²
 Max. working voltage: 1500V RMS
 Max. current: 6A (commercial rating 10A)
 Colours: Black, Blue, Brown, Green, Red, White, Green/Yellow.

Sold per metre (max. length in one piece 100m) and on 100m reels.



Order Code	Type	Price each
XR32K	Wire 3202 Black	15p
PA00A A3	100m Wire 3202 Blk	£8.49
XR33L	Wire 3202 Blue	15p
PA01B A3	100m Wire 3202 Blu	£8.49
XR34M	Wire 3202 Brown	15p
PA02C A3	100m Wire 3202 Brn	£8.49
XR35Q	Wire 3202 Green	15p
PA03D A3	100m Wire 3202 Grn	£8.49
XR36P	Wire 3202 Red	15p
PA04E A3	100m Wire 3202 Red	£8.49
XR37S	Wire 3202 White	15p
PA05F A3	100m Wire 3202 Wht	£8.49
XR38R	Wire 3202 Grn/Yllw	15p
PA06G A3	100m Wire 3202 Gn/Yl	£8.49

Heat Resisting PVC Equipment Wire



A range of equipment wire that is suitable for operating temperatures beyond the normal PVC range of -5°C to +70°C. The special grade of high temperature PVC, used for the insulation, meets the demands of operating temperatures up to 105°C and is resistant to a wide range of oils, impregnating varnishes and chemical solutions. Ideal for connections on motor-windings, transformers and other components that undergo encapsulation, or other finishing and drying operations. The insulation is to BS7646 Type 4 and the wire is suitable for continuous operation at conductor temperatures not exceeding 105°C for periods up to five years, without embrittlement. The insulation material will withstand temperatures up to 150°C for periods up to 6 hours after immersion in a variety of finishing and encapsulation varnishes. The conductor is tinned annealed high conductivity copper wire to BS 6360. Available in two sizes and two colours, red and black, on 25m reels only.

Conductor	Radial thickness mm (nom.)	Overall diameter mm (nom.)	Current Rating Amps @20°C
7/0.2mm	0.45	1.5	1.5
16/0.2mm	0.45	1.8	3

Order Code	Type	Price each
KR32K	HR Wire 7/0.2 Red	£1.49
BA43W	HR Wire 7/0.2 Black	£1.49
KR33L	HR Wire 16/0.2 Red	£2.36
BA44X	HR Wire 16/0.2 Black	£2.36

High Current Wire (50/0.25)



A flexible wire for high current applications.

Stranded core, single: 50/0.25mm copper
 Sheath: 0.8mm PVC – Conforms to BS6231 (Table 6) Type B

Overall diameter: 3.81mm
 Nom. conductor area: 2.5mm²
 Max. working voltage: 600V
 Max. current: 30A
 Colours: Black, Green, Red
 Sold per metre (max. length in one piece 50m) and on 50m reels.

Order Code	Type	Price each
XR57M	HC Wire Black	35p
PA94C A3	50m HC Wire Black	£11.99
XR58N	HC Wire Green	35p
PA95D A3	50m HC Wire Green	£11.99
XR59P	HC Wire Red	35p
PA96E A3	50m HC Wire Red	£11.99

Miniature Extra-Flexible Wire



A smaller diameter flexible wire, for use with miniature probes or as test leads.

Stranded core: 30/0.1mm copper
 Sheath: 1mm very flexible PVC
 Overall diameter: 2.0mm
 Max. working voltage: 650V DC, 500V AC
 Max. current: 1.5A
 Colours available: Black, Red.

Sold per metre (max. length in one piece 25m) and on 25m reels.

Order Code	Type	Price each
XR68Y	Min Extra Flex Black	16p
PB01B A1	25m Min Ext Flex Blk	£2.75
XR69A	Min Extra Flex Red	16p
PB02C A1	25m Min Ext Flex Red	£2.75

Extra-Flexible Wire



A very flexible wire ideal for test leads, and as inter-connection wires which are frequently being moved.

Stranded core, single: 55/0.1mm copper
 Sheath: 1mm very flexible PVC
 Overall diameter: 2.8mm
 Nom. conductor area: 0.43mm²
 Max. working voltage: 650V DC, 500V AC
 Max current: 2.5A
 Colours: Black, Blue, Green, Red

Sold per metre (max. length in one piece 25m) and on 25m reels.

Order Code	Type	Price each
XR40T	Extra Flex Black	16p
PA97F A1	25m Extra Flex Black	£2.99
XR41U	Extra Flex Blue	16p
PA98G A1	25m Extra Flex Blue	£2.99
XR43W	Extra Flex Green	16p
PA99H A1	25m Extra Flex Green	£2.99
XR44X	Extra Flex Red	16p
PB00A A1	25m Extra Flex Red	£2.99

Hook-Up Wire (24/0.2)



A flexible wire for general purpose extra heavy duty interconnections within apparatus.

Stranded core, single: 24/0.2mm copper
 Sheath: 0.45mm PVC conforms to DEF61-12 (part 6) Type 2
 Overall diameter: 2.05mm
 Maximum working voltage: 1000V RMS
 Maximum current: 6A
 Colours: Black, Blue, Brown, Green, Orange, Red, White, Yellow.

Sold per 10 metre pack (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
KR31J	24/0.2 Wire 10M Blk	92p
CK73Q A1	100m 24/0.2 Wire Blk	£6.99
BA36P	24/0.2 Wire 10M Blu	92p
CK74R A1	100m 24/0.2 Wire Blu	£6.99
BA37S	24/0.2 Wire 10M Brn	92p
CK75S A1	100m 24/0.2 Wire Brn	£6.99
BA38R	24/0.2 Wire 10M Grn	92p
CK76H A1	100m 24/0.2 Wire Grn	£6.99
BA39N	24/0.2 Wire 10M Orn	92p
CK77J A1	100m 24/0.2 Wire Orn	£6.99
BA40T	24/0.2 Wire 10M Red	92p
CK78K A1	100m 24/0.2 Wire Red	£6.99
BA41U	24/0.2 Wire 10M Wht	92p
CK79L A1	100m 24/0.2 Wire Wht	£6.99
BA42V	24/0.2 Wire 10M Yel	92p
CK80B A1	100m 24/0.2 Wire Yel	£6.99

TOP QUALITY PRODUCTS AT SUPER LOW PRICES!

E.H.T. Wire



A heavily insulated wire for very high voltage use. Ideal for use with our laser tube.

Stranded core, single: 16/0.2mm tinned copper
Sheath: 1.5mm flame-retardant white polythene sheathed with 0.55mm red PVC

Overall diameter: 4.5mm
Nom. conductor area: 0.5mm²
Max. working voltage: 25kV
Sold per metre (max. length in one piece 100m)

Order Code	Type	Price each
XR22Y	EHT Wire	75p

Enamelled Copper Wire

A 50g roll of enamelled copper wire. Available in the following diameter sizes mm (approx. swg): 2.0 (14), 1.6 (16), 1.25 (18), 0.9 (20), 0.71 (22), 0.56 (24), 0.45 (26), 0.375 (28), 0.315 (30), 0.28 (32), 0.236 (34), 0.19 (36), 0.15 (38), 0.125 (40), 0.1 (42), and 0.08 (44). All sizes up to 0.125mm (40swg) also available on 250g reels.



Approx. length of wire per reel.

Gauge (mm)	Reel size 50g	Reel size 250g	Gauge (mm)	Reel size 50g	Reel size 250g
2.0	1.75m	8.75m	0.315	70m	350m
1.6	2.7m	13.5m	0.28	95m	475m
1.25	4.8m	24m	0.236	130m	650m
0.9	8.5m	42.5m	0.19	190m	950m
0.71	14m	70m	0.15	300m	1500m
0.56	22.5m	112m	0.125	440m	2200m
0.45	34m	170m	0.1	680m	-
0.375	50m	250m	0.08	1050m	-

Order Code	Type	Price each
BL16S	EC Wire 2.0mm 14swg	79p
YN79L	250 ECW 2.0mm 14swg	£2.75
BL24B	EC Wire 1.6mm 16swg	79p
YN80B	250 ECW 1.6mm 16swg	£2.75
BL25C	EC Wire 1.25mm 18swg	82p
YN81C	250 ECW 1.25mm 18swg	£2.78
BL26D	EC Wire 0.9mm 20swg	82p
YN82D	250 ECW 0.9mm 20swg	£2.82
BL27E	EC Wire 0.71mm 22swg	84p
YN83E	250 ECW 0.71mm 22swg	£2.85
BL28F	EC Wire 0.56mm 24swg	84p
YN84F	250 ECW 0.56mm 24swg	£2.95
BL29G	EC Wire 0.45mm 26swg	88p
YN85G	250 ECW 0.45mm 26swg	£3.10
BL39N	EC Wire 0.375mm 28swg	88p
YN86T	250 ECW 0.375mm 28swg	£3.10
BL40T	EC Wire 0.315mm 30swg	94p
YN87U	250 ECW 0.315mm 30swg	£3.25
BL41U	EC Wire 0.28mm 32swg	94p
YN88V	250 ECW 0.28mm 32swg	£3.45
BL42V	EC Wire 0.236mm 34swg	98p
YN89W	250 ECW 0.236mm 34swg	£3.56
BL43W	EC Wire 0.19mm 36swg	£1.02
YN90X	250 ECW 0.19mm 36swg	£3.85
BL44X	EC Wire 0.15mm 38swg	£1.06
YN91Y	250 ECW 0.15mm 38swg	£3.95
BL60Q	EC Wire 0.125mm 40swg	£1.16
YN92A	250 ECW 0.125mm 40swg	£4.25
BL61R	EC Wire 0.1mm 42swg	£1.45
BL62S	EC Wire 0.08mm 44swg	£1.98

Tinned Copper Wire

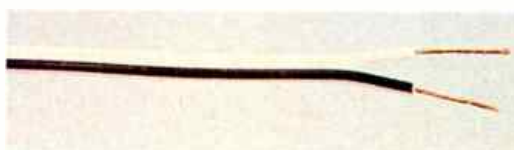


A 50g roll of tinned copper wire. Available in the following sizes: mm (approx. swg) 1.6 (16), 1.25 (18), 0.9 (20), 0.71 (22) and 0.56 (24).

Order Code	Type	Price each
BL11M	TC Wire 1.6mm 16swg	72p
BL12N	TC Wire 1.25mm 18swg	75p
BL13P	TC Wire 0.9mm 20swg	78p
BL14Q	TC Wire 0.71mm 22swg	82p
BL15R	TC Wire 0.56mm 24swg	88p

CABLE

Zip Connecting Cable



A flexible twin cable having a "figure 8" shape. Ideal for loudspeaker connections etc.

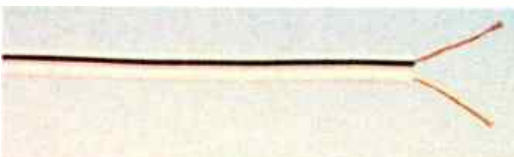
Stranded core, twin: 7/0.2mm copper
Sheath: White PVC with one side ribbed or traced for identification of polarity

Overall size: 4.0 x 2.0mm
Nom. conductor area: 0.22mm²
Max. working voltage: 60V RMS
Max. current: 1A

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR39N	Zip Wire	15p
PA75S	100m Zip Wire	£7.99

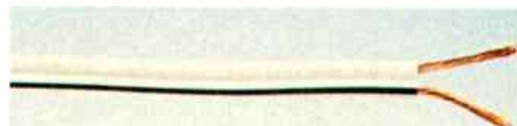
Loudspeaker Cable



Flexible figure-8 section twin cable for loudspeaker connections. Current capacity, 2.5A. Stranded cores, 13/0.2mm. Sheathed in white PVC, overall size 4 x 2mm. One side is marked with a black stripe. Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS47B	Loudspeaker Cable	22p
PB60Q	100m Loudspeaker Reel	£10.99

Heavy Duty Loudspeaker Cable



A flexible twin cable having a "figure 8" shape. The cable will carry up to 15A at 60V rms (170V peak) suitable for amplifiers up to 500W output.

Stranded core, twin: 42/0.2mm copper
Sheath: White PVC with one side marked with black line for identification of polarity

Overall size: 6 x 3mm
Nom. conductor area: 1.32mm²
Max. working voltage: 60V RMS
Max. current: 15A

Sold per metre (max length in one piece 100m) and on 100m reels.

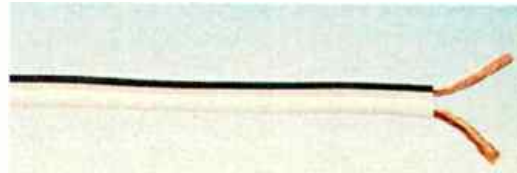
Order Code	Type	Price each
XR60Q	HD Loudspeaker Cable	40p
PA08J	100m HD L/spkr Cable	£25.99



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Hi-Fi Loudspeaker Cable



A flexible twin cable having a "figure 8" shape. The cable will carry up to 18A at 100V rms (280V peak). Recommended by Hi-Fi experts.

Stranded core, twin: 79/0.2mm copper
Sheath: White PVC with one side marked with a black stripe for polarity identification.

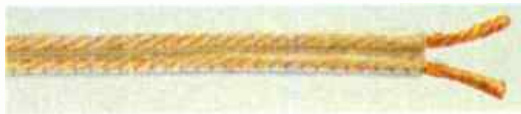
Overall size: 6 x 3mm
Nom. conductor area: 2.48mm²
Max. working voltage: 100V RMS
Max. current: 18A

Sold per metre (max length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR72P	HiFi Loudspkr Cable	55p
PA09K	100m HiFi Spkr Cable	£38.99



High Quality OFC Loudspeaker Connection Cable



An exceptionally high quality speaker connection wire, these figure-8 section speaker leads are the product of constant innovation and improvement. Each cable contains hundreds of extremely thin, single strands to improve electron flow at high frequencies. This is because, in a strand of wire, conduction tends to concentrate more at the surface at higher frequencies, so more strands provide a greater total surface area. In addition, each cable has a large than normal overall diameter for absolute minimum impedance, thus ensuring good response at bass frequencies. The strands are made from 100% Oxygen Free Copper (OFC), a process which completely removes any trace of oxygen from the wire surface during manufacture and so preventing subsequent oxidation of same, which will interfere with the efficiency of the surface electron flow as described above. Strands are then woven together, producing a cable with a rope-like appearance, creating a higher degree of contact between conductors for a 'fuller' signal. Types 'S10' and 'S12' have a pair of these effectively sealed in an extra-flexible, transparent, figure-8 sheathing which has one side marked with '+' symbols for polarity identification.

Specification Type S12

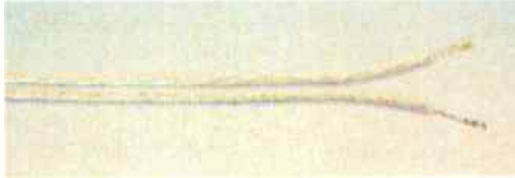
Strands: 413 strands x 0.1mm dia.
Nominal conductor area: 3.24mm²
Sheath outer diameter: 4.4mm
Total sheath width: 9.2mm
Max. working voltage: 300V peak
Working temperature range: -10°C to 105°C

Type S10

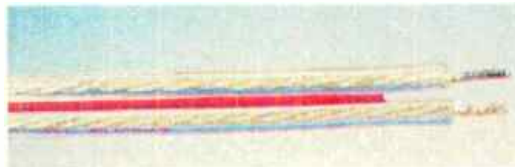
Strands: 1,050 strands x 0.08mm dia.
Nominal Conductor area: 5.28mm²
Sheath outer diameter: 5.5mm
Total sheath width: 11.5mm
Max. working voltage: 300V peak
Working temperature range: -10°C to 105°C
Sold per metre. Maximum length in one piece, 50m.
Also available on 50m reels.

Order Code	Type	Price each
XS37S	Ox Free S12	£2.20
PB61R	F10 50m Ox Free S12	£79.99
XS36P	Ox Free S10	£3.49
PB58N	H14 50m Ox Free S10	£117.99

Silver-Plated OFC Speaker Cable



Flat 2-core loudspeaker cable featuring silver-plated, OFC (Oxygen Free Copper) conductors. Silver plating is to a thickness of 100µ (microns, or 40µin.). Two different gauges of cable are available as medium capacity (0.70mm² total cross section), and high capacity (1.45mm²), and in each case, each core is organised as three bundles of twisted strands, the three bundles are again twisted together and insulated in a 3-channel sleeve. For the medium capacity cable, the sleeve forms a figure of eight cross section with its opposite partner, and can be easily separated.



The high capacity type encloses the inner sleeve with a clear flexible outer sheath. The outer sheath is joined to its opposite partner by a narrow flat strip which has reduced thickness at its join with each sheath, making it easy to 'unzip', or pull apart, the individual wires for connection to speaker terminals. (The centre strip can then be trimmed back with wire cutters.) The centre strip has a red stripe on one side for polarity identification purposes. Note: Silver Solder GW45Y must be used to solder silver wires.

Each type sold by the metre.



CC21X



CC20W

Order Code	Type	Price each
CC21X	Medium Speaker Cable	£4.55
CC20W	HC Speaker Cable	£7.99

Pure Silver Loudspeaker Cable



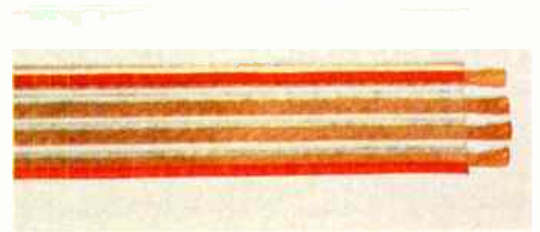
Flat 2-core loudspeaker cable having pre-extruded, pure silver strands. Each core is organised as three bundles of 7/0.28mm twisted strands of pure silver wire, which are again twisted together and insulated in a 3-channel, white polyethylene inner sleeve, with a clear flexible outer sheath. The outer sheath is joined to its opposite partner by a narrow flat strip which has reduced thickness at its join with each sheath, making it easy to 'unzip', or pull apart the individual wires for connection to speaker terminals. (The centre strip can then be trimmed back with wire cutters.)

The cable is 8mm thick and 19mm wide overall. Note that Silver Solder GW45Y must be used to solder silver wires.
Sold by the 1/4 metre.



Order Code	Type	Price each
XS55K	1/4m Silver Spkr Cbl	£15.00

Flat High Quality Speaker Cable



A flat 4-core high quality speaker cable made from high purity OFC bare copper conductor, stranded tightly into a rectangular cross section for perfect sound transmission. Each core is made from 620 strands of 0.07mm copper and covered in a very high quality anti-oxidation clear PVC. The cores can easily be separated and the outer cores are colour coded for identification of positive, and left and right. Maximum working voltage 300V. Sold by the metre (max length in one piece 50m) and on 50m reels.

Order Code	Type	Price each
BZ94C	4W Flat Speaker	£3.70
CK98G	H16 4W Flat Speaker 50m	£147.99

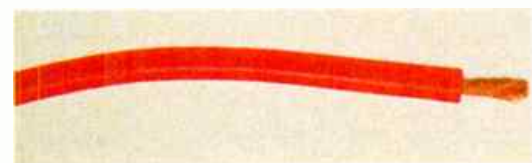
Car Battery Power Cable



High quality OFC 4AWG copper cable made from 1050 strands of 0.16mm diameter copper. Intended for use in cars, with high power in-car entertainment systems, especially CD players (see entertainment section), to ensure the very best sound quality output. A range of gold-plated accessories i.e. battery clamp, connector block etc., will also be found in the entertainment section. The cable is intended to be used with the distribution block and fuse holders, it is NOT intended to supply starter motors or other car electrical accessories. Available in red and black and sold by the 1/2m and on 50m reels.

Order Code	Type	Price each
BZ91Y	4AWG Cable Red	£1.75
CK94C	H27 4AWG Cable Red 50m	£129.99
CK17T	4AWG Cable Black	£1.75
CK95D	H27 4AWG Cable Black 50m	£129.99

Power Cable for In-Car Entertainment Systems



High quality 8AWG flexible copper cable made from 700 strands of 0.12mm diameter copper, intended for connecting power to high quality in-car entertainment systems. A gold-plated 4 into 1 cable connector, fuse blocks and fuses are also available (see entertainment section). This cable is for use with car audio equipment and is NOT intended for connecting to other car electrical accessories. Available in red and black and sold by the metre (max length in one piece 50m) and on 50m reels.

Order Code	Type	Price each
BZ92A	8AWG Cable Red	£1.75
CK96E	H14 8AWG Cable Red 50m	£64.99
BZ93B	8AWG Cable Black	£1.75
CK97F	H14 8AWG Cable Black 50m	£64.99



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Signal/Burglar Alarm Cable



General purpose 4-core, 6-core and 8-core signal cables ideal for use with security alarms and other applications where low voltages and low currents are being used. The cable contains flexible wires each having seven strands of 0.2mm tinned annealed copper insulated wire.

Specification

Max. working voltage: 60V RMS
 Max. current per core: 1A
 Max. conductor resistance: 92.4Ω/km @ 20°C
 Max. operating temperature: 70°C
 Conductors: 7/0.2mm strands of annealed copper wire conforming to BS6360
 Insulation: PVC to radial thickness of 0.2mm nominal conforming to BS6746
 Sheath: PVC nominal wall thickness 0.5mm

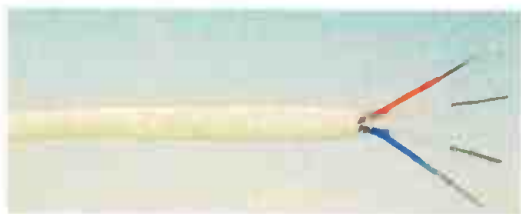
Nominal overall diameter
 4-core: 3.5mm
 6-core: 4.1mm
 8-core: 4.5mm

Wire insulation colours
 4-core: Red, blue, yellow, black
 6-core: Red, blue, yellow, black, white, green
 8-core: Red, blue, yellow, black, white, green, orange, brown

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR89W	4-Wire Burglar Cable	20p
PA77J B4	100m 4-Wire Burglar	£12.99
XS54J	6-Wire Burglar Cable	28p
PB71N C5	100m 6-Wire Burglar	£17.99
CW70M	8-Wire Burglar Cable	35p
PB80B D7	100m 8-Wire Burglar	£23.99

Telephone Cable



A high quality cable complying with British Telecom specification CW 1308 for use in wiring telephones in customers' premises. It is also ideal for use in other low voltage, low current applications. The cable contains four solid tinned annealed copper conductors each 0.5mm diameter insulated with PVC. Insulation colours are blue-white, white-blue, orange-white and white-orange.

Also available in 6-way, with extra green-white and white-green conductors.

Overall insulation is in white PVC. 6-way is also available with black PVC insulation.

Nom. conductor area: 0.2mm²
 Max. working voltage: 80V
 Max. current per core: 0.25A
 Overall diameter: 4-wire 3.6mm
 6-wire 4.5mm

Sold per metre (max. length in one piece 100m) and on 100m reels.

Note: 'British Telecommunications requires of any person who connects subscribers' apparatus directly or indirectly to any telecommunication system, that it runs to comply with the terms and conditions relating to the attachment of subscribers' apparatus under which service is provided by B.T.'

Order Code	Type	Price each
XR66W	4W Phone Cable White	20p
PA76H B4	100m 4W Phone White	£10.99
XS04E	6W Phone Cable White	28p
PA87U C5	100m 6W Phone White	£15.99
CW68Y	6W Phone Cable Black	28p
PB78K C5	100m 6W Phone Black	£15.99

Flat IPC Telephone Line Cord



Four-way flat D section telephone line cord specifically designed for use with the latest style 4 and 6-way IPC (Insulation Piercing Connector) jack plugs, see Telephones Section.

The stranded wires are 7 x 0.15mm, and colour coded Red, Blue, Green, White, Black and Orange, and are sheathed overall in a light grey PVC sheath. For details of how to attach this cable to the IPC BT line jack plugs see telephone accessories in the Connectors Section.

Sold per metre (max. length in one piece 100m).

Order Code	Type	Price each
XR86T	4-Way Flat BT Cable	32p
XS03D	6 Way Flat Phone Crd	38p

Flat IPC Telephone Cord for FCC68 Style Plugs



Three types of multi-strand telephone cord with an extra flat cross section for use with USA style FCC68 telephone connectors. Available colour coded Yellow, Green, Red, Black (4-way), Yellow, Green, Red, Black, Blue, White (6-way).

The third type has a total of eight ways and can have many other applications where a multi-way cable is needed. It is colour coded Grey, Orange, Black, Red, Green, Yellow, Blue and Brown. All three types are sheathed in light grey PVC.

Sold per metre (max. length in one piece 100m), and on 100m reels.

Order Code	Type	Price each
XS27E	FCC68 Cable 4 Core	25p
PB53H A3	FCC68 Cbl 4 Cre 100m	£14.99
XS28F	FCC68 Cable 6 Core	32p
PB54J B4	FCC68 Cbl 6 Cre 100m	£19.99
XS29G	FCC68 Cable 8 Core	38p
PB55K B3	FCC68 Cbl 8 Cre 100m	£24.99

Seven-Core Cable



A seven-core cable for use with Trailer Connectors. Stranded core, six 14/0.25mm and one 14/0.3mm copper conductors.

Sheath: Brown, Blue, Yellow, Green, Red, Black (14/0.25mm) and White (14/0.3mm) PVC in an overall black PVC sheath.

Overall dia.: 9mm
 Nom. conductor area: White 1mm², Other 0.7mm²
 Max. current: White 8.75A, Other 5.5A
 Sold per metre (max. length in one piece 50m) and also on 50m reels.

Note: Only for use up to 50 Volts DC

Order Code	Type	Price each
XR55K	7-Core Trailer Cable	99p
PA20W H14	50m 7-Core Trailer	£36.99

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Ribbon Cables



A flat ribbon-type cable which facilitates wiring in confined spaces. Stranded core 7 x 0.2mm tinned copper conductors sheathed in PVC, colour coded in like manner to the standard resistor colour code, and bonded together to form a flat 'ribbon'.

Nom. conductor area: 0.25mm²
 Max. working voltage: 900V DC,
 Max. current per core: 1.4A
 Core colours: 1 Brown, 2 Red, 3 Orange, 4 Yellow, 5 Green, 6 Blue, 7 Violet, 8 Grey, 9 White, 10 Black, then repeated.

Three types available:
 10-way (overall size 13 x 1.3mm)
 20-way (overall size 26 x 1.3mm)
 30-way (overall size 39 x 1.3mm)

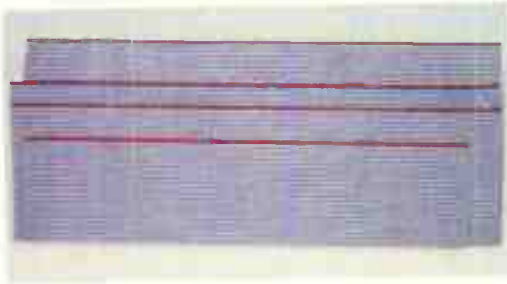
Sold per metre (max. length in one piece 30m) and on 30m reels.

Order Code	Type	Price each
XR06G	Ribbon Cable 10 Way	£1.28
PB03D A2	30m Ribbon Cable 10W	£29.99
XR07H	Ribbon Cable 20 Way	£2.45
PB04E C5	30m Ribbon Cable 20W	£54.99
XR67X	Ribbon Cable 30 Way	£3.25
PB05F F8	30m Ribbon Cable 30W	£74.99

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Insulation Displacement Cable 0.05in Spacing



Flat Cable for the 0.05in spacing IDC connectors in the Connectors Section of this catalogue, available in 16, 20, 26, 34, 40 and 50-way. The grey insulation has a red identifying strip along one edge. Sold per 30cm (approx 12in). Max. length in one piece 30m. Also available on 30m reels.

Order Code	Type	Price each
XR73Q	Flat IDC Cable 16way	26p
PA22Y	A2 30m Flat IDC 16way	£15.99
XR74R	Flat IDC Cable 20way	30p
PA23A	A2 30m Flat IDC 20way	£18.99
XR75S	Flat IDC Cable 26way	38p
PA24B	A3 30m Flat IDC 26way	£23.99
XR76H	Flat IDC Cable 34way	45p
PA25C	B4 30m Flat IDC 34way	£31.99
XR77J	Flat IDC Cable 40way	56p
PA26D	B4 30m Flat IDC 40way	£37.99
XR79L	Flat IDC Cable 50Way	72p
PA27E	D6 30m Flat IDC 50way	£44.99

Flat Cable Cutter Xcelite



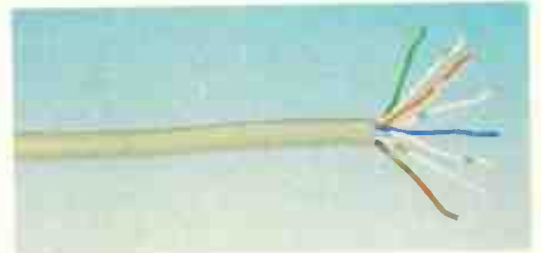
A handy cutting tool for flat cables, that gives an even, undistorted cut across all conductors (up to 64 conductors). A built-in guide guarantees a square cut, reffered to the edge of the cable. The cutter has a one-piece solid blade for increased durability and accuracy. The cutter is capable of cutting under-carpet electrical cable (up to 4 conductors).



Order Code	Type	Price each
DF91Y	Flat Cable Cutter	£70.49

4-Pair LAN Data Cable (100Mbps/s)

This 4-pair cable is intended for use on high-speed LAN applications up to 100Mbps/s. The cable complies with the electrical characteristics of EIA/TIA TSB 36 Category 5, Nov. 1991. Each solid 0.51mm conductor has a polyolefin insulation, with all the pairs housed in a PVC jacket (4.8mm OD). There is no screening.



MHz	Attenuation dB/100m	Near end crosstalk dB
1	2.1	62
4	4.3	53
10	6.6	47
16	8.2	44
20	9.2	42
31.25	11.8	40
62.5	17.1	35
100	22.0	32

Characteristic impedance: 100Ω ±15
Mutual capacitance: 46pF/m
Available per metre or on 100m reels.

Order Code	Type	Price each
CW45Y	100Mb LAN Cabl Metre	45p
PB75S	E8 100Mb LAN Cab 100m	£39.99

Colour Coded IDC Cable



Flat IDC Cable, colour coded as our Ribbon Cable. Available in 16-way, 20-way, 26-way, 34-way, 40-way and 50-way. Each wire has a coloured sheath and is spaced on a 0.05 inch pitch. Stranded cores are 7 x 0.127mm. The cable is manufactured to UL2697. Sold per 30cm (approx. 12in.) Max. length in one piece 30m. Also available on 30m reels.

Order Code	Type	Price each
XR80B	Clr Cd IDC Cable 16W	38p
PA39N	A2 30m Clr Cd IDC 16W	£29.99
XR81C	Clr Cd IDC Cable 20W	48p
PA40T	A2 30m Clr Cd IDC 20W	£36.95
XR82D	Clr Cd IDC Cable 26W	63p
PA41U	A3 30m Clr Cd IDC 26W	£46.99
XR83E	Clr Cd IDC Cable 34W	75p
PA42V	B4 30m Clr Cd IDC 34W	£59.99
XR84F	Clr Cd IDC Cable 40W	92p
PA43W	C5 30m Clr Cd IDC 40W	£69.99
XR85G	Clr Cd IDC Cable 50W	£1.16
PA44X	D6 30m Clr Cd IDC 50W	£84.99

DATA CABLES

4-Pair LAN Data Cable (20Mbps/s)

This 4-pair cable is intended for use on high-speed LAN applications up to 16Mbps/s. The cable complies with the electrical characteristics of EIA/TIA TSB 36 Category 4, Nov. 1991. Each solid 0.51mm conductor has a polyolefin insulation, with all the pairs housed in a PVC jacket (4.8mm OD). There is no screening.



MHz	Attenuation dB/100m	Near end crosstalk dB
1	2.1	56
4	4.3	47
10	7.2	41
16	8.8	38
20	10.2	36

Characteristic impedance: 100Ω ±15
Mutual capacitance: 46pF/m
Available per metre or on 100m reels.

Order Code	Type	Price each
CW44X	20Mb LAN Cable Metre	42p
PB74R	E8 20Mb LAN Cab 100m	£34.99

MAPLIN KEY CALL

Phone 01702 556751

RS232 Multi-Pair Network Cable



A range of flexible (stranded), multi-pair cables that are suitable for the interconnection of peripheral equipment and host computers, where local area networks are not in use e.g., low-speed data transfer.

Electrical Properties at 20°C	
Pair conductance:	98pF/m @ 1kHz
Capacitance @ 1kHz:	164pF/m (between 1 cond. and other cond. connected to screen)
Attenuation 100kHz:	1.3dB/100m
1MHz:	7.3dB/100m

Mechanical Properties	
Conductors stranded:	0.22mm ² TC
Insulation type:	SR-PVC
Overall screening:	Foil
Drainwire stranded:	0.22mm ² TC
Jacket type:	PVC
Temperature range:	-20°C to +80°C
Minimum bending radius:	8 x ODmm

Continued on next page.

Maplin

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Continued from previous page.

Maplin Code	No. of pairs	OD (mm)	Length
CW41U	2	5.5	Metre
PB82D	2	5.5	Reel
CW42V	3	5.8	Metre
PB72P	3	5.8	Reel
CW43W	4	6.5	Metre
PB73Q	4	6.5	Reel

Available per metre or on 100m reels.

Order Code	Type	Price each
CW41U	2 Pair RS232 Metre	80p
PB82D H15	2 Pair RS232 100m	£59.99
CW42V	3 Pair RS232 Metre	£1.10
PB72P H15	3 Pair RS232 100m	£74.99
CW43W	4 Pair RS232 Metre	£1.20
PB73Q H15	4 Pair RS232 100m	£89.99

Thin Ethernet



A thin Ethernet cable that conforms to IEEE 802.3, and is equivalent to Belden 9907.

® Ethernet is a registered trade mark of Xerox Corp.

Specification

Conductor:	Copper stranded tinned AWG 21/19
Core insulation:	Foamed polyethylene
Taping:	Polyesterfoil on both sides laminated with silver
Braiding:	36AWG tinned copper wires, optical cover 93%
Impedance:	50Ω
Attenuation (maximum):	3.3dB/100m @ 5MHz 4.6dB/100m @ 10MHz
Capacity:	81pF/m @ 1kHz
Resistance:	36Ω/km @ 20°C maximum
Operating temperature:	-10°C to +70°C

Sold on 100m reels.

Order Code	Type	Price each
AP16S E7	Thin Ethernet	£41.99

MAINS CABLES

2-Core 3A Mains Cable



A 2-core mains cable with double insulation suitable for low power use, lighting etc. Stranded core, two 16/0.2mm copper conductors

Sheath:	Brown and blue PVC in an oval PVC overall sheath — conforms to BS6500 1990 Table 15.
Overall size:	5.4 x 3.4mm
Nom. conductor area:	0.5mm ²
Max. current:	3A
Colours:	Black or White.

Sold per metre (max. length in one piece 100m).

Order Code	Type	Price each
XR47B	Twn Mains DS Black	20p
PA10L D6	100m Twn Mains Black	£14.99
XR00A	Twn Mains DS White	20p
PA11M D6	100m Twn Mains White	£14.99

2-Core 6A Mains Cable



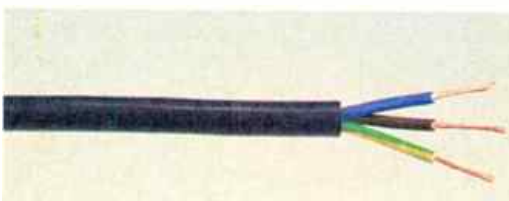
A 2-core mains cable with double insulation suitable for use with medium power double insulated appliances. Stranded core, two 24/0.2mm copper conductors

Sheath:	Brown and blue PVC in a round PVC overall sheath — conforms to BS6500 1990 Table 16.
Overall diameter:	6.5mm
Nom. conductor area:	0.75mm ²
Max. current:	6A
Colours:	Orange, White or Black

Sold per metre (max length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR61R	Twin 6A Mains Orange	28p
PB06G G12	100m Twin 6A Main Or	£19.99
XR62S	Twin 6A Mains White	28p
PB07H G13	100m Twin 6A Main Wh	£19.99
CW69A	Twin 6A Mains Black	28p
PB79L G13	100m Twin 6A Main Bk	£19.99

3-Core 3A Mains Cable



A three core mains cable ideal for equipment having power ratings up to 750W. Stranded core, three 16/0.2mm copper conductors

PORTABLE BATTERY POWERED SOLDERING IRON

A novel soldering iron which is powered by either 4 alkaline C cells or two Ni-Cd C cells. The combined low voltage element/bit retracts when not in use which serves both as a safety feature and also protects the element/bit from damage. A conveniently placed push-to-heat button operates the iron, working temperature is reached in approximately 10 seconds. A charging socket is provided so that Ni-Cd cells may be charged in situ from an AC or DC adaptor (suitable type XX09K). Charging time is 12 to 16 hours. Important: Under no circumstances must any attempt be made to recharge non-rechargeable cells. Supplied with one element/bit and solder. Batteries not included. Spare element/bits are available separately.



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Sheath:	Brown, Blue and Grn/Yellow PVC in overall PVC sheath — conforms to BS6500 1990 Table 15.
Overall dia.:	5.6mm
Nom. conductor area:	0.5mm ²
Max. current:	3A
Colours:	Black or White

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR01B	Min Mains Black	28p
PB08J G10	100m Min Mains Black	£18.99
XR02C	Min Mains White	28p
PB09K F9	100m Min Mains White	£18.99

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3-Core 6A Mains Cable



A three core mains cable with a thick outer sheath available also in orange for added safety when used as a trailing lead e.g. on power tools. Stranded core, three 24/0.2mm copper conductors.

Sheath: Brown, Blue and Green/Yellow PVC in a substantial overall PVC sheath – Conforms to BS6500 1990 Table 16.

Overall dia.: 6.9mm
 Nom. conductor area: 0.75mm²
 Max. current: 6A
 Colours: Black, White or Orange
 Sold per metre (max. length one piece 100m).
 Also available on 100m reels.

Order Code	Type	Price each
XR03D	C6A Mains Black	39p
PB10L	H14 100m C6A Mains Black	£25.99
XR04E	C6A Mains White	39p
PB11M	H14 100m C6A Mains White	£25.99
XR05F	C6A Mains Orange	39p
PB12N	H14 100m C6A Mains Orange	£25.99

3-Core 13A Mains Cable



A three core mains cable with a thick outer sheath available also in orange for added safety when used as a trailing lead e.g. on power tools. Stranded core, three 40/0.2mm copper conductors.

Sheath: Brown, Blue and Green/Yellow PVC in a substantial overall PVC sheath – Conforms to BS6500 1990 Table 16.

Overall diameter: 7.5mm
 Nom. conductor area: 1.25mm²
 Max. current: 13A
 Colours: Black, White or Orange.

Sold per metre (max. length in one piece 100m).
 Also available on 100m reels.

Order Code	Type	Price each
XR09K	HD Mains Black	56p
PA12N	H22 100m HD Mains Black	£38.99
XR10L	HD Mains White	56p
PA13P	H22 100m HD Mains White	£38.99
XR11M	HD Mains Orange	56p
PA14Q	H23 100m HD Mains Orange	£38.99

Cotton Covered Mains Cable



A three core heat resistant mains cable for use on irons, toasters, small electric fires (up to 1.4kW) etc. Stranded core, three 24/0.2mm copper conductors.

Sheath: Brown, Blue and Green/Yellow rubber in an overall sheath covered by black/white cellulose braid conforms to BS6500.

Overall diameter: 6.2mm
 Nom. conductor area: 0.75mm²
 Max. current: 6A

Sold per metre (max. length in one piece 50m).

Order Code	Type	Price each
XR24B	Cotton Mains	£1.24

Coiled Mains Cables



Three core extendible mains cable for use with tools, instruments etc. Two types are available: 1A type and 6A type.

1A Type

Stranded core: Three 17/0.122mm copper conductors

Sheath: Brown, Blue and Green/Yellow PVC in a coiled black PVC sheath.

Max. current: 1A
 Extended length: 1.8m max.

6A Type

Stranded core: Three 42/0.2mm copper conductors

Sheath: Brown, Blue and Green/Yellow PVC in a coiled black PVC sheath.

Max. current: 6A
 Extended length: 2.9m max.

Order Code	Type	Price each
BL71N	Stretchflex 1A	£3.49
BL72P	Stretchflex 6A	£5.99

4-Core 6A Mains Cable



A four core flexible mains cable for use in mains controlled applications. Stranded core, four 20/0.21mm copper conductors.

Sheath: Brown, Blue, Black and Green/Yellow rubber in a hard-wearing overall black rubber sheath to BS6500 1990 Table 6.

Overall diameter: 8.35mm
 Nom. conductor area: 0.75mm²
 Max. current: 6A

Sold per metre (max. length in one piece 50m).

Order Code	Type	Price each
XR48C	4-Core Mains	£1.10



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Flex and Wire Stripper

Toggle Tools



A unique, compact, self-adjusting cable stripper capable of preparing both the inner and outer insulations of round cables, up to 8.5mm diameter.

Order Code	Type	Price each
CW33L	Flex & Wire Stripper	£6.75

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HOUSE WIRING CABLES

All cables conform to BS6004: 1984 Tables 4 and 5.

1mm² Twin and Earth



A twin core and earth flat domestic wiring cable for use on lighting circuits. Three 1/1.13mm copper conductors. 300/500V.

Sheath: Red and Black PVC plus unsheathed earth-continuity conductor, in an overall white PVC sheath.

Overall size: 7.5 x 4mm
 Nom. conductor area: 1mm²
 Max current surface: 15A
 Max current enclosed: 11A

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR49D	1.0mm TE Cable	28p
PA82D	H13 100m TE Cable 1mm	£18.99

1mm² Twin Red and Earth



A twin core and earth flat domestic wiring cable for use on lighting circuits. Three 1/1.13mm copper conductors. Rated at 300/500V.

Sheath: Two red PVC plus unsheathed earth-continuity conductor, in an overall grey PVC sheath.

Overall size: 7.5 x 4mm
 Nom. conductor area: 1mm²
 Max current surface: 15A
 Max current enclosed: 11A

Sold per metre (max. length in one piece 100m).
 Also available on 100m reels.

Order Code	Type	Price each
CK91Y	Twin Red & E	30p
BU67X	D13 Twin Red & E x 100m	£19.99

1.5mm² Twin and Earth



A twin core and earth flat domestic wiring cable for use on separately fused spurs from ring main circuits. Two 1/1.38mm copper conductors, 300/500V and earth.

Sheath: Red and Black PVC plus unsheathed earth-continuity conductor, in an overall white PVC sheath.

Overall size: 8.5 x 4.75mm
 Nom. conductor area: 1.5mm²
 Max. current surface: 20A
 Max. current enclosed: 14.5A

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR50E	1.5mm TE Cable	38p
PA83E H16	100m TE Cable 1.5mm	£24.49

2.5mm² Twin and Earth



A twin core and earth flat domestic wiring cable for use on ring mains and unfused spurs. Two 1/1.78mm copper conductors and earth 300/500V.

Sheath: Red and Black PVC plus unsheathed earth-continuity conductor, in an overall white PVC sheath.

Overall size: 9.5 x 5.25mm
 Nom. conductor area: 2.5mm²
 Max. current surface: 27A
 Max. current enclosed: 19.5A

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR51F	2.5mm TE Cable	52p
PA84F H24	100m TE Cable 2.5mm	£33.99

6mm² Twin and Earth



A twin core and earth flat wiring cable for use on cooker points. Two 7/1.04mm copper conductors and earth 300/500V.

Sheath: Red and Black PVC plus unsheathed earth-continuity conductor, in an overall white PVC sheath.

Overall size: 14 x 7.5mm
 Nom. conductor area: 6mm²
 Max. current surface: 47A
 Max. current enclosed: 34A

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR52G	6mm TE Cable	£1.50
PA85G H46	100m TE Cable 6mm	£104.99

1mm² Three Core and Earth

A three-core and earth flat domestic wiring cable for use on lighting circuits requiring double switching. Three 1/1.13mm copper conductors and earth 300/500V.

Sheath: Blue, Red and Yellow PVC plus unsheathed earth-continuity conductor in an overall white PVC sheath.

Overall size: 10.5 x 4.6mm
 Nom. conductor area: 1mm²
 Max. current surface: 14A
 Max. current enclosed: 10.5A



Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR53H	1mm Trpl & ECC Cbl	55p
PA86T H19	100m Tpl & E Cbl 1mm	£36.99

Meter Cable

A double-insulated plain annealed copper conductor with a PVC insulation and PVC sheath, for connecting the meter to the consumer unit. Two sizes available 16mm² and 25mm². Rated at 300/500V.

Specification	16mm ²	25mm ²
Stranding:	7/1.7	7/2.14
Diameter over conductor:	5.10mm	6.42mm
Nominal overall diameter:	9.1mm	11.2mm
Max. current surface:	87A	114A
Max. current enclosed:	61A	80A



Available in red and black. Sold per metre (max length in one piece is 50m).

Order Code	Type	Price each
CK93B	Meter Tail 16mm Red	£2.25
KC88V	Meter Tail 16mm Blk	£2.25
KC87U	Meter Tail 25mm Red	£3.49
CK92A	Meter Tail 25mm Blk	£3.49

Earth Sleeving

A green/yellow PVC insulating sleeve for sleeving the earth continuity conductor on all the above House Wiring Cables (except 6mm²). Sleeve has an inside diameter of 2.24mm and an outside diameter of 3.3mm. Supplied per metre.

Order Code	Type	Price each
XS12N	Earth Sleeve	15p

Earth Bonding Wire



A rigid stranded wire for earth bonding in domestic applications. Available in 10mm² and 16mm². Conforms to BS6004.

Specification	10mm ²	16mm ²
Stranding:	7/1.35mm	7/1.7mm
Sheath:	1.0mm PVC	
Overall diameter:	6.1mm	7.1mm
Nominal conductor area:	10mm ²	16mm ²
Voltage rating:	450/750V	
Maximum current	surface:	65A
	enclosed:	43A
		85A
		57A

Colour: Green/Yellow
 Sold per metre (max. length in one piece 50m).

Order Code	Type	Price each
XS13P	Earthing Wire 10	£1.16
CW71N	Earthing Wire 16	£1.75

Insulated Steel Wire Armoured Cable



A PVC insulated steel wire armoured cable that is manufactured to BS6346 and is available with either two or three, single stranded, 1.5mm, cores. The steel wire may be used for earthing purposes. Outer sheath is black. A cable termination gland is available for use with this cable.

Specification	2-core	3-core
Voltage rating:	600V/1000V	
Maximum sustained voltage:	1100V AC	
Maximum current (clip fixing):	18A	21A
Core diameter:	1.5mm	
Insulation thickness:	0.6mm	
Bedding thickness:	0.8mm	
Nominal wire armour diameter:	0.9mm	
Oversheath thickness:	1.3mm	1.4mm
Approximate overall diameter:	11.7mm	12.3mm
Core colours:	Red, black	Red, yellow, blue

Sold by the metre (max. length in one piece 100m), and on 100m reels.

Order Code	Type	Price each
DM09K	2C Armour Cable Metr	£1.25
PB76H H20	100m 2C Armour Cable	£89.99
CW67X	3C Armour Cable Metr	£1.49
PB77J H24	100m 3C Armour Cable	£109.99

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Cable Glands for Armoured Cable



A kit of brass cable glands sufficient to terminate both ends of an armoured cable. The quality brass glands have a body thread of M20 with a thread length of 10mm and internal bore diameter of 11.8mm. They are manufactured to the requirements of BS6121 - Part 1. The kit comprises two brass glands, two galvanised locknuts, two brass earth tags and two shrouds. Suitable for use with our armoured cables DM09K and CW67X.

Order Code	Type	Price each
AP00A	Armoured Cable Gland	£3.95

Water Proof Plastic Conduit and End Fittings



A flexible, ribbed plastic conduit for carrying cable looms and protecting them against physical damage and ingress of water or other fluids. Ideal for outdoor wiring, the conduit can be routed over walls, in walls, beneath floors or below ground. Two sizes are available with inner bores of 13.8 or 17.2mm. Matching plastic end fittings for terminating conduit at junction boxes, etc. are also available; each comprises a main inner portion with threaded boss and securing ring for mounting in a panel hole, while the conduit is pressed into the other end. It is retained in position by sprung, hooked outer jaws which locate over the ribs and are clamped by a threaded outer ring. The fitting can be installed in panels up to 2.5mm thick. Conduit is sold per metre.

Bore	Minimum recommended radius bend	Panel hole clearance for end fitting
13.8mm	25mm	17.2mm
17.2mm	35mm	20.6mm

Order Code	Type	Price each
CC26D	Plastic Conduit 13.8	£1.05
CC27E	Plastic Conduit 17.2	£1.35
CC28F	End Fitting 13.8	£1.70
CC29G	End Fitting 17.2	£1.90

Minimum shrink temperature: 120°C
 Dielectric strength: 8kV/mm minimum
 Volume resistivity: 10¹³Ω/cm minimum
 Low temperature flexibility: Does not crack at -50°C
 High temperature resistance: Does not crack or soften
 Water absorption: 2% maximum
 The caps are resistant to fungus formation, do not contain elements that are corrosive to copper and are self-extinguishing.

Order Code	Type	Price each
MK00A	End Cap 10/4	50p
MK01B	End Cap 20/8	60p
MK02C	End Cap 40/14	£1.80

SCREENED CABLES Miniature Single-Core Lapped Screen



A single screened cable ideal for general audio connections especially in equipment where a large number of cables have to be packed into a small area. Stranded core, 7/0.1mm copper conductor with PVC insulation, lap screened and sheathed overall in grey PVC.

Overall diameter: 2mm
 Nom. conductor area: 0.055m²
 Capacitance (core to screen): 320pF/m
 Sold per metre (max length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR15R	Min Screened	22p
PB13P	100m Min Screened	£14.99

Single-Core Lapped Screen



A single screened cable ideal for general audio connections. Stranded core, 7/0.12mm copper conductor with PVC insulation, lap screened and sheathed overall in PVC.

Overall diameter: 3.0mm
 Nom. conductor area: 0.22mm²
 Capacitance (core to screen): 320pF/m

Available sheathed overall in Black, Grey or White. Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR12N	Cable Single Black	20p
PA79L	100m Cable Singl Blk	£12.99
XR13P	Cable Single Grey	20p
PA80B	100m Cable Singl Gry	£12.99
XR14Q	Cable Single White	20p
PA81C	100m Cable Singl Wht	£12.99



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 Level B: Quality Assurance
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Cable Blanking Caps

Insulating end caps for covering the exposed ends of multi-way cables and wiring looms which have been cut or where installation of equipment is not yet complete, but in the meantime power needs to be restored. The cap is a plastic tube closed at one end, and having a shallow constriction near the open end to help grip wires or sleeving. On fitting the cap is shrunk onto the cables by heating it to 120°C, and has the capacity to shrink down to less than half its original diameter. Three sizes are available as follows:



Code	Expanded diameter (as supplied)	Fully shrunken diameter	For cable diameter
MK00A	10mm	4mm	4 to 8mm
MK01B	20mm	7.5mm	8 to 16mm
MK02C	40mm	15mm	14 to 32mm

Specification
 Tensile strength: 11MPa minimum
 Ultimate elongation: 300% minimum
 Continuous operating temperature: -55°C to +100°C

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Single Screened Cable with Semiconducting Sheath and Double Layer Insulation



A single screened cable which has 20 x 0.12mm copper conductors with PVC insulation, a semiconducting layer, lapped screen and two layers of PVC outer insulation (outer black).

Overall diameter: 6mm
Nom. conductor area: 0.23mm²
Capacitance

(core to screen): 135pF/m

Sold per metre (Max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XS24B	Single Scrn Dble Lyr	75p
PB50E F9	Sgl Scr Dbl Lyr 100m	£49.99

Single-Core Braided Screen



A single screened cable ideal for connections to microphones. Stranded core, 16/0.2mm copper conductor with PVC insulation, braided screen and sheathed overall in black PVC.

Overall dia: 3.75mm
Nom. conductor area: 0.5mm²
Capacitance

(core to screen): 360pF/m

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR16S	Single Mic Cable	36p
PA16S C5	100m Singl Mic Cable	£24.99

Silver-Plated Screened Cable



High quality screened cable having a single 0.8mm centre conductor, silver-plated to a thickness of 100µ (microns, or 40µin.), in a polyethylene inner insulator. This is surrounded by a copper braid over foil screen, and sleeved overall in a brown sheath. Overall diameter is 8mm, and capacitance between conductor and screen is 53pF/m. Note: Silver Solder GW45Y must be used to solder silver wires.

Sold by the metre.

Order Code	Type	Price each
CC22Y	Silver Plated SC	£4.15

Pure Silver Screened Cable



High quality screened audio cable having 5/0.28mm extruded, pure silver strands as the centre conductor in a red polyethylene inner insulator, surrounded by a silverplated copper braid over foil screening, and covered overall in a translucent sheath.

Overall diameter is 8mm, and capacitance between conductor and screen is 64pF/m. Note that Silver Solder GW45Y must be used to solder silver wires. Sold by the 1/4 metre.

Order Code	Type	Price each
XS56L	1/4m Silver ScrCable	£4.65

THE BEST OF SERVICE

High Grade Shielded Audio Cable



High quality coax. cable for use in no-compromise audio applications. It features high purity, Oxygen Free Copper (OFC) conductors where each strand is bound tightly for maximum contact area and best electron flow. OFC conductors are completely oxygen free in order to eliminate surface oxidation, which will interfere with the efficiency of the conductor especially at high frequencies, where electron flow tends to be more concentrated at the surface.

The centre conductors are multi-strand bare OFC sheathed in a coax. insulator sleeve made of high density polyethylene, which is very resistant to deformation and therefore maintains the optimum distance required between the inner and screen throughout the length of the cable. The single bare OFC braided screen is sheathed in transparent extra flexible PVC, overall diameter 5mm. Strands of inner, 156/0.06mm. Max. working voltage, 200V peak. Working temperature, -10°C to 105°C. Suitable connectors are JZ07H or JZ08J. Sold per metre (max. length in one piece, 50m) and on 50m reels.

Order Code	Type	Price each
XS38R	Audio Cable	98p
PB62S C5	Audio Cable 50m	£37.99

Low Noise Screened Cable

A very low noise single screened cable ideal for use with low-level signals.

Stranded core, 10/0.1mm copper conductor with polythene insulation over which there is a layer of semi-conducting polythene. This is covered with a braided screen and sheathed overall in black PVC.

Overall dia.: 3.0mm
Nom. conductor area: 0.0785mm²
Capacitance
(core to screen): 102pF/m
Nominal impedance: 50Ω



IMPORTANT NOTE

It is most important when connected that the semi-conducting sheath should not be able to come into contact with the centre conductor or anything connected to the centre conductor, but that it should be stripped back to the braiding. The cable is only suitable for use at audio frequencies.

Sold per metre (max. length in one piece 25m). Also available on 25m reels.

Order Code	Type	Price each
XR18U	Low Noise Scnd	54p
PB14Q A1	25m Low Noise Scnd	£9.99

Twin Overall Lapped Screen

A twin screened cable ideal for general audio connections where crosstalk is not a problem. Stranded cores, 7/0.1mm copper conductors with red and blue PVC insulation, lap screened and sheathed overall in grey PVC. Cores are laid side by side in the cable such that the cable is oval in shape.



Overall size: 2 x 2.8mm
Nom. conductor area: 0.055mm²
Capacitance
(core to screen): 305pF/m
(core to core): 170pF/m

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR20W	Lapped Pair	25p
PB18U A2	100m Lapped Pair	£16.99



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Twin Overall Braided Screen



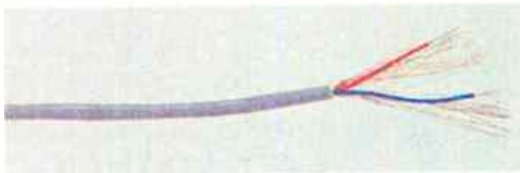
A twin screened cable ideal for use in low level balanced circuits e.g. low impedance balanced microphones. The cores are twisted together to assist in hum reduction. Stranded cores, 16/0.2mm copper conductors with red and black PVC insulation, braided screen and sheathed overall in black PVC.

Overall dia.: 6.3mm
 Nom. conductor area: 0.5mm²
 Capacitance
 (core to screen): 171pF/m
 (core to core): 120 pF/m

Sold per metre (max length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR08J	Twin Mic Cable	66p
PB17T G11	100m Twin Mic Cable	£43.99

Two-Core Lap-Screened Cable 7/0.2mm



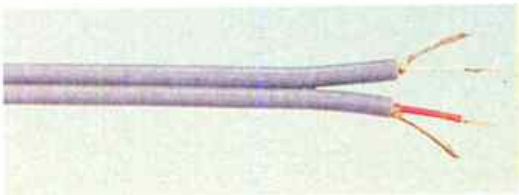
Two 7/0.2mm copper conductors with a blue and a red PVC insulation laid side-by-side and lap-screened and sheathed overall in grey PVC

Overall size: 3.1 x 4.7mm oval
 Capacitance: 272pF core to screen
 148pF core to core

Sold per metre (max length in one piece 100m). Also available on 100m reels

Order Code	Type	Price each
XS23A	Lapped Pair 7/0 2mm	32p
PB49D C5	100m Lap Pair 7/0.2mm	£24.99

Twin Individually Screened



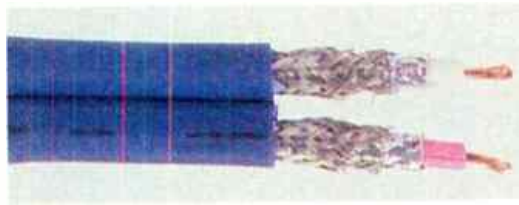
A twin screened cable having each core individually screened and laid side by side in a figure 'B' outer sheath thus keeping crosstalk problems to a minimum, but maintaining the advantages of a single cable. Stranded cores, 10/0.12mm: copper conductor with PVC insulation, lap screened and sheathed overall in grey PVC.

Overall size: 2.8 x 5.6mm
 Nom. conductor area: 0.0785mm²
 Capacitance
 (core to screen): 350pF/m

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR21X	Cable Twin	30p
PA17T B4	100m Cable Twin	£19.99

High Grade Shielded Audio Pair



A dual figure-8, individually screened pair, where the entire screen of each cable is composed from a layer of metallised mylar film under two layers of OFC (Oxygen Free Copper) braid, providing the most complete prevention against interference, and having a blue outer sleeve, diameter 6mm. The centre conductors are multi-strand bare OFC sheathed in a coax. insulator sleeve made of high density polyethylene. Strands are 91/0-08mm. Max. working voltage, 200V peak. Working temperature, -10°C to 105°C. Suitable connectors are JZ09K or JZ10L. Sold per metre (max. length in one piece, 50m) and on 50m reels.

Order Code	Type	Price each
XS39N	Audio Pair	£3.35
PB63T F13	Audio Pair 50m	£137.99

High Grade Common Screened Pair

A common screened pair of conductors within one round screen. The two inner are identified as red and white and are also screened with metallised mylar film under one braided OFC layer. The centre conductors are stranded 41/0-12mm bare OFC sheathed in a coax. insulator sleeve made of high density polyethylene. The outer sleeve is blue, overall diameter 7.3mm. Max. working voltage, 200V peak. Working temperature: -10°C to 105°C.

Sold per metre (max. length in one piece, 50m) and on 50m reels.



Order Code	Type	Price each
XS40T	Common Pair	£1.25
PB66W E7	Common Pair 50m	£44.99

Twin Overall Braided Screen Microphone Cable

A very flexible, high quality twin screened microphone cable available with five different colour outer sheaths. Stranded cores, 12/0.18mm copper conductors with red and white PVC insulation, braided screen and sheathed overall in black, blue, green, red or yellow PVC. Overall diameter: 6.2mm.

Sold per metre (max. length in one piece 100m) and on 100m reels.



Order Code	Type	Price each
XR98G	Fleximic Black	46p
PA89W G10	100m Fleximic Black	£33.99
XR97F	Fleximic Blue	65p
PA88V G10	100m Fleximic Blue	£54.99
XR99H	Fleximic Green	65p
PA90X G10	100m Fleximic Green	£54.99
XS01B	Fleximic Red	65p
PA92A G10	100m Fleximic Red	£54.99
XS02C	Fleximic Yellow	65p
PA93B G10	100m Fleximic Yellow	£54.99

Twin Individually Screened Microphone Cable



A very flexible, high quality twin screened microphone cable. Stranded cores 14/0.18mm copper conductors with red and white PVC insulation, individually lap-screened and sheathed overall in grey PVC. Overall diameter: 6.2mm.

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR90X	HD Fleximic	48p
PB39N G10	100m HD Fleximic	£34.99

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Twin Individually Screened Cable with Semiconducting Sheaths



A twin individually screened cable which has 20 x 0.12mm copper conductors in each core, with colour coded PVC insulation, individual semiconducting layers, individual lapped screen and black PVC outer insulation.

Overall Diameter: 6.5mm
 Nominal Conductor Area: 0.23mm²
 Capacitance (core to screen): 135pF/m
 Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XS26D	Twin Single Scrm SS	98p
PB52G	G12 Twn Sgl Scrm SS 100m	£67.99

Four-Core Overall Lapped Screen



A four-core cable with an overall lapped screen available with two different colour outer sheaths. Stranded cores 7/0.12mm copper conductor with red, white, black and yellow PVC insulation, lap screened and sheathed overall in grey or black PVC. Overall diameter: 4.5mm.

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR92A	Lapped 4-Core Grey	34p
PB41U	C5 100m Lap 4-Core Grey	£25.99
XR91Y	Lapped 4-Core Black	36p
PB40T	C5 100m LAP 4-Core Bkck	£26.99

- 5 White
- 6 Black
- 7 Brown
- 8 Violet
- 9 Orange
- 10 Pink
- 11 Turquoise
- 12 Grey
- 13 Red/Blue
- 14 Green/Red
- 15 Yellow/Red
- 16 White/Red
- 17 Red/Black
- 18 Red/Brown
- 23 Yellow/Green
- 24 White/Green
- 25 Orange/Green
- 26 Green/Blue
- 27 Grey/Blue
- 28 Green/Black
- 29 Grey/Green
- 30 Yellow/Brown
- 31 White/Brown
- 32 Brown/Black
- 33 Grey/Brown
- 34 Yellow/Violet
- 35 Violet/Black
- 36 White/Violet

The following sizes are available:

- 6-core (overall diameter 3.55mm)
- 9-core (overall diameter 4.25mm)
- 15-core (overall diameter 5.35mm)
- 25-core (overall diameter 6.3mm)
- 36-core (overall diameter 6.9mm)

Sold per metre (max. length in one piece 100m).

Order Code	Type	Price each
XR26D	Multi-Core 6-Way	62p
XR27E	Multi-Core 9-Way	82p
XR28F	Multi-Core 15-Way	95p
XR46A	Multi-Core 25-Way	£1.45
XR54J	Multi-Core 36-Way	£1.98

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Four-Core Individually Screened



A four-core screened cable having each core individually screened, thus keeping crosstalk to a minimum. Stranded cores, 7/0.1mm copper conductor with yellow, black, red and white polythene insulation, lap screened and sheathed overall in grey PVC.

Overall size: 5mm
 Nom. conductor area: 0.055mm²
 Capacitance (core to screen): 95pF/m
 Sold per metre (max. length in one piece 50m) and on 50m reels.

Order Code	Type	Price each
XR23A	Cable Quad	45p
PA18U	A3 50m Cable Quad	£16.99

Four Core Overall Braided Screen



A four core screened cable with particular application in quadrasonic equipment where crosstalk is not a problem. Stranded cores, 7/0.1mm tinned copper conductor with PVC insulation (red, blue, green and yellow), wrapped overall in Melinex tape then covered with a braided screen and sheathed in grey PVC.

Overall diameter: 3.15mm
 Nominal conductor area: 0.055mm²
 Maximum working voltage: 250V RMS
 Maximum current per core: 0.25A
 Capacitance (core to screen): 190pF/m

Sold per metre (max. length in one piece 100m).

Order Code	Type	Price each
XR25C	Multi-Core 4-Way	52p

Multi Core Screened Cable



A range of multi core cables having overall screens. Stranded cores 7/0.1mm tinned copper conductors with PVC insulation wrapped overall in Melinex tape then covered with a braided screen and sheathed in grey PVC.

Cables conform to DEF STAN 61-12 parts 4 and 5.

Nominal conductor area: 0.055mm²
 Maximum working voltage: 250V RMS
 Maximum current per core: 0.25A
 Capacitance (core to screen): 190pF/m

- Core colours:
- 1 Red
 - 2 Blue
 - 3 Green
 - 4 Yellow
 - 19 Yellow/Blue
 - 20 White/Blue
 - 21 Blue/Black
 - 22 Orange/Blue

Overall Foil and Braided Screen Multi Core Cable

A range of double screened (foil and braid) multi core cables; which are ideal as computer data cables e.g. RS232 & Centronics interface standards. Each core is 7/0.2mm tinned copper, covered with colour coded PVC insulation. The cores are double screened in overlapping metal foil (inner screen) and braided wire screen (outer screen). Outer insulation is grey PVC. Available in 4, 8, 12, 20 and 36-ways.



- Core colours:
- 1 White
 - 2 Yellow
 - 3 Orange
 - 4 Green
 - 5 Red
 - 6 Blue
 - 7 Purple
 - 8 Brown
 - 9 Grey
 - 10 Light Green
 - 11 Pink
 - 12 Light Blue
 - 19 Blue/Black
 - 20 Purple/Black
 - 21 Brown/Black
 - 22 Grey/Black
 - 23 Light Green/Black
 - 24 Pink/Black
 - 25 Light Blue/Black
 - 26 Black/White
 - 27 Yellow/White
 - 28 Orange/White
 - 29 Green/White
 - 30 Red/White

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BS 5750 Part 2 1987 Level B: Quality Assurance RS12750

- 13 Black
- 14 White/Black
- 15 Yellow/Black
- 16 Orange/Black
- 17 Green/Black
- 18 Red/Black
- 31 Blue/White
- 32 Purple/White
- 33 Brown/White
- 34 Grey/White
- 35 Light Green/White
- 36 Pink/White

Note: where two colours are shown; the first is the main colour and the second is the stripe colour.

Specifications

Voltage rating:	440V RMS
Maximum current per core:	1A
Nominal conductor area:	0.22mm ²
Operating temperature:	70°C max.
Overall diameter	
4-core:	4.3mm
8-core:	6.3mm
12-core:	6.9mm
20-core:	8.6mm
36-core:	10.8mm
Sold per metre (max. length in one piece 100m).	
Also available on 100m reels.	

Order Code	Type	Price each
XS18U	4 Core Scnd 7/0.2mm	65p
XS19V	8 Core Scnd 7/0.2mm	86p
XS20W	12 Core Scnd 7/0.2mm	£1.10
XS21X	20 Core Scnd 7/0.2mm	£1.49
XS22Y	36 Core Scnd 7/0.2mm	£2.30
PB44X	E7 100m 4 Core Scnd	£44.99
PB45Y	H14 100m 8 Core Scnd	£59.99
PB46A	H18 100m 12 Core Scnd	£74.99
PB47B	H26 100m 20 Core Scnd	£104.99
PB48C	H44 100m 36 Core Scnd	£164.99

Coiled Screened Cable



A single screened extendible cable with tinned prepared ends. Length 6m. Sheath available in Red and Black.

Order Code	Type	Price each
BH30H	Scr Stretchflex Blk	£5.49
BH34M	Scr Stretchflex Red	£5.49

Twin Screened Coiled Cable



A coiled extendible cable with two overall screened conductors in a black PVC sheath. Length 6m.

Order Code	Type	Price each
HQ49D	Twin Stretchflex	£5.99

60W MAGNIFIER DESK LAMP

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A magnifying lamp which is a practical and functional aid for hobbyists and whenever magnification and extra light are needed for tiny items. It comes with a 60W incandescent bulb and a 1.75x magnification lens. It has an impact resistant, coloured plastic shade and a well balanced, easily adjustable angle-poise arm. Provided with clamp for table fixing.
Dimensions: arm length: 80cm; shade, 22 x 8cm. Colour: grey.



RF CABLES

Low Capacity Screened Cable/UR76



A high quality screened cable for high performance audio connections. Stranded core, 7/0.32mm plain copper conductor with polythene insulation, braided screen and sheathed overall in black PVC.

Overall diameter:	5mm
Capacitance (core to screen):	100pF/m
Maximum voltage:	2.0kV
Nominal impedance:	50Ω

This cable is also suitable for use at RF and has characteristics superior to UniRadio UR76/RG58C.

Attenuation per 10m:	2.0dB at 100 MHz
	7.6dB at 1000 MHz

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR19V	Low C Cable	39p
PB15R	F9 100m Low C Cable	£29.99

50 Ohm Screened Cable RG58



A screened RF cable having a stranded core 17/0.19mm tinned copper conductor with a solid polyethylene insulator and a braided copper screen. Sheathed overall in black PVC.

Overall diameter:	5mm
Centre conductor:	17/0.19mm
Nominal impedance:	50Ω
Attenuation per 10m:	2dB at 100MHz
	7.6dB at 1000MHz

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XS51F	50 Ohm Cable	36p
PB64U	E7 50 Ohm Cable 100m	£22.99

Heavy Duty RF Cable/UR67



A high quality co-axial cable ideal for use as a transmitter up-lead. Stranded core, 7/0.77mm copper conductor with solid polythene insulation, braided screen and sheathed overall in black PVC.

Overall diameter:	10.3mm
Capacitance (core to screen):	100pF/m
Max. voltage:	6.5kV
Nominal impedance:	50Ω
Attenuation per 10m:	0.68dB at 100MHz
	2.52dB at 1000MHz

Sold per metre (max. length in one piece 50m). Also available on 50m reels.

Order Code	Type	Price each
XR63T	UR67 RF Cable	£1.48
PB16S	H19 50m UR67 RF Cable	£59.99

75 Ohm Screened Cable RG59B/U



A screened cable having an impedance of 75Ω, single solid centre conductor, high density polyethylene insulator and braided copper screen. Sheathed overall in black PVC.

Overall dia.:	6mm
Centre conductor:	1/0.65mm
Nominal impedance:	75Ω
Attenuation per 10m:	1.3dB at 100MHz
	4.6dB at 1000MHz

Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS52G	75 Ohm Cable	36p
PB65V	F8 75 Ohm Cable 100m	£24.99

Low Loss RF Cable URM70



High quality coaxial cable suitable for general VHF and UHF use. Stranded core, 7/0-19mm plain copper conductor with high density polyethylene insulation. Screen is braided plain copper sheathed overall in black PVC.

Overall diameter:	5.8mm
Impedance:	75Ω
Capacitance (core to screen):	67pF/metre
Max. voltage:	14kV DC, 1-8kV peak RF
Attenuation per 10m:	1.5dB at 100MHz 5.2dB at 1000MHz

Sold per metre (max. length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XS32K	URM70 Cable	38p
PB57M F8	URM70 Cable 100m	£26.99

RADIO AND TV AERIAL CABLES

Miniature Co-ax



A very high quality miniature coax cable suitable for short interconnections between, for example, computer and monitor or TV, video recorders and similar applications. The cable has a 1/0.4mm tinned copper conductor with expanded foam insulation, a good quality braided screen and a thin outer grey sheath.

Overall dia.	2.8mm
Nominal impedance:	75Ω

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR88V	Miniature Coax	36p
PB19V A2	100m Miniature Coax	£24.99

Low-Loss Co-ax



A low-loss co-axial cable intended for use as aerial downloads for UHF television sets. Solid core, 1/1.0mm copper conductor with cellular polythene insulation, braided screen and sheathed overall in brown and white PVC.

Overall dia:	6.6mm
Nom. conductor area:	0.786mm ²
Capacitance (core to screen):	56pF/m
Nominal impedance:	75Ω
Attenuation per 10m:	0.75dB at 100MHz 2.6dB at 900MHz

Sold per metre (max length in one piece 100m) and on 100m reels.

Order Code	Type	Price each
XR29G	Brown Low-loss Coax	30p
PA21X F9	100m Low Loss Coax	£18.99
XR87U	White Low-loss Coax	30p
PA78K F8	100m L/Loss Coax Wht	£18.99

Satellite TV Cable CT100



Superior quality double-screened, ultra low loss coaxial cable where screening comprises a continuous copper-mylar foil beneath a conventional braided copper screen. 5-celled polyethylene insulator. Sheathed overall in black, or white PVC.

Overall dia.:	6.6mm
Nom. conductor area:	1mm ²
Nominal impedance:	75Ω
Attenuation per 100m:	6.4dB at 100MHz 21dB at 1000MHz

Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS16S	Sat Coax Cable Black	60p
PB42V G12	100m Sat Coax Black	£39.99
XS17T	Sat Coax Cable White	60p
PB43W G12	100m Sat Coax White	£39.99

Low Loss Satellite Cable CT125



Uprated version of XS16S. 5-celled polyethylene insulator. Sheathed overall in black PVC.

Overall dia.:	7.8mm
Nom. conductor area:	1.25mm ²
Nominal impedance:	75Ω
Attenuation per 100m:	4.9dB at 100MHz 18.74dB at 1000MHz

Sold per metre (max. length in one piece, 100m) and on 100m reels. A 6mm F Plug fits this cable.

Order Code	Type	Price each
XS46A	LL Sat Cable	78p
PB59P H16	LL Sat Cable 100m	£51.99

Combined Download and Polariser Cable



A weather-proof cable specifically intended for use with satellite TV installations. The cable consists of a low-loss double screened RF download and polariser cable, side by side in figure-8 configuration. The RF download consists of a 1.0mm diameter solid copper conductor, surrounded by a 4.4mm diameter isolating layer and double screened with 0.1mm thick overlapping foil and braided screen. The cable is protected by an outer 0.8mm PVC sheath. Overall diameter (excluding web and adjacent cable) 6.8mm. The polariser cable consists of three stranded copper conductors 16/0.2mm sheathed with colour coded insulation (red, green and black). The cable is protected by an outer 0.8mm PVC sheath. Overall diameter (excluding web and adjacent cable) 3.9mm. Colour black. Sold per metre.

Order Code	Type	Price each
XS30H	Sat RF & Polar Cable	£1.00

Actuator Power and Control Cable



A weather-proof cable specifically intended for use with satellite TV installations. The power conductors consist of two stranded 32/0-22mm copper conductors, insulated by colour coded PVC insulation (blue and brown). A round PVC 'fillet' (grey) is included to maintain cable geometry. The control conductors consist of three 0.5mm diameter solid tinned-copper conductors sheathed with colour coded PVC insulation (green, yellow and brown). The three conductors are overall screened with 0.03mm thick overlapping foil, connection to the foil screen is by means of a 0.5mm diameter bare copper conductor which is in contact with the foil. The power and control conductors are overall wrapped in a melinex tape and the cable is protected by an 0.8mm PVC sheath. Overall diameter 7.3mm. Colour white. Sold per metre.

Order Code	Type	Price each
XS31J	Sat Actuator Cable	£1.48

300-Ohm Feeder



A balanced feeder cable intended for use as aerial downloads on European, Japanese and American tuners having no 75 ohm input. Stranded cores, 7/0-23mm copper conductors with clear polythene insulation.

Overall size:	9.8 x 2mm
Nom. conductor area:	0.34mm ²
Capacitance (core to core):	13.2pF/m
Nominal impedance:	300Ω
Attenuation per 10m:	0.12dB at 100MHz 1.68dB at 1000MHz

Sold per metre (max. length in one piece 100m). Also available on 100m reels.

Order Code	Type	Price each
XR31J	Bal Feeder	30p
PB20W A3	100m Bal Feeder	£19.99

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VIDEO CABLES

A range of connecting cables made to a very high quality of construction, containing both screened and unscreened conductors in different combinations. Applications include carrying high quality audio and/or video signals between equipment using multi-way connectors such as the Peritel (SCART) type. Recommended for use anywhere where external interference and crosstalk must be kept to a minimum. Four different styles are available as follows:

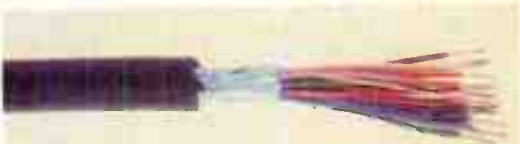
9-Way Overall Screened



Contains a bundle of 9 wires colour coded Black, Brown, Red, Orange, Green, Yellow, Blue, Purple and Grey. Each conductor has 7/0.12mm tinned strands. The whole group is wrapped with a metallised mylar film acting as the screen, which is in contact with a single uninsulated tinned stranded earth conductor with 7/0.155mm strands. Ideal for multi-way audio signals where cross-talk is not a problem. Outer sheath is soft matt black PVC to an overall diameter of 6mm. A cable suitable for making up 'Composite Video and Audio' Peritel cables. This cable should be used for short runs only, otherwise crosstalk between conductors may become a problem. Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS42V	9 Way Cable	65p
PB68Y G14	9 Way Cable 100m	£34.99

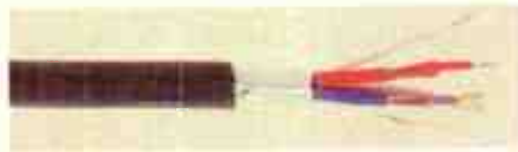
20-Way Overall Screened



Comprising a bundle of 20 insulated wires colour coded Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Grey, White, White/Black, Red/Black, Orange/Black, Yellow/Black, Grey/Black, Blue/Black, Violet/Black, Pink, Sky Blue and Cyan. Each wire has 7/0.12mm tinned strands. The whole group is wrapped with a metallised mylar film acting as the screen, which is in contact with a single uninsulated tinned stranded earth conductor of 7/0.155mm strands. Outer sheath is soft matt black PVC to an overall diameter of 9mm. A cable suitable for making up 'Universal' Peritel cables, where all 21 pins are to be connected. This cable should be used for short runs only, otherwise crosstalk between conductors may become a problem. Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS44X	20 Way Cable	86p
PB70M H19	20 Way Cable 100m	£49.99

2 Screened Cables, One 4-Way Screened, One Single Wire



Contains one red and one blue individually lap-screened, stranded conductors, with high density polyethylene insulators which resist deformation, suitable for two-way video signal traffic. Centre cores are 10/0.115mm strands, and are untinned bare copper as are the screens. Another separate bundle comprises single Red, Black, Yellow and White insulated, bare copper 10/0.11mm stranded wires, sheathed overall with a metallised film screen in contact with an uninsulated stranded conductor which is soldered together into a solid core, and then in grey PVC. The whole cable is completed by one other isolated, single white 10/0.115mm stranded bare copper wire. The whole group is then wrapped in metallised mylar film, which again includes an uninsulated and soldered, stranded conductor as an earth wire. Outer sheath is soft matt black PVC to an overall diameter of 8mm. A cable suitable for making up 'Composite Video and Audio' Peritel cables, where composite Video, Audio and Function Switching connections are to be provided. Individually screened conductors should be used for video in and out signals. 4-way screened conductors should be used for L+R Audio in and out signals. The remaining single conductor should be used for function switching. Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS41U	2 x Screen Cable	89p
PB67X G14	2 x Screen Cable 100m	£51.99

6 Screened Cables, One 4-Way Screened, Four Single Wires



An expanded version of XS41U having Black, Red, Yellow, Green, Blue and White individually lap-screened, stranded cores, with high density polyethylene insulators, also suitable for video signals. Centre cores are 10/0.115mm strands, and are untinned bare copper as are the screens. Similarly a separate bundle is also provided comprising single Red, Black, Yellow and White insulated, bare copper 7/0.12mm stranded wires, sheathed overall with a metallised film screen in contact with an uninsulated stranded conductor soldered into a solid core, and then in grey PVC. Four independent insulated Blue, Red, Yellow and White 10/0.115mm stranded bare copper wires are also provided. The whole bundle is then wrapped in metallised mylar film, which again contacts an uninsulated and soldered, stranded conductor. Outer sheath is soft matt black PVC to an overall diameter of 10.5mm. A cable suitable for making up 'Universal' Peritel cables, where all inputs and outputs are to be connected. The additional individually screened conductors should be used for R, G, B and blanking signals, whilst the additional individual single conductors should be used for data communication signals. Other conductors should be connected as type 3 above. Sold per metre (max. length in one piece, 100m) and on 100m reels.

Order Code	Type	Price each
XS43W	6 x Screen Cable	£1.70
PB69A H28	6 x Screen Cable 100m	£104.99

SLEEVING

Heat-Shrinkable Sleeving

A heat-shrinkable crosslinked polyolefin material which will shrink to 50% of its original diameter when heated over 121°C. Sleeving has high tensile strength (12MPa). It is resistant to solvents, acids, alkalis, fuel and oil. The continuous operating temperature should be between -55°C and +125°C. Self-extinguishing. Breakdown voltage >7kV. Colour is black.

Type	Size as supplied (bore)	Size (max) after shrinkage	Wall thickness (min) after shrinkage	Break-down voltage
CP16	1.6mm	0.8mm	0.46mm	7kV
CP24	2.4mm	1.2mm	0.51mm	8.6kV
CP32	3.2mm	1.6mm	0.51mm	8.6kV
CP48	4.8mm	2.4mm	0.51mm	8.6kV
CP64	6.4mm	3.2mm	0.64mm	11kV
CP95	9.5mm	4.8mm	0.64mm	11kV
CP127	12.7mm	6.4mm	0.64mm	11kV

Supplied in 1m lengths and in 5m hanks.

Order Code	Type	Price each
BF86T	Heat Shrink CP 16	75p
PB21X	5m Heat Shrink CP16	£3.25
BF87U	Heat Shrink CP 24	80p
PB22Y	5m Heat Shrink CP24	£3.60
BF88V	Heat Shrink CP 32	86p
PB23A	5m Heat Shrink CP32	£3.75
BF89W	Heat Shrink CP 48	98p
PB24B	5m Heat Shrink CP48	£4.35
BF90X	Heat Shrink CP 64	£1.10
PB25C	5m Heat Shrink CP64	£4.95
YR17T	Heat Shrink CP 95	£1.32
PB26D	5m Heat Shrink CP95	£5.95
YR18U	Heat Shrink CP 127	£1.48
PB27E	5m Heat Shrink CP127	£6.75

Low Temperature Heatshrink Tubing



A range of flexible low temperature shrink polyolefin tubing that is easy to use and is suitable for both electrical and mechanical protection. Ideal for high volume production lines in automotive, domestic appliance and all cable harness manufacture. When heated above 80°C the tubing will shrink, unrestricted, to a minimum of 50% of its supplied diameter. The tubing is resistant to common fluids and solvents. Colour black.

Specification	
Operating temperature:	-55°C to +125°C
Minimum shrink temperature:	80°C
Dielectric strength:	20kV/mm
Flammability:	non-flame retardant

Dimensions

Stock Code	Expanded internal dia. mm	Recovered (after heating above 80°C) internal maximum dia. mm	Recovered (after heating above 80°C) wall thickness nominal mm
RZ57M	1.6	0.8	0.45
RZ58N	2.4	1.2	0.51

Continued on next page.

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Continued from previous page.

RZ59P	3.2	1.6	0.51
RZ60Q	4.8	2.4	0.51
RZ61R	6.4	3.2	0.64
RZ65V	9.5	4.8	0.64

Supplied in 1m or 5m lengths

Order Code	Type	Price each
RZ57M	Low H/Shrink 1.6 1m	£1.20
RZ90X	Low H/Shrink 1.6 5m	£5.29
RZ58N	Low H/Shrink 2.4 1m	£1.28
RZ91Y	Low H/Shrink 2.4 5m	£5.29
RZ59P	Low H/Shrink 3.2 1m	£1.36
RZ92A	Low H/Shrink 3.2 5m	£5.49
RZ60Q	Low H/Shrink 4.8 1m	£1.48
XS45Y	Low H/Shrink 4.8 5m	£6.49
RZ61R	Low H/Shrink 6.4 1m	£1.56
XS48C	Low H/Shrink 6.4 5m	£6.99
RZ65V	Low H/Shrink 9.5 1m	£1.75
XS49D	Low H/Shrink 9.5 5m	£7.99

'Earthing' Heatshrink Tubing



A high performance, flexible multi-purpose, yellow/green, striped heat-shrinkable tubing that is made from a specially formulated polyolefin material, offering excellent electrical, chemical and physical properties. Particularly recommended where the international electrical ground designation is intended. When heated above 120°C the tubing will shrink, unrestricted, to a minimum of 50% of its supplied diameter. The tubing is resistant to common fluids and solvents.

Specification

Operating temperature:	-55°C to +135°C
Minimum shrink temperature:	120°C
Dielectric strength:	20kV/mm
Flammability:	highly flame retardant

Dimensions

Stock Code	Expanded internal dia. mm	Recovered internal max dia. mm	wall thickness nominal mm
RZ66W	3.2	1.6	0.51
RZ67X	4.8	2.4	0.51
RZ68Y	6.4	3.2	0.64
RZ69A	9.5	4.8	0.64
RZ70M	12.7	6.4	0.64

*After heating to above 120°C

Supplied in 1m or 5m lengths

Order Code	Type	Price each
RZ66W	Earth Shrink 3.2 1m	£1.12
XS50E	Earth Shrink 3.2 5m	£5.19
RZ67X	Earth Shrink 4.8 1m	£1.40
XS53H	Earth Shrink 4.8 5m	£6.49
RZ68Y	Earth Shrink 6.4 1m	£1.49
YU48C	Earth Shrink 6.4 5m	£6.99
RZ69A	Earth Shrink 9.5 1m	£1.85
YU62S	Earth Shrink 9.5 5m	£8.99
RZ70M	Earth Shrink 12.7 1m	£2.10
YU63T	Earth Shrink 12.7 5m	£9.99

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High Shrink Ratio Tubing



A flexible, flame retardant, heat-shrinkable polyolefin tubing with a 3:1 shrink ratio. The tubing has a thin wall and good resistance to common fluids and solvents. When heated above 120°C the tubing will shrink unrestricted to a minimum of 33% of its supplied diameter. The tubing has an operating temperature range of -55°C to +135°C and a dielectric strength of 20kV/mm minimum. Colour is black. Sold per metre and in 5m lengths.

Type	Internal diameter as supplied	Internal diameter after shrinkage maximum	Wall thickness nominal
CPX300/30	3mm	1mm	0.55mm
CPX300/60	6mm	2mm	0.65mm
CPX300/90	9mm	3mm	0.75mm
CPX300/120	12mm	4mm	0.75mm

Order Code	Type	Price each
KC41U	CPX300/30	£1.28
CK81C	CPX300/30 5m	£5.79
KC42V	CPX300/60	£1.56
CK82D	CPX300/60 5m	£6.99
KC44X	CPX300/90	£1.68
CK83E	CPX300/90 5m	£7.99
KC43W	CPX300/120	£1.98
CK84F	CPX300/120 5m	£8.99

Heat-Shrinkable Tubing with Adhesive Inner Liner



A semi-flexible tubing with a meltable adhesive inner liner which flows when heated. After shrinkage and upon cooling this provides a moisture proof seal over the product covered. Suitable for a wide range of applications, such as encapsulation of cables, wires, splices, breakouts and components. The tubing has a continuous operating temperature range of -55°C to +110°C and when heated above 120°C will shrink unrestricted to 33% of its supplied diameter. The tubing is flame retardant and has a dielectric strength of 20kV/mm minimum. Supplied in lengths of 1.2m only and colour is black.

Type	Internal diameter as supplied	Internal diameter maximum	Total wall thickness nominal	Meltable wall only thickness
CPA100/30	3mm	1mm	1mm	0.5mm
CPA100/60	6mm	2mm	1mm	0.5mm
CPA100/90	9mm	3mm	1.4mm	0.6mm
CPA100/120	12mm	4mm	1.75mm	0.7mm

Order Code	Type	Price each
KC45Y	CPA100/30	£2.25
KC46A	CPA100/60	£2.95
KC47B	CPA100/90	£3.45
KC48C	CPA100/120	£3.95

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01702 553935**

Lay Flat Heat-Shrinkable Tubing



A multi-purpose polyvinylchloride heat-shrinkable tubing supplied in lay flat form. The tubing has an ultra thin wall, is semi-rigid and is ideal for covering batteries, capacitors and other components. When heated above 80°C the tubing will shrink unrestricted to a minimum of 45% of its supplied diameter. The tubing has a continuous operating temperature range of -20°C to +85°C, and a dielectric strength of 20kV/mm. Colour is white. Sold per metre and in 5 metre lengths.

Type	Lay flat width	Wall thickness
CHT16.5	16.5mm	0.07mm
CHT24	24mm	0.1mm
CHT37	37mm	0.1mm
CHT43	43mm	0.1mm
CHT57	57mm	0.15mm
CHT67	67mm	0.15mm

Order Code	Type	Price each
BA01B	CHT16.5	28p
CK85G	CHT16.5 x 5m	£1.25
BA02C	CHT24	36p
CK86T	CHT24 x 5m	£1.60
BA03D	CHT37	48p
CK87U	CHT37 x 5m	£2.10
BA04E	CHT43	60p
CK88V	CHT43 x 5m	£2.65
BA05F	CHT57	86p
CK89W	CHT57 x 5m	£3.75
BA06G	CHT67	98p
CK90X	CHT67 x 5m	£4.25

Heat Resistant Sleeving

An impregnated glass fibre sleeving resistant up to 400°C. Bore: 2mm Available in Black and Red. Fibreglass based products may cause some skin irritation. It is recommended that gloves are worn when handling this product.

Sold only in one metre lengths

Order Code	Type	Price each
BL66W	Ht-Resist Sleeve Blk	28p
BL70M	Ht-Resist Sleeve Red	28p

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552941**

Insulating Sleeve

A PVC insulating sleeve suitable for use up to 85°C. Available in the following sizes and colours:

- 1mm bore: Black, Green and Red
- 2mm bore: Black, Green and Red
- 4mm bore: Black, Green and Red
- 6mm bore: Black
- 10mm bore: Black

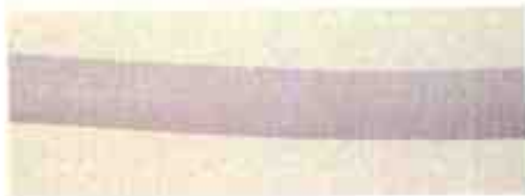
Available in one metre lengths and on 25m reels.

Order Code	Type	Price each
BH00A	Systoflex 1mm Black	12p
PB28F	25m Systoflex 1mm Blk	£1.75
BH02C	Systoflex 1mm Green	12p
PB29G	25m Systoflex 1mm Grn	£1.75
BH03D	Systoflex 1mm Red	12p
PB30H	25m Systoflex 1mm Red	£1.75
BH06G	Systoflex 2mm Black	15p
PB31J	25m Systoflex 2mm Blk	£2.49
BH08J	Systoflex 2mm Green	15p
PB32K	25m Systoflex 2mm Grn	£2.49
BH09K	Systoflex 2mm Red	15p
PB33L	25m Systoflex 2mm Red	£2.49
BH12N	Systoflex 4mm Black	24p
PB34M	25m Systoflex 4mm Blk	£3.99
BH14Q	Systoflex 4mm Green	24p
PB35Q	25m Systoflex 4mm Grn	£3.99
BH15R	Systoflex 4mm Red	24p
PB36P	25m Systoflex 4mm Red	£3.99
BH42V	Systoflex 6mm Black	32p
PB37S A1	25m Systoflex 6mm Blk	£4.99
BH43W	Systoflex 10mm Black	39p
PB38R A1	25m Systoflex 10mm Blk	£6.99

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Braided Sleeving

A modified heat stabilised, self-extinguishing, braided sleeving made from nylon 66. The sleeving has a working temperature up to 105°C and a melting point at 256°C. Available in four sizes. Colour grey. Sold per metre (max. length in one piece 25m).



Type	Nominal diameter (mm)
6TS/3N	3
6TS/4-6N	4
6TS/6-10N	6
6TS/10-14N	10

Order Code	Type	Price each
KC97F	Braid 6TS/3N	30p
KC98G	Braid 6TS/4-6N	45p
KC99H	Braid 6TS/6-10N	60p
BA00A	Braid 6TS/10-14N	86p

Snap-On Wire Markers

A range of wire markers used for identifying cables, in the form of a 'C' shaped ring which is simply pushed onto the wire required. Fast and easy to fit. The chevron shaped marker is flexible and the tongue arrangement



adjusts itself to fit cable insulation between 1.3 to 3mm diameter without sliding. The material is finest, soft grade, durable PVC that will resist oil, grease, acid

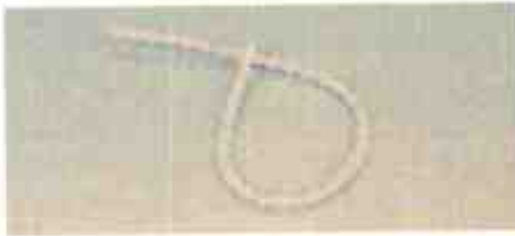
abrasion and other chemicals. The maximum in-service temperature is 85°C. Bold, black print on a yellow background shows your codes plainly, and any combination of numbers can be composed, including letters if desired, in any sequence by using several markers together side-by-side.

11 different legends are available: all numbers '0' to '9'; and an earth symbol. Sold in strips of 20 of each legend. If ordering a quantity of 1,000, supplied in one length on a reel.

Order Code	Type	Price each
UM35Q	Cable Marker-0	20p
UM36P	Cable Marker-1	20p
UM37S	Cable Marker-2	20p
UM38R	Cable Marker-3	20p
UM39N	Cable Marker-4	20p
UM40T	Cable Marker-5	20p
UM41U	Cable Marker-6	20p
UM42V	Cable Marker-7	20p
UM43W	Cable Marker-8	20p
UM44X	Cable Marker-9	20p
UM47B	Cable Marker-OVE	20p

CABLE TIES

Re-Usable Cable Tie



A locking re-usable cable tie. Length: 100mm (4in)

Order Code	Type	Price each
RK59P	Re-Usable Cable Tie	5p

Releasable Cable Ties

Tie-wraps which can be quickly and easily undone for access to wiring and then re-used. The operating principle is identical to ordinary cable ties except that a lever is included which if depressed releases the catch.



Length	Max dia.
125	33
150	38
200	51
300	84

All types are 8mm wide.

Order Code	Type	Price each
JY74R	Rel Tie 125	7p
JY75S	Rel Tie 150	8p
JY76H	Rel Tie 200	10p
JY77J	Rel Tie 300	12p

Self-Locking Cable Ties

Self-locking cable ties for simple and quick binding of cables or components.

Moulded in natural colour nylon, they are extremely strong and flame resistant to UL94 V2. Simply slip a tie-wrap around the bundle, thread up through head, pull tight and cut off. Available in five sizes in packs of 100 or individually. Dimensions in mm. For fixing gun, see Tools section.



Length (mm)	Max dia. (mm)	Width (mm)	Min Tensile Strength (kg)
100	25	2.5	8
142	35	3.2	18
203	55	2.5	8
203	55	4.6	22
385	116	4.8	22

Order Code	Type	Price each
BF91Y	Tie-Wrap 100	4p
BF92A	Tie-Wrap 142	5p
BF93B	Tie-Wrap 203/2.5	6p
FD99H	Tie-Wrap 203/4.6	8p
FE00A	Tie-Wrap 385	10p
FP16S	100pk Tie-Wrap 100	£2.49
FP17T	100pk Tie-Wrap 142	£2.99
FP18U	100pk TieWrp 203/2.5	£3.79
FP19V	100pk TieWrp 203/4.6	£4.49
FP20W	100pk Tie-Wrap 385	£7.49

Marker Cable Ties

Cable ties having a flat rectangular area which can be labelled or written on with an indelible marker to identify particular bundles of wires, looms or various other items which need to be marked.

CC24B has a rectangular extension at one end, at right angles to the strap direction and beyond the securing clip end, which will protrude beyond the loom and be easily noticeable. Tie CC25C has a similar right-angled area across the strap direction, but located inside the securing clip, so will lie flush with the loom.

Ties RT82D/83E/84F have a flat area incorporated into and inline with the strap portion near the securing clip, and which will also wrap around the loom out of the way.

Code	Length mm	Maximum diameter mm	Width mm	Minimum tensile strength kg
CC24B	110	25	25	8
CC25C	100	18	25	8.1
RT82D	188	43	48	22.7
RT83E	270	68	48	22.17
RT84F	340	85	48	22.17

All types available singly or in packs of 100.

Order Code	Type	Price each
CC24B	Marker Cable Tie 110	5p
CC25C	Marker Cable Tie 100	6p
RT82D	Marker Cable Tie 188	6p
RT83E	Marker Cable Tie 270	8p
RT84F	Marker Cable Tie 340	10p
AY25C	100 Pack Tie 110	£4.20
RT86T	100 Pack Tie 100	£1.65
RT88V	100 Pack Tie 188	£2.95
RT89W	100 Pack Tie 270	£5.25
RT90X	100 Pack Tie 340	£7.45



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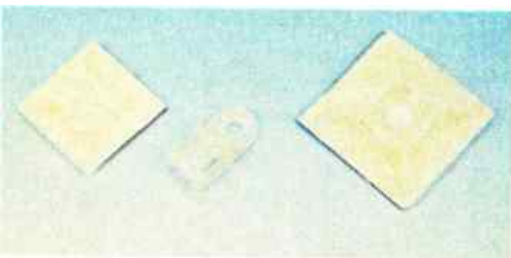
Push Mounted Cable Tie



A cable tie which can be press fitted into a panel hole at one end and support a loom or bundle of wires tidily against the panel or chassis wall. Available singly or in a pack of 100.

Order Code	Type	Price each
RT79L	Push Mount Tie Wrap	10p
RT85G	100 Pack Push Tie	£5.99

Cable Tie Bases



Two self-adhesive and one screw-down moulded cable tie base available singly or in packs of 50.

Type	Size (mm)	Max cable tie width (mm)
Small self-adhesive	19 x 19	4
Large self-adhesive	25 x 25	5
Screw fix	19 x 9.7	5

Order Code	Type	Price each
FE01B	Small Cable Tie Base	12p
BF94C	Large Cable Tie Base	14p
FE02C	Cable Tie Screw Base	5p
FP21X	50 Pk Small Base	£3.99
FP22Y	50 Pk Large Base	£5.49
FP23A	50 Pk Screw Base	£1.80

Cable Tie Pack



A packet of 75 self-locking cable ties for tidying wire and cable forms. The pack consists of 25 pieces of each of 3 different sizes. These are:

Large:	188mm(L) x 5mm(W) x 45mm(Max Dia)
Medium:	120mm(L) x 5mm(W) x 25mm(Max Dia)
Small:	91mm(L) x 2.5mm(W) x 20mm(Max Dia)

Order Code	Type	Price each
DK27E	75pc Cable Tie Pack	£2.99

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Lacing Cord

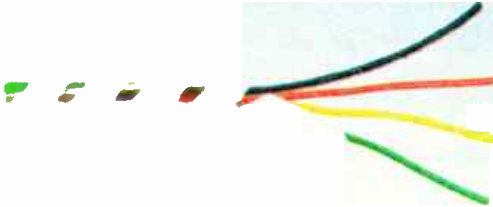


A high grade tubular nylon-cored cord covered with a flexible PVC coating. Suitable for lacing wire and cable forms. Conforming to DEF5020.

Outside diameter: 1.1mm
Working load: 10lbs
Breaking strain: 17lbs
Sold on 25m reels

Order Code	Type	Price each
BL65V	Lacing Cord	£2.40

Spiral Cable Wrap



An expandable polythene spiral binding which simply wraps around the cable-form gripping it tightly. It will follow any route taken by the cableform and wires can be easily led out from the form. Resistant to chemical attack and has a high electrical resistance. Available in three sizes.

Type	Unexpanded outside dia.	Wall thickness
1/8in	3.18mm	0.79mm
1/4in	6.35mm	1.15mm
1/2in	12.7mm	1.58mm

Type	Pitch between lead out points	Suitable for cable forms of diameter
1/8in	5.56mm	1.59 to 12.7mm
1/4in	9.53mm	4.76 to 50.8mm
1/2in	12.7mm	9.53 to 101.6mm

Supplied per metre (max. length in one piece 30m).

Order Code	Type	Price each
BL57M	Spirawrap 1/8in.	26p
BL58N	Spirawrap 1/4in.	36p
BL59P	Spirawrap 1/2in.	52p

CABLE CLIPS

Cable 'P' Clips

A range of nylon cable clamps moulded in natural colour nylon to UL94V-2. Nylon thickness 1.4mm. The following sizes are available to suit cables diameter:



Type	Fixing hole dia. (mm)	Width (mm)	Length (mm)
3-2 to 4-8mm	5-0	9-6	19-8
4-8 to 6-4mm	4-6	9-6	19-8
6-4 to 7-9mm	5-0	10-0	22-0
7-9 to 9-5mm	4-6	10-0	22-0
9-5mm to 12-7mm	4-6	12-0	24-0
12-7 to 15-8mm	4-6	12-0	31-0

Sold individually and in packs of 10.

Order Code	Type	Price each
JH21X	Cable P Clip 1/8in.	6p
LR44X	Cable P Clip 3/16in.	6p
LR45Y	Cable P Clip 1/4in.	7p
LR46A	Cable P Clip 5/16in.	7p
LR04E	Cable P Clip 3/8in.	8p
JH22Y	Cable P Clip 1/2in.	8p
JK95D	Pk 10 P Clip 1/8in	60p
JK96E	Pk 10 P Clip 3/16in	60p
JK97F	Pk 10 P Clip 1/4	70p
JK98G	Pk 10 P Clip 5/16in	70p
JK99H	Pk 10 P Clip 3/8in	76p
JL00A	Pk 10 P Clip 1/2in	76p



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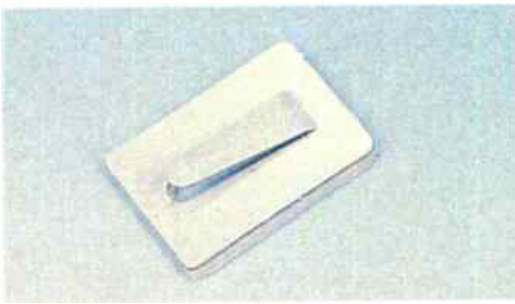
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Self-Adhesive Cable Fixings



Makes cabling simplicity itself. No more hammering nails into concrete, plaster etc. Just wipe the fixing surface to ensure that it is free from moisture, dust, oil or grease, peel off the clip's protective backing and press firmly into place on the surface. An average workman can fix 20 per minute – an enormous saving in labour time over conventional fixings. Also there is no noise – a further valuable advantage if cabling in occupied premises, hospitals etc.

The fixings are manufactured in 26swg zinc-finished electro-galvanised mild steel with cross-linked, acrylic adhesive coating on a cushion of closed cell polyethylene foam. The fixings will adhere to any clean flat surface; the foam cushion taking up any slight unevenness in the fixing surface giving maximum adhesion area.

Four types are available to suit different cable weights and sizes:

Type	Width (mm)	Size Height (mm)	Maximum Cable Diameter (mm)
Mini 4	15	20	4
4	20	30	4
8	25	38	8
12	38	42	12

Sold individually and in packs of 20.

Order Code	Type	Price each
FS58N	Safix Mini 4	16p
FS59P	20 Pk Safix Mini 4	£2.25
BH26D	Safix 4	18p
FS60Q	20 Pk Safix 4	£2.65
BH27E	Safix 8	20p
FS61R	20 Pk Safix 8	£2.85
BH28F	Safix 12	22p
FS62S	20 Pk Safix 12	£3.40

Plastic Cable Clips

A range of plastic cable clips manufactured from high impact polystyrene which is weatherproof and shatterproof. All of the round clips push fit onto the cable and grip it firmly leaving both hands free for positioning and fixing. Plated long life masonry nails are supplied with all clips except Round 2.75mm and Flat 4mm and 5mm which have carbon steel nails, blued for extra resilience.



The following sizes are available:

Type (mm)	Pin Length (mm)	Pin diameter (mm)	Suits Cable of overall size (mm)
Round 2.75	15	1	2 to 3
Round 3.5	15	1.5	3 to 3.75
Round 4	15	1.5	3.75 to 4.5
Round 5	20	1.5	4.5 to 5.5
Round 6	22	1.5	5.5 to 6.5
Round 7	22	1.5	6.5 to 7.5
Round 8	25	2	7.5 to 8.5
Round 9	25	2	8.5 to 9.5
Flat 4	15	1	Zip Wire
Flat 5	15	1	Twin Mains DS
Flat 9	25	2	1.5m ² TE
Flat 10	25	2	2.5m ² TE and 1mm ² Triple ECC
Flat 14	25	2	6mm ² TE

Round 5mm available in black for use with black telephone cable CW68Y.

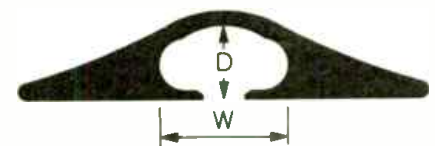
Sold in packs of 20 and boxes of 100.

Order Code	Type	Price each
BH18U	Hiatt Rd 2.75mm	36p
BH19V	Hiatt Rd 3.5mm	36p
BH20W	Hiatt Rd 4mm	36p
BH21X	Hiatt Rd 5mm	36p
RT63T	Hiatt Rd 5mm Blk 20	36p
BH22Y	Hiatt Rd 6mm	38p
BH23A	Hiatt Rd 7mm	42p
BH24B	Hiatt Rd 8mm	44p
BH36P	Hiatt Rd 9mm	48p
BH25C	Hiatt Flat 4mm	37p
BH37S	Hiatt Flat 5mm	40p
BH39N	Hiatt Flat 9mm	42p
BH40T	Hiatt Flat 10mm	47p
BH41U	Hiatt Flat 14mm	58p
YM00A	100 Hiatt Rd 2.75mm	£1.42
YM01B	100 Hiatt Rd 3.5mm	£1.42
YM02C	100 Hiatt Rd 4mm	£1.42
YM03D	100 Hiatt Rd 5mm	£1.42
CW40T	100 Hiatt Rd 5mm Blk	£1.42
YM04E	100 Hiatt Rd 6mm	£1.52
YM05F	100 Hiatt Rd 7mm	£1.68
YM06G	100 Hiatt Rd 8mm	£1.75
YM07H	100 Hiatt Rd 9mm	£1.92
YM08J	100 Hiatt Flat 4mm	£1.45
YM09K	100 Hiatt Flat 5mm	£1.56
YM11M	100 Hiatt Flat 9mm	£1.65
YM12N	100 Hiatt Flat 10mm	£1.86
YM13P	100 Hiatt Flat 14mm	£2.35

Cable Protector



A simple, effective and economical way to protect loose cables in offices, houses, workshops, showrooms etc. Formed from PVC and split along the length of its base. Cable Protect can be installed over existing cable(s) without the need to disconnect. Cable Protect is flexible, durable and is suitable for either permanent or temporary installation. Available in three sizes, coloured grey. Sold per metre (maximum length in one piece is 10m).



Type	W (mm)	D (mm)
CP9	16	9
CP12	20	12
CP16	27	16

Order Code	Type	Price each
KR30H	Protector CP9	£7.60
KR59P	Protector CP12	£9.60
KR60Q	Protector CP16	£14.99

FOR CASHTEL
Phone 01702 552941

Releasable Self-Adhesive Cable Clip

Black plastic cable clip with a 25 x 18mm base with self-adhesive pad. The clip can accommodate a cable or wire bundle up to 8mm diameter, and is unlocked by simply pressing down the lower finger tab which releases the teeth of the upper movable part.



Order Code	Type	Price each
JY73Q	Releasable Clip	25p

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Yes, the state-of-the-art Maplin key call system means that you can now place your orders directly into our computer, 24 hours a day, seven days a week by simply using your telephone keypad or a pocket tone dialler.

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CAPACITORS

Audio Grade	497	FM Sound Filters	502	Polystyrene	494
Can-style	499	High Frequency	498	Resonator	502
Ceramic	492	Interference Suppression	496	SAW Filter	503
Ceramic Filters	503	Memory Back-up	500	Silvered Mica	493
Crystals	502	Monolithic Ceramic	492	Snap-in	499
Crystal Sockets	502	Mylar	496	Tantalum	497
Disc Ceramic	493	Non-polarised Electrolytic	498	Trimmers	500
Electrolytic	498	Polycarbonate	494	Tuning	500
Feed-through	493	Polyester	494	TV IF Filters	502
Filters	502/503	Polypropylene	496	Variable	500

CAPACITOR FINDER

pF	nF	µF	Voltage (DC)	Tolerance	Type	Page	pF	nF	µF	Voltage (DC)	Tolerance	Type	Page					
1.8		100	±0.25pF	Ceramic	492	270	0.27	100	±5%	Ceramic	492	2700	2.7	0.0027	125	±1%	1% Polysty	494
2.2		100	±0.25pF	Ceramic	492	270	0.27	500	±1%	1% Polysty	494	3300	3.3	0.0033	100	±10%	Ceramic	492
2.7		100	±0.25pF	Ceramic	492	330	0.33	100	±5%	Ceramic	492	3300	3.3	0.0033	100	±10%	Monores	492
3.3		100	±0.25pF	Ceramic	492	330	0.33	350	±1%	Mica	493	3300	3.3	0.0033	125	±1%	1% Polysty	494
3.9		100	±0.25pF	Ceramic	492	330	0.33	500	±1%	1% Polysty	494	3300	3.3	0.0033	400	±10%	Poly Layer	494
4.7		100	±0.25pF	Ceramic	492	390	0.39	100	±10%	Ceramic	492	3900	3.9	0.0039	100	±10%	Ceramic	492
5		350	±0.5pF	Mica	493	390	0.39	500	±1%	1% Polysty	494	3900	3.9	0.0039	125	±1%	1% Polysty	494
5.6		100	±0.25pF	Ceramic	492	470	0.47	100	±10%	Ceramic	492	4700	4.7	0.0047	100	±5%	Miniprop	496
6.8		100	±0.25pF	Ceramic	492	470	0.47	100	±10%	MiniCarb	494	4700	4.7	0.0047	63	±20%	SubminEster	495
8.2		100	±0.25pF	Ceramic	492	470	0.47	100	±10%	Monores	492	4700	4.7	0.0047	100	±10%	Ceramic	492
10		100	±5%	Ceramic	492	470	0.47	100	±5%	Miniprop	496	4700	4.7	0.0047	100	±10%	MiniCarb	494
10		100	±5%	Monores	492	470	0.47	160	±5%	Polystyrene	494	4700	4.7	0.0047	100	±10%	Monocap	493
10		350	±0.5pF	Mica	493	470	0.47	350	±1%	Mica	493	4700	4.7	0.0047	100	±10%	Mylar	496
10		500	±10%	HV Disc	493	470	0.47	500	±1%	1% Polysty	494	4700	4.7	0.0047	100	±20%	MiniFoil	495
12		100	±5%	Ceramic	492	470	0.47	500	±10%	HV Disc	493	4700	4.7	0.0047	100	±20%	MiniFoil	495
15		100	±5%	Ceramic	492	560	0.56	100	±10%	Ceramic	492	4700	4.7	0.0047	125	±1%	1% Polysty	494
18		100	±5%	Ceramic	492	560	0.56	125	±1%	1% Polysty	494	4700	4.7	0.0047	160	±5%	Polystyrene	494
22		100	±5%	Ceramic	492	560	0.56	160	±5%	Polystyrene	494	4700	4.7	0.0047	400	±10%	Poly Layer	494
22		100	±5%	Ceramic	492	680	0.68	63	±10%	Ceramic	492	4700	4.7	0.0047	500	-20+80%	HV Disc	493
22		100	±5%	Monores	492	680	0.68	160	±5%	Polystyrene	494	4700	4.7	0.0047	1000	-20+80%	1000V Disc	493
22		160	±5%	Polystyrene	494	680	0.68	350	±1%	Mica	493	5600	5.6	0.0056	125	±1%	1% Polysty	494
22		350	±0.5pF	Mica	493	750	0.75	125	±1%	1% Polysty	494	6800	6.8	0.0068	63	±5%	Miniprop	496
27		100	±5%	Ceramic	492	820	0.82	100	±10%	Ceramic	492	6800	6.8	0.0068	100	±10%	Monores	492
33		100	±5%	Ceramic	492	1000	1	63	±20%	SubminEster	495	6800	6.8	0.0068	125	±1%	1% Polysty	494
33		350	±0.5pF	Mica	493	1000	1	100	±10%	Ceramic	492	6800	6.8	0.0068	160	±5%	Polystyrene	494
39		100	±5%	Ceramic	492	1000	1	100	±10%	MiniCarb	494	6800	6.8	0.0068	400	±10%	Poly Layer	494
47		100	±5%	Ceramic	492	1000	1	100	±5%	Miniprop	496	8200	8.2	0.0082	125	±1%	1% Polysty	494
47		100	±5%	Monores	492	1000	1	100	±10%	Monores	492	8200	8.2	0.0082	400	±10%	Poly Layer	494
47		350	±0.5pF	Mica	493	1000	1	100	±10%	Mylar	496	10,000	10	0.01	50	-20+80%	Disc	493
56		100	±5%	Ceramic	492	1000	1	100	±20%	MiniFoil	495	10,000	10	0.01	63	±5%	Miniprop	496
68		100	±5%	Ceramic	492	1000	1	100	±1%	1% Polysty	494	10,000	10	0.01	63	±1%	1% Polysty	494
68		350	±1%	Mica	493	1000	1	200	±10%	Monocap	493	10,000	10	0.01	63	±10%	MiniEster	495
82		100	±5%	Ceramic	492	1000	1	350	±1%	Mica	493	10,000	10	0.01	63	±20%	SubminEster	495
100	0.1	100	±5%	Ceramic	492	1000	1	350	-20+80%	Feed Thro	493	10,000	10	0.01	100	-20+80%	Ceramic	492
100	0.1	100	±5%	Monores	492	1000	1	400	±10%	Poly Layer	494	10,000	10	0.01	100	±10%	MiniCarb	494
100	0.1	100	±5%	Miniprop	496	1000	1	500	-20+80%	HV Disc	493	10,000	10	0.01	100	±10%	Monocap	493
100	0.1	100	±10%	MiniCarb	494	1000	1	1000	-20+80%	1000V Disc	493	10,000	10	0.01	100	±10%	Monores	492
100	0.1	160	±5%	Polystyrene	494	1200	1.2	100	±10%	Ceramic	492	10,000	10	0.01	100	±20%	MiniFoil	495
100	0.1	350	±1%	Mica	493	1200	1.2	125	±1%	1% Polysty	494	10,000	10	0.01	160	±5%	Polystyrene	494
100	0.1	500	±1%	1% Polysty	494	1500	1.5	100	±10%	Ceramic	492	10,000	10	0.01	250AC	±20%	IS Cap	496
100	0.1	500	±10%	HV Disc	493	1500	1.5	125	±1%	1% Polysty	494	10,000	10	0.01	400	±10%	Poly Layer	494
120	0.12	100	±5%	Ceramic	492	1500	1.5	400	±10%	Poly Layer	494	10,000	10	0.01	400	±20%	Polyester 20	495
120	0.12	350	±1%	Mica	493	1800	1.8	100	±10%	Ceramic	492	10,000	10	0.01	500	-20+80%	HV Disc	493
150	0.15	100	±5%	Ceramic	492	1800	1.8	125	±1%	1% Polysty	494	10,000	10	0.01	1000	-20+80%	1000V Disc	493
150	0.15	160	±5%	Polystyrene	494	2200	2.2	63	±20%	SubminEster	495	15,000	15	0.015	250	±5%	Poly Layer	494
150	0.15	350	±1%	Mica	493	2200	2.2	100	±10%	Ceramic	492	15,000	15	0.015	400	±20%	Polyester 20	495
150	0.15	500	±1%	1% Polysty	494	2200	2.2	100	±10%	MiniCarb	494	18,000	18	0.018	250	±5%	Poly Layer	494
180	0.18	100	±5%	Ceramic	492	2200	2.2	100	±10%	Monores	492	22,000	22	0.022	50	±10%	Monocap	493
180	0.18	350	±1%	Mica	493	2200	2.2	100	±10%	Monocap	493	22,000	22	0.022	50	-20+80%	Disc	493
220	0.22	100	±5%	Ceramic	492	2200	2.2	100	±10%	Mylar	496	22,000	22	0.022	63	±1%	1% Polysty	494
220	0.22	100	±5%	Monores	492	2200	2.2	100	±5%	Miniprop	496	22,000	22	0.022	63	±10%	MiniEster	495
220	0.22	100	±5%	Miniprop	496	2200	2.2	100	±20%	MiniFoil	495	22,000	22	0.022	63	±20%	SubminEster	495
220	0.22	100	±10%	MiniCarb	494	2200	2.2	125	±1%	1% Polysty	494	22,000	22	0.022	63	-20+80%	Ceramic	492
220	0.22	160	±5%	Polystyrene	494	2200	2.2	160	±5%	Polystyrene	494	22,000	22	0.022	100	±10%	Monores	492
220	0.22	350	±1%	Mica	493	2200	2.2	400	±10%	Poly Layer	494	22,000	22	0.022	100	±10%	Mylar	496
220	0.22	500	±1%	1% Polysty	494	2700	2.7	100	±10%	Ceramic	492	22,000	22	0.022	160	±5%	Polystyrene	494

pF	nF	µF	Voltage (DC)	Tolerance	Type	Page	pF	nF	µF	Voltage (DC)	Tolerance	Type	Page	pF	nF	µF	Voltage (DC)	Tolerance	Type	Page
22,000	22	0.022	250	±5%	Poly Layer	494	1.5	630	±5%	Audio Grade	497	220	50	±20%	SMPS Cap	498				
22,000	22	0.022	250AC	±20%	IS Cap	496	2.2	35	±20%	LC Tant	497	220	63	±20%	PC Elect	498				
22,000	22	0.022	400	±20%	Polyester 20	495	2.2	50	±10%	MiniEster	495	220	100	±20%	PC Elect	498				
27,000	27	0.027	250	±5%	Poly Layer	494	2.2	100AC	±20%	Reversoradial	498	330	25	±20%	Axial	498				
33,000	33	0.033	100	±10%	Monores	492	2.2	63	±20%	Minelect	497	330	50	±20%	PC Elect	498				
33,000	33	0.033	250	±5%	Poly Layer	494	2.2	100	±20%	Polyester 20	495	470	10	±20%	Axial	498				
33,000	33	0.033	250	±20%	Polyester 20	495	2.2	100	±20%	Axial	498	470	16	±20%	Axial	498				
33,000	33	0.033	250AC	±20%	IS Cap	496	2.2	100	±20%	PC Elect	498	470	16	±20%	PC Elect	498				
39,000	39	0.039	250	±5%	Poly Layer	494	2.2	630	±5%	Audio Grade	497	470	25	±20%	Axial	498				
47,000	47	0.047	16	-20+80%	Minidisc	493	3.3	35	±20%	LC Tant	497	470	35	±20%	PC Elect	498				
47,000	47	0.047	25	±5%	Polystyrene	494	3.3	100AC	±20%	Reversoradial	498	470	50	±20%	SMPS Cap	498				
47,000	47	0.047	50	±10%	Monocap	493	3.3	630	±5%	Audio Grade	497	470	63	±20%	Axial	498				
47,000	47	0.047	50	-20+80%	Disc	493	4.7	16	±20%	LC Tant	497	470	63	±20%	PC Elect	498				
47,000	47	0.047	63	±10%	MiniEster	495	4.7	35	±20%	Minelect	497	470	100	±20%	PC Elect	498				
47,000	47	0.047	63	±20%	SubminEster	495	4.7	35	±20%	LC Tant	497	470	100	±20%	Snap-in	499				
47,000	47	0.047	100	±10%	Monores	492	4.7	100AC	±20%	Reversoradial	498	1000	10	±20%	Axial	498				
47,000	47	0.047	100	±10%	Mylar	496	4.7	630	±5%	Audio Grade	497	1000	16	±20%	Axial	498				
47,000	47	0.047	250	±5%	Poly Layer	494	4.7	63	±20%	Minelect	497	1000	16	±20%	PC Elect	498				
47,000	47	0.047	250	±20%	Polyester 20	495	4.7	63	±20%	PC Elect	498	1000	35	±20%	Axial	498				
47,000	47	0.047	250AC	±20%	IS Cap	496	4.7	100	±20%	Axial	498	1000	35	±20%	PC Elect	498				
68,000	68	0.068	100	±10%	Monores	492	4.7	100	±20%	PC Elect	498	1000	63	±20%	Axial	498				
68,000	68	0.068	250	±5%	Poly Layer	494	4.7	450	-10+50%	PC Elect	498	1000	63	±20%	PC Elect	498				
68,000	68	0.068	250	±20%	Polyester 20	495	6.8	630	±5%	Audio Grade	497	1000	100	±20%	PC Elect	498				
100,000	100	0.1	16	-20+80%	Minidisc	493	10	16	±20%	Minelect	497	1000	100	±20%	Snap-in	499				
100,000	100	0.1	25	±5%	Polystyrene	494	10	16	±20%	LC Tant	497	2200	16	±20%	PC Elect	498				
100,000	100	0.1	35	±20%	LC Tant	497	10	25	±20%	Axial	498	2200	35	±20%	Axial	498				
100,000	100	0.1	50	±10%	Monocap	493	10	25	±20%	LC Tant	497	2200	35	±20%	PC Elect	498				
100,000	100	0.1	50	-20+80%	Disc	493	10	35	±20%	Minelect	497	2200	50	±20%	Axial	498				
100,000	100	0.1	63	±10%	MiniEster	495	10	35	±20%	LC Tant	497	2200	63	±20%	PC Elect	498				
100,000	100	0.1	63	±20%	SubminEster	495	10	50AC	±20%	Reversoradial	498	2200	63	±20%	Axial	498				
100,000	100	0.1	63	±20%	Minelect	497	10	100AC	±20%	Reversoradial	498	2200	63	-10+30%	Can	499				
100,000	100	0.1	100	±10%	Monores	492	10	50	±20%	Minelect	497	2200	100	-10+30%	Can	499				
100,000	100	0.1	100	±10%	Mylar	496	10	50	±20%	PC Elect	498	3300	63	-10+30%	Can	499				
100,000	100	0.1	250	±5%	Poly Layer	494	10	63	±20%	Axial	498	4700	16	±20%	PC Elect	498				
100,000	100	0.1	250	±20%	Polyester 20	495	10	63	±20%	PC Elect	498	4700	35	±20%	Axial	498				
100,000	100	0.1	250AC	±20%	IS Cap	496	10	100	±20%	PC Elect	498	4700	35	±20%	PC Elect	498				
100,000	100	0.1	1000	±10%	HV Cap	496	10	450	-10+50%	Axial	498	4700	50	±20%	Axial	498				
100,000	100	0.1	120	±5%	Poly Layer	494	10	450	-10+50%	PC Elect	498	4700	50	±20%	Axial	498				
150	0.15	250	±5%	Poly Layer	494	22	16	±20%	Minelect	497	4700	50	±20%	Snap-in	499					
150	0.15	250	±20%	Polyester 20	495	22	16	±20%	LC Tant	497	4700	50	-10+30%	Can	499					
180	0.18	250	±5%	Poly Layer	494	22	25	±20%	Axial	498	4700	63	±20%	Audio	499					
220	0.22	16	-20+80%	Minidisc	493	22	25	±20%	PC Elect	498	4700	63	-10+30%	Can	499					
220	0.22	25	-20+80%	Disc	493	22	25	±20%	LC Tant	497	4700	100	-10+30%	Can	499					
220	0.22	35	±20%	LC Tant	497	22	35	±20%	Minelect	497	6800	35	±20%	Snap-in	499					
220	0.22	50	±20%	SubminEster	495	22	50	±20%	PC Elect	498	6800	63	-10+30%	Can	499					
220	0.22	63	±10%	MiniEster	495	22	100AC	±20%	Reversoradial	498	8200	63	±20%	Snap-in	499					
220	0.22	100	±5%	Poly Layer	494	22	63	±20%	PC Elect	498	10,000	16	±20%	PC Elect	498					
220	0.22	100	±10%	Mylar	496	22	100	±20%	PC Elect	498	10,000	16	±20%	Snap-in	499					
220	0.22	100	±20%	Monores	492	33	10	±20%	LC Tant	497	10,000	35	±20%	Snap-in	499					
220	0.22	250	±20%	Polyester 20	495	33	35	±20%	PC Elect	498	10,000	35	-10+30%	Can	499					
220	0.22	250AC	±20%	IS Cap	496	33	50AC	±20%	Reversolytic	498	10,000	50	±20%	Snap-in	499					
220	0.22	1000	±10%	HV Cap	496	33	63	±20%	PC Elect	498	10,000	50	±20%	Snap-in	499					
270	0.27	100	±5%	Poly Layer	494	47	10	±20%	LC Tant	497	10,000	63	±20%	Audio	499					
330	0.33	35	±20%	LC Tant	497	47	16	±20%	Axial	498	10,000	63	-10+30%	Can	499					
330	0.33	100	±5%	Poly Layer	494	47	16	±20%	Minelect	497	10,000	80	±20%	Audio	499					
330	0.33	250	±20%	Polyester 20	495	47	16	±20%	LC Tant	497	12,000	25	±20%	Snap-in	499					
390	0.39	100	±5%	Poly Layer	494	47	25	±20%	PC Elect	498	22,000	56	±20%	Audio	499					
470	0.47	35	±20%	LC Tant	497	47	50	±20%	PC Elect	498	0.22F	5	-20+80%	Rnd Mmcap	500					
470	0.47	50	±20%	SubminEster	495	47	50	±20%	SMPS Cap	498	0.47F	5	-20+80%	Rnd Mmcap	500					
470	0.47	63	±10%	MiniEster	495	47	63	±20%	Axial	498	1F	5	-20+80%	Rnd Mmcap	500					
470	0.47	63	±20%	Minelect	497	47	63	±20%	PC Elect	498										
470	0.47	63	±20%	Monores	492	47	100	±20%	PC Elect	498										
470	0.47	100	±5%	Poly Layer	494	47	100AC	±20%	Reversoradial	498										
470	0.47	100	±20%	Polyester 20	495	47	450	±20%	Axial	498										
470	0.47	100	±20%	PC Elect	498	47	450	-10+50%	PC Elect	498										
470	0.47	250AC	±20%	IS Cap	496	68	500	±20%	Can	500										
470	0.47	1000	±10%	HV Cap	496	100	10	±20%	Axial	498										
560	0.56	100	±5%	Poly Layer	494	100	10	±20%	Minelect	497										
680	0.68	100	±5%	Poly Layer	494	100	10	±20%	PC Elect	498										
680	0.68	100	±20%	Polyester 20	495	100	10	±20%	Minelect	497										
1	35	±20%	LC Tant	497	100	10	100	±20%	Axial	498										
1	63	±10%	MiniEster	495	100	10	100	±20%	Minelect	497										
1	63	±20%	Minelect	497	100	10	100	±20%	PC Elect	498										
1	100	±5%	Poly Layer	494	100	10	100	±20%	LC Tant	497										
1	100	±20%	Polyester 20	495	100	16	100	±20%	Minelect	497										
1	100	±20%	Axial	498	100	25	100	±20%	PC Elect	498										
1	100	±20%	PC Elect	498	100	35	100	±20%	Axial	498										
1	100	±20%	PC Elect	498	100	35	100	±20%	PC Elect	498										
1	160	±5%	Polyprop	496	100	50	100	±20%	SMPS Cap	498										
1	250AC	±20%	IS Cap	496	100	63	100	±20%	Axial	498										
1	450	-10+50%	PC Elect	498	100	63	100	±20%	PC Elect	498										
1	630	±5%	Audio Grade	497	100	100	100AC	±20%	Reversoradial	498										
1	1000	±10%	HV Cap	496	220	10	±20%	Axial	498											
1.5	35	±20%	LC Tant	497	220	10	±20%	Minelect	497											
1.5	100AC	±20%	Reversoradial	498	220	16	±20%	Axial	498											
					220	16	±20%	PC Elect	498											
					220	35	±20%	Axial	498											
					220	35	±20%	PC Elect	498											

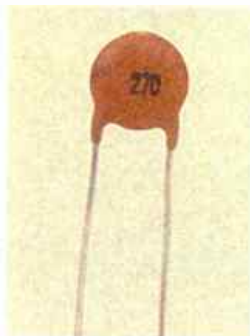
Capacitor Markings

Some of the capacitors we sell are marked using three digits and a letter. The three digits denote the value and the letter indicates the tolerance. The first two digits are the actual value and the third digit indicates the number of zeros that follow the value, and the value is printed in picoFarads. For example a capacitor marked 102 has a value of 10 plus 2 zeros, which is 1000pF (1000pF = 0.001µF). The letter indicates the tolerance as follows: F = ±1%, G = ±2%, H = ±2½%, J = ±5%, K = ±10%, M = ±20%.

Fax your orders to:
01702 553935

CERAMIC CAPACITORS Metalised Ceramic Plate Capacitors

A miniature ceramic capacitor with a cement-coated case. Values up to and including 220pF are suitable for temperature compensation in tuned circuits where low losses, close tolerance and high stability are required.



Values from 270pF to 4700pF are for use in coupling and decoupling applications, where a non-linear change of capacitance with temperature is permissible. Values 10,000pF and 22,000pF are suitable for use in coupling and decoupling applications, where capacitance stability is not critical.

Tolerance:

1.8pF to 8.2pF:	±0.25pF
10pF to 330pF:	±5%
390pF to 4700pF:	±10%
10,000pF and 22,000pF:	-20% +80%

Working voltage:

1.8pF to 4700pF:	100V DC
10,000pF and 22,000pF:	63V DC
Insulation resistance:	>1000MΩ

Temperature coefficient:

1.8pF to 220pF:	Zero
270pF to 390pF:	+350 to -1000ppm/°C
470pF to 4700pF:	medium K (±10%)
10,000pF to 20,000pF:	high K (+22% -82%)

Power factor:

1.8pF to 390pF:	<10×10 ⁻⁴
470pF to 4700pF:	<25×10 ⁻³
10,000pF:	<50×10 ⁻²
22,000pF:	<25×10 ⁻²

Dimensions

Thickness of body:	2.25mm max.
Lead spacing:	5mm
Lead length:	25mm

Capacitance (pF)	Diameter (mm) max.	Capacitor marking
1.8	5	1.8C
2.2	5	2.2C
2.7	5	2.7C
3.3	5	3.3C
3.9	5	3.9C
4.7	5	4.7C
5.6	5	5.6
6.8	5	6.8
8.2	5	8.2
10	5	10J
12	5	12J
15	5	15J
18	5	18J
22	5	22J
27	5	27J
33	5	33J
39	6	39J
47	6	47J
56	6	56J
68	7	68J
82	7	82J
100	7	101J NPO
120	8	121J
150	8	151J NPO
180	8	181J NPO
220	10	221J NPO
270	8	270
330	7	330
390	9	391K
470	5	471K
560	5	561K
680	5	681K

Capacitance (pF)	Diameter (mm) max.	Capacitor marking
820	5	821K
1000	5	102K
1200	5	122
1500	5	152
1800	5	182
2200	5	222
2700	6	272
3300	7	332
3900	7	392
4700	8	472K
10,000	6	103Z
22,000	7	223Z

Order Code

Order Code	Type	Price each
WX35Q	Ceramic 1.8	7p
WX36P	Ceramic 2.2	7p
WX37S	Ceramic 2.7	7p
WX38R	Ceramic 3.3	7p
WX39N	Ceramic 3.9	7p
WX40T	Ceramic 4.7	7p
WX41U	Ceramic 5.6	7p
WX42V	Ceramic 6.8	7p
WX43W	Ceramic 8.2	7p
WX44X	Ceramic 10	7p
WX45Y	Ceramic 12	7p
WX46A	Ceramic 15	7p
WX47B	Ceramic 18	7p
WX48C	Ceramic 22	7p
WX49D	Ceramic 27	7p
WX50E	Ceramic 33	7p
WX51F	Ceramic 39	7p
WX52G	Ceramic 47	7p
WX53H	Ceramic 56	8p
WX54J	Ceramic 68	8p
WX55K	Ceramic 82	8p
WX56L	Ceramic 100	8p
WX57M	Ceramic 120	8p
WX58N	Ceramic 150	8p
WX59P	Ceramic 180	8p
WX60Q	Ceramic 220	8p
WX61R	Ceramic 270	8p
WX62S	Ceramic 330	8p
WX63T	Ceramic 390	8p
WX64U	Ceramic 470	7p
WX65V	Ceramic 560	7p
WX66W	Ceramic 680	7p
WX67X	Ceramic 820	7p
WX68Y	Ceramic 1000	7p
WX69A	Ceramic 1200	7p
WX70M	Ceramic 1500	7p
WX71N	Ceramic 1800	7p
WX72P	Ceramic 2200	7p
WX73Q	Ceramic 2700	8p
WX74R	Ceramic 3300	8p
WX75S	Ceramic 3900	8p
WX76H	Ceramic 4700	8p
WX77J	Ceramic 10,000	8p
WX78K	Ceramic 22,000	8p

MONOLITHIC CERAMIC CAPACITORS Resin-Dipped



A high quality multilayer resin-dipped plate ceramic capacitor, offering a very high capacitance in a very small case at a very economical price. Applications include coupling, decoupling and filtering.

Tolerance:	10pF to 220pF:	±5%
	470pF to 0.1μF:	±10%
	0.22μF to 0.47μF:	±20%

Insulation resistance: >10¹¹ or 10⁹ divided by μF (whichever is less)

Temperature coefficient:

10pF to 220pF:	±30ppm/°C (COG)
470pF to 0.1μF:	±15% (X7R) max from -55°C to +125°C
0.22μF to 0.47μF:	+22% -56% (Z5U) max from -25°C to +85°C

Power factor:	10pF to 220pF	<0.1%
	470pF to 0.1μF:	<2.5%
	0.22μF to 0.47μF	<3%

Case size:	(H x W x T)	Lead pitch
10pF to 0.0047μF:	4.2 x 4.2 x 3.0mm	2.5mm
0.0068μF to 0.033μF:	5.0 x 5.0 x 3.0mm	2.5mm
0.047μF to 0.47μF:	5.5 x 5.5 x 3.0mm	5.0mm

The following values are available:

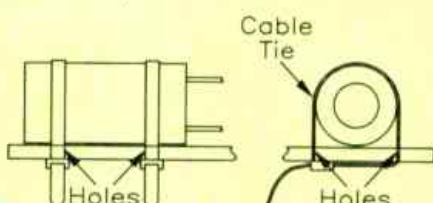
Value	Voltage	Marking
10pF	100V	100J1C
22pF	100V	220J1C
47pF	100V	470J1C
100pF	100V	101J1C
220pF	100V	221J1C
470pF	100V	471K1D
0.001μF	100V	102K1D
0.0022μF	100V	222K1D
0.0033μF	100V	332K1D
0.0047μF	100V	472K1D
0.0068μF	100V	682K1D
0.01μF	100V	103K1D
0.022μF	100V	223K1D
0.033μF	100V	333K1D
0.047μF	100V	473K1D
0.068μF	100V	683K1D
0.1μF	100V	104K1D
0.22μF	100V	224M1F
0.47μF	50V	474M5F

Order Code

Order Code	Type	Price each
RA33L	Monores Cap 10pF	18p
RA34M	Monores Cap 22pF	18p
RA35Q	Monores Cap 47pF	18p
RA36P	Monores Cap 100pF	10p
RA37S	Monores Cap 220pF	10p
RA38R	Monores Cap 470pF	10p
RA39N	Monores Cap 1000pF	10p
RA40T	Monores Cap 2200pF	10p
RA41U	Monores Cap 3300pF	14p
RA42V	Monores Cap 4700pF	14p
RA43W	Monores Cap 6800pF	14p
RA44X	Monores Cap 0.01uF	16p
RA45Y	Monores Cap 0.02uF	16p
RA46A	Monores Cap 0.033uF	18p
RA47B	Monores Cap 0.047uF	20p
RA48C	Monores Cap 0.068uF	20p
RA49D	Monores Cap 0.1uF	24p
RA50E	Monores Cap 0.22uF	26p
RA52G	Monores Cap 0.47uF	30p

HOT TIP

Cable ties can be used to secure large can electrolytics to a chassis, Veroboard or PCB. Use a tie at each end of the electrolytic, and secure by passing the ties through holes that have been conveniently drilled in the chassis.



Epoxy Cased

Murata



A very high quality plate ceramic capacitor in a rugged moulded epoxy case.

These capacitors offer very high capacitance in a very small case size. Applications include coupling, decoupling and filtering.

Tolerance: $\pm 10\%$
 Insulation resistance: $>10^{11}\Omega$
 Temperature coefficient: $\pm 15\%$ (X7R)
 Power factor: 2.5%

Dimensions

Case size: 5 x 5 x 2.5mm
 Lead pitch: 5mm

The following values are available:

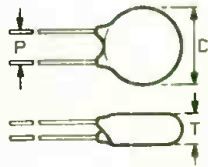
Value (μF)	Voltage (V)	Marking
0.001	200	05BX102K
0.0022	100	05BX222K
0.0047	100	05BX472K
0.01	100	05BX103K
0.022	50	05BX223K
0.047	50	05BX473K
0.1	50	05BX104K

Order Code	Type	Price each
YY24B	Monocap 0.001 μF	32p
YY25C	Monocap 0.0022 μF	42p
YY07H	Monocap 0.0047 μF	40p
YY08J	Monocap 0.01 μF	40p
YY09K	Monocap 0.022 μF	48p
YY10L	Monocap 0.047 μF	54p
YY11M	Monocap 0.1 μF	68p

High Voltage Disc Ceramic

Standard disc ceramic capacitors for general purpose use in high voltage circuits.

Tolerance: $\pm 10\% \leq 470\text{pF}$
 $-20+80\% \geq 1000\text{pF}$
 Insulation resistance: 10,000M Ω min.



Value (pF)	Voltage (V DC)	Case size (mm) D	T	P	Temperature coefficient	Power factor (max)
10	500	5	4	5	0	0.26%
100	500	10	4	5	0	0.4%
470	500	5	4	5	+10-10%	2.5%
1000	500	5	4	5	+22-56%	5%
1000	1000	6	4	5	+22-56%	5%
4700	500	8	4	5	+22-56%	5%
4700	1000	10	4	5	+22-56%	5%
10,000	500	8	4	5	+22-82%	5%
10,000	1000	10	4	5	+22-82%	5%

Order Code	Type	Price each
BX05F	HV Disc 10	8p
BX07H	HV Disc 100	8p
BX10L	HV Disc 470	3p
BX12N	HV Disc 1000	8p
JL03D	1000V Disc 1000pF	11p
BX14Q	HV Disc 4700	11p
HY18U	1000V Disc 4700pF	12p
BX15R	HV Disc 10,000	12p
JL04E	1000V Disc 10,000pF	16p

Feed Through Capacitor

Murata

Feed through capacitor
 1000pF 300V
 DC miniature, tubular solder-in construction.

Tolerance $-0+200\%$
 Overall size 16 x 5.5mm dia. Hole size required 3mm.

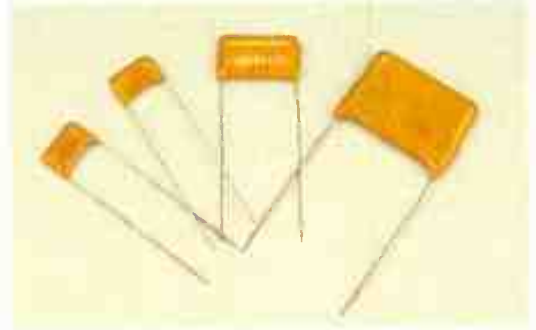


Order Code	Type	Price each
BX16S	Feed Thro Cap	25p

▶ IT'S A FACT! ◀

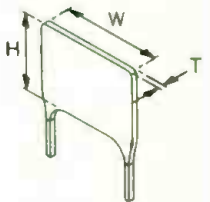
Michael Faraday (1791 to 1867) was a great British scientist who made fundamental discoveries in electricity and magnetism, and made the first generator of electricity. He showed that if a conducting wire is moved across a magnetic field an electric current is generated in the wire. It is not an exaggeration to say that the whole of our present way of life is based on his discovery. His name is remembered in a number of technical terms, the best known being the unit of capacitance - the Farad. A capacitor has a capacitance of 1F when a change of 1 volt/sec. produces a current of 1A through it.

SILVERED MICA



A capacitor featuring high stability for use in tuned circuits, and filters and for pulse operation. It has a solid wax impregnant with a tough cement coating.

Tolerance: 5pF to 47pF $\pm 0.5\text{pF}$
 68pF to 1000pF $\pm 1\%$



Working voltage: 350V DC

Insulation resistance: 50,000M Ω
 Temperature coefficient: 5pF to 47pF $+75\text{ppm}/^\circ\text{C}$
 68pF to 1000pF $+35\text{ppm}/^\circ\text{C}$

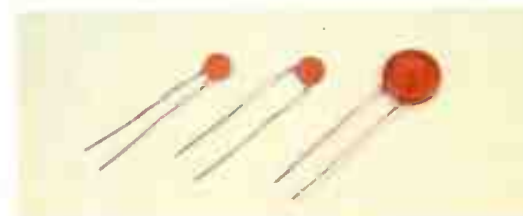
Power Factor: 5pF to 47pF: $<25 \times 10^{-4}$
 68pF to 680pF: $<15 \times 10^{-4}$
 1000pF: $<20 \times 10^{-4}$

Case sizes	W	H	T
5pF to 68pF	13	8	3.2
100pF to 220pF	17	12	3.2
330pF to 470pF	27	17	3.2
680pF to 1000pF	27	22	3.2

The following values are available (pF): 5, 10, 22, 33, 47, 68, 100, 120, 150, 180, 220, 330, 470, 680 and 1000.

Order Code	Type	Price each
WX02C	Mica 5pF	50p
WX03D	Mica 10pF	50p
WX05F	Mica 22pF	50p
WX07H	Mica 33pF	50p
WX09K	Mica 47pF	50p
WX11M	Mica 68pF	55p
WX13P	Mica 100pF	65p
WX14Q	Mica 120pF	65p
WX15R	Mica 150pF	65p
WX16S	Mica 180pF	65p
WX17T	Mica 220pF	70p
WX19V	Mica 330pF	75p
WX21X	Mica 470pF	75p
WX23A	Mica 680pF	90p
WX25C	Mica 1000pF	95p

Disc Ceramic



General purpose cement-coated ceramic disc capacitor having a large capacitance in a very small case size.

Tolerance: $-20+80\%$
 Power factor: $<8\%$ at 1kHz

Value (μF)	Voltage (V DC)	Diameter (mm)	Thickness (mm)	Lead pitch (mm)
0.01	50	5	4	2.5
0.022	50	7	4	2.5
0.047	16	9	4	5
0.047	50	9	4	5
0.1	16	10	4	5
0.1	50	10	4	5
0.22	16	10	4	5
0.22	25	10	4	5

Order Code	Type	Price each
BX00A	Disc 0.01 μF 50V	9p
BX01B	Disc 0.022 μF 50V	9p
YR74R	Minidisc 0.047 μF 16V	9p
BX02C	Disc 0.047 μF 50V	10p
YR75S	Minidisc 0.1 μF 16V	14p
BX03D	Disc 0.1 μF 50V	16p
JL01B	Minidisc 0.22 μF 16V	16p
JL02C	Disc 0.22 μF 25V	18p

POLYCARBONATE

Miniature Polycarbonate Film and Foil WIMA FK2



A range of polycarbonate film capacitors with metal foil electrodes that are designed for reservoir and decoupling applications in high-speed digital circuits. The capacitors feature low induction and low damping with an almost linear capacitance temperature coefficient. Housed in a yellow flame-retardant plastic case (UL 94 V-O) with an epoxy resin seal.

Tolerance: $\pm 10\%$
 Temperature range: -55°C to $+100^{\circ}\text{C}$
 Insulation resistance
 50V: $\pm 3.75 \times 10^3 \text{M}\Omega$
 63V: $\pm 1 \times 10^4 \text{M}\Omega$
 Dissipation factors (tan δ) at
 1kHz: $\pm 2 \times 10^{-3}$
 10kHz: $\pm 4 \times 10^{-3}$
 100kHz: $\pm 8 \times 10^{-3}$
 Lead spacing: 5mm

Value	Voltage	Dimensions mm		
		W	H	L
100pF	100V	2.5	6.5	7.2
220pF	100V	2.5	6.5	7.2
470pF	100V	2.5	6.5	7.2
1000pF	100V	2.5	6.5	7.2
2200pF	100V	2.5	6.5	7.2
4700pF	100V	3.5	8.5	7.2
0.01 μF	100V	4.5	9.5	7.2

Order Code	Type	Price each
CX03D	100pF MiniCarb	18p
CX04E	220pF MiniCarb	18p
CX05F	470pF MiniCarb	19p
CX06G	1000pF MiniCarb	19p
CX07H	2200pF MiniCarb	19p
CX08J	4700pF MiniCarb	20p
CX09K	0.01 μF MiniCarb	22p

The following values are available:

Value(pF)	Case Size (mm)	
	Diameter	Length
22	4.0	10.0
100	4.0	10.0
150	4.0	10.0
220	4.0	10.0
470	5.0	10.0
560	6.0	10.0
680	6.0	10.0
2,200	8.0	10.0
22,000	15.0	20.0
47,000	15.0	30.0

Order Code	Type	Price each
BX24B	Polystyrene 22	29p
BX28F	Polystyrene 100	12p
BX29G	Polystyrene 150	12p
BX30H	Polystyrene 220	12p
BX32K	Polystyrene 470	12p
BX33L	Polystyrene 560	12p
BX34M	Polystyrene 680	12p
BX37S	Polystyrene 2200	16p
BX93B	Polystyrene 22,000	20p
BX94C	Polystyrene 47,000	50p

Close Tolerance Polystyrene

Philips



A polystyrene film and tin/lead foil capacitor using extended techniques, resulting in low inherent inductance and low series resistance. This combined with low temperature coefficient, makes these capacitors suitable for use in professional and general purpose applications where precision, reliability, stability and low losses are of prime importance, e.g. in tuned circuits, filter networks, discriminators etc.

Tolerance: $\pm 1\%$
 Working voltage: 100pF to 470pF: 500V DC, 220V AC 50Hz
 560pF to 8200pF: 125V DC, 63V AC 50Hz
 10,000pF and 22,000pF: 63V DC
 Insulation resistance: $>10^{11}\Omega$
 Temperature coefficient: $-150 \pm 60 \text{ppm}/^{\circ}\text{C}$
 Power factor: $<2 \times 10^{-4}$ at 1kHz
 $<5 \times 10^{-4}$ at 1MHz

Value (pF)	Case size (mm)	
	L (max)	D (max)
100	8	3.5
150	8	3.5
220	8	3.5
270	8	3.5
330	8	3.5
390	8	3.5
470	8	3.5
560	8	3.5
750	8	4.5
1,000	10.5	4.5
1,200	11	6.3
1,500	11	5
1,800	11	5
2,200	11	5
2,700	11	5
3,300	11	5
3,900	11.5	11
4,700	14	11.5
5,600	14	12
8,200	15	12.5
10,000	14.5	5
22,000	15	7

Order Code	Type	Price each
BX46A	1% Polysty 100	28p
BX47B	1% Polysty 150	28p
BX49D	1% Polysty 220	28p
BX50E	1% Polysty 270	28p
BX51F	1% Polysty 330	30p
BX52G	1% Polysty 390	30p
BX53H	1% Polysty 470	30p
BX54J	1% Polysty 560	30p
BX55K	1% Polysty 750	30p
BX56L	1% Polysty 1000	30p
BX57M	1% Polysty 1200	30p
BX58N	1% Polysty 1500	30p
BX59P	1% Polysty 1800	30p
BX60Q	1% Polysty 2200	30p
BX61R	1% Polysty 2700	32p
BX62S	1% Polysty 3300	32p
BX63T	1% Polysty 3900	32p
BX64U	1% Polysty 4700	39p
BX65V	1% Polysty 5600	39p
BX66W	1% Polysty 6800	45p
BX85G	1% Polysty 8200	45p
BX86T	1% Polysty 10,000	45p
BX87U	1% Polysty 22,000	58p

POLYESTER

Polyester Layer

Siemens

A self-healing layer capacitor with a polyethylene-terephthalate dielectric. Designed specifically for use on printed circuit boards, they offer high values of capacitance in extremely small case sizes and they have low inductance and low loss characteristics.



Tolerance: 0.001 μF to 0.01 μF : $\pm 10\%$
 0.015 μF to 1 μF : $\pm 5\%$
 Working voltage: 0.001 μF to 0.01 μF : 400V DC
 160V AC rms 50Hz
 0.015 μF to 0.18 μF : 250V DC
 100V AC rms 50Hz
 0.22 μF to 1 μF : 100V DC
 55V AC rms 50Hz
 Insulation resistance: 0.001 μF to 0.33 μF : $>7.5 \times 10^{10}\Omega$ ave.
 0.39 μF to 1 μF : $>2.5 \times 10^{10}\Omega$ ave.
 Temp coefficient: 200ppm/ $^{\circ}\text{C}$ ave.
 Self-inductance: 6nH approx.
 Power factor: $<8 \times 10^{-3}$ at 1kHz

Value (μF)	Case size			
	l max	b max	h max	p max
0.001	9	2.4	8.2	7.5
0.0015	9	2.3	8.2	7.5
0.0022	9	2.3	8.2	7.5
0.0033	9	2.3	8.2	7.5
0.0047	9	2.3	8.2	7.5
0.0068	9	2.4	7.3	7.5
0.0082	9	2.4	7.3	7.5
0.01	9	2.4	7.3	7.5
0.015	9	2.3	7.3	7.5
0.018	9	2.3	7.3	7.5
0.022	9	2.5	7.3	7.5
0.027	9	2.4	7.3	7.5
0.033	9	2.5	7.3	7.5
0.039	9	2.9	7.3	7.5
0.047	9	2.9	7.4	7.5
0.068	9	3.6	8.1	7.5
0.1	9	4.0	10.1	7.5
0.12	11.5	4.2	7.7	10
0.15	11.5	4.3	8.5	10
0.18	11.5	4.6	10.1	10
0.22	11.5	3.4	7.2	10
0.27	9	5	11.5	7.5
0.33	9	5.5	8.8	7.5

FAX YOUR ORDER NOW!
01702 553935

POLYSTYRENE

A range of high quality axial lead polystyrene capacitors. Aluminium foil electrodes and welded terminal wires ensure good performance at low and high frequencies. Suitable for use in IFT's, tuned circuits, pulse networks, timing circuits, etc.



Tolerance: $\pm 5\%$
 Working voltage: 160V DC (22pF to 5,600pF)
 63V DC (22,000pF to 47,000pF)
 Insulation resistance: $>10^9 \text{M}\Omega$
 Power factor: <0.0005

Value (µF)	Case size			
	l max	b max	h max	p max
0.39	9	5.5	11.5	7.5
0.47	9	5.5	12.5	7.5
0.56	9	6.5	12.5	7.5
0.68	9	8	11.4	7.5
1	11.5	8.5	9.8	10

Order Code	Type	Price each
WW22Y	Poly Layer 0.001	20p
WW23A	Poly Layer 0.0015	20p
WW24B	Poly Layer 0.0022	20p
WW25C	Poly Layer 0.0033	20p
WW26D	Poly Layer 0.0047	20p
WW27E	Poly Layer 0.0068	20p
WW28F	Poly Layer 0.0082	20p
WW29G	Poly Layer 0.01	20p
WW31J	Poly Layer 0.015	20p
WW32K	Poly Layer 0.018	20p
WW33L	Poly Layer 0.022	20p
WW34M	Poly Layer 0.027	20p
WW35Q	Poly Layer 0.033	20p
WW36P	Poly Layer 0.039	20p
WW37S	Poly Layer 0.047	20p
WW39N	Poly Layer 0.068	20p
WW41U	Poly Layer 0.1	25p
WW42V	Poly Layer 0.12	25p
WW43W	Poly Layer 0.15	25p
WW44X	Poly Layer 0.18	25p
WW45Y	Poly Layer 0.22	25p
WW46A	Poly Layer 0.27	30p
WW47B	Poly Layer 0.33	30p
WW48C	Poly Layer 0.39	30p
WW49D	Poly Layer 0.47	40p
WW50E	Poly Layer 0.56	40p
WW51F	Poly Layer 0.68	45p
WW53H	Poly Layer 1	45p

Sub-miniature Metallised Polyester

WIMA Type MKS 02

A range of metallised polyester capacitors that are designed for PCB mounting and have a 2.5mm lead spacing.

The capacitors are ideally suited for decoupling, and are housed in a flame-retardant red plastic case (UL 94 V-O) with an epoxy resin seal.

Tolerance: ±20%

Insulation resistance
50V: ≥3.75 x 10⁹MΩ
63V: ≥1 x 10⁴MΩ

Temperature range: -55°C to +100°C

Dissipation factors (tanδ) at 1kHz 10kHz 100kHz
C ≤ 0.1µF: ≤0.006 ≤0.015 ≤0.025
C ≥ 0.1µF: ≤0.008 ≤0.015

Temp coefficient: 200ppm/°C ave.

Value	Voltage	Dimensions mm		
		W	H	L
1000pF	63V	2.5	7	4.6
2200pF	63V	2.5	7	4.6
4700pF	63V	2.5	7	4.6
0.01µF	63V	2.5	7	4.6
0.022µF	63V	2.5	7	4.6
0.047µF	63V	2.5	7	4.6
0.1µF	63V	3	7.5	4.6
0.22µF	50V	3	7.5	4.6
0.47µF	50V	4.6	9	4.6

Order Code	Type	Price each
CW94C	1000pF SubminEster	18p
CW95D	2200pF SubminEster	18p
CW96E	4700pF SubminEster	20p
CW97F	0.01µF SubminEster	20p
CW98G	0.022µF SubminEster	22p
CW99H	0.047µF SubminEster	22p
CX00A	0.1µF SubminEster	28p
CX01B	0.22µF SubminEster	34p
CX02C	0.47µF SubminEster	56p

Miniature Metallised Polyester Film

WIMA MKS 2

A range of polyester film capacitors with vacuum-deposited aluminium electrodes that are ideally suited for decoupling applications. The capacitors are encapsulated in a red flame-retardant plastic case (UL 94 V-O) with an epoxy resin seal.



Tolerance: ±10%

Insulation resistance @ 20°C
C ≤ 0.22µF: ≥1 x 10⁴MΩ (mean value 5 x 10⁴MΩ)
C ≤ 2.2µF: ≥3000s (MΩ x µF, mean value 6000s)
C = 2.2µF: ≥1000s (MΩ x µF, mean value 3000s)

Temperature range: -55°C to +100°C
Dissipation factors (tanδ @ 20°):

	C ≤ 0.1µF	0.1µF - 1µF	2.2µF
1kHz	≤8 x 10 ⁻³	≤8 x 10 ⁻³	≤10 x 10 ⁻³
10kHz	≤15 x 10 ⁻³	≤15 x 10 ⁻³	—
100kHz	≤25 x 10 ⁻³	—	—

Lead spacing: 5mm

Value	Voltage	Dimensions mm		
		W	H	L
0.01µF	63V	2.5	7	7.2
0.022µF	63V	2.5	7	7.2
0.047µF	63V	2.5	7	7.2
0.1µF	63V	2.5	7	7.2
0.22µF	63V	3.5	8.5	7.2
0.47µF	63V	5.0	10	7.2
1.0µF	63V	5.5	11.5	7.2
2.2µF	50V	7.2	13	7.2

Order Code	Type	Price each
CX18U	0.01µF MiniEster	16p
CX19V	0.022µF MiniEster	16p
CX20W	0.047µF MiniEster	16p
CX21X	0.1µF MiniEster	20p
CX22Y	0.22µF MiniEster	32p
CX23A	0.47µF MiniEster	48p
CX24B	1.0µF MiniEster	75p
CX25C	2.2µF MiniEster	£1.65

Metallised Polyester Film

Philips



These capacitors consist of a low-inductive wound cell of metallised (PETP) film. This is protected by a hard, water repellent, solvent resistant and flame retardant orange epoxy. Designed for use on PCB's for coupling and decoupling applications, the radial leads are solder-dipped copper wire 5mm long. The capacitors are available in two tolerances of 10% and 20%. Please refer to the order code table to verify which tolerance is supplied to any particular value. Rated voltage (DC) and code for dielectric material (MKT = metallised PETP film).

Operating Temperature Range is -40°C to +100°C

Insulation resistance: 0.01µF to 0.33µF: >3 x 10¹⁰Ω
0.47µF to 2.2µF: >5 x 10⁹Ω

Temperature coeff.: 333ppm/°C ave.

Power factor: < 130 x 10⁻⁴ at 1kHz

Value (µF)	Case size (mm)			Working V DC	Lead spacing
	T	H	L		
0.01	4.0	12	12.5	400	10.0
0.015	4.0	12	12.5	400	10.0
0.022	4.0	12	12.5	400	10.0
0.033	4.0	12	12.5	250	10.0
0.047	4.0	12	12.5	250	10.0
0.068	4.5	12.5	12.5	250	10.0
0.1	5.0	13	12.5	250	10.0
0.15	5.0	14	17.5	250	15.0
0.22	6.0	15	17.5	250	15.0
0.33	7.0	16	17.5	250	15.0
0.47	5.5	14.5	17.5	100	15.0
0.68	6.0	15	17.5	100	15.0
1	8.5	17.5	17.5	100	15.0
2.2	6.5	18.5	26.0	100	22.86

Order Code	Type	Price each
BX70M	Polyester 0.01µF	13p
BX71N	Polyester 0.015µF	13p
BX72P	Polyester 0.022µF	13p
BX73Q	Polyester 0.033µF	13p
BX74R	Polyester 0.047µF	13p
BX75S	Polyester 0.068µF	13p
BX76H	Polyester 0.1µF	16p
BX77J	Polyester 0.15µF	18p
BX78K	Polyester 0.22µF	22p
BX79L	Polyester 0.33µF	24p
BX80B	Polyester 0.47µF	25p
BX81C	Polyester 0.68µF	29p
BX82D	Polyester 1µF	38p
BX84F	Polyester 2.2µF	75p

Miniature Polyester and Foil

WIMA FKS 2

A range of polyester film capacitors with metal foil electrodes that are designed for reservoir and decoupling applications in high-speed digital circuits. The capacitors feature low induction and low damping and are encapsulated in a blue flame-retardant plastic case (UL 94 V-O) with an epoxy resin seal.



Tolerance: ±20%

Insulation resistance @ 20°C: ≥3 x 10⁴MΩ (mean value 8 x 10⁵MΩ)

Temperature range: -55°C to +100°C

Dissipation factors (tanδ) at 20°C
1kHz: ≤7 x 10⁻³
10kHz: ≤15 x 10⁻³
100kHz: ≤20 x 10⁻³

Lead spacing: 5mm

Value	Voltage	Dimensions mm		
		W	H	L
1000pF	100V	2.5	6.5	7.2
2200pF	100V	2.5	6.5	7.2
4700pF	100V	2.5	6.5	7.2
0.01µF	100V	3	7.5	7.2

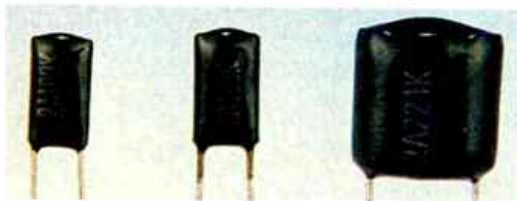
Order Code	Type	Price each
CX48C	1000pF100V MiniFoil	12p
CX49D	2200pF100V MiniFoil	12p
CX50E	4700pF100V MiniFoil	12p
CX51F	0.01µF100V MiniFoil	12p



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

Mylar Film Capacitors



A general purpose capacitor supplementing the other film and foil capacitor ranges in this catalogue.

Tolerance: $\pm 10\%$
Working voltage: 100V DC

The following values are available:

Value (μF)	Case Size (mm)			
	H	W	T	P
0.001	10	5	3	3.5
0.0022	11	5	3	3.5
0.0047	11	5.5	3	4
0.01	11	6	3	4
0.022	11	6	3.5	5
0.047	12	8.5	4	5.5
0.1	13	10	5.5	6.5
0.22	16	15	6.5	11

Order Code	Type	Price each
WW15R	Mylar 0.001	10p
WW16S	Mylar 0.0022	10p
WW17T	Mylar 0.0047	10p
WW18U	Mylar 0.01	10p
WW19V	Mylar 0.022	10p
WW20W	Mylar 0.047	12p
WW21X	Mylar 0.1	12p
WW83E	Mylar 0.22	15p

The following values are available:

Value (μF)	Length (mm)	Height (mm)	Thickness (mm)	Voltage (V)
0.01	17.5	11	5	250
0.022	17.5	11	5	250
0.033	17.5	11	5	250
0.047	17.5	11.5	6	250
0.1	17.5	14.5	8.5	250
0.22	26	17.5	8.5	250
0.47	31	22.5	13.5	250
1.0	31	28	18	250

Tolerance: $\pm 20\%$
Insulation Resistance: $>15 \times 10^9 \Omega$ @ 20°C
Power Factor: $\leq 130 \times 10^{-4}$ @ 10kHz
Lead pitch $<0.22\mu\text{F}$: 15mm
 $0.22\mu\text{F}$: 22.5mm
 $>0.22\mu\text{F}$: 27.5mm

Order Code	Type	Price each
JR31J	IS Cap 0.01uF	26p
JR32K	IS Cap 0.022uF	26p
FT34M	IS Cap 0.033uF	26p
JR33L	IS Cap 0.047uF	26p
JR34M	IS Cap 0.1uF	32p
JR35Q	IS Cap 0.22uF	52p
JR36P	IS Cap 0.47uF	90p
JR37S	IS Cap 1.00uF	£1.50

Metallised Polypropylene Industrial Capacitors

A high quality metallised polypropylene capacitor for use at very high continuous AC or DC voltages. They meet the requirements of BS2135 for Class X or Class Y use at 250V AC mains.



Tolerance: $\pm 10\%$ (K)
Working voltage: 1000V DC, 500V AC
Power factor: $<1.5 \times 10^{-3}$ at 1kHz
Pulse rating: 0.1 μF and 0.22 μF 70V/ Ωs max
0.47 μF and 1 μF 40V/ Ωs max

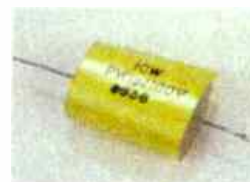
The following values are available:

Value	Length (mm)	Dia. max (mm)
0.1 μF	28	15
0.22 μF	28	18
0.47 μF	45	19
1 μF	45	28

Order Code	Type	Price each
FA21X	HV Cap 0.1uF	£1.20
FA22Y	HV Cap 0.22uF	£1.65
FA23A	HV Cap 0.47uF	£2.25
FA24B	HV Cap 1uF	£3.25

General Purpose 160V Range Industrial Capacitors

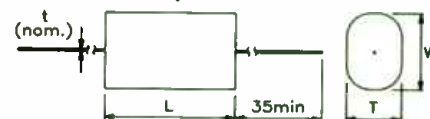
General purpose, axial polypropylene capacitors rated at 160V DC working. Constructed from metallised polypropylene film and encapsulated using the 'wrap and seal' method, where the wound elements are wrapped in heavy duty insulation tape wider than the element, and the end cavities sealed with high grade epoxy resin. This method results in a cost effective yet high quality construction. Ideal for a wide range of applications, in particular those requiring a low loss and/or low dielectric absorption component in such applications as sample and hold circuits and Hi-Fi including crossover networks. Colour yellow.



Not to be used for mains voltage filtering applications. Five values available: 1 μF , 1.5 μF , 2.2 μF , 3.3 μF and 4.7 μF .

Specification
Tolerance: $\pm 10\%$
Max. working voltage: 160V DC
Max. survivable peak-voltage: 240V for 30s, not to be repeated.
Dissipation factor: ≤ 0.001 at 1kHz & 20 $\pm 3^\circ\text{C}$
Insulation resistance: $\geq 10^4 \text{M}\Omega$ per μF
Operating temp. range: -40 to +85°C

Vibration proof to BS2011 in the frequency range of 10 to 500Hz, where displacement of component does not exceed 0.75mm in any direction.



Value (μF)	L (mm)	W (mm)	T (mm)	t (mm)
1	20	14.5	10	0.6
1.5	30	14	9.5	0.8
2.2	30	16	11.5	0.8
3.3	30	18.5	14	0.8
4.7	34	19	14.5	0.8

Order Code	Type	Price each
JY78K	Polyprop 1uF 160V	£1.16
JY79L	Polyprop 1.5uF 160V	£1.35
JY80B	Polyprop 2.2uF 160V	£1.56
JY81C	Polyprop 3.3uF 160V	£1.98
JY82D	Polyprop 4.7uF 160V	£2.45

POLYPROPYLENE

Miniature Polypropylene Film and Foil

WIMA FKP 2

A range of polypropylene film capacitors with metal foil electrodes that are designed for pulse applications.



The capacitors feature low dissipation, a negative temperature coefficient of capacitance and a low dielectric absorption, making these capacitors suitable for sample and hold circuits. Housed in a green flame-retardant plastic case (UL 94 V-O) with an epoxy resin seal.

Tolerance: $\pm 5\%$
Insulation resistance @ 20°C: $\geq 5 \times 10^5 \text{M}\Omega$ (mean value $1 \times 10^6 \text{M}\Omega$)
Temperature range: -55°C to +85°C
Dissipation factors for ($\tan \delta$ @ 20°)

	$C \leq 1000\text{pF}$	1000-4700pF	0.01 μF
1kHz	$\leq 3 \times 10^{-4}$	$\leq 4 \times 10^{-4}$	$\leq 4 \times 10^{-4}$
10kHz	$\leq 3 \times 10^{-4}$	$\leq 4 \times 10^{-4}$	$\leq 4 \times 10^{-4}$
100kHz	$\leq 4 \times 10^{-4}$	$\leq 5 \times 10^{-4}$	—
1MHz	$\leq 10 \times 10^{-4}$	—	—

Lead spacing: 5mm

Value	Voltage	Dimensions mm		
		W	H	L
100pF	100V	4.5	6	7.2
220pF	100V	4.5	6	7.2
470pF	100V	4.5	6	7.2
1000pF	100V	4.5	6	7.2
2200pF	100V	4.5	6	7.2
4700pF	63V	4.5	6	7.2
6800pF	63V	4.5	6	7.2
0.01 μF	63V	5.5	7	7.2

Order Code	Type	Price each
CX10L	100pF MiniProp	26p
CX11M	220pF MiniProp	26p
CX12N	470pF MiniProp	26p
CX13P	1000pF MiniProp	24p
CX14Q	2200pF MiniProp	24p
CX15R	4700pF MiniProp	24p
CX16S	6800pF MiniProp	26p
CX17T	0.01uF MiniProp	26p



BS 5750
Part 2 1987
Level B:
Quality Assurance
RS12750



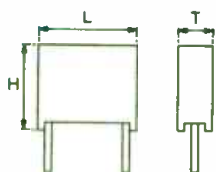
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HIGH VOLTAGE AND INTERFERENCE SUPPRESSION CAPACITORS

Interference Suppression Capacitors

Philips



A metallised film PETP (polyethylene terephthalate) film and impregnated paper dual dielectric moulded in blue flame-retardant polypropylene. The capacitors are designed to suppress electrical interference from domestic appliances and should be connected directly across the mains.

IT'S A FACT!

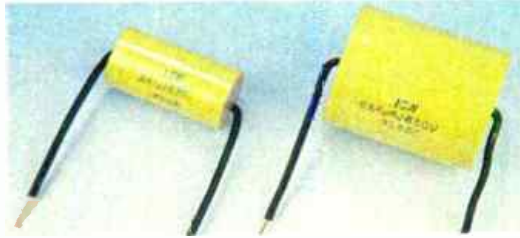
For capacitors combined in series i.e. C_1, C_2, C_3 etc., the resultant value C is given by the formula:

$$C = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots}$$

For capacitors combined in parallel, the resultant value C is the sum of the value of each capacitor i.e.

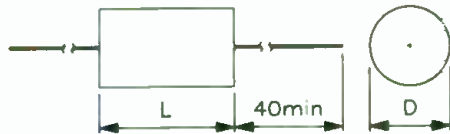
$$C = C_1 + C_2 + C_3 + \text{etc.}$$

Audio-Grade Polypropylene Axial Capacitors



A range of capacitors that have been specially developed to be used in very high quality loudspeaker cross-over networks in domestic and studio monitoring systems. The inherently low dissipation and dielectric absorption factors of polypropylene, allied with an excellent mechanical stability, results in an extremely detailed sound. The construction results in a low self-inductance and ESR, and the devices are highly stable with respect to temperature and frequency.

Tolerance: $\pm 5\%$
 Rated voltage: 630V DC
 Insulation resistance: $\geq 1 \times 10^4 M\Omega/\mu F$ @ rated voltage and $20 \pm 3^\circ C$
 Dissipation factor: ≤ 0.001 @ 1kHz & $20 \pm 3^\circ C$
 Dielectric absorption: $\leq 0.1\%$ @ $20 \pm 3^\circ C$



Cap (μF)	Case size L (mm)	D (mm)
1.0	38	22
1.5	38	27
2.2	38	31
3.3	38	35
4.7	45	35
6.8	45	42

Terminations are PVC covered 1mm diameter copper wire. Sleeved diameter is 2.5mm.

Order Code	Type	Price each
KR78K	Audio Grade 1uF	£1.99
KR79L	Audio Grade 1.5uF	£2.25
KR80B	Audio Grade 2.2uF	£2.49
KR81C	Audio Grade 3.3uF	£3.29
KR82D	Audio Grade 4.7uF	£3.75
KR83E	Audio Grade 6.8uF	£4.99

TANTALUM BEAD CAPACITORS

Low Cost Tantalum

A range of resin-dipped solid tantalum bead capacitors featuring very high values of capacitance in an extremely small package.



Tolerance: $\pm 20\%$.
 Reverse voltage must not exceed: 0.5V.
 Leakage current: $0.02\mu A/\mu F V$ or $1\mu A$ whichever is greater.
 Power factor: < 0.1 except $100\mu F$ which is < 0.2 .
 Lead pitch: 5mm.

The following values are available:

Value (μF)	Working voltage (DC)	Case size L (mm)	D (mm)
0.1	35	9	4.5
0.22	35	9	4.5
0.33	35	9	4.5
0.47	35	9	4.5
1.0	35	9	4.5
1.5	35	9.5	5
2.2	35	10	5.5
3.3	35	10.5	5.5
4.7	16	10	5.5
4.7	35	11	5.5
10	16	11	5.5
10	25	11.5	6.5
10	35	12	7
22	16	12	7
22	25	16.5	8.5
33	10	12	7
47	10	13	7.5
47	16	13	7.5
100	10	16.5	8.5

Order Code	Type	Price each
WW54J	Tant 0.1uF 35V	24p
WW56L	Tant 0.22uF 35V	24p
WW57M	Tant 0.33uF 35V	24p
WW58N	Tant 0.47uF 35V	24p
WW60Q	Tant 1.0uF 35V	24p
WW61R	Tant 1.5uF 35V	25p
WW62S	Tant 2.2uF 35V	25p
WW63T	Tant 3.3uF 35V	25p
WW64U	Tant 4.7uF 16V	25p
WW65V	Tant 4.7uF 35V	28p
WW68Y	Tant 10uF 16V	28p
WW69A	Tant 10uF 25V	36p
WW70M	Tant 10uF 35V	38p
WW72P	Tant 22uF 16V	36p
WW73Q	Tant 22uF 25V	60p
WW74R	Tant 33uF 10V	48p
WW75S	Tant 47uF 10V	68p
WW76H	Tant 47uF 16V	80p
WW79L	Tant 100uF 10V	£1.28

ELECTROLYTIC CAPACITORS

Sub-Miniature Radial Electrolytics

Gemcon

A range of sub-miniature capacitors offering size, tolerance and leakage current similar to tantalum bead. Designed for direct mounting on pcb's.



Tolerance: $\pm 20\%$
 Temperature range: $-40^\circ C$ to $+85^\circ C$

Cap (μF)	Working Voltage (DC)	Case Size (mm) l (max) d (max) p	Leakage Current (μA max)	Power Factor (max)	Ripple current (mA max) at 120Hz 85°C
0.1	63	7 4 1.5	3.1	0.1	1
0.47	63	7 4 1.5	3.3	0.1	6
1	63	7 4 1.5	3.6	0.1	13
2.2	63	7 4 1.5	4.4	0.1	21
4.7	50	7 4 1.5	4.6	0.12	24
4.7	63	7 4 1.5	6	0.1	33
10	16	7 4 1.5	4.6	0.16	29
10	35	7 5 2	6.5	0.12	36
10	50	7 6.3 2.5	8	0.1	44
22	16	7 4 1.5	6.5	0.16	44
22	35	7 6.3 2.5	10.7	0.12	57
47	16	7 6.3 2.5	10.5	0.16	68
100	10	7 6.3 2.5	13	0.2	80
100	16	7 6.3 3.5	19	0.16	90
220	6.3	9 8 3.5	25	0.2	110

Order Code	Type	Price each
YY29G	Minelect 0.1uF 63V	14p
YY30H	Minelect 0.47uF 63V	14p
YY31J	Minelect 1uF 63V	14p
YY32K	Minelect 2.2uF 63V	14p
YY33L	Minelect 4.7uF 35V	14p
RA53H	Minelect 4.7uF 63V	14p
YY34M	Minelect 10uF 16V	14p
JL05F	Minelect 10uF 35V	14p
YY35Q	Minelect 10uF 50V	14p
YY36P	Minelect 22uF 16V	14p
RA54J	Minelect 22uF 35V	14p
YY37S	Minelect 47uF 16V	14p
RK50E	Minelect 100uF 10V	14p
RA55K	Minelect 100uF 16V	14p
JL06G	Minelect 220uF 10V	14p

Fax your orders to:

01702 553935

IT'S A FACT!

TYPES OF CAPACITOR

Ceramic - These offer low-cost and high capacitance in a small physical size.

Normally there are two types the 'high stability temperature compensating type' and the 'bypass and coupling type'. The former are for use in resonant circuit and filter applications, with a value largely independent of voltage and frequency. The latter is for use in less critical applications, as they are less stable and have non-linear temperature characteristics and are somewhat voltage dependent.

Paper - This type is very rarely used in electronics but are still used in mains supply

applications for power factor corrections, i.e. electric motors.

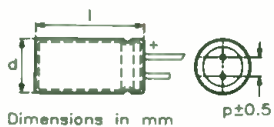
Polyester - This type offer good stability, a large range of values at low-cost, and are the most widely used capacitor for general applications.

Polycarbonate - These have a low temperature coefficient, low dielectric loss at high frequency and excellent temperature stability characteristics.

Polystyrene - These offer tight tolerance and are highly stable, making them suitable for very stable tuned circuits and oscillators.

Polypropylene - This type have a very low dielectric loss and are particularly suitable in audio circuits and sample-and-hold circuits.

Radial Electrolytics



A range of small electrolytic capacitors designed for direct mounting on pcb's.

Tolerance: ±20%
(-10+50% for 450V types)
Temperature range: -40°C to +85°C (-25°C to +85°C for 450V types)

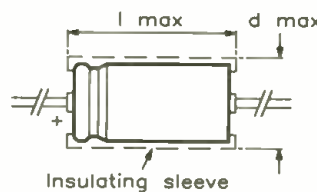
Cap (µF)	Working Voltage (DC)	Case Size (mm) l (max) d (max) p	Leakage Current (µA max)	Power Factor (max)	Ripple current (mA max) at 120Hz 85°C
0.47	100	11 5 2	12	0.1	3.9
1	100	11 5 2	18	0.1	5
1	450	12 10 5	18	0.24	37
2.2	100	11 5 2	27	0.1	7.4
4.7	63	11 5 2	40	0.1	8.9
4.7	100	11 5 2	42	0.1	12.4
4.7	450	20 13 5	42	0.24	137
10	50	11 5 2	54	0.1	13
10	63	11 5 2	58	0.1	15.6
10	100	11 6.3 3	69	0.1	23
10	450	25 13 5	69	0.24	280
22	25	11 5 2	69	0.15	14
22	50	11 6.3 2.5	81	0.1	25
22	63	11 6.3 2.5	98	0.1	30.7
22	100	11 8 3.5	120	0.1	47
33	35	11 6.3 2.5	91	0.12	26.1
33	63	11 6.3 2.5	120	0.1	44.6
47	25	11 5 2	100	0.15	26.5
47	50	11 6.3 2.5	140	0.1	50
47	63	11 8 3.5	170	0.1	62.2
47	100	16 10 5	230	0.1	97
47	450	33 16 7.5	240	0.24	1279
100	10	11 5 2	130	0.2	23
100	25	11 6.3 2.5	170	0.15	53
100	35	11 8 3.5	210	0.12	73
100	63	12 10 5	280	0.1	129
100	100	20 13 5	400	0.1	203
220	16	11 8 3.5	270	0.17	73.4
220	35	14 8 3.5	370	0.12	157
220	63	20 10 5	490	0.1	280
220	100	25 16 7.5	710	0.1	443
330	50	20 10 5	580	0.1	333
470	16	14 8 3.5	450	0.17	153
470	35	20 10 5	640	0.12	332
470	63	25 13 5	880	0.1	595
470	100	32 16 7.5	1100	0.1	943
1000	16	20 10 5	790	0.17	323
1000	35	25 13 5	1100	0.12	703
1000	63	32 16 7.5	1530	0.1	1263
1000	100	40 18 7.5	1750	0.1	2003
2200	16	25 13 5	1340	0.2	707
2200	35	32 16 7.5	1810	0.15	1543
2200	63	40 18 7.5	2350	0.13	2775
4700	16	36 18 7.5	2100	0.25	1507
4700	35	41 22 10	2600	0.2	3293
10,000	16	40 20 8	2800	0.35	3203

Order Code	Type	Price each
FF00A	PC Elect 0.47µF 100V	10p
FF01B	PC Elect 1µF 100V	10p
JL07H	PC Elect 1µF 450V	44p
FF02C	PC Elect 2.2µF 100V	10p
FF03D	PC Elect 4.7µF 63V	10p
JL08J	PC Elect 4.7µF 100V	10p
JL09K	PC Elect 4.7µF 450V	68p
FF04E	PC Elect 10µF 50V	12p
JL10L	PC Elect 10µF 63V	12p
FF05F	PC Elect 10µF 100V	12p
JL11M	PC Elect 10µF 450V	84p
FF06G	PC Elect 22µF 25V	10p
JL12N	PC Elect 22µF 50V	12p
FF07H	PC Elect 22µF 63V	12p
JL13P	PC Elect 22µF 100V	15p
JL14Q	PC Elect 33µF 35V	10p
JL15R	PC Elect 33µF 63V	12p
FF08J	PC Elect 47µF 25V	14p
JL16S	PC Elect 47µF 50V	15p
FF09K	PC Elect 47µF 63V	14p

JL17T	PC Elect 47µF 100V	29p
JL18U	PC Elect 47µF 450V	£1.52
FF10L	PC Elect 100µF 10V	12p
FF11M	PC Elect 100µF 25V	16p
JL19V	PC Elect 100µF 35V	14p
FF12N	PC Elect 100µF 63V	20p
FD15R	PC Elect 100µF 100V	36p
FF13P	PC Elect 220µF 16V	14p
JL22Y	PC Elect 220µF 35V	18p
FF14Q	PC Elect 220µF 63V	36p
JL23A	PC Elect 220µF 100V	52p
JL24B	PC Elect 330µF 50V	36p
FF15R	PC Elect 470µF 16V	27p
FF16S	PC Elect 470µF 35V	32p
FF59P	PC Elect 470µF 63V	56p
JL25C	PC Elect 470µF 100V	£1.40
FF17T	PC Elect 1000µF 16V	32p
FF18U	PC Elect 1000µF 35V	52p
JL26D	PC Elect 1000µF 63V	86p
JL27E	PC Elect 1000µF 100V	£2.35
FF60Q	PC Elect 2200µF 16V	65p
JL28F	PC Elect 2200µF 35V	£1.16
JL29G	PC Elect 2200µF 63V	£1.65
FM83E	PC Elect 4700µF 16V	£1.34
JL30H	PC Elect 4700µF 35V	£1.80
JL31J	PC Elect 10000µF 16V	£1.60

Axial Lead Electrolytics

A range of miniature, general purpose aluminium electrolytic capacitors, using high etch factor foils to enable wide operating temperatures and high capacitance to be achieved in a miniature can size. For new designs we recommend the use of radial types.



Cap (µF)	Working Voltage (DC)	Case Size (mm) l (max) d (max)	Ripple Current (mA max) @ 120Hz 85°C	Tolerance (%)	Leakage Current (µA max)	Power Factor (max)
1	100	12.5 6.3	17	±20	3	0.08
2.2	100	12.5 6.3	31	±20	3	0.08
4.7	100	12.5 6.3	46	±20	4.7	0.08
10	25	12.5 6.3	27	±20	3	0.14
10	63	12.5 6.3	60	±20	6.3	0.09
10	450	31 16 60	70	-10+50	470	0.25
22	35	12.5 6.3	70	±20	5.5	0.14
47	16	12.5 6.3	101	±20	7.6	0.16
47	63	16 8	164	±20	29.7	0.09
47	450	50 22.4	138	±20	645	0.25
100	10	16 8	169	±20	10	0.2
100	35	16 8	220	±20	35	0.12
100	63	20 10	300	±20	63	0.09
220	10	16 8	250	±20	22	0.2
220	16	20 8	310	±20	35.2	0.16
220	35	20 10	410	±20	77	0.12
330	25	20 10	460	±20	82.5	0.14
470	10	20 10	459	±20	47	0.2
470	16	20 10	510	±20	75.2	0.16
470	25	25 10	600	±20	117.5	0.14
470	63	31.5 12.5	890	±20	297	0.09
1000	10	25 10	733	±20	100	0.2
1000	16	25 12.5	940	±20	160	0.16
1000	35	31.5 12.5	1190	±20	350	0.12
1000	63	40 16	1660	±20	630	0.09
2200	35	40 16	2080	±20	770	0.15
2200	50	40 22.4	2740	±20	1100	0.13
2200	63	50 22.4	3000	±20	1386	0.12
4700	35	50 22.4	3580	±20	1645	0.2
4700	50	50 25	4050	±20	2350	0.18

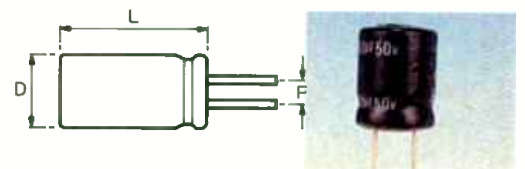
Order Code	Type	Price each
FB12N	Axial 1µF 100V	14p
FB15R	Axial 2.2µF 100V	16p
FB18U	Axial 4.7µF 100V	18p
FB22Y	Axial 10µF 25V	14p
FB23A	Axial 10µF 63V	16p
FB25C	Axial 10µF 450V	97p

FB30H	Axial 22µF 35V	20p
FB38R	Axial 47µF 16V	16p
FB39N	Axial 47µF 63V	28p
FB43W	Axial 47µF 450V	£2.45
FB48C	Axial 100µF 10V	26p
FB49D	Axial 100µF 35V	32p
FB51F	Axial 100µF 63V	36p
FB60Q	Axial 220µF 10V	25p
FB61R	Axial 220µF 16V	28p
FB62S	Axial 220µF 35V	34p
FB68Y	Axial 330µF 25V	32p
FB71N	Axial 470µF 10V	29p
FB72P	Axial 470µF 16V	30p
FB73Q	Axial 470µF 25V	54p
FB74R	Axial 470µF 63V	80p
FB81C	Axial 1000µF 10V	38p
FB82D	Axial 1000µF 16V	58p
FB83E	Axial 1000µF 35V	64p
FB84F	Axial 1000µF 63V	£1.10
FB90X	Axial 2200µF 35V	£1.20
FB91Y	Axial 2200µF 50V	£1.75
FB92A	Axial 2200µF 63V	£2.25
FB96E	Axial 4700µF 35V	£2.49
RK26D	Axial 4700µF 50V	£2.99

High Frequency Electrolytics

Radial lead electrolytic capacitors having very low impedances at high frequencies, designed primarily for use in switch mode power supplies, but suitable for use in many applications where a high grade capacitor is required.

Tolerance: ±20%
Temperature range: -55°C to +105°C
Leakage current: 0.02CV
Power factor: <0.08 (0.1 for 1000µF types)



Cap (µF)	Working Voltage (DC)	Case Size (mm) L (max) D (max) P	Ripple current (max) at 120Hz 105°C	ESR max (mΩ) at 20°C 120Hz	Impedance (mΩ) at 1kHz
47	50	11 10 5	0.5A	2000	1000
100	50	20 10 5	0.9A	760	550
220	50	25 13 5	1.75A	400	300
1000	25	32 16 8	3.3A	120	80
1000	50	32 18 8	4.5A	60	60

Order Code	Type	Price each
JL47B	SMPS Cap 47µF 50V	28p
JL49D	SMPS Cap 100µF 50V	36p
JL51F	SMPS Cap 220µF 50V	55p
JL56L	SMPS Cap 1000µF 25V	86p
JL57M	SMPS Cap 1000µF 50V	98p

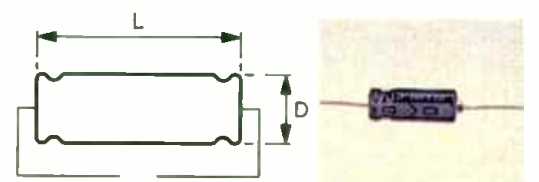
Fax your orders to:
01702 553935

Non-Polarised Electrolytics

Non-polarised electrolytic capacitor designed for use in loudspeaker crossover networks, but suitable for use in many applications where a large capacitance is required with a large bipolar signal at relatively low cost.

Tolerance: ±20%
Temperature range: -40°C to +85°C

Axial 50V

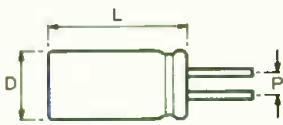


Cap (µF)	Working voltage (VAC rms)	Case size (mm) L D	Leakage current (µA max)	Power factor (max)
33	50	27 13	96	0.1

Order Code	Type	Price each
FB09K	Reversolytic 33uF	49p

Radial 50V/100V

Cap (µF)	Working voltage (VAC rms)	Case size (mm) L D P	Leakage current (µA max)	Power factor (max)
1.5	100	14.5 8 3.5	8.6	0.09
2.2	100	14.1 8.1 3.4	11.3	0.09
3.3	100	14 8 3.5	15.4	0.09
4.7	100	12 8.2 3.8	20.6	0.09
10	50	12.5 8 3.5	21.9	0.15
10	100	21 13 5	40.5	0.09
22	100	21 13 5	85.5	0.09
47	100	21 13 5	179.3	0.09
100	100	27 16 7.5	378	0.09



Order Code	Type	Price each
KP52G	Reverso Radial 1.5uF	20p
KP53H	Reverso Radial 2.2uF	22p
JH29G	Reverso Radial 3.3uF	34p
JH30H	Reverso Radial 4.7uF	30p
KP54J	Reverso Radial 10uF	34p
JH31J	Reverso Radial 10uF	39p
JH32K	Reverso Radial 22uF	47p
JH34M	Reverso Radial 47uF	70p
JH35Q	Reverso Radial 100uF	79p

Snap-in Electrolytics

A range of low-profile high value electrolytic capacitors designed for use in power supplies etc., and featuring standard 10mm snap-in connection terminals which grip the pcb and provide excellent vibration characteristics.



Tolerance: ±20%
 Temperature range: -40°C to +85°C
 Leakage current (µA): $3\sqrt{CV}$ (C in µF)

Value (µF)	Working voltage (DC)	Case size (mm) L D	ESR max (mΩ) at 20°C	Power factor (max) at 120Hz	Ripple current (max) at 85°C 120Hz
470	100	25 22	423	0.25	0.75A
1000	100	25 30	199	0.25	1.38A

Order Code	Type	Price each
JL33L	Snap-in 470uF 100V	£1.25
JL36P	Snap-in 1000uF 100V	£2.25

10mm Snap-in Electrolytics

A range of compact, Elna LP4-series of snap-in electrolytics with standard 10mm connectors for PCB use. The range provides high value capacitors with high ripple current and exceptionally long life.



Tolerance: ±20%
 Temperature range: -40°C to -85°C

Leakage current (µA): Less than larger value of 0.01CV or 1.5mA (C in µF)

Value (µF)	Working voltage (DC)	Can size (mm) D L	Power factor (max)	Ripple current (max) at 85°C 120Hz
4700	50	25 35	0.25	2.4A
6800	35	25 35	0.3	2.6A
8200	63	35 40	0.25	3.8A
10000	16	22 30	0.4	2.6A
10000	35	30 35	0.35	3.2A
10000	50	35.5 35	0.35	3.4A
12000	25	25 35	0.35	3.2A

Order Code	Type	Price each
CW74R	4700uF50V Snap-In10	£2.99
CW77J	6800uF35V Snap-In10	£3.49
DK74R	8200uF63V Snap-In10	£6.49
CW76H	10000uF16V Snap-In10	£2.49
CW73Q	10000uF35V Snap-In10	£3.99
CW75S	10000uF50V Snap-In10	£5.49
CW72P	12000uF25V Snap-In10	£2.99



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

CAN-STYLE ELECTROLYTIC CAPACITORS

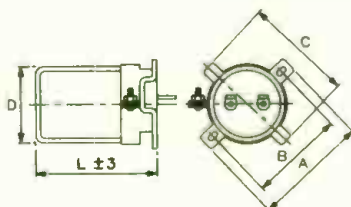
Standard Range Can-Type Electrolytics

Elna

A range of can-type electrolytic capacitors employing high gain etched aluminium foil non-inductively wound with electrolytic tissue impregnated with long life electrolyte.



All dimensions in mm.



30 to 40mm dia. types

Tolerance: -10+30%
 Temperature range: -40°C to +85°C

Value (µF)	Working voltage (DC)	Case size (mm max) L D	Ripple current (max) at 100Hz 55°C	Leakage current (max)	Power factor (max)
2200	63	50 30	3.4A	5mA	0.35
3300	63	60 30	4.6A	6.3mA	0.35
4700	50	50 30	5.2A	7.1mA	0.5
4700	63	60 35	5.6A	8.9mA	0.5
4700	100	80 40	7.4A	14.1mA	0.4
6800	63	76 35	6.4A	12.9mA	0.5
10,000	35	60 30	6.4A	10.5mA	0.5
10,000	63	80 35	9.8A	18.9mA	0.5

Ripple currents: These shown are the maximum allowable at 100Hz, 55°C. The maximum allowable at other frequencies and temperatures is as follows:

50Hz: 95%	120Hz: 100%	1kHz: 110%
10kHz: 130%	20kHz: 133%	
20°C: 150%	30°C: 125%	
70°C: 75%	85°C: 50%	of value shown.

All types are supplied with vertical mounting clips. Clip dimensions in mm.

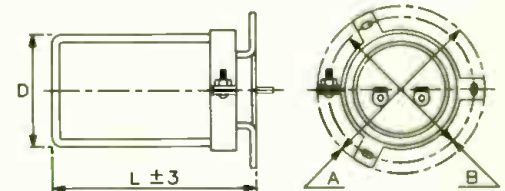
Capacitor dia. (D)	Fixing centres (B)	Overall area A x C
30	43	52 38
35	50	61 44
40	54	65 53

Order Code	Type	Price each
FF22Y	Can 2200uF 63V	£1.99
FF24B	Can 3300uF 63V	£3.99
FF27E	Can 4700uF 50V	£2.99
FF28F	Can 4700uF 63V	£3.49
FF29G	Can 4700uF 100V	£7.99
FF30H	Can 6800uF 63V	£4.49
FF31J	Can 10,000uF 35V	£2.99
FF32K	Can 10,000uF 63V	£8.99

High-Grade Can-Type Electrolytic Capacitors

Elna

A very high grade capacitor designed for use in the power supplies and outputs of high power audio amplifiers. The capacitor's excellent response is obtained by lowering the equivalent circuit series resistance to half that of ordinary capacitors. The high grade materials used in the capacitor are chosen to give superior aging and stable tonal quality over the audio range. In addition, particular care has been taken to ensure very low distortion levels, for example third harmonic distortion at 10kHz, 01A is 150dB or less.



50.8mm dia. type

Tolerance: ±20%
 Temperature range: -40 to +85°C.

Value (µF)	Working voltage (DC)	Case size (mm max) L D	Ripple current (max) at 100Hz 55°C	Leakage current (max)	Power factor (max)
4700	63	80 35.5	7.7A	5mA	0.20
10,000	63	80 50.8	13.2A	6.3mA	0.20
10,000	80	100 50.8	14.6A	8mA	0.20
22,000	56	112 50.8	22.3A	12.3mA	0.20

Ripple currents: Those shown are the maximum allowable at 100Hz, 55°C. The maximum allowable at other frequencies and temperatures is as follows:

50Hz: 95%	120Hz: 100%	1kHz: 110%
10kHz: 130%	20kHz: 133%	
20°C: 140%	40°C: 120%	
70°C: 80%	85°C: 40%	of value shown.

Dimensions for 35.5 and 40mm diameter types refer to drawings in Standard Range.

All types are supplied with vertical mounting clips. Clip dimensions in mm:

Capacitor Dia. (D)	Fixing Centres (B)	Overall area (A x C)
35.5	48	58 x 46
50.8	65 dia.	74.5 dia.

Order Code	Type	Price each
FA16S	Audio 4700uF 63V	£11.99
FA18U	Audio 10,000uF 63V	£22.99
FA19V	Audio 10,000uF 80V	£27.99
FA20W	Audio 22,000uF 56V	£34.99

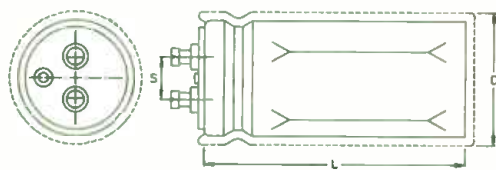
500V Can Electrolytic

NEW!

A high quality 68µF 500V can electrolytic specifically for high voltage supply decoupling and reservoir applications. Connections are to two M4 tapped terminals. Supplied with screws and shakeproof washers.



Volts Wkg	Volts Peak	Cap. µF	Max. ripple @ 100Hz @ t:	Max. ESR mΩ @ 100Hz
500V	550V	68	50°C 4.0A 70°C 0.6A 85°C 0.4A	5,850



Dimensions	L	D	S
	49mm	35.8mm	13mm

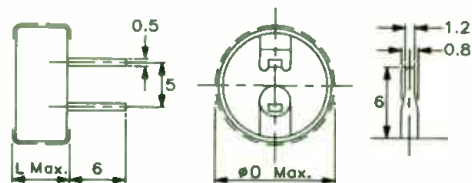
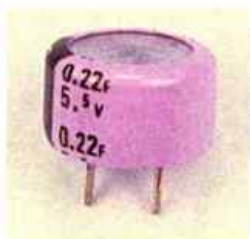
Order Code	Type	Price each
DM57M	68µF 500V Can Elect	£8.99

MEMORY BACKUP CAPACITORS

Memory Retention Capacitors

Elna

A range of very compact, high value polarised memory retention capacitors. Primarily intended for use with 5V CMOS low power static memory devices to provide a back-up supply so that data is retained when power is switched off. Three values are available; 0.22F, 0.47F and 1F (1F = 1 x 10⁶ µF).



Specifications

Tolerance:	-20/+80%
Working voltage:	5.5V DC (max)
Leakage current 0.22F:	135µA
0.47F:	216µA
1.0F:	315µA
Internal resistance 0.22F:	75Ω
0.47F:	30Ω
1.0F:	30Ω
Operating temperature range:	-25 to +70°C
Size 0.22F:	7.5mm x 13.5mm dia
0.47F:	8.0mm x 21.5mm dia
1.0F:	8.0mm x 21.5mm dia
Lead pitch:	5mm

Order Code	Type	Price each
JP99H	Rnd Memcap 0.22F/5.5	£1.80
JR00A	Rnd Memcap 0.47F/5.5	£3.49
JR01B	Rnd Memcap 1.0F/5.5	£3.99

Choosing an Electrolytic to Suit Your Needs

Since all electrolytic capacitors have a wide tolerance, one of the capacitors here will suffice in most cases where an electrolytic is specified. Choose the nearest value to the one specified, and the nearest voltage equal to or above the one specified, e.g. 50µF at 50V specified, nearest value 47µF; and 100V is the nearest voltage above. Thus a 47µF at 100V will perform exactly the same job as a 50µF at 50V in almost all applications, provided its physical size is not too large.

TRIMMER CAPACITORS

Miniature Film Dielectric Trimmers



A miniature trimmer sturdily constructed on a plastic frame. The dielectric is arranged so as to support the vanes giving a very high degree of stability. Adjustment is by means of a screwdriver slot in the upper face.

Working voltage:	100V DC
Insulation resistance:	>10,000MΩ
Power factor:	<10x10 ⁻⁴ at 1MHz: <25x10 ⁻⁴ at 100MHz

The following values are available:

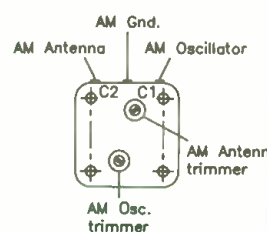
Max value:	10pF	22pF	65pF
Range:	2 to 10pF	2 to 22pF	5.5 to 65pF
Body colour:	Yellow	Green	Yellow
*Temp. coefficient:	-200	-350	-200
Height above board(max):	10	10	11
Max diameter:	8.8	8.8	11.5
Max dissipation:	0.35W	0.35W	0.9W

*Temperature coefficient is in ppm/°C with a tolerance of ±300.

Order Code	Type	Price each
WL69A	Trimmer 10pF	42p
WL70M	Trimmer 22pF	48p
WL72P	Trimmer 65pF	56p

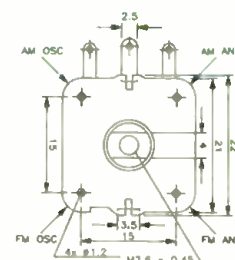
VARIABLE TUNING CAPACITORS

AM/FM Miniature Tuning Capacitors



Drawing of FT78K

Miniature tuning capacitors for radios, ZN414 circuits and crystal sets. Each has an antenna section and an oscillator section for each band, and a trimmer for each section. The control shaft is a flattened 6mm dia. brass spindle, tapped down the centre with an M2.5 thread. Fixing is either direct pcb or by two M2.5 screws on 14mm centres on same face as shaft. (Note: Thread length is 3mm. If using long screws, take care that they do not foul the vanes.)



Drawing of AB11M



Specifications:

For stock code:	AB11M	FT78K
Capacity AM sections:	126pF	141.6/59.2pF*
FM sections:	20pF	-
Q AM sections:	<500	500
FM sections:	<150	-
Total rotation:	180°	180°
Max voltage:	100V	100V
Dimensions mm: (excluding shaft)	20 x 20 x 13	20 x 20 x 13

*Antenna/Oscillator gang.

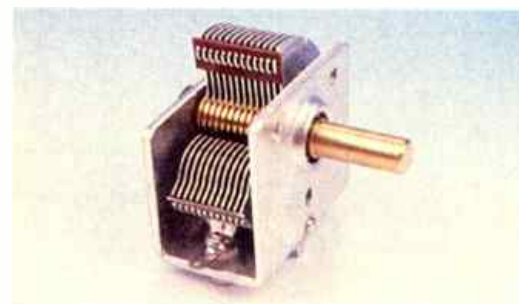
Order Code	Type	Price each
AB11M	Mini AM FM Tuner	£1.28
FT78K	Min AM Tuner Cap	£1.15

Variable Capacitors

Mid-line O law characteristics. Air gap 0.19mm, 500V DC tested. Front area (including vanes) 34.95 x 43.25mm. Cadmium plated steel frames. Aluminium vanes. Ceramic insulation. Silver plated wipers. All types with 1/4in. spindles.

Type O 1-Gang

Jackson

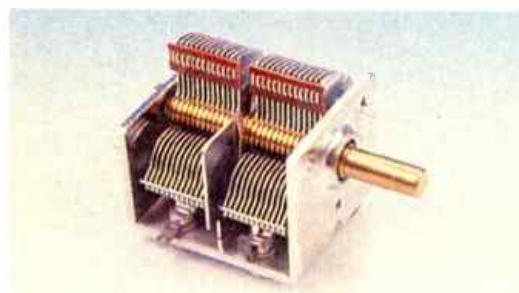


Length (excluding spindle) 23.8mm. AM capacity 10 to 365pF. Tested up to 750V.

Order Code	Type	Price each
FF39N	Vari O	£10.99

Type O 2-Gang

Jackson



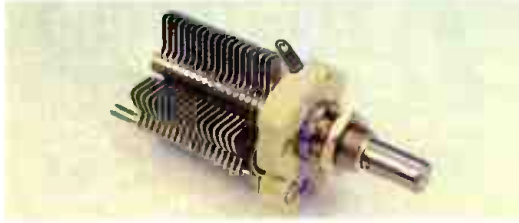
Length (excl. spindle) 43.25mm. AM capacity, each gang 10 to 365pF. Tested up to 750V.

Order Code	Type	Price each
FF40T	DG Vari	£15.99

Type C804A Series

Jackson

Air dielectric trimmer, SLC Law characteristics. Air gap 0.4mm, 750V tested, air gap 1.15mm 1250V DC tested. Front plate 23.8 x 31.75mm. Values available: 10pF, 15pF, 25pF, 50pF, 100pF and 150pF.



Order Code	Type	Price each
FF42V	SW Trim 10pF	£8.49
FF43W	SW Trim 15pF	£8.49
FF44X	SW Trim 25pF	£8.99
FF45Y	SW Trim 50pF	£8.99
FF48C	SW Trim 100pF	£10.99
FF49D	SW Trim 150pF	£11.99

Dilecon Capacitors

Jackson



Solid dielectric. Front area 44.5 x 46mm. The following values are available: 6.5 to 300pF, 7 to 500pF.

Order Code	Type	Price each
FF50E	Dilecon 300pF	£9.99
FF51F	Dilecon 500pF	£9.99

CRYSTALS

A range of crystals for various applications. All types are cut for parallel resonance except those shown SR under "Load Cap" in the following tables, which are cut for series resonance. To use parallel types in a series circuit simply connect a Trimmer 65pF in series with the crystal.

The crystals are supplied in metal cans and details of the cans are given in the table immediately before 'Crystal Sockets'.

Frequency Standards

Two crystals for use in frequency counters etc., and offering very high stability are available.

Frequency	Can Style	Adjustment Tolerance	Temp Stability	Temperature Range	Load Cap
1MHz	HC-6/U	±20ppm	±50ppm	-20°C to +70°C	30pF
10MHz	HC-43/U	±20ppm	±20ppm	-20°C to +70°C	30pF

Order Code	Type	Price each
HX62S	FS Crystal 1MHz	£7.99
FY78K	FS Crystal 10MHz	£2.49

General Purpose Crystals

A range of crystals for use with microprocessors and other IC's. A typical application for each crystal is shown below.

Frequency	Application
1MHz	6800
2MHz	6502
2.4576MHz	Baud rates

2.5MHz	ZNA234E
3.6864MHz	6802
4MHz	6802, Z80A
5MHz	SAA1043
5.824MHz	TA8662
6MHz	Z80B
6.144MHz	8085A
6.552MHz	NICAM
8MHz	NSC800
12MHz	TMS9995
16MHz	General purpose
16.93MHz	TD6710
18.432MHz	8080A
20MHz	Z80A
21.47727MHz	V9938
24MHz	General purpose

Frequency	Can Style	Adjustment Tolerance	Temp Stability	Temperature Range	Load Cap
1MHz	HC-33/U	±50ppm	±50ppm	-10°C to +60°C	30pF
2MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	20pF
2.4576MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
2.5MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
3.6864MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
4MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
5MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
5.824MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
6MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
6.144MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
6.552MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
8MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
12MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
16MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
16.93MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	30pF
18.432MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	SR
20MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	SR
21.47727MHz	HC-18/U	±20ppm	±30ppm	-10°C to +60°C	30pF
24MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	SR

Order Code	Type	Price each
FY79L	MP Crystal 1MHz	£5.25
FY80B	MP Crystal 2MHz	£2.75
FY81C	MP Crystal 2.4576MHz	£2.25
UK82D	Crystal 2.5MHz	£2.75
UJ04E	Crystal 3.6864MHz	99p
FY82D	MP Crystal 4MHz	£1.35
UL51F	Crystal 5MHz	99p
UK99H	Crystal 5.824MHz	99p
UJ05F	Crystal 6MHz	£1.20
FY83E	MP Crystal 6.144MHz	99p
UK98G	Crystal 6.552MHz	£1.28
UJ06G	Crystal 8MHz	£1.10
UJ07H	Crystal 12MHz	£1.10
UJ08J	Crystal 16MHz	98p
UL00A	Crystal 16.930MHz	£1.28
FY84F	MP Crystal 18.432MHz	£1.20
UJ09K	Crystal 20MHz	£1.65
UH94C	21.47727MHz Crystal	£2.75
UJ10L	Crystal 24MHz	£1.75

Colour TV Crystals

Crystals for use in colour TV receivers, TV games, home computers etc. Frequencies available operate at the colour sub-carrier frequency in American standard NTSC receivers (3.579545MHz), standard British PAL TV receivers (4.433619MHz), and at twice that frequency (8.867238MHz).

Can style	HC-49/U
Adjustment tolerance	±30ppm
Temperature stability	±30ppm
Temperature range	-10°C +60°C
Load capacitor	20pF (30pF for 8.867238MHz)

Order Code	Type	Price each
UJ03D	Crystal 3.5794MHz	99p
FY85G	Colour TV Crystal	99p
UH85G	Crystal 8.867238 MHz	£1.10

Timing Crystals

Three crystals for time keeping purposes, counters etc., using simple flip-flop divider stages. Two crystals generate 1Hz and one generates 50Hz when divided by 2¹⁵. The 32.768kHz crystal is suitable for use as a replacement in most digital watches, and the crystal for generating 50Hz can be used to drive mains operated clocks from a battery when mains fails or in portable applications.

Frequency	Application
32.768kHz	Divide by 2 ¹⁵ for 1Hz (digital watch crystal)
3.2768MHz	Divide by 2 ¹⁶ for 50Hz
4.194304MHz	Divide by 2 ²² for 1Hz

Frequency	Can Style	Adjustment Tolerance	Temp Stability	Temperature Range	Load Cap
32.768kHz	3 x 8	±15ppm	±200ppm	-10°C to +60°C	12.5pF
3.2768MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	12pF
4.194304MHz	HC-49/U	±30ppm	±30ppm	-10°C to +60°C	12pF

Order Code	Type	Price each
UJ02C	Crystal 32.768kHz	99p
FY86T	Crystal 50HzX 2.16	£1.20
FY87U	Crystal 1HzX 2.22	99p

Radio Control Crystals

A range of third overtone crystals for radio controlled models etc. All are plug-in with 6mm pins on 4.9mm centres and are directly interchangeable.



Can style:	HC-25/U Solder weld.
Adjustment tolerance:	±30ppm.
Temperature stability:	±50ppm.
Temperature range:	-10°C to 60°C.
Load capacitor:	20pF.
Can size:	13.5 x 11.1 x 4.7mm.

Available only in matched pairs as follows:

Channel	Transmitter frequency	Receiver frequency
Brown	26.995MHz	26.540MHz
Red	27.045MHz	26.590MHz
Orange	27.095MHz	26.640MHz
Yellow	27.145MHz	26.690MHz
Green	27.195MHz	26.740MHz
Blue	27.245MHz	26.790MHz

Suitable for use with 455kHz i.f.'s.

Order Code	Type	Price each
HX30H	MCR Crys Brown Pairs	£3.79
HX31J	MCR Crystal Red Pair	£3.79
HX32K	MCR Crys Orange Pair	£3.79
HX33L	MCR Crys Yellow Pair	£3.79
HX34M	MCR Crystal Green Pr	£3.79
HX35Q	MCR Crys Blue Pair	£3.79



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Useful Information About Crystals

Style	Plug-in or Wire-in	Pins or Wire Length	Pins or Wire Spacing
3 x 8	Wire-in	6mm wires (min)	1.1mm
HC-6/U	Plug-in	6mm pins	12.3mm
HC-13/U	Plug-in	6mm pins	12.3mm
HC-18/U	Wire-in	20mm wires	4.9mm
HC-25/U	Plug-in	6mm pins	4.9mm
HC-33/U	Wire-in	20mm wires	12.3mm
HC-43/U	Wire-in	20mm wires	4.9mm
HC-49/U	Wire-in	20mm wires	4.9mm

Can Dimensions (mm)

Style	Height	Width	Thickness	Weld
3 x 8	8.1 (max)	3.1 (max)	-	Solder
HC-6/U	19.5	19.3	9	Solder
HC-13/U	38.8	19.3	9	Solder
HC-18/U	13.5	11.1	4.7	Solder
HC-25/U	13.5	11.1	4.7	Solder
HC-33/U	19.5	19.3	9	Solder
HC-43/U	13.5	11.1	4.7	Cold
HC-49/U	13.5	11.1	4.7	Resistance

Welds

Solder weld cans have dependable characteristics over a wide frequency range. After can-sealing, they are welded by solder and the air removed from the can under a vacuum. The resistance weld can offers higher quality and is free from contaminants as it is sealed within a clean, inert atmosphere. It ages more slowly than solder weld cans. The cold weld can is free from contaminants, sealed under vacuum and offers the highest quality, greatest dependability and least aging of the standard weld types.

Crystal Socket

A moulded nylon crystal socket suiting crystals with HC-25/U bases. Has a printed circuit connection.

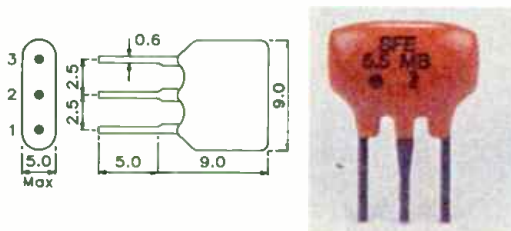


Order Code	Type	Price each
HX60Q	Crystal Socket 25u	90p

OSCILLATORS

TV Sound IF Filters

Two TV F.M. sound I.F. bandpass filters, the 5.5MHz version follows the European TV I.F. standard, the other is for the U.K. standard of 6MHz.



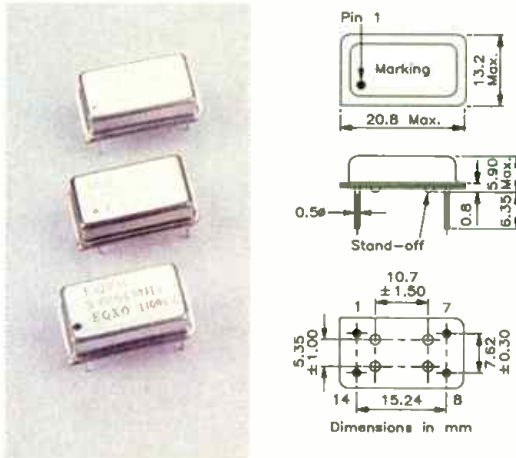
Specification

	UL54J	UL53H
Centre freq.	5.5MHz	6MHz
Bandwidth	-3dB @ ±60kHz	-3dB @ ±80kHz
Insertion loss	-6dB	-6dB
Temperature range	-20°C to +180°C	-20°C to +180°C
Rated voltage	50V DC	50V DC

Order Code	Type	Price each
UL54J	Ceramic Fitr 5.5MHz	42p
UL53H	Ceramic Filter 6MHz	42p

Oscillators

A range of TTL oscillators that are housed in a standard 14-pin DIL package and have a universal output. The oscillators have a HCMOS output buffer capable of driving the usual 10 TTL loads. Therefore, the devices are both CMOS and TTL compatible. The devices offer a low-cost alternative to existing products.



Specification

Overall tolerance:	±100ppm (0.1%)
Operating temperature range:	0°C to +70°C
Supply voltage:	5V ±10%
Maximum supply current:	47mA (37mA typical)
Logic levels:	'0' +0.5V max '1' +4.5V min
Duty cycle:	40% -60% to 2.5V (45% -55% typical)
Rise/fall times:	6ns max., 10% -905 @ 15pF load
Start up times:	50ms for first full cycle to within 1% of nominal frequency
Output:	Universal - HCMOS or 10 TTL loads
Packaging:	Hermetically sealed resistance weld package

Frequency	Maplin code
24.5760MHz	CW90X
50.0000MHz	CW92A
64.0000MHz	CW93B

Order Code	Type	Price each
CW90X	24.5760MHz Osc	£2.99
CW92A	50MHz Oscillator	£2.99
CW93B	64MHz Oscillator	£2.99

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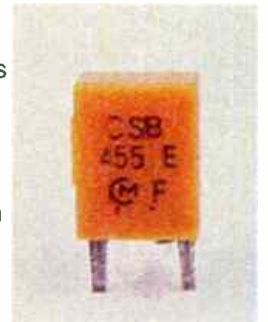
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Ceramic Resonator

A range of ceramic resonators that offer an alternative to quartz crystals in clock generation circuits. Both the CSA and CSB series are very stable (±0.5%), and have a high mechanical Q making them ideal for use in microprocessors and remote control units.



Maplin code	Frequency
UL61R	445kHz
DJ28F	500kHz
CP91Y	1MHz
DJ31J	3.58MHz
DJ32K	4MHz
DJ37S	8MHz
DJ38R	10MHz

Order Code	Type	Price each
UL61R	Ceramic Rsnr 455kHz	56p
DJ28F	Ceramic Rsnr 500kHz	56p
CP91Y	Ceramic Rsnr 1MHz	56p
DJ31J	Ceramic Rsnr 3.58MHz	56p
DJ32K	Ceramic Rsnr 4MHz	56p
DJ37S	Ceramic Rsnr 8MHz	56p
DJ38R	Ceramic Rsnr 10MHz	56p

IT'S A FACT!

CAPACITORS

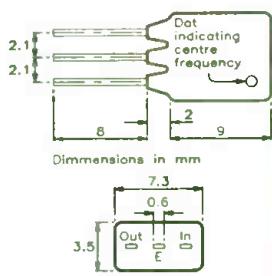
The insulating material between the plates of a capacitor is called the dielectric. Wide ranges of different materials are used as dielectrics. Capacitance is a measure of how much electrical energy can be stored by the insulating medium between two conductors. It depends on both the size of, and the distance between the conductors, and the nature of the medium.

Electrolytic - These capacitors have special chemical dielectrics that produce capacitors with very high values. The bulk of this dielectric gel is conductive, simulating many layers of conductive 'plates', and having a thin insulating layer on one of the actual metal 'plates'. Without such techniques even a modest 10µF value capacitor could be the size of a milk bottle! The most common type of electrolytic capacitor comprises aluminium

foil, which can be dimpled or corrugated to increase the effective area, enclosed in an aluminium can which is filled with a slightly acidic solution of ammonium perborate in a jelly form. The final part of the manufacturing process involves applying a slowly rising voltage to the capacitor, with the foil positive and the can negative, until the voltage reaches the rated level and the DC current falls to a minimum when the insulating film is formed, at which point the insulation is as good as it is ever going to be. The capacitor must have a DC or polarising voltage applied in the same polarity to maintain the insulating film. If the capacitor is used with a reversed voltage the film will be dissolved, the insulation is thus removed, which then allows large currents to pass through the gel, which will vaporise, and the resulting gas pressure produced will burst the can.

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Ceramic Filter



A ceramic filter designed primarily for use in FM receivers using a 10.7MHz i.f. The filters are small in size with high selectivity, good temperature stability and low distortion.

Specification

Bandwidth: 280kHz (-3dB)
600kHz max (-20dB)

Spurious peaks: (9 to 12MHz):
<40dB (typical)

Insertion loss: 6dB
Input-Output Impedance: 330Ω±15%
Breakdown voltage: 50V DC max
Ripple: <1dB

Owing to the way ceramic filters are manufactured they do not all have an exact 10.7MHz centre frequency. All designers should be aware of this fact and all commercial designs usually allow the i.f. to be used to at least 10.58 to 10.82. The fact that the i.f. is not exactly 10.7MHz has no effect whatsoever on any other parameter and the overall quality of the tuner is not affected in any way. However, it is absolutely vital that all the ceramic filters in one tuner have the same nominal centre frequency. Therefore, during manufacture they are tested and colour coded into matched groups as follows:

- 10.64MHz ±30kHz Black
- 10.67MHz ±30kHz Blue
- 10.70MHz ±30kHz Red
- 10.73MHz ±30kHz Orange
- 10.76MHz ±30kHz White

Therefore, if you are ordering ceramic filters for more than one tuner please indicate how many filters are required per tuner so that we can supply them in sets if we do not have enough of one colour to fulfil the whole order.

Order Code	Type	Price each
HX99H	Ceramic Fitr 10.7MHz	99p

50kHz Scan Filter

Bonex

A ceramic filter with a centre operating frequency of 10.7MHz, and an especially narrow bandwidth.



Specification

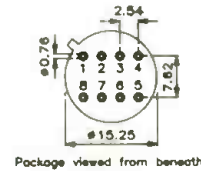
Bandwidth: 50kHz
Input-Output Impedance: 330Ω
Breakdown voltage: 50V DC max

Dimensions: width 8mm x height 7mm x 3mm thick.
Pin spacing 2.5mm.

Order Code	Type	Price each
UF71N	Fitr 10.7MHz/50kHz	£1.49

Saw TV IF Filter

A Surface Acoustic Wave (S.A.W.) I.F. filter for PAL T.V. which is NICAM compatible. Passes vision carrier at 39.5MHz, F.M. sound carrier at 33.5MHz and NICAM at 32.948MHz. Separate outputs for vision and sound. Vision channel has a Nyquist slope in the vision carrier region and a flat group delay characteristic. Sound channel has peaks at vision and NICAM sound carriers.



Pin	Description
1	Input
2	Ground
3	Balanced sound output
4	Balanced sound output
5	Balanced vision output
6	Balanced vision output
7	No connection
8	Input return

Specification

Type: SW166
Package: 8-pin TO8
Ambient operating temperature: 20°C
Source impedance: 50Ω
Load impedance: 2kΩ
Sound channel*
Insertion loss: 15dB @ 39.5MHz
NICAM carrier: 0dB
Sound carrier: -3.5dB
In-band trap: -35dB @ 35-38MHz
Adjacent vision trap: -45dB @ 31.5MHz
Adjacent sound trap: -50dB @ 41.5MHz
Group delay ripple: 40ns typ.
Output impedance: 1.4kΩ
Vision channel**
Insertion loss: 17.7dB @ 38MHz
Vision carrier: -5.3dB
Colour carrier: -4.5dB
NICAM carrier: -34dB
Sound carrier: -36dB
Adjacent vision trap: -42dB @ 31.5MHz
Adjacent sound trap: -41dB @ 41.5MHz
Group delay ripple: 40ns typ.
Output impedance: 6.3kΩ
Amplitudes relative to 0dB at *39.5MHz and **38MHz.

Order Code	Type	Price each
UL52G	SAW Filter NICAM	£4.99



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CONNECTORS

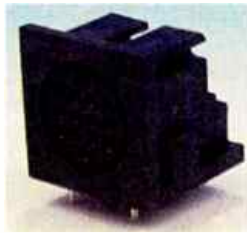
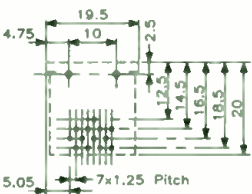
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DIN 5-pin A Plug	2x Jack 3.5mm Mono Plug and Jack 2.5mm Mono Plug	FG21X	Lead	525	Jack 1/4in. Stereo Socket	Jack 3.5mm Stereo Plug	RK56L/		
DIN 5-pin A Plug	2x Jack 3.5mm Mono Plug	RW24B	Lead	510	2 x Jack 1/4in. Stereo Sockets	Jack 3.5mm Stereo Plug	JK07H	Adaptor	511
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Header 26-way	BNC Female	FE87U	Adaptor	548	N Male	UHF Female	FE97F	Adaptor	549
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Jack 2.5mm Mono Plug	DIN 7-pin Plug	FG18U	Lead	524	Phono Socket	BNC Male	FA11M	Adaptor	546
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Jack 3.5mm Mono Plug	Jack 1/4in. Mono Socket	RW02C	Adaptor	510	2 x Phono Socket	Jack 3.5mm Stereo Plug	JK14Q	Adaptor	511
Jack 3.5mm Mono Plug	Jack 1/4in. Stereo Socket	RW12N	Adaptor	510	Phono Socket	Jack 1/4in. Mono Plug	RW01B/		
Jack 3.5mm Mono Plug	Phono Socket	RW04E	Adaptor	510	2 x Phono Socket	Jack 1/4in. Stereo Plug	JK13P	Adaptor	515
Jack 3.5mm Mono Socket	Jack 2.5mm Mono Plug	RW08J	Adaptor	509	Phono Socket	UHF Male	FE85G	Adaptor	551
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Jack 3.5mm Mono Socket	Jack 1/4in. Mono Plug	RW00A	Adaptor	513	Power 2.1mm Socket	Power 2.5mm Socket	FK09K	Adaptor	539
2 x Jack 3.5mm Mono Sockets	Jack 1/4in Mono Plug	JB19V	Adaptor	513	Power 1.3mm Plug	Power 1.3mm Plug	FK08J	Adaptor	539
Jack 3.5mm Mono Socket	Jack 1/4in. Stereo Plug	YW34M	Adaptor	516	Power 2.5mm Socket	Power 1.3mm Plug	FK09K	Adaptor	539
Jack 3.5mm Mono Socket	Phono Plug	RW06G	Adaptor	518	TNC Female	Power 1.3mm Plug	FK09K	Adaptor	539
Jack 3.5mm Mono Socket	Power 1.3mm Plug	FK10L	Adaptor	539	TNC Male	BNC Male	FS45Y	Adaptor	550
Jack 3.5mm Stereo Plug	Jack 3.5mm Mono Socket	FK15R	Adaptor	511	TNC Male	UHF Male	FS47B	Adaptor	550
Jack 3.5mm Stereo Plug	Jack 3.5mm Stereo Plug	CK27E	Lead	511	TNC Male	BNC Female	FE83E	Adaptor	550
Jack 3.5mm Stereo Plug	2x Jack 3.5mm Mono Sockets	JM91Y	Adaptor	511	Transition 50-way 2-row	UHF Female	FE84F	Adaptor	550
Jack 3.5mm Stereo Plug	2 x Jack 1/4in. Stereo Sockets	JB20W	Adaptor	511	Mini UHF Female	UHF Female	FE97F	Adaptor	549
Jack 3.5mm Stereo Plug	Jack 1/4in. Stereo Socket	JK07H	Adaptor	511	Mini UHF Male	UHF Female	FE89W	Adaptor	551
		RK56L/			UHF Female	UHF Female	FE84F	Adaptor	550
		JK14Q	Adaptor	511	UHF Male	UHF Male	YW05F	Adaptor	551
Jack 3.5mm Stereo Plug	2 x Phono Sockets	JK14Q	Adaptor	511	UHF Male	UHF Male	FE94C	Adaptor	549
					UHF Male	Phono Socket	FE85G	Adaptor	551
					UHF Male	TNC Female	FS47B	Adaptor	550

13-Pin DIN Socket

All dimensions in mm
Viewed from above



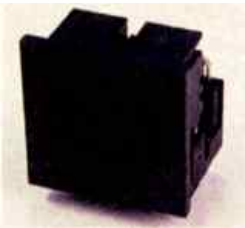
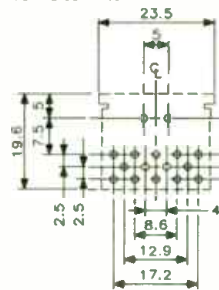
2 Holes #1.4
13 Holes #0.9

13-pin DIN socket, used on Atari ST computer video port, but will also find applications where a compact multiway connector is required.

Order Code	Type	Price each
JW99H	13 Pin DIN PCB Skt	£1.39

14-Pin DIN Socket

All dimensions in mm
Viewed from above
16 Holes #1.5



14-pin DIN socket, used on Atari ST computer disk drive port and Amstrad 1512/1640 computer power socket, but will also find applications where a compact multiway connector is required.

Order Code	Type	Price each
JX00A	14 Pin DIN PCB Skt	£1.49

2-Pin In-Line Socket with Screw Terminals

2-pin line socket with screw terminals.



Order Code	Type	Price each
FM43W	Sldr's 2-Pin DIN Skt	32p

2-Pin In-Line Right-Angle Socket



2-pin right-angle line socket with screw terminals

Order Code	Type	Price each
FM41U	R/A 2-Pn DIN Line Sk	32p

2- to 8-Pin Line Sockets



2-pin		HH40T
3-pin		HH41U
4-pin		HH42V
5-pin	180° (Type A)	HH43W
5-pin	240° (Type B)	HH44X
5-pin	360° (Type C)	FJ95D
6-pin		HH45Y
7-pin		HH46A
8-pin with all outer pins on the same arc		FJ97F
8-pin with two pins in a different arc from the other outer pins		FJ96E

Order Code	Type	Price each
HH40T	DIN Line Skt 2-pin	22p
HH41U	DIN Line Scket 3-pin	35p
HH42V	DIN Line Scket 4-pin	35p
HH43W	DIN Line Skt 5-pin A	39p
HH44X	DIN Line Skt 5-pin B	39p
FJ95D	DIN Line Skt 5-Pin C	40p
HH45Y	DIN Line Scket 6-pin	40p
HH46A	DIN Line Scket 7-pin	43p
FJ97F	DIN Line Skt 8-Pn Cr	49p
FJ96E	DIN Line 8-Pin Offst	49p

13-Pin DIN In-Line Socket



13-pin DIN line socket, used on Atari ST computer video port, but will also find applications where a compact multiway connector is required.

Order Code	Type	Price each
JW97F	13 Pin DIN Line Skt	£1.69

14-Pin DIN In-Line Socket



14-pin DIN line socket, used on Atari ST computer disk drive port and Amstrad 1512/1640 computer power socket, but will also find applications where a compact multiway connector is required.

Order Code	Type	Price each
JW98G	14 Pin DIN Line Skt	£1.99

Latching Screened



A high quality DIN plug and socket with screened metal body and incorporating a latching mechanism. Plug has cable clamp and support sleeve. This plug and socket will mate with the appropriate part from any standard DIN range, but they will only latch when mated with each other. Both are 5-pin A (180°C).

Order Code	Type	Price each
BW94C	Dinlatch 5-pin A Plg	£2.14
BW98G	Dinlatch Sckt 5-pin A	£1.35

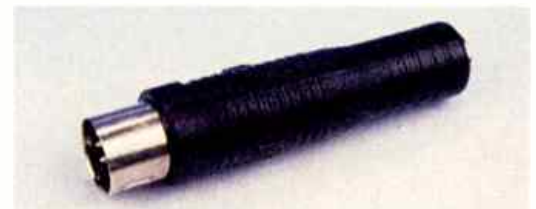
5-pin A DIN Straight Female Adaptor

An in-line adaptor enabling two 5-pin A (180°) DIN plugs to be connected together. Ideal for extending ready-made leads.



Order Code	Type	Price each
JB22Y	5pin A Skts Adaptor	£1.29

5-pin A DIN Plug to Stereo 1/4 in. Socket Adaptor



Allows a 1/4 in Stereo Jack Plug to be connected to a 5-pin A (180°) DIN Socket.

Order Code	Type	Price each
YW33L	Adaptor R	£1.39

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5-Pin DIN MIDI Connection Lead



5-pin 180° 'A' DIN plug to 5-pin 180° 'A' plug non-reversed (pin 1 connects to pin 1, 2 to 2 etc.). Available in lengths of 1m and 6.5m approx.

Order Code	Type	Price each
YZ26D	MIDI Cable 1m	£1.99
YZ27E	MIDI Cable 6.5m	£4.99

L/S Plug to Open Lead



Loudspeaker plug to open end. Length 3m.

Order Code	Type	Price each
RW27E	Dinpak P	89p

L/S Plug to Socket Lead



Loudspeaker plug to line socket. Length 5m or 10m.

Order Code	Type	Price each
RW47B	5m Dinpak 275	£1.19
RW25C	10m Dinpak M	£1.49

5-Pin Plug to 5-Pin Plug Lead



5-pin A DIN plug to 5-pin A DIN plug. Length 1-5m.

Order Code	Type	Price each
RW14Q	Dinpak A	£1.19

5-Pin Plug to Mirror-Image Lead



5-pin DIN plug to 5-pin DIN plug with reversal (mirror image) connections. Length: 1-5m.

Order Code	Type	Price each
RW43W	Dinpak 254	£1.39

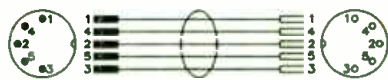
Microphones		Phono	Headphone
Balanced 	Unbalanced 		
XLR 	XLR 	DIN (mono) 	DIN (240)
JACK 	JACK 	For mono connection of five-pin plugs short out pins 3 and 5.	
JACK 	JACK 	Aux 	DIN (special)
Ear-piece 	High Impedance Low Impedance 	Internal link DIN 	JACK
NOTE: All DIN & XLR connections as viewed from soldering side of plug		DIN 	Speaker
Record/Replay 	Input 	Tuner 	Tape Record/Replay
	Output 	DIN 	Universal
DIN (mono) 	High Impedance Low Impedance DIN (mono) 	DIN (special) 	High Sensitivity Low Sensitivity DIN

Key:

Screen	Right input	Left output
LIVE	Left input	Mono input
RETURN	Right output	Mono output

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5-Pin Plug to Socket Lead

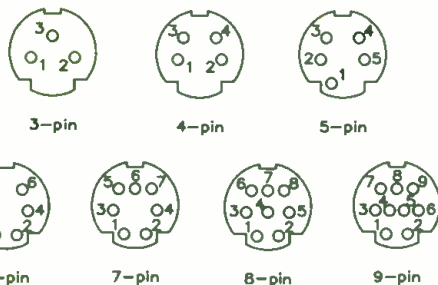


5-pin DIN plug to 5-pin DIN line socket. Length 1.5m.

Order Code	Type	Price each
RW16S	Dinpak C	£1.59

Miniature DIN Connectors

A range of miniature DIN connectors, commonly used on computer equipment, but also suitable for a variety of other applications where compact multipole connectors are required.



Viewed looking into pins of plug

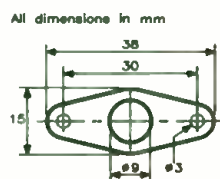
Miniature DIN Line Plugs



A range of miniature DIN line plugs which will mate with mini DIN sockets. Available in 3, 4, 5, 6, 7, 8 and 9 pin types.

Order Code	Type	Price each
JX01B	Mini DIN Line Plg 3W	69p
JX02C	Mini DIN Line Plg 4W	69p
JX03D	Mini DIN Line Plg 5W	69p
JX04E	Mini DIN Line Plg 6W	79p
JX05F	Mini DIN Line Plg 7W	79p
JX06G	Mini DIN Line Plg 8W	84p
JX19V	Mini DIN Line Plg 9W	99p

Miniature DIN Chassis Sockets

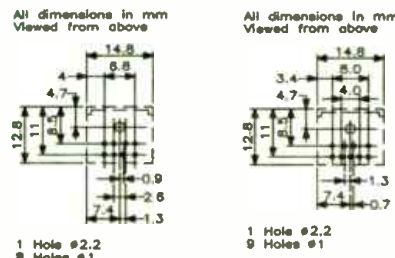
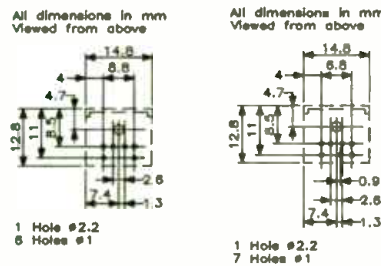
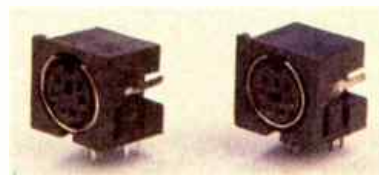
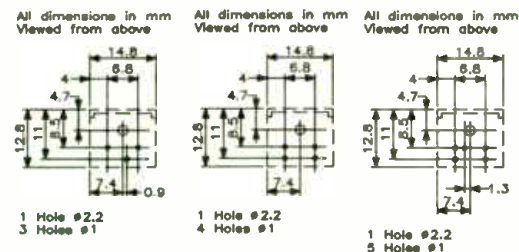


A range of miniature DIN chassis sockets which will mate with mini DIN plugs. Available in 3, 4, 5, 6, 7 and 8 pin types.

Order Code	Type	Price each
JX07H	Mini DIN Chss Skt 3W	69p
JX08J	Mini DIN Chss Skt 4W	69p
JX09K	Mini DIN Chss Skt 5W	69p
JX10L	Mini DIN Chss Skt 6W	79p
JX11M	Mini DIN Chss Skt 7W	79p
JX12N	Mini DIN Chss Skt 8W	79p

Miniature DIN PCB Sockets

A range of miniature DIN PCB sockets which will mate with mini DIN plugs. Available in 3, 4, 5, 6, 7, 8 and 9 pin types.



Order Code	Type	Price each
JX13P	Mini DIN PCB Skt 3W	74p
JX14Q	Mini DIN PCB Skt 4W	74p
JX15R	Mini DIN PCB Skt 5W	79p
JX16S	Mini DIN PCB Skt 6W	79p
JX17T	Mini DIN PCB Skt 7W	84p
JX18U	Mini DIN PCB Skt 8W	84p
JX20W	Mini DIN PCB Skt 9W	99p

2.5mm Mono Jack Connectors

Plastic Barrel Plug



2.5mm Jack plug with plastic barrel.

Order Code	Type	Price each
HF76H	2.5 Plug Plas	25p

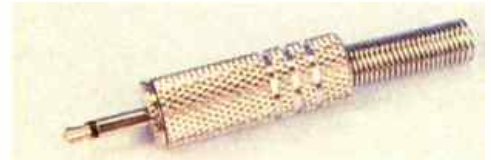
Plastic Barrel Plug with Strain Relief Sleeve



A 2.5mm mono jack plug with plastic barrel and strain relief sleeve.

Order Code	Type	Price each
JK00A	2.5 Plug Plas SR	34p

Screened Plug



2.5mm Jack plug with metal barrel and coiled spring cable relief sleeve.

Order Code	Type	Price each
HF77J	2.5 Plug Scr	39p

Chassis Socket

2.5mm Jack socket, open-type with break contact. Mounting hole: 3.8mm dia.



Order Code	Type	Price each
HF78K	2.5 Jack Socket	32p

Screened Chassis Socket

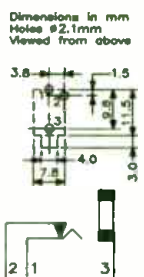
2.5mm screened mono chassis socket for panels up to 2mm thick. Requires 6mm dia. panel cut-out. Overall length behind panel 21mm. Overall length 24mm.



Order Code	Type	Price each
JK03D	2.5 Mono Chas Skt	39p

PCB Mounting Socket

Union Brothers



A 2.5mm mono jack socket having a knurled fixing nut for panel mounting in addition to solder tags suitable for insertion into drilled holes in a printed circuit board. The socket also has a break action contact to a third pin on insertion of the plug. Overall height from PCB is 9mm.

Order Code	Type	Price each
FK01B	PCB 2.5mm Jack Skt	39p

Line Socket

A 2.5mm mono line jack socket with plastic barrel and strain relief sleeve.



Order Code	Type	Price each
HF79L	2.5 Line Socket	30p



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2.5mm Plug to 3.5mm Socket

Allows a 3.5mm Mono Jack Plug to be used with a 2.5mm Mono Jack Socket.



Order Code	Type	Price each
RW08J	Adaptor J	59p

2.5mm Stereo Jack Connectors

Plastic Barrel Plug

2.5mm stereo Jack plug with plastic barrel.



Order Code	Type	Price each
FJ85G	Stereo 2.5mm Jack Pl	65p

Screened Plug

2.5mm stereo jack plug with metal barrel and coiled spring cable relief sleeve.



Order Code	Type	Price each
FE67X	Stereo 2.5mm P'g Scr	£1.19

Chassis Socket

2.5mm screened stereo chassis socket for panels up to 2mm thick. Requires 6mm dia. panel cut-out. Overall length behind panel 21mm. Overall length 24mm. Coppered terminal is tip.



Order Code	Type	Price each
FT94C	2.5 Stereo Chas Skt	39p

Line Socket

A stereo 2.5mm line jack socket with plastic body and strain relief sleeve.



Order Code	Type	Price each
FT93B	2.5 Stereo Line Skt	36p

2.5mm Plug to 3.5mm Stereo Socket

Allows a 3.5mm stereo jack plug to be used with a 2.5mm stereo jack socket.



Order Code	Type	Price each
FA94C	Adaptor W	99p

3.5mm Mono Jack Connectors

Plastic Barrel Plug

A mono 3.5mm jack plug with a plastic barrel and strain relief sleeve.



Order Code	Type	Price each
HF80B	Plug Plas 3.5	31p

Coloured Plugs Union Brothers



Plastic barrel mono 3.5mm jack plugs in five colours. The tip insulator ring matches the colour of the barrel. Supplied in packs of five plugs, one each of the following colours: Red, Yellow, Green, Blue, White.

Order Code	Type	Price each
JR95D	Colour 3.5mm Jacks	£2.50

Right-Angled Plug

A right-angled mono 3.5mm jack plug with snap-on cover and solder terminals.



Order Code	Type	Price each
FA37S	R/A 3.5mm Plug	36p

Screened Plug

A mono 3.5mm screened jack plug in a metal barrel with coiled spring cable relief sleeve.



Order Code	Type	Price each
HF81C	Plug Metal 3.5	39p

Lockable Plug and Socket



A 3.5mm mono jack plug in a metal barrel, having a threaded locking ring to firmly attach the plug to the matching socket. The fixing nut of the single hole mounting socket is threaded for the ring, and has flats for tightening with pliers or a spanner. Plug has coil strain relief sleeve. Mounting hole for socket: 6mm dia.

Order Code	Type	Price each
FV03D	Lck 3.5 Jack Plug	£1.22
FV04E	Lck 3.5 Jack Skt	79p

Chassis Socket

An open mono 3.5mm jack socket with break contact. Mounting hole: 6.3mm dia.



Order Code	Type	Price each
HF82D	Jack Socket 3.5	34p

Screened Chassis Socket

3.5mm screened mono chassis socket for panels up to 2mm thick. Requires 6mm dia. panel cut-out. Overall length behind panel 27mm. Overall length 30mm.



Order Code	Type	Price each
JK02C	Mono 3.5mm Ch Jk Skt	39p

PCB Socket Union Brothers

Dimensions in mm
Holes #2.1mm
Viewed from above



A PCB mounting mono 3.5mm jack socket which includes the facility for chassis mounting (6.3mm dia.)

Order Code	Type	Price each
FK02C	PCB 3.5mm Jack Skt	36p

Mono 3.5mm Jack Socket Cliff



A 3.5mm mono jack socket manufactured in accordance with DIN dimensions and fitted with break contacts. Available with either solder tags or PCB mounting tags. Supplied with nickel-plated brass fixing nuts.

Manufacturer's Code	Mounting	Stock Code
S6 BB	Tag	CX93B
S6 BB PC	PCB	CX94C

Order Code	Type	Price each
CX93B	Mono 3.5 Skt Solder	35p
CX94C	Mono 3.5 Skt PCB	42p

Plastic Barrel Line Socket

A mono 3.5mm line socket in a plastic barrel with strain relief sleeve.



Order Code	Type	Price each
HF83E	Line Socket Plas 3.5	32p

Screened Line Socket

A 3.5mm mono jack line socket in metal barrel with coiled spring cable relief sleeve.



Order Code	Type	Price each
HF84F	Line Socket Scr 3.5	45p

Screened Coupler

A screened metal-barrelled coupler for joining two mono 3.5mm plugs.



Order Code	Type	Price each
JK06G	Mono 3.5mm Jk Cplr	56p

Two-Into-One Adaptor

Allows two mono jack plugs to be connected to one socket.



Order Code	Type	Price each
YW35Q	Adaptor T	£1.09

Mini-Headphone Splitter

Headphone adaptor lead. Mono 3.5mm jack plug to two mono 3.5mm line sockets. Length: 0.2m.



Order Code	Type	Price each
RK27E	Pluggak Z	£1.19

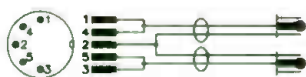
Plug to Plug

3.5mm jack plug to 3.5mm jack plug. Length 1.5m.



Order Code	Type	Price each
RW28F	Pluggak Q	89p

5-Pin DIN Plug to 3.5mm Plugs



5-pin A DIN plug (pins 1 & 4 and pins 3 & 5) to two 3.5mm jack plugs. Length: 1.5m.

Order Code	Type	Price each
RW24B	Dinpak L	£1.39

3.5mm Plug to Stereo 3.5mm Socket

Union Brothers

Allows a 3.5mm stereo plug to be used with a 3.5mm mono socket.



Order Code	Type	Price each
FK14Q	Adaptor U	54p

3.5mm Plug to 1/4in. Mono Socket

Allows a 1/4in. mono jack plug to be used with a 3.5mm mono socket.



Order Code	Type	Price each
RW02C	Adaptor C	59p

3.5mm Plug to 1/4in. Stereo Socket

Allows a 1/4in. stereo jack plug to be used with a 3.5mm mono jack socket.



Order Code	Type	Price each
RW12N	Adaptor N	59p

3.5mm Plug to Phono Socket

Allows a phono plug to be used with a 3.5mm mono jack socket.



Order Code	Type	Price each
RW04E	Adaptor E	54p

3.5mm Stereo Jack Connectors

Plastic Plug

A 3.5mm stereo jack plug with plastic barrel and strain relief sleeve.



Order Code	Type	Price each
HF98G	Stereo Plas 3.5 Plug	58p

Right-Angled Plug

A right-angled stereo 3.5mm jack plug.



Order Code	Type	Price each
FA38R	R/A 3.5mm Stereo Plug	60p

Screened Plug



A 3.5mm stereo jack plug with a metal barrel with a coiled spring cable relief sleeve.

Order Code	Type	Price each
FJ99H	Mtl Stereo 3.5mm Jk	78p

Chassis Socket

A stereo 3.5mm chassis socket in a tubular metal screen. Mounting hole 6.3mm dia. Coppered terminal is tip.

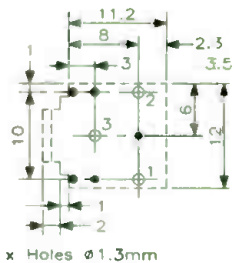


Order Code	Type	Price each
FK03D	Stereo 3.5mm Ch Jk Skt	42p

PCB Socket



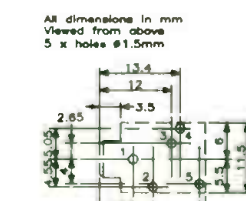
All dimensions in mm Viewed from above



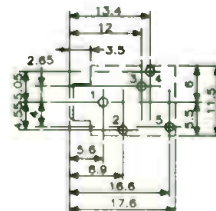
A 3.5mm stereo jack socket for PCB mounting. Measures 12 x 6 x 14mm excluding pins.

Order Code	Type	Price each
JM23A	PCB 3.5 Sto Socket	44p

PCB Socket



All dimensions in mm Viewed from above 5 x holes ø1.5mm



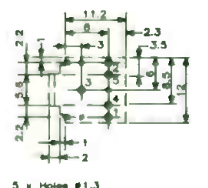
A PCB mounting stereo 3.5mm jack socket with two contacts which break when the plug is inserted.

Order Code	Type	Price each
FK20W	PCB 3.5mm Ste Jk Skt	69p

PCB Socket with Contacts



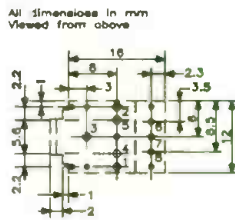
All dimensions in mm Viewed from above



A 3.5mm stereo jack socket for PCB mounting. Socket has switched contacts. Measures 12 x 6 x 14mm excluding pins.

Order Code	Type	Price each
JM20W	PCB 3.5 Sto Sw Skt	34p

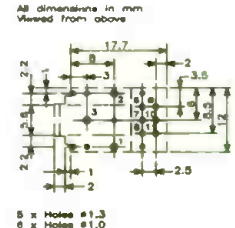
PCB Socket with 1 Pole 2 Way Contacts



A 3.5mm stereo jack socket for PCB mounting. Socket has terminals for main socket contacts and also has 1 pole 2 way switch contacts. Measures 12 x 6 x 18.5mm excluding pins.

Order Code	Type	Price each
JM22Y	PCB 3.5 Sto SPCO Skt	56p

PCB Socket with 2 Pole 2 Way Contacts



A 3.5mm stereo jack socket for PCB mounting. Socket has terminals for main socket contacts and also has 2 pole 2 way switch contacts. Measures 12 x 6 x 20.5mm excluding pins.

Order Code	Type	Price each
JM21X	PCB 3.5 Sto DPCO Skt	62p

Plastic Line Socket

A 3.5mm stereo line socket with plastic body and strain relief sleeve.



Order Code	Type	Price each
RK51F	Stereo Plas 3.5 Skt	49p

Screened Line Socket

A stereo 3.5mm line socket in a metal barrel with coiled spring cable relief sleeve.



Order Code	Type	Price each
FK04E	Ster Scr 3.5mm Ln Sk	49p

Screened Coupler

A screened metal-barrelled coupler for joining two stereo 3.5mm plugs.



Order Code	Type	Price each
JK05F	Stereo 3.5mm Jk Cplr	59p

Two-Into-One Adaptor

Allows two 3.5mm stereo plugs to be used with one 3.5mm stereo socket.



Order Code	Type	Price each
FP34M	Twin 3.5 Skt/3.5 Plg	£1.06

Two 3.5mm Mono Sockets to 3.5mm Stereo Plug

Allows two 3.5mm mono jack plugs, one carrying the left and one carrying the right channel of a stereo signal to be connected to a 3.5mm stereo socket.



Order Code	Type	Price each
JM91Y	2x3.5 Mono/3.5 Sto	99p

Stereo Phono Socket Adaptor

Allows two phono plugs, one carrying the left and one the right channel of a stereo signal to be connected to a 3.5mm stereo socket.



Order Code	Type	Price each
JK14Q	Phono/Stereo 3.5mm	99p

Two 1/4 in. Stereo Sockets to 3.5mm Stereo Plug

Allows two stereo 1/4 in. jack plugs to be connected to one 3.5mm stereo jack socket.



Order Code	Type	Price each
JB20W	2x1/4skt x3.5plg Sto	99p

Mini-Headphone Splitter



Headphone adaptor lead. Stereo 3.5mm jack plug to two stereo 3.5mm line sockets (so that two sets of headphones can be connected to one outlet).

Length: 0.2m.

Order Code	Type	Price each
RK58N	Pluggak Y	£1.49

Mini-Headphone Extension Lead



Headphone extension lead. Stereo 3.5mm jack plug to stereo 3.5mm jack socket. Length 3m.

Order Code	Type	Price each
RK57M	Pluggak W	£1.49

3.5mm Stereo Plug Extension Lead

A 1.5m long extension lead with a 3.5mm stereo plug at both ends. Suitable for connecting personal stereos to personal stereo loudspeakers.

Order Code	Type	Price each
CK27E	3.5/3.5 Str Plug Ld	99p

3.5mm Stereo Plug to 3.5mm Mono Socket Adaptor

Allows a 3.5mm mono jack plug to be used with a 3.5mm stereo jack socket.



Order Code	Type	Price each
FK15R	Adaptor D	60p

3.5mm Stereo Plug to 1/4 in. Stereo Socket Adaptors

Available with plastic barrel or fully screened metal barrel. They allow a 1/4 in. stereo jack plug to be used with a 3.5mm stereo socket.



Order Code	Type	Price each
RK56L	Adaptor Z	59p
JK07H	Adaptor Z Metal	72p

1/4 in. Mono Jack Connectors

Plastic Barrel Plug



Standard 1/4 in. mono jack plug in plastic barrel with strain relief sleeve.

Order Code	Type	Price each
HF85G	Jack Plug Plas	45p

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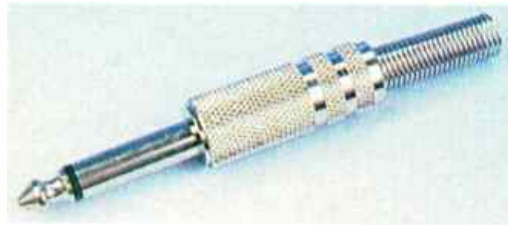
Side Entry Jack Plug

Standard 1/4 in mono right-angled side entry jack plug with plastic cover.



Order Code	Type	Price each
HF86T	Side Jack Plas	49p

Screened Plug



Standard 1/4 in mono jack plug in a metal barrel with coiled spring cable relief sleeve.

Order Code	Type	Price each
HF87U	Jack Plug Metal	64p

High Quality Screened Plug



Standard 1/4 in. mono screened jack plugs with metal body and coiled spring cable relief sleeve. Available with black or red identification bands.

Order Code	Type	Price each
YW07H	SR Jack Plug Black	79p
JH99H	SR Jack Plug Red	79p

Gold-Plated Plug



A gold-plated 1/4 in. mono jack plug with metal body and coiled spring cable relief sleeve. Available with black or red identification bands.

Order Code	Type	Price each
FJ86T	Gold/Blk Mono 1/4" Pl	£1.50
JH98G	Gold/Red Mono 1/4" Pl	£1.50

Professional Plug



Solid nickel-plated brass jack plug with slide-over plastic sleeve. Suitable for cables 4.5 to 6.35mm overall diameter. Available in the following colours: Black, Blue, Orange, Red, White and Yellow.

Order Code	Type	Price each
FD80B	Prof Jack Plug Black	£2.49
FD81C	Prof Jack Plug Blue	£2.49
FD83E	Prof Jack Plug Orng	£2.49
FD79L	Prof Jack Plug Red	£2.49
FD84F	Prof Jack Plug White	£2.49
FD82D	Prof Jack Plug Yello	£2.49

Heavy Duty Plug



A gold plated mono screened jack plug with heavy duty brass handle, plastic finger-grip and long coiled spring strain-relief sleeve. Handle dia. 16mm. Sleeve length 53mm.

Order Code	Type	Price each
FP15R	Heavy Duty Jack Plug	£1.56

Screened Side-Entry Plug

Standard 1/4 in right-angled side entry mono jack plug with a metal body.



Order Code	Type	Price each
YL03D	Side Jack Screened	54p

Lockable Plug and Socket

Union Brothers

A standard 1/4 in. mono jack plug with metal barrel and coiled strain relief sleeve. The plug has a threaded locking ring to firmly attach it to the matching socket, which has a fixing nut threaded for the ring. The chassis socket is single hole mounting requiring a 9.5mm (3/8 in.) dia. hole.



Order Code	Type	Price each
FV05F	Lck Standrd Jack Plg	£1.50
FV06G	Lck Standrd Jack Skt	£1.32

Open Chassis Socket

Standard 1/4 in open-type mono jack socket. Mounting hole: 9.5mm dia.



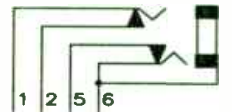
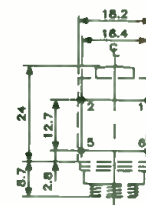
Order Code	Type	Price each
HF91Y	Jack Skt Open	42p

Moulded Chassis Socket Plastic Bezel

Re-An



Dimensions in mm
Holes ø 1.3mm
Viewed from above



Standard 1/4 in moulded jack socket with 2 break contacts. Mounting hole: 11mm dia. Available with solder tags or PCB mounting pins.

Order Code	Type	Price each
HF90X	Jack Skt Brk	42p
FJ00A	Mono PCB 1/4" J/Skt	42p

Moulded Chassis Socket Chromed Bezel

Cliff

Standard 1/4 in moulded jack socket with 2 break contacts. Bezel is domed and chromed. Mounting hole: 11mm dia.



Order Code	Type	Price each
BW78K	Chro Mono Jack Skt	62p

Compact Mono PCB Jack Sockets

Cliff

A compact PC mounting 1/4 in. mono jack socket with a switch contact, and supplied with mounting nut and washer.



Order Code	Type	Price each
CX89W	PCB Skt Sw Mono	72p

Plastic Barrel Line Socket



A standard 1/4 in mono line socket with plastic barrel and strain relief sleeve.

Order Code	Type	Price each
HH19V	Line Jack Plas	39p

Screened Line Socket

Standard 1/4in mono line socket with metal barrel and coiled spring strain relief sleeve.



Order Code	Type	Price each
HH20W	Scr Line Jack	82p

1/4in. Jack Coupler

A heavy-duty plastic-barrelled coupler for joining two mono 1/4in jack plugs.



Order Code	Type	Price each
RK80B	Mono 0.25in Jk Cplr	99p

Two 3.5mm Mono Sockets to 1/4in. Mono Plug

Allows two mono 3.5mm jack plugs to be connected to one 1/4in. mono jack socket.



Order Code	Type	Price each
JB19V	2x3.5skt x1/4plg Mon	99p

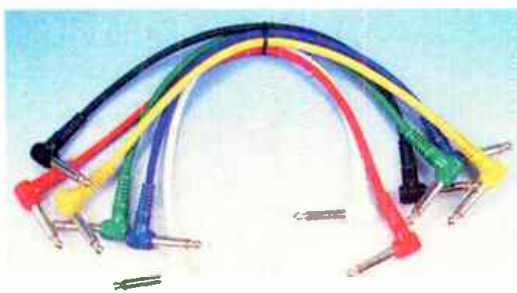
Two-Into-One Adaptor

Allows two 1/4in. mono jack plugs to be used with one 1/4in. mono jack socket.



Order Code	Type	Price each
YW37S	Adaptor V	£1.19

Patch Lead Set



Six short colour coded screened leads terminated with right angled 1/4in. mono jack plugs for chaining several items of audio or stage equipment together. Supplied as a set. Length 300mm each. Colours: Black, Blue, Green, Yellow, Red, White.

Order Code	Type	Price each
YZ32K	Patch Lead Set	£5.99

Stereo/Mono Patch Bay



A 19in. 1U high, rack mounting 48-way mono or 24-way stereo patch bay. Standard operation is in normalised or half normalised modes and by simply rotating any PCB through 180° will give de-normalised operation. Individual patch bays are numbered '1' to '24', with convenient 'write-on' labels. The unit is of a high quality construction with a steel epoxy resin coated chassis, fibreglass PCB and nickel/silver contacts which have a switch contact better than 15mΩ.

Order Code	Type	Price each
RZ78K	B2 Stereo/Mono Patchbay	£54.99

1/4in. Plug to 3.5mm Mono Socket Adaptor

Allows a 3.5mm mono jack plug to be used with a 1/4in. mono jack socket.



Order Code	Type	Price each
RW00A	Adaptor A	59p

1/4in. Plug to 1/4in. Stereo Socket Adaptor

Allows a 1/4in. stereo jack plug to be used with a 1/4in. mono jack socket.



Order Code	Type	Price each
FK11M	Adaptor L	54p

1/4in. Plug to Phono Socket Adaptors



Allows a phono plug to be used with a 1/4in. mono jack socket. Available with plastic body or high quality gold-plated metal body.

Order Code	Type	Price each
RW01B	Adaptor B	59p
KW36P	Adaptor B Gold	80p



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Guitar Leads

Coiled Right Angled Mono 1/4in. Jack Lead



A coiled extension lead terminated with a right angled mono 1/4in. jack plug and a straight 1/4in. jack plug. Coiled length 1.2m. Extended length 3.5m.

Order Code	Type	Price each
RW34M	Pluggak X	£2.29

Straight Mono 1/4in. Jack Lead



A straight extension lead terminated with a metal bodied 1/4in. jack plug at each end. The plug bodies have knurled finger grips and coiled spring strain relief sleeves. Length 3m.

Order Code	Type	Price each
YZ29G	Strght 1/4 Jack Lead	£2.99

Double Screened Straight Mono 1/4in. Jack Lead



A straight extension lead terminated with a metal bodied 1/4in. jack plug at each end. The plug bodies are sleeved with chunky moulded plastic finger grips. The cable features a conductive polythene screen over a polythene insulator for the central conductor which is in overall contact with an outer copper braided screen for minimum noise pick-up. Length 4.5m.

Order Code	Type	Price each
YZ30H	DS Strght 1/4 Jk Ld	£4.59

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Double Screened Coiled Mono 1/4 in. Jack Lead



A coiled extension lead terminated with a metal bodied 1/4 in jack plug at each end. The plug bodies are sleeved with chunky moulded plastic finger grips. The cable features a conductive polythene screen over a polythene insulator for the central conductor which is in overall contact with an outer copper braided screen for minimum noise pick-up. Coiled length 1m. Extended length 3.2m.

Order Code	Type	Price each
YZ31J	DS Coiled 1/4 Jk Ld	£4.99

Long Double Screened Coiled Mono 1/4 in. Jack Lead



A coiled extension lead terminated with plastic bodied 1/4 in. jack plugs at each end, with chunky moulded finger grips. The cable has a conductive polythene screen over a polythene insulator for the central conductor, in contact with an outer copper braided screen for minimum noise pick-up. Coiled length: 1.3 metres. Extended length: 5.4 metres. Colour black.

Order Code	Type	Price each
JX84F	LD Coiled 1/4 Jk Ld	£6.99

High Quality Straight Mono 1/4 in. Jack Lead with OFC Conductors



A straight extension lead terminated with a black, metal bodied, 1/4 in. jack plug at each end. The plug bodies have knurled finger grips and coiled strain relief

sleeves. Untinned OFC (oxygen free copper) conductors are used for unparalleled sound purity. Length 6 metres. Colour black.

Order Code	Type	Price each
JX85G	OFC 1/4 Jack Lead	£14.99

Neon Extension Leads



A range of very flexible quality extension leads in a bright fluorescent neon coloured cable. The ends are terminated in standard 1/4 in. jack plugs that are protected and strain relieved by black heat-shrink sleeving. Choice of three colours: green, pink, orange. Length 6m.

Order Code	Type	Price each
CC36P	Neon Lead Green	£8.99
CC37S	Neon Lead Pink	£8.99
CC38R	Neon Lead Orange	£8.99

Guitar Lead



A straight extension lead of the highest quality with a brass bodied, 1/4 in. jack plug at each end. The jack plug bodies have knurled finger grips and moulded strain relief sleeves. This lead is manufactured with untinned OFC (oxygen free copper) conductors to preserve sound purity. Length 6m. Colour black.

Order Code	Type	Price each
CC39N	Guitar Lead	£7.99

1/4 in. Stereo Jack Connectors

Plastic Barrel Plug

A standard 1/4 in stereo jack plug with plastic barrel and strain relief sleeve.



Order Code	Type	Price each
HF88V	Jack PI Sto Plas	£2.99

Side Entry Plug

Standard 1/4 in stereo side entry jack plug with plastic body.



Order Code	Type	Price each
FK00A	Stereo R/A 1/4 in Jk	60p

Screened Plug

A standard 1/4 in. screened stereo Jack plug with a metal barrel and coiled spring cable relief sleeve.



Order Code	Type	Price each
HF89W	Jack PI Sto Metal	77p

Gold-Plated Jack Plug

A gold-plated stereo 1/4 in jack plug, having a plated barrel in addition to plated contact areas, plus a coil spring strain relief sleeve.



Order Code	Type	Price each
FM12N	Gold Stereo 1/4 in Jk	£1.49

Screened Side-Entry Plug

Standard 1/4 in. right-angled side entry stereo jack plug with a metal body.



Order Code	Type	Price each
JK01B	Stereo R/A 1/4" Scr	65p

Open Socket

Standard 1/4 in open-type 3-pole stereo Jack socket. Mounting hole: 9.5mm dia.



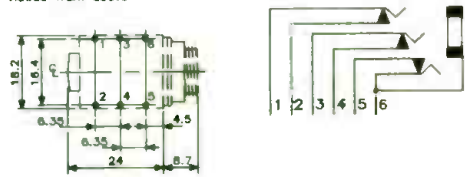
Order Code	Type	Price each
HF93B	Stereo Open Skt	56p

THE BEST OF SERVICE

Moulded Chassis Socket with Plastic Bezel



Dimensions in mm
Holes #1.3mm
Viewed from above



Standard 1/4in moulded stereo Jack socket with 3 break contacts. Mounting hole: 11mm dia. Available with solder tags or PCB mounting pins.

Order Code	Type	Price each
HF92A	Jack Skt Sto	55p
FJ05F	Stereo PCB 1/4" J/Sk	58p

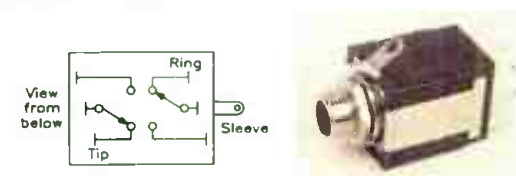
Moulded Chassis Socket with Chromed Bezel

Standard 1/4in moulded stereo Jack socket with 3 break contacts. Bezel is domed and chromed and contacts are nickel silver. Mounting hole: 11mm dia.



Order Code	Type	Price each
BW79L	Chro Stereo Jack Skt	78p

DPDT Jack Socket

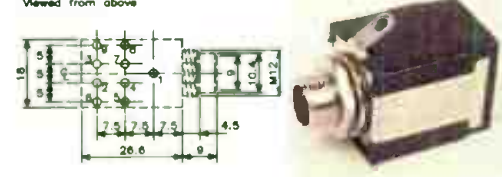


A standard 6.3mm (1/4in) stereo Jack socket with two changeover contacts which are not connected to the plug when it is inserted, 9 contacts. Ideally suited as headphone outlet on amplifier, with switches used to change main output from speakers to dummy loads. Mounting hole: 9.5mm dia.

Order Code	Type	Price each
BW80B	DPDT Jack Socket	99p

DPDT PCB Jack Socket

Dimensions in mm
Holes #2.2mm
Viewed from above

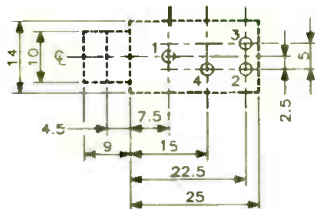


A standard 1/4in stereo PCB mounting jack socket with internal DPDT contacts.

Order Code	Type	Price each
FJ87U	Sw PCB Stereo Jk Skt	£1.49

Compact Stereo PCB Jack Sockets

Cliff



4 Holes #2.4

Two types of compact PC mounting 1/4in. stereo jack sockets, with either one switched contact or unswitched. Supplied with mounting nuts and washers.

Order Code	Type	Price each
CX88V	PCB Skt UnSw Stereo	72p
CX90X	PCB Skt Sw Stereo	72p

Plastic Barrel Line Socket

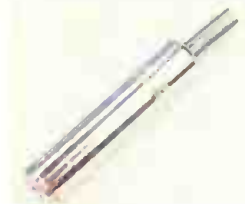
A standard 1/4in stereo line socket with plastic barrel and strain relief sleeve.



Order Code	Type	Price each
HH21X	Stereo Line Skt	52p

Screened Line Socket

A standard 1/4in stereo line socket with a metal barrel and coiled spring cable relief sleeve.



Order Code	Type	Price each
HH22Y	Scr Stereo Line Skt	89p

1/4in. Jack Coupler

A heavy-duty plastic-barrelled coupler for joining two stereo 1/4in. jack plugs.



Order Code	Type	Price each
JK04E	Stereo 0.25" Jk Cplr	89p

Two-Into-One Adaptor

Allows two 1/4in. stereo jack plugs to be used with one 1/4in. stereo jack socket.



Order Code	Type	Price each
JB17T	2 into 1 Stereo Jk	99p

Two 1/4in. Mono Sockets to 1/4in. Stereo Plug

Allows two 1/4in. mono plugs, one carrying the left and one carrying the right channel of a stereo signal to be connected to a stereo socket.



Order Code	Type	Price each
JM92A	2x1/4 Mono 1/4 Sto	99p

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Stereo Phono Socket Adaptor

Allows two phono plugs, one carrying the left and one the right channel of a stereo signal to be connected to a 1/4in. stereo socket.



Order Code	Type	Price each
JK13P	Phono/Stereo 1/4in	99p

Two 3.5mm Stereo Sockets to 1/4in. Stereo Plug

Allows two stereo 3.5mm jack plugs to be connected to one 1/4in. stereo jack socket.



Order Code	Type	Price each
JB18U	2x3.5skt x1/4plg Sto	99p

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Headphone Lead



Headphone extension lead. Stereo jack plug to stereo line socket. Coiled lead. Length: 5m.

Order Code	Type	Price each
RW31J	Plugpak T	£2.29

1/4 in. Stereo Plug to 5-Pin A DIN Socket Adaptor



Allows a 5-pin A (180°) DIN plug to be used with a 1/4 in. stereo jack socket.

Order Code	Type	Price each
FK12N	Adaptor M	99p

1/4 in. Stereo Plug to 3.5mm Mono Socket Adaptor



Allows a 3.5mm mono jack plug to be used with a 1/4 in. stereo jack socket.

Order Code	Type	Price each
YW34M	Adaptor S	59p

1/4 in. Stereo Plug to 3.5mm Stereo Socket Adaptor



Allows a 3.5mm stereo jack plug to be used with a 1/4 in. stereo jack socket.

Order Code	Type	Price each
RK55K	Adaptor Y	59p

Multiway Connectors

Audio Locking Connectors Chassis Plug / Line Socket



A range of high quality audio connectors with die-cast metal housings and plated brass contacts. Connectors are keyed and a screw locking mechanism locks the connector into place. Line socket has an integral cable

clamp. Chassis mounting plug requires a 16mm diameter panel cutout. Line socket overall length: 37mm, diameter 18mm. Current rating: 5A at 50V AC. Plugs and sockets supplied separately. Available in 2, 3, 4, 5, 6, 7 and 8 ways.

Order Code	Type	Price each
FM50E	Lkg Audio Plug 2-Way	99p
FK22Y	Lkg Audio Skt 2-Way	99p
FM51F	Lkg Audio Plug 3-Way	£1.06
FK23A	Lkg Audio Skt 3-Way	£1.06
FM52G	Lkg Audio Plug 4-Way	£1.20
FK24B	Lkg Audio Skt 4-Way	£1.20
FM53H	Lkg Audio Plug 5-Way	£1.28
FK25C	Lkg Audio Skt 5-Way	£1.28
FM54J	Lkg Audio Plug 6-Way	£1.40
FK26D	Lkg Audio Skt 6-Way	£1.40
FK27E	Lkg Audio Plug 7-Way	£1.56
FK28F	Lkg Audio Skt 7-Way	£1.56
FK29G	Lkg Audio Plug 8-Way	£1.80
FK30H	Lkg Audio Skt 8-Way	£1.80

Chassis Socket / Line Plug



Identical to the above connectors, but with a line plug and chassis socket. Available only in 10-way.

Order Code	Type	Price each
FT91Y	Lkg Audio Plg 10-Way	£4.99
FT92A	Lkg Audio Skt 10-Way	£3.29

Phono Connectors

Plastic Plug

A phono plug with a smart screw on plastic cap. Available in Black, Blue, Red, White and Yellow. Overall length: 34mm. Pin length: 9mm from end of shield. Overall diameter: 11.5mm.



Order Code	Type	Price each
HQ54J	Screw-Cap Phono Blk	26p
HQ55K	Screw Cap Phono Blue	26p
HQ58N	Screw Cap Phono Red	26p
HQ59P	Screw Cap Phono White	26p
HQ60Q	Screw Cap Phono Yell	26p

Plastic Plug With Strain Relief Sleeve

A phono plug having a coloured plastic screw-on body. When the body is unscrewed the threaded moulding on the plug is exposed, which is colour matched to the body. The body is of hexagonal section and includes a strain relief sleeve. Available in red and black.



Order Code	Type	Price each
FJ88V	Phono Plug Red	25p
FJ89W	Phono Plug Black	25p

Right-Angled Plastic Plug

A right-angled phono plug having a black plastic body with strain relief sleeve.



Order Code	Type	Price each
FJ74R	R/A Phono Plug	59p

Screened Plug

A screened phono plug with a metal barrel and coiled spring cable relief sleeve.



Order Code	Type	Price each
HH01B	Phono Plug Screened	39p

Gold-Plated Plug

A very high quality screened phono plug having a gold-plated body and gold-plated contact surfaces for maximum contact reliability. Plug has a coiled spring relief sleeve. Available with black or red identification bands.



Order Code	Type	Price each
FK18U	Gld/Blk Phono Plug	79p
JH94C	Gld/Red Phono Plug	79p

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Quality Gold Plated Phonos



A very high quality screened phono plug having gold plated contact surfaces and a gold plated body in silver-grey or blue. Includes gold plated strain relief grip. Each type is sold in pairs, with a red and black identification band.

Order Code	Type	Price each
AQ57M	Silv Red+Blk Phono Pk	£4.49
AQ56L	Blu Red+Blk Phono Pk	£4.49

Metal Barrel Gold-Plated Phono Plugs For Large Diameter Cables



A range of high quality metal barrelled phono plugs with gold plated contact surfaces for minimum contact resistance and maximum reliability. These plugs are designed for use with large diameter cables, often encountered in semi-professional and professional applications. Suffix 70 types have 27mm x 12mm dia. bodies finished in black with knurled grip rings, an 18mm long coil spring strain relief and are suitable for cables up to 7mm diameter. Suffix 85 types have 36 x 14mm dia. black knurled bodies, a 34mm long coil spring strain relief and are suitable for cables up to 8.5mm diameter, a substantial tubular cable clamp will ensure cable retention. Both types are available with red or white identifier bands around the plug body; for left/right identification in stereo applications.

Order Code	Type	Price each
JU06G	Gold Phono P1-R-70	£1.29
JU07H	Gold Phono P1-W-70	£1.29
JU08J	Gold Phono P1-R-85	£1.64
JU09K	Gold Phono P1-W-85	£1.64

High Quality Gold-Plated Phono Plugs

A range of metal barrelled, gold-plated phono line plugs with different cable entry diameters to match 5, 6, 7 and 8mm dia. sleeving. The high quality of construction includes a body containing a split collet with a ridged inner surface, to grip outer screen when folded back over outer sleeve. Inner conductor can be soldered to centre pin. Insulation material is Teflon. Available with black or red identification band.



Order Code	Type	Price each
JZ07H	Gld Phono Plg 5mm Bk	£1.69
JZ08J	Gld Phono Plg 5mm Rd	£1.69
JZ09K	Gld Phono Plg 6mm Bk	£1.69
JZ10L	Gld Phono Plg 6mm Rd	£1.69
JZ11M	Gld Phono Plg 7mm Bk	£1.80
JZ12N	Gld Phono Plg 7mm Rd	£1.80
JZ13P	Gld Phono Plg 8mm Bk	£1.80
JZ14Q	Gld Phono Plg 8mm Rd	£1.80

Lockable Plug and Socket

A phono plug in a metal barrel having a threaded locking ring to firmly attach the plug to the matching socket. Plug has a coiled spring cable relief sleeve. Mounting hole for socket 6.3mm.



Order Code	Type	Price each
JB14Q	Locking Phono Plug	99p
JB15R	Locking Phono Socket	82p

Single-Hole Fixing Chassis Socket

A chassis mounting phono socket that requires a single hole fixing. Mounting hole: 6.35mm dia.



Order Code	Type	Price each
YW06G	Chassis Phono Skt	34p

Gold-Plated Socket

A chassis mounting phono socket with gold-plated contact surfaces for ultimate reliability. Available with either Red or Black colour bands to identify relevant channel. Single hole fixing. Mounting hole: 6.3mm dia.



Order Code	Type	Price each
FT95D	Gold Phono Skt Blk	74p
DE77J	Gold Phono Skt Red	74p

Gold Single-Hole Fixing Insulated Chassis Socket

A chassis mounted phono socket, the body of which is insulated from its panel by shoulder washers. Fixed with supplied nut and tag washer for separate screen connection. Teflon insulation, gold-plated. Available with black or red identification band.



Order Code	Type	Price each
JZ05F	Gld Ch Phono Skt Blk	£1.75
JZ06G	Gld Ch Phono Skt Red	£1.75

PCB Mounting Socket

A compact phono socket which mounts directly onto printed circuit boards. Dimensions: 22 x 15 x 10mm.



Order Code	Type	Price each
HF99H	PCB Phono Skt	45p

Chassis Sockets

Chassis mounting phono sockets fixed to paxolin panels.



Type	No. of sockets	Dimensions of mount mm	Fixing centres mm	Socket centres mm
Single	1	35 x 22	26	-
Twin	2	56 x 22	48	20
Quad	4	76 x 24	65	14
2 Square	4	49 x 36	40 x 26	15 x 16
6-Way	6	65 x 36	55 x 26	15 x 16
8-Way	8	80 x 36	70 x 26	15 x 16

Fixing holes are 3.75mm dia. Phono sockets require 8.5mm dia. cut-outs.

Order Code	Type	Price each
JH93B	Phono Socket Single	21p
JK15R	Phono Socket Twin	36p
BW74R	Phono Socket Quad	56p
JK16S	Phono Socket 2 Sqre	58p
JH95D	Phono Socket 6-way	75p
JK17T	Phono Socket 8-Way	99p

Plastic Line Socket

An in-line plastic barrel phono socket with strain relief sleeve. Available in red and black.



Order Code	Type	Price each
FJ90X	Line Phono Skt Blk	26p
JK23A	Line Phono Skt Red	26p

Screened Line Socket

A screened in-line metal barrel phono socket with coiled spring cable relief sleeve.



Order Code	Type	Price each
HH04E	Line Phono	39p

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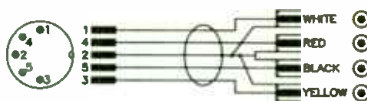
Gold-Plated Line Socket

A very high quality screened phono line socket with a gold-plated body and gold-plated contact surfaces for ultimate contact reliability. It has a coil spring strain relief sleeve.



Order Code	Type	Price each
FA93B	Gld/Blk Phono Ln Skt	79p
JH96E	Gld/Red Phono Ln Skt	79p

5-Pin A DIN Plug to Four Phono Plugs



5-pin A (180°) DIN plug to four phono plugs. Length 1.5m.

Order Code	Type	Price each
RW17T	Dinpak D	£2.39

3-Pin Chassis Socket

Union Brothers

Mounting hole: 24mm dia. Bezel: 27 x 36.5mm. Fixing centres: 26 x 17mm x M3 countersunk. Overall depth (excl. latch release): 37mm.



Order Code	Type	Price each
BW90X	XLR Chassis Socket	£2.50

In-Line Connector

A metal barrel adaptor for connecting two phono plugs together.



Order Code	Type	Price each
HH05F	Phono Conn	49p

Phono Plug to 3.5mm Mono Jack Socket Adaptor

Allows a 3.5mm mono jack plug to be used with a phono socket.



Order Code	Type	Price each
RW06G	Adaptor G	59p

3-Pin Line Socket



Overall length: 90mm. Diameter: 19mm. (excl. latch release).

Order Code	Type	Price each
BW91Y	XLR Line Socket	£2.50

Two-Into-One Adaptor

Allows two phono plugs to be used with one phono socket.



Order Code	Type	Price each
YW39N	Adaptor X	99p

Phono Plug to 1/4 in. Mono Jack Socket Adaptor

Allows a 1/4 in. mono jack plug to be used with a phono socket.



Order Code	Type	Price each
RW05F	Adaptor F	59p

3-Pin Chassis Plug

Mounting hole: 19mm dia. Bezel: 22 x 36.5mm. Fixing centres: 27mm x M3 countersunk. Overall depth: 25mm.



Order Code	Type	Price each
BW92A	XLR Chassis Plug	£1.86

Phono Plug to Phono Plug

Phono plug to phono plug lead. Length 1.5m. Also see Video Connectors.



Order Code	Type	Price each
RW48C	Pluggak 279	99p

XLR-Type Connectors

3-Pin Plug

Professional quality connectors for use on audio and test equipment etc. The strong metal housings are sandblasted die-cast zinc then copper and nickel plated. Contacts are brass, mercury dipped then silver plated. Self-adjusting strain-relief sleeves on line plug and socket will accommodate cables from 4 to 7mm dia. preventing damage to cable sheath up to 50kg stress.

Current rating: 15A at 120V AC
Contact resistance: 5mΩ max

All parts are latching and will mate with other 3-pin XLR connectors.

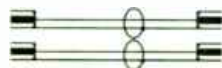
Overall length: 70mm. Diameter: 19mm.



Order Code	Type	Price each
BW89W	XLR Line Plug	£2.35

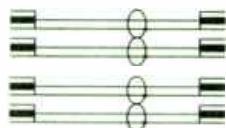
Twin Phono Plug to Phono Plug

Two phono plugs to two phono plugs. Length 1.5m.



Order Code	Type	Price each
RW50E	Pluggak 282	£1.49

Quad Phono Plug to Phono Plug



Four phono plugs to four phono plugs. Length 1.5m.

Order Code	Type	Price each
RW51F	Pluggak 283	£2.19

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IT'S A FACT!

Peritelevision (SCART) Audio-Visual Interface Standard

The Peritelevision (also known as SCART) audio-visual interface standard was developed by the European Committee for Electrotechnical Standardisation (CENELEC), as a universal means of interfacing a wide variety of audio-visual equipment; namely the domestic TV, DBS and other satellite decoders, video recorders, video disc players, video cameras, domestic computer equipment, etc. Interface connection is via a single multipole connector, carrying a variety of audio, video and control signals, which is incapable of incorrect connection, thus avoiding problems associated with individual connectors being used for each component signal; which give rise to possible incorrect connection. Many current models of domestic TV and video equipment are provided with Peritel interface connectors.

The Peritelevision interface standard is defined by the European Standard EN 50 049 and the British Standard BS 6552, which is the English language version of the European Standard EN 50 049. Copies of the British Standard BS 6552 publication (payment required) may be obtained from BSI Sales Dept., Linford Wood, Milton Keynes, MK14 6LE. Tel: 0908 220022.

The Peritelevision interface consists of a socket, panel mounted on the equipment; and a plug, attached to the interconnecting cable. Connection between socket and plug is via a staggered 2 row by 10 contact arrangement, plus a contact encompassing shield contact; providing a total of 21 connections.

The pin designations of the Peritel connector are shown here in Figure 1 and Table 1.

Source Selection Table

P8	P16	Source Selected
0	0	Normal 'off-air' signal
0	1	RGB Input
1	0	Composite Input
1	1	RGB Input

Figure 1

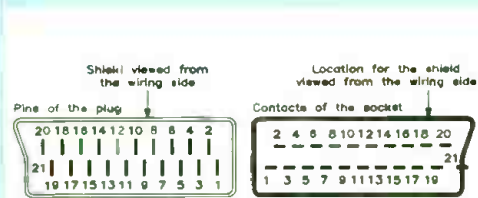


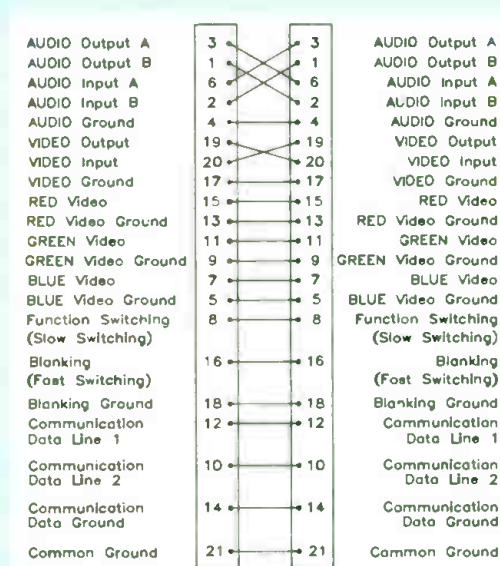
Table 1

Connect Number	Signal Designation	Signal Switching Characteristics	Impedance	Signal Level
1	AUDIO OUTPUT B (Stereo Right Independent B)	Impedance: 75Ω Signal Level: 0.5V RMS @ 2V max	75Ω	0.5V RMS @ 2V max
2	AUDIO INPUT B (Stereo Right Independent B)	Impedance: 75Ω Signal Level: 0.5V RMS @ 2V max, 2V max	75Ω	0.5V RMS @ 2V max, 2V max
3	AUDIO OUTPUT A (Stereo Left Independent A)	Impedance: 75Ω Signal Level: 0.5V RMS @ 2V max	75Ω	0.5V RMS @ 2V max
4	AUDIO GROUND	Impedance: 75Ω	75Ω	
5	BLUE VIDEO GROUND	Impedance: 75Ω	75Ω	
6	AUDIO INPUT A (Stereo Left Independent A)	Impedance: 75Ω Signal Level: 0.5V RMS @ 2V max, 2V max	75Ω	0.5V RMS @ 2V max, 2V max
7	BLUE VIDEO (Input or Output)	Impedance: 75Ω Video Level: 0.7V ± 5dB (peak level to peak level) DC component: 0 to +1V	75Ω	0.7V ± 5dB (peak level to peak level) 0 to +1V
8	FUNCTION SWITCHING (Input or Output)	Logic: 0 = +5V, +1V (Normal Mode) 1 = +5V, +1V (Normal Mode)	75Ω	
9	GREEN VIDEO GROUND	Impedance: 75Ω	75Ω	
10	COMMUNICATION DATA LINE 1	Undefined	75Ω	
11	GREEN VIDEO (Input or Output)	Impedance: 75Ω Video Level: 0.7V ± 5dB (peak level to peak level) DC component: 0 to +1V	75Ω	0.7V ± 5dB (peak level to peak level) 0 to +1V
12	COMMUNICATION DATA LINE 2	Undefined	75Ω	
13	RED VIDEO GROUND	Impedance: 75Ω	75Ω	
14	COMMUNICATION DATA GROUND	Undefined	75Ω	
15	RED VIDEO (Input or Output)	Impedance: 75Ω Video Level: 0.7V ± 5dB (peak level to peak level) DC component: 0 to +1V	75Ω	0.7V ± 5dB (peak level to peak level) 0 to +1V
16	BLANKING (Input or Output)	Logic: 0 = +5V, +1V (Blanked & Fast RGB) 1 = +5V, +1V (Blanked & Fast RGB)	75Ω	
17	VIDEO GROUND	Impedance: 75Ω	75Ω	
18	BLANKING GROUND	Impedance: 75Ω	75Ω	
19	VIDEO OUTPUT (Composite Video)	Impedance: 75Ω Video Level: 1V p-p ± 5dB (Peak level to peak level) DC component: 0 to +2V	75Ω	1V p-p ± 5dB (Peak level to peak level) 0 to +2V
20	OR SYNCHRONISATION OUTPUT	Impedance: 75Ω Syst. Level: 0.5V ± 5dB ± 10dB	75Ω	0.5V ± 5dB ± 10dB
21	COMMON GROUND (Shield)	Impedance: 75Ω Syst. Level: 0.5V ± 5dB ± 10dB	75Ω	0.5V ± 5dB ± 10dB

Peritel Interconnecting Cables

All equipment fitted with a Peritel socket should have the pins connected as designated, to connect two pieces of equipment an interconnecting cable fitted with Peritel plugs is used. To provide the necessary connection between equipment the interconnecting cable needs to fulfil connections between the appropriate pins, this involves some conductors 'crossing' from input to output (and vice versa), whereas ground and control conductors connect 'straight'. This is illustrated in Figure 2. To allow interconnecting cables to be extended socket to plug and socket to socket interconnecting cables can be used. To prevent 'crossed' connections from becoming 'uncrossed' the following guidelines should be used when making

Figure 2



up interconnecting cables: Plug to Plug, Conductors 'Crossed' as Figure 2; Socket to Plug, Conductors 'Straight' (Pin 1 - Pin 1, Pin 2 - Pin 2, etc.); Socket to Socket, Cables 'Crossed' as Figure 2.

Within the Peritel Standard it is permissible to employ only the conductors required to provided the interconnection, instead of connecting all 21 pins; for example just composite video and audio, but not RGB video. The following connection configurations have been adopted as standard. Type U (Universal) - provides connections to all 21 pins. Type V (Video) - provides all connections excluding Audio pins (3, 1, 6, 2 & 4). Type C (Composite Video & Audio) - provides all connections excluding RGB Video & Blanking pins (15, 13, 11, 9, 7, 5, 16 & 18). Type A (Audio) - Provides all connections excluding Video pins (19, 20, 17, 15, 13, 11, 9, 7, 5, 16 & 18).

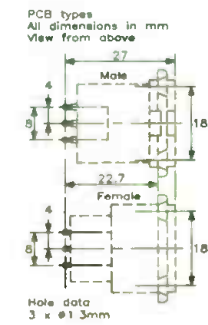
Assembling Custom Cables

When assembling custom cables for particular applications, where a standard cable cannot be used (i.e. computer to TV) it is important to use the correct type of cable for the signal being carried: Video (including sync and blanking) connections should be made with 75Ω coaxial cable (e.g. Miniature Coax XR88V) and Audio connections with screened cable (e.g. Low Noise Screened XR18U, Cable Quad XR23A). Other connections should be made with standard insulated cable (e.g. 7/0.2 Wire BL00A). The bundle of cables should be neatly bound by using cable ties at 200mm intervals (approx.), Spiral Wrap or Systoflex sleeving.

Low Cost XLR - Type Connectors



A range of low cost professional quality plugs and sockets moulded from tough nylon. Metal fittings are silver-plated brass. Sockets may be mounted to the front or rear of a chassis, and rear mounting may utilise the PC type. The sockets are panel air-tight construction and secured by two diagonal M3 countersunk screws. Matching male and female plugs are available, and incorporate integral cable/strain relief.



Specification
 Current rating: 3-pin 16A/250 VAC
 Contact resistance: <3mΩ
 Insulation resistance: 1600 VAC between contacts and housing
 Mounting hole: 21.5mm
 Fixing centres: 24 x 18mm



Type	Overall depth	Socket
ACF	32.5mm	female
ACM	30mm	male
ACF-PC	27mm	female PCB type
ACM-PC	27mm	male PCB type
APF	91.6mm	female
APM	92.8mm	male

Order Code	Type	Price each
KC53H	Low Cost XLR ACF	82p
KC54J	Low Cost XLR ACM	67p
KC55K	Low Cost XLR ACF-PC	£1.19
KC56L	Low Cost XLR ACM-PC	89p
KC57M	Low Cost XLR APF	£1.59
KC58N	Low Cost XLR APM	£1.45

FAX YOUR ORDER NOW!
01702 553935

Optical Fibre Lead

Digital Optical Fibre Lead



An optical fibre lead specifically designed for use with CD equipment, to link the CD player to an external D to A converter unit and convert the digital data into analogue information. The lead is 1m long and manufactured from high quality, flexible, fibre optic light guide material. It is covered in a black protective sheath and terminated with standard couplings to fit most CD's.

Order Code	Type	Price each
CC40T	Fibre Optic Lead Dig	£14.99

Video Connectors

EIA 8 Pin Video Plug

An 8-pin video plug connector to EIA standard with smart plastic body with sprung locking catches and cable clamp.



Order Code	Type	Price each
FJ70M	8 Pin EIA Plug	£2.45

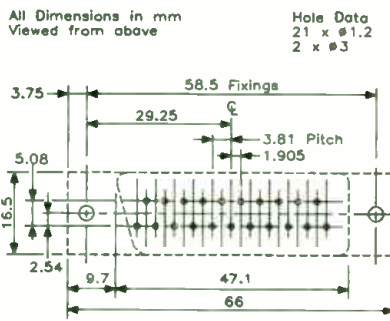
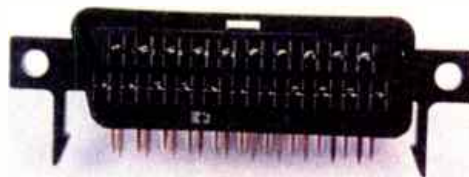
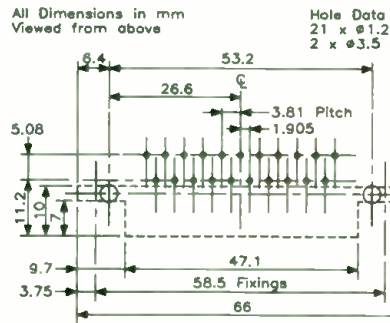
Peritel (SCART) Line Connectors



A 21-way Peritel (SCART) line plug for use with audio/video equipment. Available in both line plug and line socket. Both connectors have plastic connector housings and cable clamps.

Order Code	Type	Price each
FJ41U	Peritel Line Plug	£1.29
JW33L	Peritel Line Skt	99p

Peritel (SCART) PCB Socket



21-way Peritel (SCART) PCB mounting sockets for use with audio/video equipment. Available in right angle and straight versions. Sockets have M3-5mm fixing holes on 58.5mm centres, for panel fixing etc. Panel cut out 48 x 17mm.

Order Code	Type	Price each
FV89W	Peritel R/A PCB Skt	60p
JW34M	Peritel St PCB Skt	£1.10

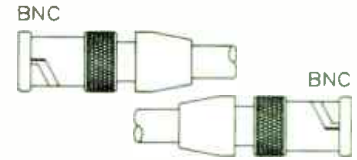
Round 10-Way



A high quality set of plugs and sockets, mainly for use as video camera connectors. Connectors are keyed and a screw locking mechanism locks them tightly in place. Line socket overall length is 66.5mm, diameter 20mm. Line plug overall length is 70mm, diameter 23mm. Chassis mounting socket length is 18mm, and requires a 16.5mm diameter panel cut-out.

Order Code	Type	Price each
RK52G	10 Way Line Skt	£4.29
RK53H	10 Way Line Plug	£4.29
RK54J	10 Way Chassis Skt	£1.99

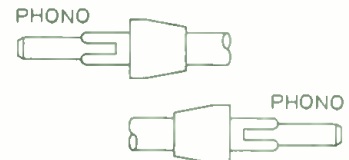
Video Lead 1



A BNC plug to BNC plug with approx. 1.5m of cable.

Order Code	Type	Price each
RK84F	Video Lead 1	£2.99

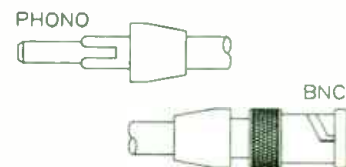
Video Lead 4



Phono plug to phono plug with approx. 1.5m of cable.

Order Code	Type	Price each
RK86T	Video Lead 4	£1.79

Video Lead 5



BNC plug to phono plug with approx. 1.5m of cable.

Order Code	Type	Price each
RK87U	Video Lead 5	£1.99

Video Lead 6



Phono plug to coax plug with approx. 1.2m of cable.

Order Code	Type	Price each
FV90X	Phono/Coaxplg Vid Ld	£1.20

Atari ST to Philips 8833/2 Monitor Lead



A high quality lead set for connecting an Atari ST computer to a Philips 8833/2 monitor. A direct RGB connection is made to the monitor eliminating picture deterioration normally due to conversion of the video signal. The video connection on the ST can be made semi-permanent by tightening the retaining screws on the 9-pin D type connector. Stereo sound signals from the ST are conveyed to the monitor by plugging into the phono sound sockets on the computer. All video and sound connections are made on the back of the monitor by way of a 13-pin high density DIN plug. Overall length: 1.5m.

Order Code	Type	Price each
RZ80B	Atari ST/Philips Ld	£9.99

AUTOMOTIVE CONNECTORS

Skeleton Plug



A skeleton-type plug which fits the aerial sockets fitted to most car radios.

Order Code	Type	Price each
HH13P	Skeleton Car Plug	26p

Plastic Plug



A car aerial plug similar to the skeleton plug above, but with plastic body and screw-on cap.

Order Code	Type	Price each
HH12N	Car AE Plug Plas	72p

Line Socket



A line socket for extending a car aerial lead.

Order Code	Type	Price each
FJ76H	Car AE Line Skt	79p

Socket



A chassis mounting socket to suit above car plugs. As fitted on many car radios. Panel cut-out: 12.7mm. Fixing centres: 20mm x 6BA clear.

Order Code	Type	Price each
HH14Q	Chassis Car Socket	38p

Car Accessory Plug



A plug for cigarette lighter sockets to which car accessories may be connected.

Order Code	Type	Price each
-HW12N	Car Accessory Plug	69p

Car Accessory Plug



A plug for connecting car accessories to the vehicles 12 volt supply via the cigarette lighter socket. Two versions are available: fused and unfused. The fused version takes a 1 1/4 in. long fuse. Fuse not supplied.

Order Code	Type	Price each
CC30H	Car Acc Plug	80p
CC31J	Car Acc Plug Fused	99p

Car Accessory Socket



An in-line socket for cigarette lighter plugs.

Order Code	Type	Price each
FE42V	Car Accessory Skt	79p

Cigarette Lighter Extension Lead



An extension lead with plug at one end to fit the cigarette lighter socket in a car and socket at the other end to accept cigarette lighter plug. Approx. 3.7m of lead.

Order Code	Type	Price each
YB68Y	Car Lighter Ext Lead	£2.49

CLIPS AND TERMINALS

Min Crocodile Clips



A range of crocodile clips with insulating vinyl covers in six colours, Red, Black, Yellow, Green, White and Blue. Clips are 27mm long. Overall length with sleeve 33mm. Also available with completely gold-plated clip with Red or Black sleeve.

Order Code	Type	Price each
FM37S	Red Croc Clip	19p
FK34M	Black Croc Clip	19p
FK35Q	Yellow Croc Clip	19p
FK36P	Green Croc Clip	19p
FK37S	White Croc Clip	19p
FM11M	Blue Croc Clip	19p
FS54J	Gold Croc Clip Red	29p
FS55K	Gold Croc Clip Black	29p

Standard Crocodile Clips



A range of crocodile clips with insulating vinyl covers in six colours, Red, Black, Yellow, Green, White and Blue. Clips are 35mm long. Overall length with sleeve 42mm. Also available with completely gold-plated clip with Red or Black sleeve.

Order Code	Type	Price each
FS48C	Std Croc Clip Red	22p
FS49D	Std Croc Clip Black	22p
FS50E	Std Croc Clip Yellow	22p
FS51F	Std Croc Clip Green	22p
FS52G	Std Croc Clip White	22p
FS53H	Std Croc Clip Blue	22p
FS56L	Gld Std CrocClip Red	32p
FS57M	Gld Std CrocClip Blk	32p

Large Crocodile Clip



Crocodile clips with insulating vinyl covers in red and black. Clips are 50mm long and have a 4mm socket with insulating sleeve formed on one side of the clip. Overall length with sleeve 58mm.

Order Code	Type	Price each
HF23A	4mm Croc Clip Black	39p
HF24B	4mm Croc Clip Red	39p

Battery Charger Clips

Union Brothers



Large plated clip as used on battery chargers. Overall length 75mm. Width of jaws 15mm, maximum gap between jaws when fully opened 28mm. Current rating 25A.

Order Code	Type	Price each
HF26D	Charger Clip	39p

Insulated Battery Charger Clips



Large, heavily-sprung plated clip for use with battery chargers etc. Overall length 74mm. Width of jaws 16mm. Max gap between jaws when fully opened 15mm. Current rating 25A. The clips have a screw terminal connection and very thick PVC insulating cover available in red or black.

Order Code	Type	Price each
FS86T	Large Batt Clip Red	50p
FS87U	Large Batt Clip Blk	50p

CONTACT LUBRICANT

An extra high quality contact treatment oil for preserving long term reliability and performance. It is anti-static, and safe to use on most plastics, paints and rubbers. Supplied in 200ml aerosol can.

GREAT VALUE!

£8.49

DM86T

Kits contents are as follows:

Item	Size mm	Sleeve	Quantity in		
			YP96E	YP97F	YT11M
Eyelets	3-7	Red	4	-	25
	4-3	Red	4	10	20
	5-3	Red	4	-	20
	3-7	Blue	4	-	20
	4-3	Blue	-	10	20
	5-3	Blue	-	10	20
Spades	5-3	Yellow	-	-	10
	6-7	Yellow	-	-	10
	3-7	Red	2	-	-
Receptacles	4-3	Red	2	10	20
	4-3	Blue	4	10	20
	5-3	Blue	2	10	14
	1/4 in.	Red	4	-	14
Blades	1/4 in.	Blue	4	7	14
	1/4 in.	Red	4	-	14
Butts	1/4 in.	Blue	4	7	14
	-	Red	4	7	20
Bullet	-	Blue	4	7	15
	-	Yellow	-	-	10
	-	Red	-	6	-
Bullet Socket	-	Red	-	6	-
Crimp Tool	-	-	1	-	-

Test Lead Kit



A very useful pack containing ten pieces of insulated stranded wire approx. 370mm long terminated at each end by a miniature insulated crocodile clip. The insulated sleeve on the clip and the wire are the same colour and there are two leads of each of five colours: Black, Green, Red, White and Yellow.

Order Code	Type	Price each
BW69A	Croc Lead Kit	£2.99

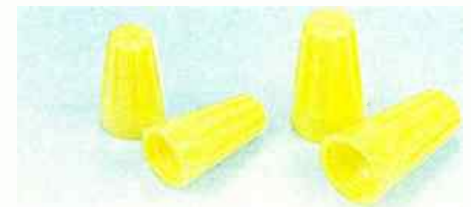
Order Code	Type	Price each
JH60Q	Eyelet 3.2mm	20p
JH61R	Eyelet 4.3mm	24p
JH62S	Eyelet 5.3mm	28p
JH63T	Eyelet 6.7mm	34p
JH64U	Spade 3.2mm	26p
JH65V	Spade 4.3mm	28p
JH66W	Spade 5.3mm	32p

Crimp Connector Sets



A choice of three kits, one containing 100 and one 300 assorted insulated crimp terminals and connectors and the other containing 50 and a crimping tool. The crimp tool has bolt cutters for M2.5, M3, M3.5, M4 and M5 bolts, wire strippers for wires and cables of conductor area 0.75, 1.0, 1.5, 2.5, 4.0 and 6.0mm², a wire cutter and it can crimp red, blue and yellow insulated crimp connectors. Terminals are tin-plated copper with PVC insulation. Types with red sleeves suit cables from 0.4mm² to 1.0mm², with blue sleeves from 1.1mm² to 2.6mm² and with yellow sleeves from 2.7mm² to 6.6mm².

Wire Joints



Plastic wire connectors. Max temperature 105°C.

Type	Suits wires (mm ²)	Overall diameter (mm)	Overall length (mm)
Small	0.5 to 1.5	8.5	14.5
Large	1.5 to 2.5	10	17.5

Supplied in packs of 10.

Order Code	Type	Price each
JH91Y	Ins Wire Joint Small	36p
JH92A	Ins Wire Joint Large	49p

Crimp Terminals Uninsulated



Tin-plated copper crimp terminals with solder-filled seams, suitable for wires from 0.4mm² to 1.0mm². Wire entry 1.7mm inside diameter, 3.3mm outside diameter. Terminal thickness 0.8mm.

Eyelets	External diameter	Overall length	Suits bolts
Type (Int dia.)	mm	mm	mm/BA
3-2	5.5	11.2	3/6
4-3	8	15.5	4/4
5-3	8	15.5	5/2
6-7	11.6	21.3	6/0

Spades	External width	Overall length	Suits bolts
Type (Int. width)	mm	mm	mm/BA
3-2	5.7	16	3.5/4
4-3	7.2	16	4/-
5-3	8	16	5/2

All supplied in packs of 10.

Crimp Wire Joints



Insulated crimp-on connectors for joining the ends of two or more wires quickly and simply with a crimping tool. Two sizes are available. Price is for pack of ten.

Type	Internal Diameter	Overall Diameter	Overall Length
Small	2.9mm	10mm	21mm
Large	3.7mm	11mm	28mm

Priced in packs of 10.

Order Code	Type	Price each
MK34M	Crimp End Small	75p
MK35Q	Crimp End Large	£1.20



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

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Crimp Terminals Insulated

Tin-plated copper crimp terminals with solder-filled seams, and PVC insulation. Types with red sleeves suit cables from 0.4mm² to 1.0mm², with blue sleeves from 1.1mm² to 2.6mm², except where shown.

Eyelets

Type (Int. dia.) mm	External diameter mm	Overall length mm	Suits bolts mm/BA
3.2 Red	5.5	15.7	3/6
4.3 Red	8	20	4/4
5.3 Red	8	20	5/2
6.7 Red	11.6	25.8	6/0
4.3 Blue	8.5	21	4/4
5.3 Blue	9.5	21.5	5/2
6.7 Blue	12	26	6/0



Spades

Type (Int. width) (mm)	External width (mm)	Overall length (mm)	Suits bolts (mm/BA)
3.7 Red	5.7	20.5	3.5/4
4.3 Red	7.2	20.5	4/0
5.3 Red	8	20.5	5/2
4.3 Blue	7.2	20.5	4/4
5.3 Blue	8	20.5	5/2

Butt Splices

Type	Overall length (mm)
Red	25
Blue	25

Bullet Plugs

Type	Overall length (mm)	Suits wires (mm ²)
Red	21	0.5 to 1.5
Blue	21	1.5 to 2.5



Bullet Sockets

Type	Overall length (mm)	Suits wires (mm ²)
Red	23	0.5 to 1.5
Blue	23	1.5 to 2.5

Part-insulated 1/4 in. Receptacles

Type	Overall length (mm)	Suits wires (mm ²)
Red	21	0.5 to 1.5
Blue	21	1.5 to 2.5

1/4 in. Blades

Type	Overall length (mm)	Suits wires (mm ²)
Red	21	0.5 to 1.5
Blue	21	1.5 to 2.5

Fully-insulated 1/4 in. Receptacles

Type	Overall length (mm)	Suits wires (mm ²)
Red	21.5	0.5 to 1.5
Blue	21.5	1.5 to 2.5

All supplied in packs of ten.

Order Code	Type	Price each
JH67X	Ins Eyelet Red 3.2mm	34p
JH68Y	Ins Eyelet Red 4.3mm	36p
JH69A	Ins Eyelet Red 5.3mm	38p
JH70M	Ins Eyelet Red 6.7mm	45p
JH71N	Ins Eyelet Blue 4.3	38p
JH72P	Ins Eyelet Blue 5.3	40p
JH73Q	Ins Eyelet Blue 6.7	46p
JH74R	Ins Spade Red 3.7mm	34p
JH75S	Ins Spade Red 4.3mm	36p
JH76H	Ins Spade Red 5.3mm	36p
JH77J	Ins Spade Blue 4.3mm	38p
JH78K	Ins Spade Blue 5.3mm	38p
JH79L	Ins Butt Red	50p
JH80B	Ins Butt Blue	50p
JH85G	Ins Bullet Red	50p
JH86T	Ins Bullet Blue	54p
JH83E	Ins Bullet Skt Red	59p
JH84F	Ins Bullet Skt Blue	64p
JH89W	Part-Ins Blade Red	44p
JH90X	Part-Ins Blade Blue	49p
JH87U	Part-Ins Rcptcl Red	54p
JH88V	Part-Ins Rcptcl Blue	59p
JH81C	Full-Ins Rcptcl Red	65p
JH82D	Full-Ins Rcptcl Blue	74p

Push-on Lucar Style Receptacle



Push-on receptacle for 1/4 in blades. In packs of ten.

Order Code	Type	Price each
HF10L	Push-On Receptacle	50p

Lucar Style Blade



Push-on 1/4 in. blades for above receptacle. Supplied in packs of ten.

Order Code	Type	Price each
HF11M	Push-On Blade	50p

Covers

FE65V

FE66W

Transparent polythene covers to fit our 1/4 in. blades and receptacles. Covers overlap for maximum protection. Supplied in packs of ten.

Order Code	Type	Price each
FE66W	Push-On Blade Covers	50p
FE65V	Push-On Recep Covers	50p

THE BEST OF SERVICE

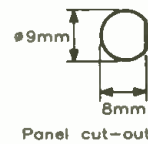
Snap-Lock Automotive Cable Connector



A very quick and reliable way of connecting additional cables to existing wiring in automotive applications, for example fitting car alarms, radio-cassette units, etc. The cables to be joined are placed inside the snap-lock connector, the cover is pushed home with a pair of pliers and locks shut, thus completing the connection.

Order Code	Type	Price each
JR88V	Quick Snap Connector	15p

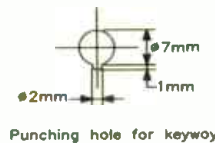
Terminal Post with Small Handle



Nickel-plated brass terminal post rated 15A at 250V. It has a 4mm top socket and 2.1mm dia. hole in post. Knob size: 14mm x 11.5mm dia. Fits panels from 0.9mm to 5mm (20swg to 6swg) thickness. Available in the following colours: Black, Blue, Green, Red, White and Yellow.

Order Code	Type	Price each
FD69A	Small Term Post Blk	59p
FD70M	Small Term Post Blue	59p
FD71N	Small Term Post Gm	59p
FD72P	Small Term Post Red	59p
FD73Q	Small Term Post Wht	59p
FD74R	Small Term Post Ylw	59p

Terminal Post with Large Handle



Nickel-plated brass terminal post with insulation moulded in polypropylene. Rated 15A at 240V. It has a 4mm top socket and 2.3mm dia. hole in post. Knob size: 17mm x 12.5mm dia. Fits panels up to 3mm (12swg) thickness. Available in the following colours: Black, Blue, Green, Red and Yellow.

Order Code	Type	Price each
HF02C	Large Term Post Blk	65p
HF03D	Large Term Post Blue	65p
HF05F	Large Term Post Gm	65p
HF07H	Large Term Post Red	65p
HF09K	Large Term Post Ylw	65p

Twin Terminal Post



Gold-plated brass terminal posts, one with a red and one with a black knob on a twin base having one part red and one part black, so that the part on the outside of the chassis can be either red or black. Rated 15A at 240V. Each post has a 4mm top socket and a 2.1mm dia. hole in post. Knob size 16 x 15mm dia. Fits panels from 1.2mm dia. to 7mm thick. Panel cut-out requires two 12.7mm holes on 18.5mm centres. Bezel size 35mm x 16mm.

Order Code	Type	Price each
JK24B	Pair Terminal Posts	£1.89

30A Terminal Post

Cliff

A 30A terminal (binding) post that will accept a 4mm plug-in front or through a cross hole in the post. Available in red and black. Mounting hole: 7mm.



Order Code	Type	Price each
CX83E	30A Post Red	£1.39
CX84F	30A Post Black	£1.39

Recess Terminal Mounting Plate

Cliff

A mounting plate for two 30A terminals that replaces the top insulators of those terminals. Available in black.



Order Code	Type	Price each
CX85G	Mounting Plate	18p

Grounding Post with 4mm Socket

A grounding (terminal) post for use on equipment where a connection needs to be made to the earthed case, e.g. power supplies and measurement equipment. The post is made of chromed brass. It has a central hole to accept a 4mm plug and a 2mm hole in the post. Requires a 5.5mm mounting hole. Overall size 21mm x 10mm dia. Supplied with locking washer, solder tag and two nuts.



Order Code	Type	Price each
JL99H	Grounding Post	55p

Spade Terminals Solder Type

Union Brothers



A spade terminal with insulated handle for use with our terminal posts. Wire is soldered to spade. Spade has 6.3mm (1/4 in.) opening. Overall length 36mm. Overall width 12mm. Available in red and black.

Order Code	Type	Price each
FS90X	Solder Spade Red	49p
FS91Y	Solder Spade Black	49p

Spade Terminals Screw Type

Cliff



A spade terminal with insulated handle forming a 4mm socket, for use with our terminal posts. Grub screw in handle clamps wire to spade. Spade has 6.3mm (1/4 in.) opening. Overall length 42mm. Overall width 15mm. Available in red and black.

Order Code	Type	Price each
JC20W	Screw Spade Red	39p
JC21X	Screw Spade Black	39p

Screw Terminals

Union Brothers



A paxolin strip having a pair of solder tags for terminating wires to a pair of screw terminals. The strip can be attached to a panel or instrument case within a suitably shaped cutout to provide a basic, simple method of connecting cables to the instrument or equipment in question. Bare wires can be wrapped around the screws before tightening, or spade terminals can be used; the screw terminals have ears to positively locate the spades. The screws are M4 size, and suitable for use with 4BA spades and tag washers. Overall size 42 x 18mm. Fixing centres 33mm. Screw/tag spacing 14.5mm.



A four way version of the above. Overall size 72 x 18mm. Fixing centres 62mm. Screw/tag spacing 14.5mm.

Order Code	Type	Price each
FK16S	Screw Terminal 2-Way	40p
FK17T	Screw Terminal 4-Way	70p

Quick Connection Lever Terminals

Spring loaded, lever action, quick connection terminals which will hold wires in a vice-like grip. These terminals, originally intended for terminating loudspeaker leads, have many uses.



The 2-way lever terminal on a round escutcheon has one red and one black lever marked '+' and '-', and 'INPUT'. Escutcheon diameter 74mm. Requires 50mm diameter panel cut-out. Fixing centres 43.5 x 43.5mm x 3mm clear. Overall depth 28mm.

The 2-way lever terminal on a rectangular escutcheon has one red and one black lever. Escutcheon size 55 x 24mm. Fixing centres 43.5mm x 3mm clear. Max depth 22mm. The two solder tags are 4mm from one edge and 19mm apart. The 4-way type has two black and two red levers on a base 70 x 24mm. Fixing centres 60mm x 3mm clear. Max depth 22mm. The four solder tags are 4mm from one edge and 13mm apart.



Order Code	Type	Price each
JK18U	Lever Term 2-Way Rnd	55p
BW72P	Lever Term 2-Way	55p
BW71N	Lever Term 4-Way	85p

Speaker Terminal



A spring loaded terminal for gripping speaker wires etc. The terminal is attached to a base panel with a threaded M3 stud and nut. In use, simply depress plunger and insert wire into side hole. Available in red and black.

Order Code	Type	Price each
JY89W	Spkr Term Blk	49p
JY90X	Spkr Term Red	49p

COMPUTER LEADS

Computer Lead 1

Union Brothers



7-pin DIN plug to 2 x 3.5mm jack plugs and a 2.5mm jack plug. Length: 1m (approx).

Order Code	Type	Price each
FG18U	Computer Lead 1	£2.99

Computer Lead 4



5-pin DIN plug to 2 x 3.5mm jack plugs and 2.5mm jack plug. Length: 1m (approx.)

Order Code	Type	Price each
FG21X	Computer Lead 4	£2.49

RS232C to RS232C M/M



A fully screened 25-way computer cable having 25-way D-range plugs at both ends. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc. All 25 pins are connected.

Order Code	Type	Price each
JC12N	D25P/D25P Lead	£6.99

Centronics to Centronics M/F



A fully screened 25-way computer cable having a 36-way Centronics-type male plug at one end and a 36-way Centronics-type female socket at the other. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc., but pins 15, 16, 17, 18, 20, 22, 24, 26, 28, 34 and 35 are not connected.

Order Code	Type	Price each
JC15R	Cent36P/Cent36S Lead	£6.99

Computer Lead 5



A metre of 50 way IDC cable having a 50 way IDC edge connector at one end, and a 50-way transition header at the other end. Particularly suitable for use with the Amstrad CPC 464.

Order Code	Type	Price each
FT66W	Computer Lead 5	£5.99

RS232C to RS232C M/F



A fully screened 25-way computer cable having 25-way D-range plug at one end and 25-way D-range socket at the other. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc. All 25 pins are connected.

Order Code	Type	Price each
JC13P	D25P/D25S Lead	£6.99

Centronics to Centronics M/F IDC

Union Brothers



A flat 36-way IDC ribbon cable having a polyester 36-way male Centronics plug at one end and a 36-way female Centronics socket at the other. Cable is 1.8m long.

Order Code	Type	Price each
JC16S	IDC Cent36P/36S Lead	£8.99

RS232C to Centronics



A fully screened 25-way computer cable having a 25-way D range plug at one end and a Centronics-type 36-way male plug at the other. Cable is 1.8m long. Suitable for interfacing IBM PC, Apple III etc. to parallel printers etc. The following pins are connected.

D-type Centronics	D-type Centronics	D-type Centronics
1	1	9
2	2	10
3	3	11
4	4	12
5	5	13
6	6	14
7	7	15
8	8	16
		31
		32
		23
		24
		25
		26
		27
		28
		29
		30

Other pins in the 36-way plug are not connected.

Order Code	Type	Price each
JC11M	Cent36P/D25P Lead	£6.99

RS232C to RS232C M/F IDC



A flat 25-way IDC ribbon cable having a polyester 25-way D-range plug at one end and a polyester 25-way D-range socket at the other. Cable is 1.8m long.

Order Code	Type	Price each
JC17T	IDC D25P/D25S Lead	£6.49

Centronics to Centronics M/M



A fully screened 25-way computer cable having 36-way Centronics-type male plugs on both ends. Cable is 1.8m long. Pins are connected 1 to 1, 2 to 2 etc., but pins 15, 16, 17, 18, 20, 22, 24, 26, 28, 34 and 35 are not connected.

Order Code	Type	Price each
JC14Q	Cent36P/Cent36P Lead	£7.99

Printer Cable 26-Way



A 26-way ribbon cable, connected to a 26-way (2 x 13) way IDC socket at one end and a Centronics type plug at the other. Ideal for use with the BBC Micro. Length 1 metre.

Order Code	Type	Price each
FG30H	Printer Cable 1	£5.99

MSX Printer Cable



This cable comprises a cable 1 metre in length, and terminated in a 14-way Centronics type connector at one end and a 36-way Centronics type connector at the other end.

Order Code	Type	Price each
FV93B	MSX Printer Cable	£11.99

D SERIES CONNECTORS

A range of standard D series connectors. Plugs and sockets may be in-line or panel mounted and are available with solder connections, straight pcb connections or right angle pcb connections. A range of shells with separate pins is available so that connectors may be constructed having pins only in the positions required. A wide range of covers is also available.

Solder Type



Gold over nickel plated copper alloy contacts identified on both sides of the PBT and glass fibre reinforced moulding (UL-94-V0). Solder cup terminations.

Specification

Working current: 7.5A per contact.
Working voltage: 300V rms.
Contact resistance: <math>< 3m\Omega</math>
Insulation resistance: >math>10^6 M\Omega</math>

	9-Way	15-Way	19-Way
Overall length	31	39.4	45
Fixing centres (M3/6BA)	25	33.3	39

Cut-out if mounting

	19 x 11	27 x 11	34 x 11
from rear of panel:	19 x 11	27 x 11	34 x 11
from front of panel:	21 x 10	29 x 10	31 x 10
Height	12.6	12.6	12.6
Width:	16	16	16

	23-Way	25-Way	37-Way
Overall length	51	53	69
Fixing centres (M3/6BA)	44.5	47	63.5

Cut-out if mounting

	39 x 11	41 x 11	58 x 11
from rear of panel:	39 x 11	41 x 11	58 x 11
from front of panel:	36 x 10	43 x 10	60 x 10
Height	12.6	2.6	12.6
Width:	16	16	16

50-Way

Overall length	67
Fixing centres (M3/6BA)	61.5

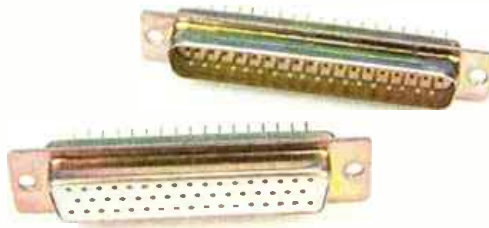
Cut-out if mounting

from rear of panel:	55 x 13
from front of panel:	57 x 14
Height	15.5
Width:	16

All dimensions in mm.

Order Code	Type	Price each
RK60Q	D-Range 9 Way Plug	49p
BK58N	D-Range 15-Way Plug	64p
JZ16S	D-Range 19-Way Plug	66p
JZ17T	D-Range 23-Way Plug	68p
YQ48C	D-Range 25-Way Plug	79p
FV71N	D-Range 37-Way Plug	£1.05
FV74R	D-Range 50-Way Plug	£1.69
RK61R	D-Range 9 Way Skt	64p
BK59P	D-Range 15-Way Skt	79p
JZ18U	D-Range 19-Way Skt	79p
JZ19V	D-Range 23-Way Skt	£1.05
YQ49D	D-Range 25W Socket	£1.19
FV72P	D-Range 37-Way Skt	£1.45
FV75S	D-Range 50-Way Skt	£1.89

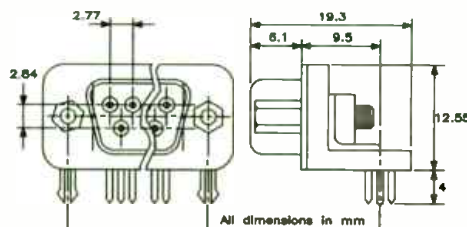
Straight PCB Type



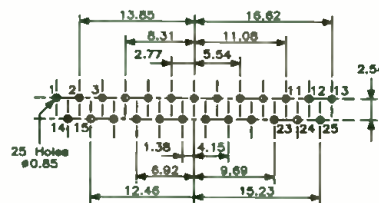
As solder type, but with machined pcb pins 3.7mm long from shoulder (1mm long).

Order Code	Type	Price each
JB29G	D-Rng 9W Plug PC	64p
JB30H	D-Rng 15W Plug PC	84p
JZ20W	D-Rng 19W Plug PC	89p
JZ21X	D-Rng 23W Plug PC	£1.04
FS84F	D-Rng 25W Plug PC	£1.22
JB31J	D-Rng 37W Plug PC	£1.72
JB33L	D-Rng 9W Skt PC	72p
JB34M	D-Rng 15W Skt PC	£1.04
JZ22Y	D-Rng 19W Skt PC	£1.20
JZ23A	D-Rng 23W Skt PC	£1.29
FS82D	D-Rng 25W Skt PC	£1.39
JB35Q	D-Rng 37W Skt PC	£2.34
JB36P	D-Rng 50W Skt PC	£2.60

Right-Angled D Connectors



All dimensions in mm Viewed from above



A D Series connector with right-angled bends in the pins, enabling them to be directly mounted on to PCB's. All dimensions are as Solder Type.

Order Code	Type	Price each
FG66W	RA D Range 9 Way Plg	69p
FG67X	RA D Range 15 Wy Plg	85p
FG68Y	RA D Range 25 Wy Plg	£1.05
JB37S	RA D Range 37 Wy Plg	£1.29
FG25C	RA D-Range 9-Way Skt	65p
FG26D	RA D-Rnge 15-Way Skt	85p
FG27E	RA D-Rnge 25-Way Skt	£1.05
JB38R	RA D Range 37 Wy Skt	£1.29

Shells

Standard D connector shells with separate gold-plated pins for plugs and sockets enabling connectors to be constructed with pins only in the positions where a connection is required. Plug housings and socket housings are available and plug-pins or sockets simply snap in from the rear after soldering or crimping wires to them. Both plug pins and socket pins are sold in strips of 10.



Order Code	Type	Price each
JB39N	D-Rng Plug Shell 9W	39p
JB40T	D-Rng Plug Shell 15W	44p
FS83E	D-Rng Plug Shell 25W	49p
UJ11M	10pk D Plg Shell Pin	44p
JB42V	D-Rng Skt Shell 9W	44p
JB82D	D-Rng Skt Shell 15W	49p
FS85G	D-Rng Skt Shell 25W	58p
UJ14Q	10pk D Skt Shell Pin	49p

Covers



A thermoplastic cover to fit both the plugs and the sockets described previously. The connector is wired and the cover fitted afterwards. A removable side plate allows subsequent inspection without dismantling the assembly. The cable can enter from the side or top by removing the appropriate knock-out. Supplied with cable clamp & self tapping screws; the shorter one holds the side plate to the cover.

Order Code	Type	Price each
RK62S	D-Range 9-Way Cover	£1.39
BK60Q	D-Range 15-Way Cover	£1.49
YQ50E	D-Range 25-Way Cover	£1.59

25 Way D-type Hoods with Thumb Screws



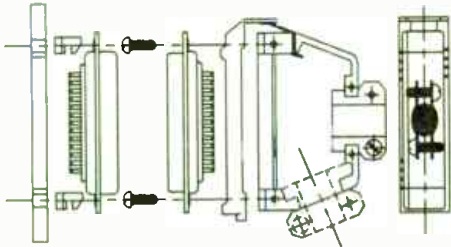
Hoods for standard 25 way D-type connectors. Supplied with cable clamp, assembly screws and quick secure/release thumb screws. Available in plastic or metallised plastic versions.

Order Code	Type	Price each
JW87U	T/Screw Hood 25W	£1.04
JW88V	T/Screw M/Hood 25W	£1.24

Assembly Instructions

(1) Hooded connector plug

Open window in moulding to give appropriate cable entry. Place spring in slit in hood. Mount connector in lock mechanism, from mating side (i.e. away from release button). Secure connector/lock to hood using the larger self-tapping screws provided. Ensure that the spring is between the release button and the hood then fit the cable clamp. Secure the side plate to the hood with the remaining screw.



Snap-Lock 25 way D-type Plastic Hood



A snap-lock plastic hood that may be used with standard 25 way D-type connectors but not D-type IDC connectors. Assembly of the hood is very quick and easy, the hood simply snaps shut and locks by means of plastic clips. A flat bladed screwdriver can be used to re-open the hood if necessary. Supplied complete with thumb screws and cable clamp.

Order Code	Type	Price each
JW91Y	25W Snap-Lock Hood	89p

Locking Hoods Metallised Type



A range of chrome-plated hoods for standard D connectors, with cable clamp and standard jack screws. Strong thermoplastic moulding.

Order Code	Type	Price each
JB68Y	Metallised D Hood 9W	75p
JB69A	Metallised D Hood 15W	89p
JB80B	Metallised D Hood 25W	£1.19

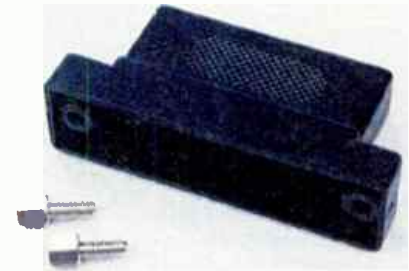
Locking Hood Metal Type

A chrome plated solid metal hood for standard 25-way D connectors supplied with jack screws.



Order Code	Type	Price each
JB02C	Metal D Hood 25W	£2.19

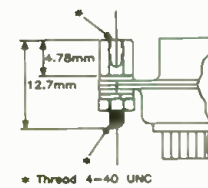
'Ribbon Cable' Plastic Hood for 25 Way D-type Connectors



A plastic hood designed for use with ribbon cables terminated in 25-way D-type connectors, please note the cover is not suitable for use with IDC D-type connectors. Supplied complete with one pair of jack posts.

Order Code	Type	Price each
JW86T	Ribbon 25W D Hood	69p

Jack Posts



For use with Locking Hoods these jack posts have 8mm long screws and hexagonal spacers centred-tapped with a 4-40UNC thread. Sold in pairs.

Order Code	Type	Price each
FP31J	D Connectr Jack Post	59p



01702 554161

Extension Jack Posts

A pair of hexagonal extension jack posts, tapped with 4-40UNC threads, for use with D-type connectors, 5.03mm A/F x 5.93mm. The extension jack posts when fitted to a panel mounted or free connector allow a mating connector fitted with jack screws to be secured. Bright plated finish over brass.



Order Code	Type	Price each
JW92A	Jack Post Set	24p

Captive Jack Screws with Retainers

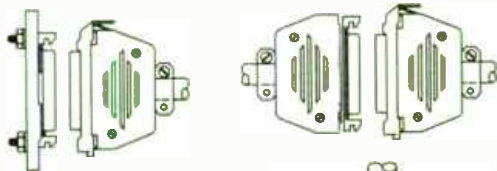
A pair of captive jack screws (4-40UNC thread) with retainers for use on standard D-type connectors. The jack screws allow connectors to be secured to a mating connector fitted with jack posts (for jack posts see below). Made from steel with chromate over zinc plating.



Order Code	Type	Price each
JW93B	Jack Screw Set	39p

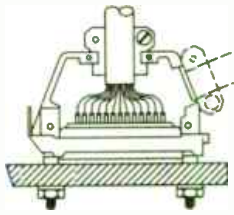
(2) Receptacle

The latches are mounted from the wiring side of the connector. Ensure that they are correctly orientated with respect to the mating plug. Where a hooded 'free' receptacle is required, assemble as in (1) left (without lock and spring), fitting latches between connector and hood.



Cable to cable or cable to panel.

Fit hood after wiring & choice of cable entry.



Locking Hoods Plastic Type

A range of hoods for standard D connectors, with cable clamp and standard jack screws. Strong thermoplastic moulding.



Order Code	Type	Price each
FP27E	D Hood 9 Way	59p
FP28F	D Hood 15 Way	69p
JZ24B	D Hood 19 Way	79p
JZ25C	D Hood 23 Way	89p
FP29G	D Hood 25 Way	89p
JB66W	D Hood 37 Way	99p
JB67X	D Hood 50 Way	£1.25

MAPLIN KEY CALL Phone 01702 556751

Bail-Lock Mechanism for D-type Connectors

A bail lock mechanism for use with standard D-type connectors. Set contains male and female bail-lock pairs, bail-arms, four nuts and four bolts. Bail-arm pair is attached to one connector (usually socket) and receptacle pair is attached to other connector (usually plug). Bright plated finish over steel.



Order Code	Type	Price each
JW94C	Bail-Lock Set	59p

25-Way D Outlet

A flush mounting 25-way D female socket mounted on a white front plate. Fits standard conduit and surface boxes (see Electrical Accessories) to BS1363. Screws supplied. Depth from rear of plate 6mm.



Order Code	Type	Price each
FP14Q	25W D Outlet	£2.99

High Density 15 way D-type Connectors

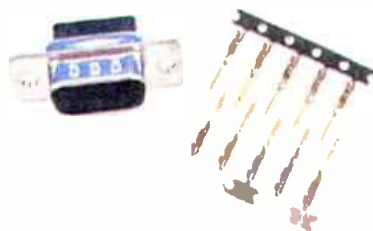
Union Brothers



High density 15 way D-type connectors that fit 15 pins into the same size shell as a 9 way standard D-type connector. Termination is by solder bucket. Contacts are copper alloy with gold plating over nickel. Shells are steel with chromate plating over zinc. Insulator is glass reinforced PBT plastic to UL-94-V0.

Order Code	Type	Price each
JW77J	HD 15 Way D Plg	£1.39
JW78K	HD 15 Way D Skt	£1.69

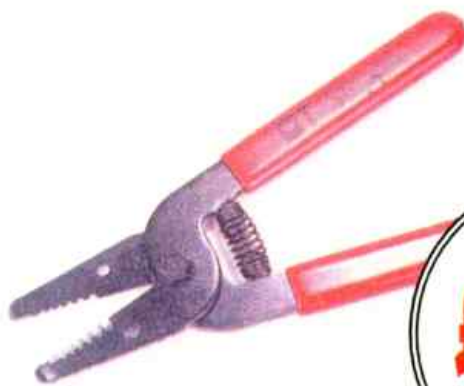
High Density 15 way D-type Connector Shells



High density D-type connector shells with separate gold plated pins for plugs and sockets enabling connectors to be constructed with pins only in the positions where a connection is required. Plug and socket housings are available, plug or socket pins simply snap in from the rear after soldering or crimping wires to them. Both plug and socket pins are supplied in strips of 10.

Order Code	Type	Price each
JW81C	HD 15W D Plg Shell	£1.09
JW82D	HD 15W D Skt Shell	£1.09
JW83E	10pk HD Plg Pin	29p
JW84F	10pk HD Skt Pin	34p

PRECISION WIRE STRIPPER



GREAT VALUE!

£10.99

KC16S

A wire stripper made from precision ground, hardened steel, that strips and cuts wire. The wire stripper has six holes that are used to cut and remove the insulation from the wire. The holes are marked in AWG (American wire gauge) sizes, but are suitable for 18 to 27 SWG sizes. At the base of the jaws is the cutting area which will cut copper or aluminium wire. A convenient flat design allows the wire stripper to be used in tight locations and to fit easily in a pocket or tool kit.

DISK DRIVE CONNECTORS

4 pin 0.2in Spacing Polarised Power Connector



Commonly used on 5 1/4 in floppy and hard disk drives. Supplied complete with connector housing and four crimp/solder terminals. Available in male and female types.

Order Code	Type	Price each
JW64U	0.2in Power Conn M	66p
JW65V	0.2in Power Conn F	57p

4 pin 0.1in Spacing Polarised Power Connector



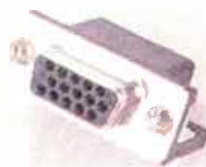
Commonly used on 3 1/2 in floppy disk drives. Supplied complete with connector housing and crimp/solder terminals. Available in female only.

Order Code	Type	Price each
JW63T	0.1in Power Conn F	54p

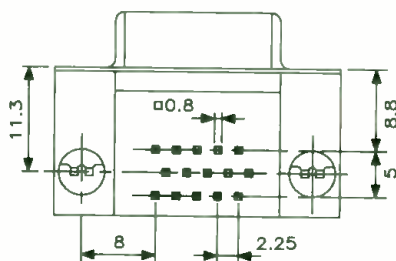
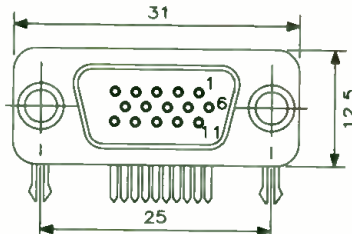
FAX YOUR ORDER NOW!

01702 553935

High Density 15 way Right Angle PCB D-type Socket



All dimensions in mm



View from below

A high density 15 way right Angle PCB D-type socket that fits 15 pins into the same size shell as a 9 way standard D-type connector. Termination is by PCB pins. Contacts are copper alloy with gold plating over nickel. Shells are steel with tin plating. Insulator is glass reinforced polyester resin to UL-94-V0.

Order Code	Type	Price each
JW85G	HD 15 way R/A D Skt	£1.79

IEEE-488/CENTRONICS CONNECTORS

Centronics-Type

(See also IDC connectors)

A multi-way connection system commonly used for connecting data interface cables to computers and their peripherals. Cable conductors insert into the hollow solder terminals of the gold-plated, double row contacts. The plugs have ears for the spring clips of the socket to secure them in position.

Screened Plug



A double row plug in a metal body with oval cable entry and clamp. The body is in two parts secured by two screws, this being all that is required to retain the thermoplastic contact block. Available in 14, 24, 36 and 50 ways.

Order Code	Type	Price each
JB46A	Centronix 14W Plug	£1.79
JB47B	Centronix 24W Plug	£1.89
FJ61R	Centronix 36W Plug	£2.19
JB48C	Centronix 50W Plug	£2.79

36 Way Metallised Centronics Hood



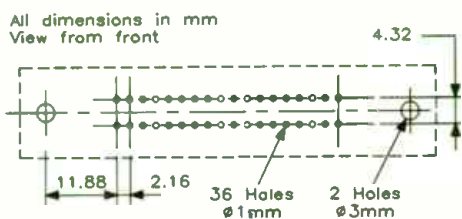
A metallised hood for use with 36 way centronics connectors. Supplied with cable clamp.

Order Code	Type	Price each
JW89W	M/Hood Centronics 36	79p

Straight Chassis Socket



A double-row socket with metal shroud. Connections are brought out at rear to two rows of pcb pins. Plug locking clips are included. Sockets are available in 14, 24 and 36 ways. Diagram shows 36-way type.



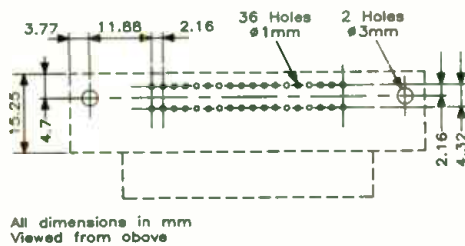
Fixing holes suit M3/6BA bolts and fixing centres are as follows. 14-way: 36mm; 24-way: 47mm; 36-way: 60mm.

Order Code	Type	Price each
JB49D	Centronix 14W Chaskt	£1.69
JB50E	Centronix 24W Chaskt	£1.89
FV87U	Centronix 36W Chaskt	£2.19

36 Way Right-Angled Socket



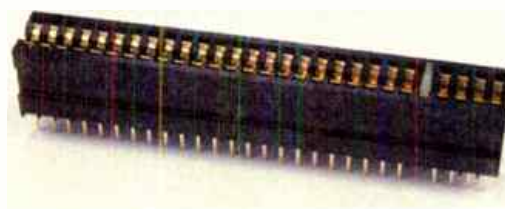
A right-angled double row socket suitable for pcb mounting. The socket has two rows 0.17in. apart of 18 pins spaced at 0.85in. at 90° to the metal shrouded socket. Plug locking clips are included. Socket available in 36 ways.



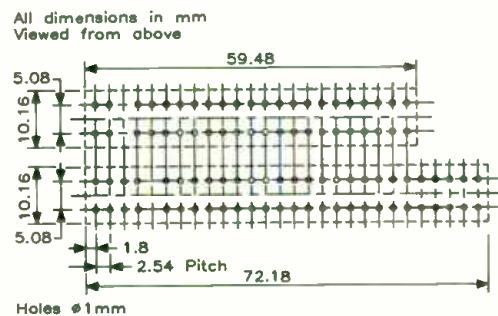
Order Code	Type	Price each
FV88V	RA Centronix 36W Skt	£2.19

EDGE CONNECTORS

0.1in Double-Sided



A series of edge connectors designed to mount directly on PCB's. Ideal for use with double-sided PCB's, and having their main uses in micro-computers. (e.g. ZX81, Spectrum). The 2 x 28-way connector is blank at pin 5, and the 2 x 23-way at pin 3. These connectors use the mounting feet as shown below.



Order Code	Type	Price each
RK35Q	PC Edgconn 2x23 way	£3.99
FG23A	PC Edgconn 2x28 way	£3.99

Polarising Key

A metal polarising key for use with the edge connectors RK35Q and FG23A.

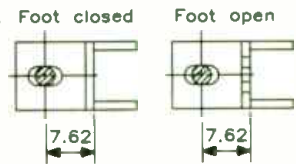
Order Code	Type	Price each
JP45Y	Polarising Key Metal	29p

Mounting feet for Edge Connectors

End brackets (feet) with open or closed sides for use with 0.1in. Double Sided (not Low Cost type) and 0.1in. Single Sided Edge Connectors. Sold individually.

All dimensions in mm

Hole ø3mm
Slot 3 x 5mm



Order Code	Type	Price each
YR58N	Edge Conn Foot Open	39p
FL91Y	Edge Conn Foot Closed	49p

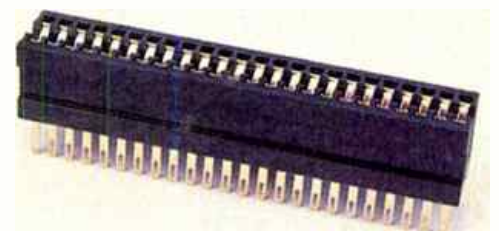
0.1in. Double-Sided Low-Cost



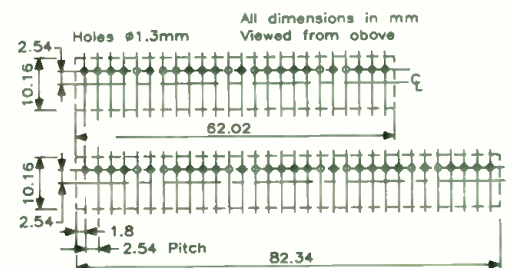
A range of good quality low-cost edge connectors primarily for use with double-sided pcb's. Moulded in glass-fibre reinforced polyester UL94-V0, the connectors have gold-plated phosphor bronze contacts. All types have closed ends and overall width of pcb tongue should be 0.2in. wider than measurement between centres of end contacts. Connectors available in 36, 46, 50, 56, 62 and 98 ways.

Order Code	Type	Price each
JB99H	Locost PC Edge 2x18W	77p
JC00A	Locost PC Edge 2x23W	97p
JC01B	Locost PC Edge 2x25W	£1.09
JC02C	Locost PC Edge 2x28W	£1.19
JC03D	Locost PC Edge 2x31W	£1.39
JC04E	Locost PC Edge 2x49W	£1.49

0.1in. Single-Sided



A range of edge connectors identical in construction to the card frame type on the next page. Although these connectors have two rows of contacts, only one row is provided with solder tags for use with single-sided boards. The unused row provide a means of gripping the PCB as backing contacts. The connectors are open-ended so that wide PCB's may be inserted. Contacts have tags suitable for wiring or direct insertion in PCB's. These connectors use the mounting feet shown above.



Specification

Current rating:	5A per contact
Working voltage:	350V AC peak or DC
Pcb thickness nominal:	1.6mm

Continued on next page.

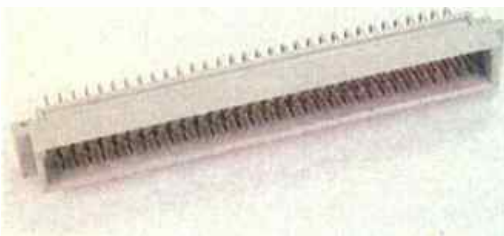
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Type	No. of contacts	Length (mm)	Fix centres with mounting feet fitted
124	24	61.0	75-80
132	32	83.0	95-101

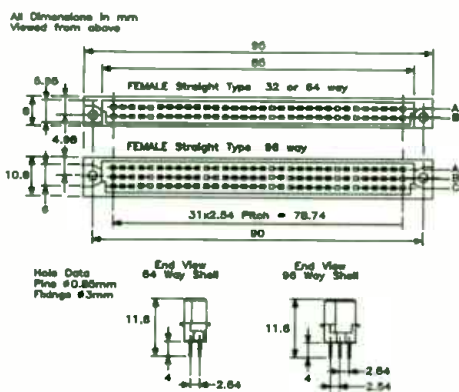
Width: 10.5mm
Pitch: 0.1in.
Moulding height: 12mm
Board insertion depth: 8.0mm
Tag length: 6.5mm

Order Code	Type	Price each
FL85G	Edge Conn 124	£2.89
FL86T	Edge Conn 132	£3.49

DIN 41612 Indirect Cardframe Connectors

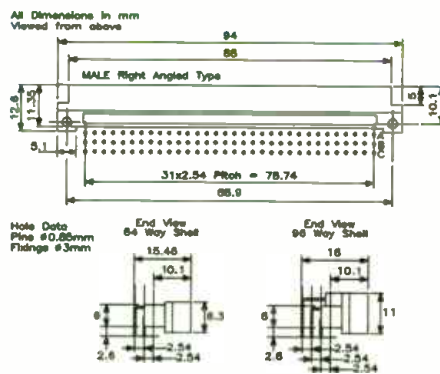


A range of DIN 41612 cardframe connectors, for use in cardframe and rackmounted assemblies. These connectors are ideal for use with our modular sub-rack system and eurocard prototyping boards. Other applications include mother board/daughter board interconnections. The connectors comprise of one multiway socket with PCB pins on a 0.1in pitch for fixing to a mother board or backplane. The mating plug has right-angle PCB pins for fixing to a daughter board or plug-in card. Socket contacts are gold plated phosphor bronze, plug contacts are gold plated brass, termination area of each pin is tin plated. Connectors have locking keys to prevent accidental reversal on insertion. Available in 32, 64 and 96 ways. 32 way version is only available in 64 way shell. 64 way version is available in both 64 and 96 way shells (middle row unused). Shells are made from glass reinforced PBT to UL94-V0.



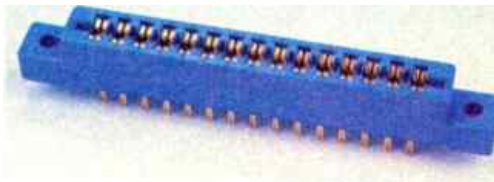
Dimensions:	Plug (mm)	Receptacle (mm)
Length:	95	95
Width:	11	10.5
Fixing centres:	88.9	90
Depth + pins:	18	15.5
Without pins:	12.5	11

Type	Plg or Skt	No of Contacts	Shell Size	Straight or R/A	Contact Rows
RAPL32A	Plg	32	64	R/A	A
RAPL64AB	Plg	64	64	R/A	A & B
RAPL64AC	Plg	64	96	R/A	A & C
RAPL96ABC	Plg	96	96	R/A	A, B & C
STSK32A	Skt	32	64	ST	A
STSK64AB	Skt	64	64	ST	A & B
STSK64AC	Skt	64	96	ST	A & C
STSK96ABC	Skt	96	96	ST	A, B & C

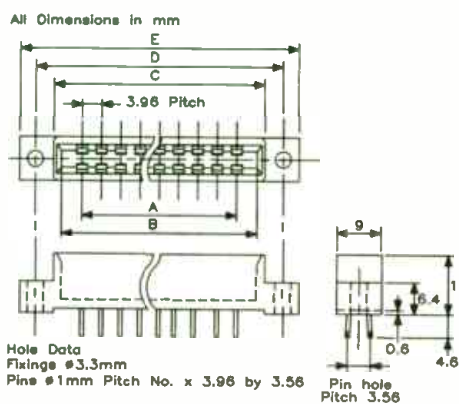


Order Code	Type	Price each
JW69A	RAPL32A Connector	£1.10
JW71N	RAPL64AB Connector	£1.43
FJ51F	RAPL64AC Connector	£1.39
JW73Q	RAPL96ABC Connector	£1.79
JW70M	STSK32A Connector	£1.40
JW72P	STSK64AB Connector	£1.95
FJ47B	STSK64AC Connector	£1.99
JW74R	STSK96ABC Connector	£2.59

0.156in. Double-Sided



A range of edge connectors designed to mount directly on pcb's, particularly double-sided types. Moulded in glass fibre reinforced polyester UL94-V0, the contacts and pins are gold-plated phosphor bronze. A polarising key which is available separately, can be inserted into the shallow notches between contacts using a long-nosed pair of pliers, if required. Connectors are available in 12, 24 and 30 ways.



No. of Positions	A	B	C	D	E
2x6 way	19.61	26.20	31.40	36.89	45.30
2x12 way	43.57	51.96	55.16	62.85	69.08
2x15 way	55.45	63.84	67.04	74.53	80.94

Type L (in.)

2x6-way	1.5
2x12-way	2.45
2x15-way	2.9

Order Code	Type	Price each
FG24B	0.156in 2x6way Egcn	99p
BK74R	0.156in 2x12way Egcn	£1.79
JB63T	0.156in 2x15way Egcn	£1.79
FD08J	Polarising Key 0.156	15p

2 x 12 way 0.156 Edge Connector Hood

A plastic hood for use with 2 x 12 way 0.156 edge connector (BK74R), featuring rear or side cable exit. (The 2 x 12 way connector is used on Commodore VIC-20 and 64 computer user port.) Supplied complete with assembly screws, cable clamp and cable exit blanking plate.

Order Code	Type	Price each
JW90X	2 x 12W Conn Hood	79p



FCC68 MODULAR CONNECTORS

FCC68 Modular Plugs



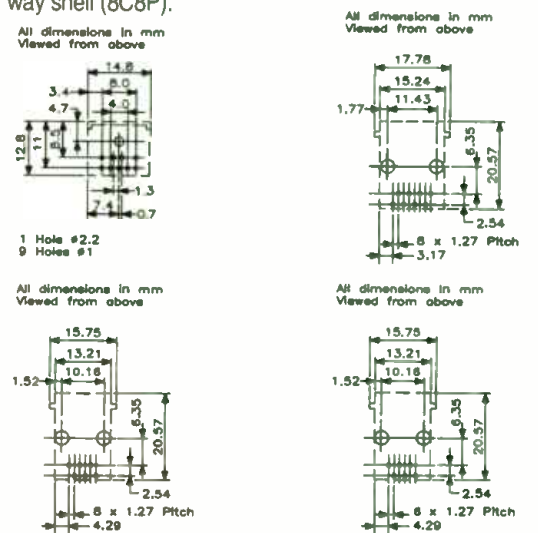
A range of modular plugs that are used on computer equipment and American telephones. Available in the following contact configurations: Four contacts in a four position shell (4C4P), four contacts in a six position shell (4C6P), six contacts in a six position shell (6C6P) and eight contacts in an eight position shell (8C8P).

Order Code	Type	Price each
JW42V	FCC68 Plg 4C4P	37p
JW43W	FCC68 Plg 4C6P	42p
JW41U	FCC68 Plg 6C6P	45p
JW44X	FCC68 Plg 8C8P	85p

FCC68 Modular PCB Sockets

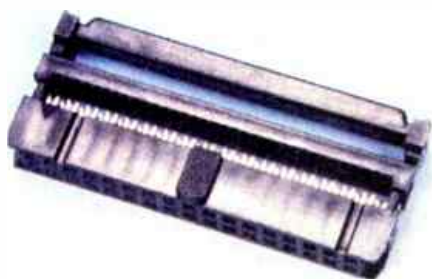


A range of modular PCB sockets that are used on computer equipment and American telephones. Available in the following contact configurations: Four contacts in a four position shell (4C4P), four contacts in a six position shell (4C6P), six contacts in a six position shell (6C6P) and eight contacts in an eight way shell (8C8P).



Order Code	Type	Price each
JW46A	FCC68 PCB Skt 4C4P	74p
JW47B	FCC68 PCB Skt 4C6P	89p
JW45Y	FCC68 PCB Skt 6C6P	79p
JW48C	FCC68 PCB Skt 8C8P	£1.35

Double Row Cable Connector Socket



A range of double row IDC connectors moulded in 30% glass fibre reinforced PBT (UL94-V0). Contacts are gold-plated phosphor bronze. Cable strain-relief clamps are supplied. Connectors conform to BS9525.

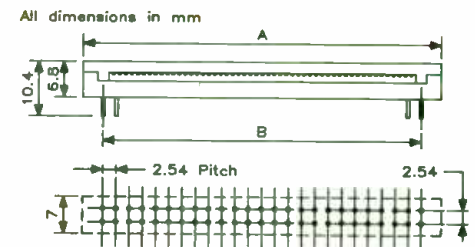
Order Code	Type	Price each
JB59P	2x5 dil IDC Socket	79p
FG44X	2x8 dil IDC Socket	99p
FG84F	2x10 dil IDC Socket	£1.09
FG85G	2x13 dil IDC Socket	£1.39
FG86T	2x17 dil IDC Socket	£1.69
FG87U	2x20 dil IDC Socket	£1.99
FA40T	2x25 dil IDC Socket	£2.39

Low Cost IDC Edge Connectors

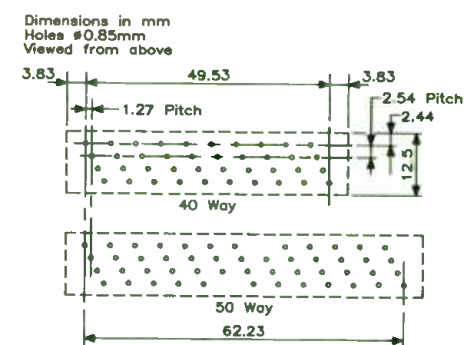


A range of low-cost IDC edge connectors moulded in glass fibre reinforced polyester (UL-94-V0). Contacts are gold-plated phosphor bronze.

Order Code	Type	Price each
JC05F	Lo-cost IDC Edge 16W	59p
JB26D	Lo-cost IDC Edge 20W	65p
JB27E	Lo-cost IDC Edge 26W	69p
FS80B	Lo-cost IDC Edge 34W	79p
FS81C	Lo-cost IDC Edge 40W	£1.05
JB28F	Lo-cost IDC Edge 50W	£1.35



Pins	16	20	26	34	40	50
A	27.32	32.40	40.02	50.18	57.80	68.65
B	17.78	22.86	30.48	40.64	48.27	60.96



Order Code	Type	Price each
FA47B	Str Transheader 16w	69p
FA48C	Str Transheader 20w	79p
FA49D	Str Transheader 26w	89p
FA50E	Str Transheader 34w	99p
FA51F	Str Transheader 40w	£1.35
FA52G	Str Transheader 50w	£1.49
FA53H	Stg Transheader 40w	£1.99
FA54J	Stg Transheader 50w	£2.29

IDC Connectors With Cables Fitted



A range of assembled Flat Cables and IDC Connectors conforming to BS9525 with pins on 0.1in spacing. All connectors are moulded in thermoplastic, glass-fibre filled resin. Max working voltage: 750V DC. Max working current: 2A. Fitted with 1/4 metre (10in approx) of cable and other end unterminated. Available in 16 way, 20 way, 26 way, 34 way and 40 way.

Order Code	Type	Price each
FJ01B	16 Way IDC Skt+Cable	£1.39
FJ02C	20 Way IDC Skt+Cable	£1.65
FJ03D	26 Way IDC Skt+Cable	£1.99
BK96E	34 Way IDC Skt+Cable	£2.29
FJ04E	40 Way IDC Skt+Cable	£2.75

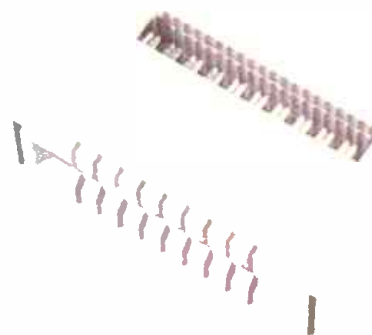
IDC Edge Connector and Cable Assemblies



The IDC Edge Connectors as above connected to 1m of IDC cable. The other end of the cable is unterminated.

Order Code	Type	Price each
FT71N	2X17W IDC Edge+Cable	£3.99
FT70M	2X25W IDC Edge+Cable	£4.99

IDC Edge Connectors



These grey moulded edge connectors feature closed ends for precise mating with a tongue shaped card edge, thus completely obviating any mismatch due to sideways slip. These connectors can be supplied in 20-way, 34-way and 50-way.

Order Code	Type	Price each
FT87U	20W IDC Edge Connctr	£2.49
FT89W	34W IDC Edge Connctr	£3.09
FT60Q	50W IDC Edge Connctr	£3.79

DIL IDC Headers

Headers which may be plugged into standard 14-pin, 16-pin or 28-pin DIL sockets, or they can be directly mounted on the pcb. Overall dimensions: (mm)



	14-way	16-way	28-way
Length	22.0	24.8	40.0
Width	10.8	10.8	18.1
Height (excl. pins)	5.9	5.9	5.9
Pin length	4.0	4.0	4.0

Order Code	Type	Price each
JH37S	14Pin DIL IDC Header	69p
JH36P	16Pin DIL IDC Header	79p
JP40T	28Pin DIL IDC Header	£1.59

PCB Transition Headers

Two alternative types of double row or staggered pin transition headers for permanently attaching IDC cable looms to a PCB.

Flat Cable IDC Series D Connectors

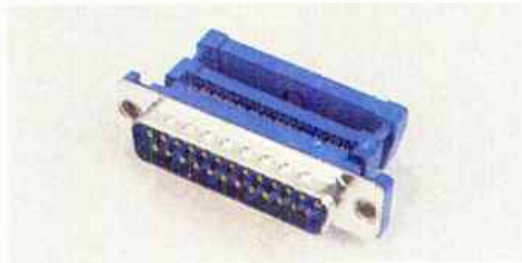
Union Brothers



Of the range of the D series plugs and sockets described elsewhere in this section, 9-way, 15-way, 25-way and 37-way plugs and sockets are now available in IDC form, greatly simplifying the task of terminating many wires. In addition, many plugs or sockets can share the same cable harness for looping to several destinations. These metal and plastic bodied connectors will mate with the other D range connectors shown elsewhere in this section.

Order Code	Type	Price each
FV77J	IDC D-Rnge 9-Way Plg	£2.05
FV79L	IDC D-Rng 15-Way Plg	£2.69
FV81C	IDC D-Rng 25-Way Plg	£2.99
JB44X	IDC D-Rng 37-Way Plg	£3.99
FV78K	IDC D-Rnge 9-Way Skt	£2.19
FV80B	IDC D-Rng 15-Way Skt	£2.99
FV82D	IDC D-Rng 25-Way Skt	£3.29
JB45Y	IDC D-Rng 37-Way Skt	£4.49

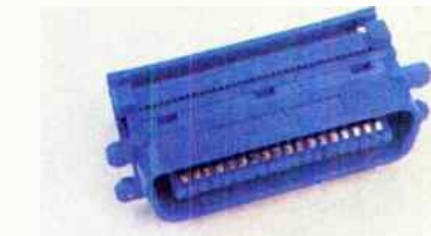
Low Profile 25 way IDC D-type Connectors



Low profile 25 way IDC D-type connectors, plastic body with metal shell incorporating grounding dimples, designed for use with IDC cable. These connectors will mate with other standard 25 way D-type connectors. Contacts are copper alloy with gold plating over nickel. Shells are steel with tin plating. Body is glass reinforced PBT plastic to UL-94-V0.

Order Code	Type	Price each
JW79L	L/Prfl IDC 25W D Plg	£2.09
JW80B	L/Prfl IDC 25W D Skt	£2.39

Flat Cable Centronics Type IDC Plug



A range of double row plugs in a thermoplastic body with cable clamp for use with IDC cable.

Order Code	Type	Price each
JB55K	IDC Centronix 24Wplg	£2.79
FJ62S	IDC Centronix 36Wplg	£2.19
JB56L	IDC Centronix 50Wplg	£3.29

Flat Cable Centronic Type IDC Chassis Socket



A range of double row sockets in a thermoplastic body with cable clamp and M3/6BA holes for chassis mounting. Includes spring clips for locking the plug. Chassis fixing centres are as follows. 24-way: 47mm; 36-way: 60mm; 50-way: 75mm.

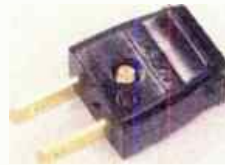
Order Code	Type	Price each
JB57M	IDC Centronix 24Wskt	£2.79
FT74R	IDC Centronix 36Wskt	£2.29
JB58N	IDC Centronix 50Wskt	£3.55

MAINS AND POWER CONNECTORS

Mains Connectors

American Plug

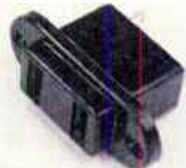
A two pin 7-5A line plug with flat pins on 12.7mm centres. For 110V use only.



Order Code	Type	Price each
HL17T	USA Mains Plug	49p

American Chassis Socket

A two pin 7-5A chassis socket to suit USA Mains Plug. Fixing centres 32mm. For 110V use only.



Order Code	Type	Price each
HL18U	Flat Pin M/S	39p

American 3-pin Chassis Socket

A 3-pin 7-5A chassis socket with snap-in fixing in 23 x 23mm panel cut-out. Bezel size 27 x 27mm. Overall depth: 32mm. For 110V use only.



Order Code	Type	Price each
JK19V	USA 3-pin Socket	79p

American Line Socket

A two pin 7-5A line socket to suit our USA Mains Plug. For 110V use only.



Order Code	Type	Price each
HL19V	Flat Pin Conn	79p

Telefunken Line Socket

A 2-pin line socket for use with the Telefunken style 2-pin mains plug. Twin wire cable can be terminated to the pair of solder tags inside, beneath the removable cover retained by a single screw. Overall length 31mm.



Order Code	Type	Price each
FT99H	Telefunken Skt	45p

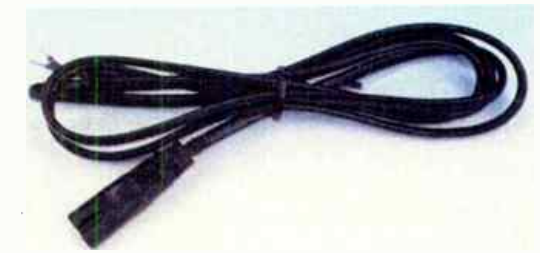
Telefunken Plug

A 2-pin mains plug with integral change over switch for isolating internal battery supply or similar, operated on insertion of the line socket. Suits Telefunken plug. Cut-out required: 20 x 20mm. Fixing centres: 26.5mm.



Order Code	Type	Price each
FT98G	Telefunken Plug	99p

Cassette Mains Lead



A mains lead with moulded socket which will fit the mains plugs on many battery/mains cassette players, radios etc.

Order Code	Type	Price each
RW66W	Cas Lead Telefunken	89p

Mains Lead



A non-rewirable mains lead with Telefunken style moulded two-pin socket at one end and a 13A moulded plug at the other. The Telefunken style socket is suitable for use with most mains/battery radios, cassette recorders, etc. The lead is 2m long, coloured black and rated at 250V AC, 2.5 Amp. The 13A plug carries a 3A fuse.

Order Code	Type	Price each
AK16S	2.5A Mains Lead	£2.29

European Style Connectors Line Socket



Rated at 6A at 250V AC, this socket includes cord grip and strain relief sleeve.

Order Code	Type	Price each
HL16S	Eurosocket	£1.35

Right Angle Mains Inlet Line Socket

Bulgin

This well finished right angled or side entry line socket is rated at 10A at 250V AC. It features clearly labelled screw terminals for connecting wires to Live, Neutral and Earth. In addition there is a metal cable clamp, and a strain relief sleeve.



Continued on next page.

Maplin
FOR TOP
QUALITY
& VALUE

Continued from previous page.

Approved to VDE, UL, CSA, SEV, SEMKO, and DEMKO standards.

Order Code	Type	Price each
FT62S	R/A Euro Mns In P588	£2.19

Side Entry Euro Socket

Bulgin

A mains line socket with side entry for cable, conforming to BS4491. Rated at 10A at 250V AC. Includes cable clamp and strain relief.

Approved to BSI, VDE, UL, CSA, SEMKO, NEMKO, DEMKO and IMQ standards



Order Code	Type	Price each
JP19V	Side Eurosocket	£1.89

Mains Inlet Chassis Plug

Cliff



Rated at 10A 250V AC. Mounting lip 30.7 x 22.7mm. Mounting hole: 31 x 23mm. Fixing centres: 40 x 6BA (M3) countersunk. Overall depth: 33mm. An insulation cover for the rear of this plug is also available. Conforms to IEC 320.

Order Code	Type	Price each
HL15R	Europlug	89p
JK66W	Ins Cover for HL15R	49p

Hot Condition Euro Chassis Plug

Bulgin

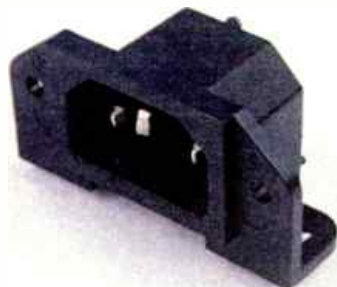
'Hot condition' plug, that is capable of withstanding high temperatures, moulded in black nylon, with integral polarisation lug. Fitted with 1/4in.

blade connections at the rear. Rating 10A 250V AC. Operating temperature -40°C to +70°C. Maximum pin temperature 120°C. Mounting hole 27.5 x 20mm. Fixing centres 40mm x M3(6BA). Overall depth 32mm.



Order Code	Type	Price each
MK19V	Hot Chassis Plug	99p

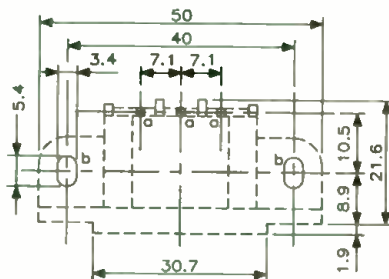
PCB Mounting Mains Inlet Plug



Requires chassis cut-out 30 x 22mm. Has 3mm (6BA) dia. holes in front face and base for fixing to panel

and/or pcb on 39mm centres. Pcb pins are 1.5mm dia. and in addition the earth pin also has a solder lug protruding from the rear for earth wire to chassis connection etc. Overall size (excluding pcb pins and lug): 49 x 21 x 27mm high. Front flange protrudes by 3mm.

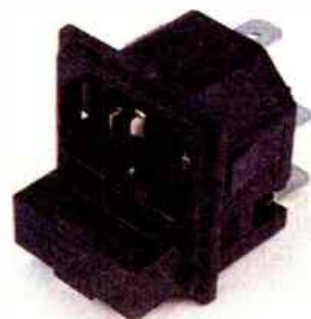
All dimensions in mm
Viewed from above
Hole data
a 3 x Ø1.6mm
b 2 x Slots 3.4 x 5.4



Order Code	Type	Price each
FE15R	PCB Europlug	84p

Euro Fused Mains Chassis Plug Inlet

Cliff



A chassis mounting, Euro style, moulded nylon, mains inlet plug with integral fuseholder, or magazine that partially withdraws to accept a 5 x 20mm cartridge fuse. The fuse magazine is connected in the Live line only and the mains connector cannot be inserted unless the magazine is closed. When the fuse magazine is opened the fuse is disconnected and remains loose in the drawer. Changing the fuse is then just a matter of lifting out the old and inserting the new. The magazine has storage space for one spare fuse. (Fuses are not included). Maximum rating is 10A at 250V AC. Connections are tin-plated brass 1/4in. blades and may be soldered, or a quick-fit receptacle used. (e.g., HF10L). The chassis plug is a snap fit, into an aperture of 27.3 x 31.12mm, in a panel of 1.5mm thickness and has an overall depth of 27.6mm. An insulation cover is available for protecting the rear of this item (Manufactured by Bulgin).

Order Code	Type	Price each
MK18U	Euro Fused	£1.49
JK67X	Cover For FT37/MK18	59p

Fused Mains Inlet Chassis Plug

Cliff

A chassis mounting Euro style mains inlet connector with a built in fuseholder that accepts a 5 x 20mm cartridge fuse. The fuse is connected in the Live line only. The fuseholder consists of a small 'drawer' which cannot be withdrawn unless the input lead line socket is removed first. The fuse is automatically disconnected and remains loose in the 'drawer,' changing the fuse is merely a matter of lifting out the old and dropping in the new. Additional space is provided at the front of the 'drawer' to carry a spare fuse. (Fuses are not included). The line socket cannot be inserted without closing the 'drawer'.



An insulation cover for the rear of this plug is also available. (Manufactured by Bulgin).

Order Code	Type	Price each
FT37S	Fused Euro Ch Plg	£1.59
JK67X	Cover For FT37/MK18	59p

Fused Mains Inlet Chassis Plug with Switch

Bulgin

As FT37S but with SPST mains switch incorporated in the one moulding and having a snap-in fixing. Requires a 57 x 34mm panel cut-out. UL, CSA, VDE and SEMKO approved. 10A 250V rating. Bezel size 59 x 36mm. Overall depth behind bezel 26mm. Suitable for 1.0, 1.5, 2.0 and 3mm panel thickness.



Order Code	Type	Price each
JK71N	Fuse/Switch Inlet	£3.29



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

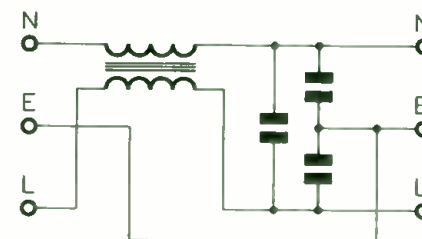
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Filtered Mains Inlet Chassis Plug

Littelfuse



A chassis mounting Euro style mains input connector which incorporates an integral interference filter for the exclusion of unwanted noise from the mains supply, or to prevent equipment introducing noise spikes into the mains circuit. The combined inductive and capacitive filter, contained in a metal case, includes the Earth connection in its arrangement together with the Live and Neutral to cover all possible interference sources. Connecting wires are terminated to solder tags.



Specification

Nominal wkg voltage: 250V AC @ 50Hz
 Current rating: 6A
 Earth leakage current: 0.35mA
 Dimensions: Width 50mm, Depth 22mm, Length 55mm.
 Cutout required: 28 x 22mm.
 Fixing centres: 40mm.

Order Code	Type	Price each
FT36P	Mains In Filter Plg	£8.99

Chassis Mount Mains Filters

Littelfuse

A range of chassis mounted mains RF filters with current ratings of 3A, 6A and 10A. Connections are by 'faston' 6.3mm solder tags.



Type	Current amps	L (mH)
848003	3	2
848006	6	0.8
848010	10	0.4

Order Code	Type	Price each
KR96E	Mains Filter 3A	£9.49
KR97F	Mains Filter 6A	£9.49
KR98G	Mains Filter 10A	£9.49

Euro Facility Line Plug

Bulgin

Plug has cord grip and strain relief grommet. The pins are partly shrouded for extra safety. Rated at 6A 250V, BEAB and CSA approved.

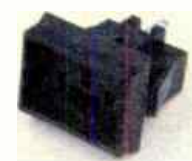


Order Code	Type	Price each
HL43W	Euro Facility Plug	£3.29

Euro Facility Chassis Socket

Bulgin

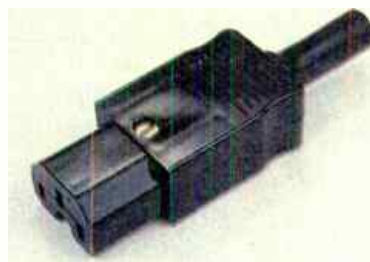
Mounting hole: 28.24 x 23.24mm. Overall depth: 33mm. Socket is snap-in fixing. Rated at 6A, 250V, BEAB and CSA approved. An insulation cover for the rear of this socket is also available.



Order Code	Type	Price each
HL42V	Euro Facility Outlet	£1.14
JK69A	Ins Cover for HL42V	80p

Hot Condition Euro Line Socket

Bulgin

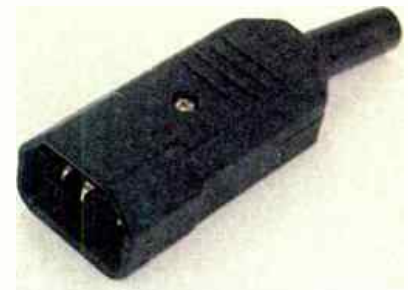


Rewirable cable mounting Hot Condition socket with cord grip and strain relief grommet. Rated at 250V AC 10A maximum.

Order Code	Type	Price each
MK20W	Euro Line Socket	£1.69

Mains Outlet Line Plug

Cliff



A line plug for use with the chassis mounting Euro outlet socket. The line plug has shielded pins to prevent accidental touching of the pins whilst inserting or removing the plug. Wires are terminated to the connectors using screw terminals. Includes cable clamp and strain relief sleeve. Rated at 6A at 250V AC.

Order Code	Type	Price each
FT64U	Euro Outlt Plg P686	£2.22

Mains Outlet Chassis Socket



A mains outlet chassis socket complementary to the mains inlet chassis plug HL15R. Physically identical it requires a 32 x 25mm mounting hole, and has an overall depth of 35mm. Fixing centres are 40mm x 6BA or M3, countersunk. Contacts are rated at 6A at 250V AC, with solder tag terminations at rear 2.5mm wide x 10mm long. An insulation cover for the rear of this socket is also available.

Order Code	Type	Price each
FT63T	Euro Outlt Skt P675	£1.05
JK68Y	Cover For FT63/MK17	60p

Right Angle Mains Outlet Line Plug

Bulgin

A right angled or side entry Euro style mains outlet plug, having the special feature in that the centre portion comprising the shielded pins and screw terminals can be mounted into the body upon assembly in any one of four positions relative to the body and 90° to each other, so that the cable may exit in whichever direction is the most convenient. Includes cable clamp and strain relief sleeve. Rated at 10A at 250V AC. UL, CSA, SEV and BEAB approved.

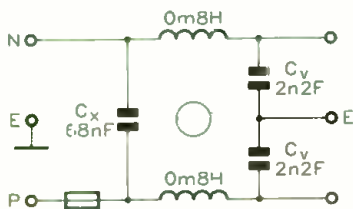
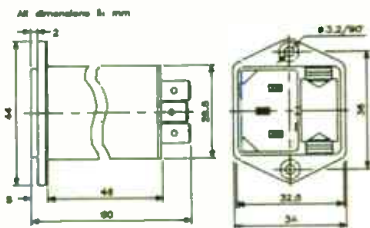


Order Code	Type	Price each
FT65V	Euro R/A Out Pg P685	£2.69

Fused Mains Inlet and Filter

Littelfuse

A Euro style mains inlet connector with a built-in fuseholder and RF filter. The fuseholder accepts a 5 x 20mm fuse cartridge. The rated current is 6A and connections are by 'faston' 6.3mm solder tags.

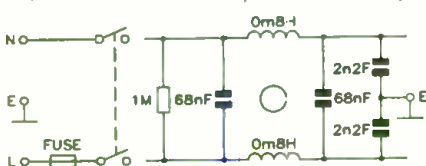
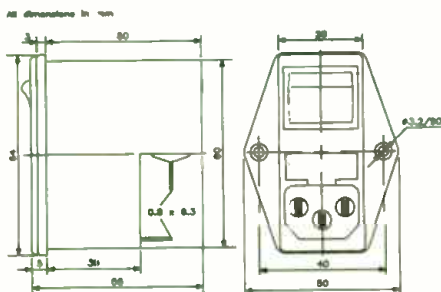


Order Code	Type	Price each
KR99H	Fused Inlet/Filter	£9.99

Fused Mains Inlet and Filter with 2-Pole Switch

Littelfuse

A Euro style mains inlet connector with a built-in fuseholder, 2-pole switch and RF filter. The fuseholder accepts a 5 x 20mm fuse cartridge. The rated current is 6A and connections are by 'faston' 6.3mm solder tags.



Order Code	Type	Price each
KC00A	Sw Fused Inlet/Filtr	£18.99

COMPARE OUR PRICE & QUALITY – SAVE MONEY TODAY!

European Plug and Socket Cord Set

Bulgin



Moulded, high quality, BEAB approved non-rewirable European style shrouded plug and socket cable assembly, 2m long, rated at 250V 10A. Colour black.

Order Code	Type	Price each
MK24B	Euro Mains Cord Set	£4.99

Moulded Socket and Lead

Bulgin



A line socket permanently moulded to a length of 3-core flex. Rated at 10A, 250VAC. Available with straight or right-angle line socket. Length of flex: BW99H 1.5m; FE79L 2m. Approved to BSI, VDE, SEMKO, SEV, NEMKO, DEMKO and IMQ standards.

Order Code	Type	Price each
BW99H	Euroconn Lead	£2.49
FE79L	R/A Euroconn Lead	£3.29

2 way & 4 way Plug Adaptors



An ingenious way of providing a mains supply to Hi-Fi, computer equipment etc. These units allow either 2 or 4 miniature mains connectors to be connected to one mains socket safely and neatly. The main unit has integral 13A plug pins and sockets to take the miniature connectors. Supplied with miniature connectors.

Order Code	Type	Price each
YZ13P	Plug Connector 2 Way	£8.99
YZ12N	Plug Connector 4 Way	£11.99

4 way and 6 way Mains Distribution Units



A safe and tidy way of connecting up to four or six mains appliances to a single mains socket, ideally suited to Hi-Fi and computer equipment etc. The unit may be used either 'trailing' or fixed to a wall. The unit has the following features: Neon 'on' indicator, sockets are fully shuttered for safety, internally fused, labelling system to identify appliance plug, unbreakable polycarbonate construction. Current capacity 13A (240V AC mains) overall, maximum current per socket 10A. Conforms to BS5733. Supplied complete with miniature connectors.

Order Code	Type	Price each
YZ10L	4 Way Mains Conn	£11.99
YZ11M A1	6 Way Mains Conn	£14.99

Hi-Fi Distribution Box



Designed to be mounted behind hi-fi equipment etc. these neat compact boxes have 4 Eurosockets mounted in line. There is 1m of 6A mains lead fitted. Supplied complete with four Euro-facility plugs. Rated 1.5kW total. Max current 6A.

Overall size: 204 x 36 x 34mm
Fixing centres: 190 x 3mm clear

Order Code	Type	Price each
WY16S A1	Euroboard 4-way	£10.99

Sealed In-Line Connector

Bulgin



A threaded-coupling sealed in-line connector sealed to IP68 and BS5490, 1977 approved, suitable for repairing or extending 3-core circular mains cables. The plastic sealed two-piece black housing is fitted with cable glands and retained together with a screwed ring. Supplied with 3-way terminal block, rated at 6A 250V AC, and fitting instructions. Conforms to IP68 BS5490: 1977.

Order Code	Type	Price each
MK33L	In-Line Connector	£5.49

Threaded-Coupling Connectors

Bulgin

A range of plastic moulded in-line and chassis mounting 3-way interchangeable plug and socket connectors. The threaded-coupling housings are supplied with interchangeable polarised plug and socket inserts to cater for mains inlet or outlet application and cable glands for circular mains cable. Two types of insert/extraction tools are available, for ease of assembly of plugs and sockets, that also double as sealing covers. Rated at 10A 250VAC. Sealed to IP68. BS5490: 1977, UL, CSA approved.



MK25C	Chassis mounting 3-way plug
MK26D	Chassis mounting 3-way socket
MK27E	Free 3-way plug (with coupling ring)
MK28F	Free 3-way socket (with coupling ring)
MK29G	In-line 3-way plug
MK30H	In-line 3-way socket
MK31J	Cap/Tool for chassis mounted and in-line connectors
MK32K	Cap/Tool for free connectors

Order Code	Type	Price each
MK25C	3-Way Chassis Plug	£3.89
MK26D	3-way Chassis Socket	£4.59
MK27E	3-Way Plug	£4.59
MK28F	3-way Socket	£5.89
MK29G	3-Way Plug	£4.99
MK30H	3-Way Socket	£6.29
MK31J	Assembly Tool Chass	54p
MK32K	Assembly Tool	69p

3-Pin Low Current Range

P429

Bulgin

A three pin chassis plug. Overall depth: 21mm. Mounting hole: 19mm dia. Bezel diameter: 24.7mm. Rated: 1.5A at 250V, 2A at 110V, 3A at 6V AC and DC. Mates with sockets P631, P646 and P430SE.



See note on next page.

Order Code	Type	Price each
HL20W	Mains Plug P429	79p

P646

Bulgin



A 3-pin line socket to fit plug P429. With cord grip and strain relief sleeve. Rated: (as P429).

Order Code	Type	Price each
HL44X	Mains Socket P646	£2.19

5-PIECE INSULATED SCREWDRIVER SET WITH SCREW RETAINER

A superb set of five screwdrivers which includes three flat blade and two Phillips crosspoint screwdrivers, all protected with a sliding spring-loaded, insulating sleeve on the blade. A 'gripper' on the end of the sleeve acts like an extra hand by holding the screw onto the blade while it is being inserted. The handles and sleeves, supplied in three sizes, are of a tough shatterproof red plastic and the shafts, which are in three lengths, are of chrome vanadium steel with a chemically black finish.



Flat Blade Types

Blade Width	Shaft Length	Overall Length
5mm	150mm	255mm
4mm	125mm	220mm
3mm	125mm	220mm

Crosspoint Blade Types

Blade Width	Shaft Length	Overall Length
No. 2	175mm	280mm
No. 1	125mm	223mm



Please Note:

Connectors marked ★ are unsuitable for use on domestic equipment at voltages over 50V; unless contact with the connector or terminals is impossible without the use of a tool defined in the Electrical Equipment (Safety) Regulations 1975. Connectors marked ★★ are suitable for use on domestic equipment at voltages over 50V, provided they are NOT live when unmated and are used in conjunction with a connector NOT marked with a ★. Or alternatively, if contact with the connector or terminals is impossible without the use of a tool as defined in the Electrical Equipment (Safety) Regulations 1975.

P430SE

Bulgin

A 3-pin line socket; side entry version of P646. With cord grip. Rated as P429.



Order Code	Type	Price each
HL23A	Mains Socket P430SE	£1 89

P631 ★

Bulgin

A three-pin line socket with strain relief sleeve. Rated as P429. Mates with Plug P429. Suitable for use with PSU24 Soldering Station.



Order Code	Type	Price each
JU67X	50V Socket P631	89p

P649 ★★

Bulgin

A 3-pin plug with cord grip and strain relief sleeve. Rated at 2.5A at 250V, 3A at 110V, 4A at 6V AC and DC. Mates with socket P650.



Order Code	Type	Price each
HL45Y	Mains Plug P649	£1.79

P650

Bulgin

A 3-pin chassis socket. Mounting hole: 19mm. Rated as P649. Mates with plug P649.



Order Code	Type	Price each
HL46A	Mains Socket P650	£1.39

SA2403

Bulgin

A 3-pin line plug with shielded pins and cord grip. Plug is side entry type. Rated: 2A at 250V, 3A at 110V and 4A at 6V AC and DC. Mates with socket SA2404.



Order Code	Type	Price each
HL47B	Mains Plug SA2403	£1.79

SA2404

Bulgin

A 3-pin chassis socket. Mounting hole: 19mm dia. Rated (as SA2403). Mates with plug SA2403.



Order Code	Type	Price each
HL48C	Mains Socket SA2404	£1.29

3-Pin 5A Range SA1861 ★★

A 3-pin chassis plug. Overall depth: 33mm. Mounting hole: 27mm dia. Bezel dia. 40mm. Fixing centres: 32mm x 4BA. Rated: 5A at 50V AC. 7A at 6V AC and DC. Mates with sockets SA2597 and SA2111.



Order Code	Type	Price each
HL27E	50V Plug SA1861	£1.49

SA2597 ★

A 3-pin line socket to fit plug SA1861. With cord grip. Strain relief sleeve available separately, if required.



Order Code	Type	Price each
HL28F	50V Socket SA2597	£1.79

Strain Relief Sleeve

Bulgin

A moulded black strain relief sleeve suitable for use with Socket SA2597.



Order Code	Type	Price each
HL50E	Sleeve 8037	25p

SA2111

Bulgin

A 3-pin line socket; side entry version of SA2597. With cord grip. Fits plug SA1861, and the pair are suitable for use at 250V AC in domestic applications, otherwise rated as SA1861.



Order Code	Type	Price each
HL49D	250V Socket SA2111	£3.09

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Four Pole Connector SA2367

Bulgin

A 4-pin line plug with shielded pins and cord grip. Plug is side entry type. Rated 2A at 250V, 3A at 110V and 4A at 6V AC and DC. Mates with socket SA2368. Plug is keyed so that it can only be inserted one way.



Order Code	Type	Price each
HL33L	Mains Plug SA2367	£2.49

SA2368

Bulgin

A 4-pin chassis socket. Overall depth: 28mm. Mounting hole: 19mm. Bezel dia: 25mm. Rated: (as SA2367). Mates with SA2367.



Order Code	Type	Price each
HL34M	Mains Socket SA2368	£1.49

Six-Pole Connector P635 ★

Bulgin

A six-pin chassis plug. Overall depth: 34mm. Mounting hole: 19mm dia. Bezel dia: 23.5mm. Rated: 1.5A at 250V, 3A at 50V AC and DC. Mates with socket P636.



Order Code	Type	Price each
HL36P	50V Plug P635	£1.74

P636 ★

Bulgin

A six-pin line socket with strain relief sleeve. Rated as P635. Mates with Plug P635.



Order Code	Type	Price each
HL37S	50V Socket P636	£1.99

P551

Bulgin

An eight-pin line plug with cord grip. Side entry type. Will accept up to eight full size insulated conductors or two to three mains cables simultaneously. Rated (per pin): 6A at 250V, 10A at 2.5V AC. Mates with socket P552.



Order Code	Type	Price each
HL39N	Mains Plug P551	£4.69

P552

Bulgin

An eight-pin chassis socket available with solder tags P552, or PCB pins PX0552. Overall depth: 23mm. Mounting hole: 38mm dia. Bezel: 41 x 41mm. Fixing centres: 33 x 33mm x 6BA (M3) countersunk. Rated as P551. Mates with plug P551.



Order Code	Type	Price each
HL40T	Mains Socket P552	£1.49
JZ02C	Mains Socket PX0552	£1.59

Insulating Boot

Bulgin

Flexible black covers providing neat tangle-free cable connection and giving protection against accidental contact. Fits over the back of Plug P429 and Sockets SA2404 and SA2368.



Order Code	Type	Price each
HL51F	Boot 9455	42p

Model Control Connectors

A range of lightweight, compact plug and socket arrays especially suitable for model control applications where small physical size and minimum weight may be essential, in the case of model aircraft, for example. Reliability is assured by the contact surfaces being gold plated, for both plug and socket.

Battery Connector

Union Brothers



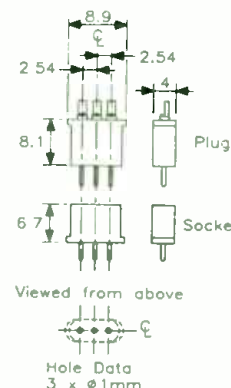
A non-reversible, mirror image plug and socket assembly for quick and simple battery coupling.

Order Code	Type	Price each
FK96E	Batt Pl/Skt Pair	92p

3-Pin Connector



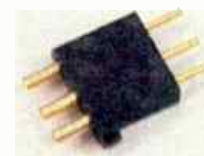
A 3-pin plug and socket assembly for interconnections where three wires are required. Note the connectors are not polarised. The socket is designed for pcb mounting.



Order Code	Type	Price each
FK97F	GP Pl/Skt Pair	75p

3-Way Polarised Plug

A 3-pin plug having one pin offset in order to prevent accidental reversal. Such connectors are ideal for interconnecting the receiver to a servo control circuit, providing power on two pins and a signal on the other.



Order Code	Type	Price each
FK99H	3-Pin Offst Plug	42p

3-Way Polarised Socket

A non-reversible 3-pin socket that mates to the above plug.



Order Code	Type	Price each
FK98G	3P Offst Skt	45p

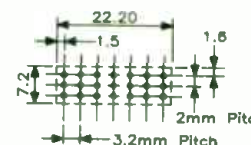
7-Way PCB Socket

A PCB mounting socket providing for up to seven 3-way outlets from receiver board etc. Pins are spaced 2mm apart in each row of 3 pins, with 3mm spacing between rows. Overall length of block: 22mm. Overall width: 7mm.



All dimensions in mm
Viewed from above
Hole data
21 x ø1mm

Note these connectors are non-polarised.



Order Code	Type	Price each
FM01B	7-Way Skt Bloc	£2.39

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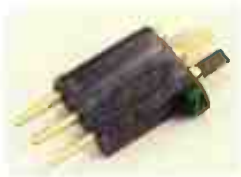
Eight-Pole Connector

Bulgin

An eight-pole mains connector which is fully shrouded and completely safe when de-mated. It is also polarised and keyed so that mis-mating is impossible. Consequently inputs and outputs may be connected simultaneously through one plug and socket pair with absolute safety. Centre pin is designated 'earth' and unfaillingly, mates first and demates last.

Small 3-Way Plugs

Miniature 3-pin plugs to fit the above 7-way socket block. Plugs are sold singly.



Order Code	Type	Price each
FM00A	3-Pin Plug	39p

1.3mm Plug to 2.1mm Socket Adaptor

Converts 2.1mm power plug to 1.3mm for use with Walkman-type cassette power sockets.



Order Code	Type	Price each
FK08J	DC 2.1 - 1.3mm Adapt	60p

Battery Connectors

Union Brothers



For making your own battery packs and chargers, the standard racing pack plugs and sockets are available pre-assembled to 150mm (6in.) lengths of red and black high-temperature silicone insulated wires. The part with the pins inside the connector housing is the male part and normally connected to the battery, and the part with the sockets inside the housing which also has the latch mechanism is the female part and normally connected to the model or charger.

Order Code	Type	Price each
JG04E	Race Pk Lead Male	89p
JG05F	Race Pk Lead Female	89p

Power Connectors

1.3mm Plug

A miniature DC power plug as used with the Walkman-type personal stereo cassette players. Suitable only for use with matching socket having 1.3mm dia. pin.

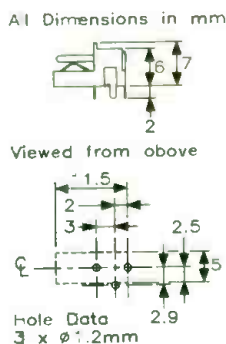


Order Code	Type	Price each
FK05F	Mini DC Pwr Plug	33p

1.3mm PCB Socket



A PCB mounting socket compatible with 1.3mm Walkman type plugs.



Order Code	Type	Price each
FK07H	PCB Mini DC Pwr Skt	52p

1.3mm Plug to 2.5mm Socket Adaptor

Converts 2.5mm power plugs to 1.3mm for use with Walkman-type cassette power sockets.



Order Code	Type	Price each
FK09K	DC 2.5-1.3mm Adapt	60p

1.3mm Plug to 3.5mm Mono Jack Socket Adaptor

An adaptor which enables a 3.5mm mono jack plug to be used with Walkman-type cassette players using 1.3mm power sockets.



Order Code	Type	Price each
FK10L	DC 3.5-1.3mm Adapt	60p

Standard 2.1mm Plug

2.1mm power plug of standard length.



Order Code	Type	Price each
HH60Q	Std Power Plug 2.1	32p

Long 2.1mm Plug

2.1mm power plug having a long reach.



Order Code	Type	Price each
HH61R	Long Pwr Plug 2.1	32p

2.1mm Socket

2.1mm chassis socket with break contact suits Standard Power Plug 2.1. Fixing centres: 24mm. Hole diameter:



Order Code	Type	Price each
HH85G	Power Skt 2.1	39p

2.1mm Plastic Socket

A plastic bodied 2.1mm power socket with break contact. Suits Standard Power Plug 2.1. Fixing centres: 15.5mm. Hole diameter: 2.5mm.



Order Code	Type	Price each
FT96E	Plas 2.1 Chas Skt	35p

2.1mm Socket Single-hole-Fixing

A 2.1mm power socket with break contact. Requires a single 8mm panel cut-out. Overall size 21 x 11mm dia.

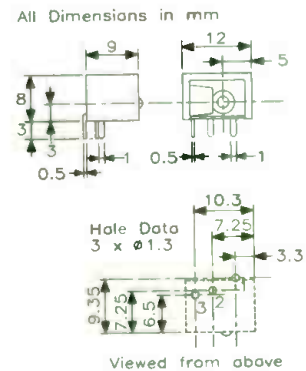


Order Code	Type	Price each
JK09K	Pan Mnt Pwr Skt 2.1	72p

2.1mm Socket Printed Circuit Mounting



A DC socket that mounts directly onto PCB's. Eliminates internal wiring. Intended for low voltage and current applications. Should not be used at currents greater than 2A or DC voltages greater than 50V. Ideal for most 12V DC powered items.



Order Code	Type	Price each
RK37S	PC Mtg Power Socket	39p

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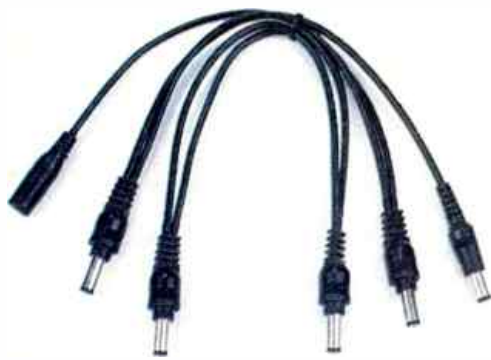
2.1mm Line Socket

A 2.1mm in-line socket.



Order Code	Type	Price each
JK11M	Power Line Skt 2.1	69p

2.1mm Power Extension Lead Set



Five 2.1mm standard length power plugs connected together in a chain with 190mm of cable between each. The end of the chain is terminated with a line socket into which the original power supply plug is inserted which can then power several items simultaneously. Input socket suits 2.1 or 2.5mm plug.

Order Code	Type	Price each
JR94C	Pwr Ext Lead 2.1mm	£2.69

Standard 2.5mm Plug

2.5mm power plug of standard length.



Order Code	Type	Price each
HH62S	Std Power Plug 2.5	35p

Long 2.5mm Plug

2.5mm power plug having a long reach.



Order Code	Type	Price each
HH63T	Long Pwr Plug 2.5	35p

2.5mm Socket

2.5mm chassis socket with break contact suits Standard Power Plug 2.5. Fixing centres: 24mm. Hole diameter: 2mm.



Order Code	Type	Price each
HH86T	Power Skt 2.5	39p

Plastic 2.5mm Socket

A plastic bodied 2.5mm chassis socket with break contact. Suits Standard Power Plug 2.5. Fixing centres: 15.5mm. Hole diameter: 2.5mm.



Order Code	Type	Price each
FT97F	Plas 2.5 Chas Skt	32p

2.5mm Socket Single-hole-Fixing

2.5mm power socket with break contact. Requires a single 8mm panel cut-out. Overall size 21 x 11mm dia.

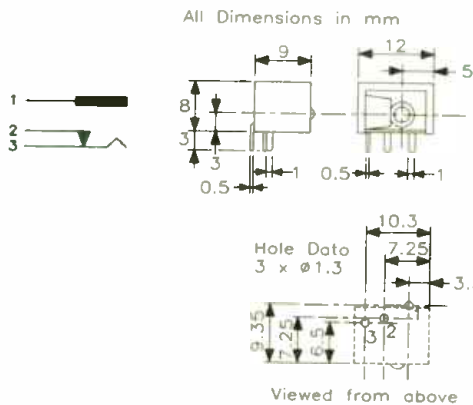


Order Code	Type	Price each
JK10L	Pan Mnt Pwr Skt 2.5	72p

2.5mm Socket Printed Circuit Mounting

Union Brothers

A 2.5mm PCB mounting DC power socket with break contact.



Order Code	Type	Price each
FK06G	PCB 2.5mm DC Pwr Skt	45p

2.5mm Line Socket

A 2.5mm in-line socket.



Order Code	Type	Price each
JK12N	Power Line Skt 2.5	65p

JVC-Type 3.1mm Plug

JVC-type 3.1mm plug with cable strain relief.



Order Code	Type	Price each
FM47B	JVC Type DC Plug	39p

Universal Plug



Four plugs: 2.1 power; 2.5 power; 2.5mm mono; 3.5mm mono; moulded onto 2m of 2-core flex.

Order Code	Type	Price each
HH38R	Universal Plug	£1.19

Extension Lead and Power Plugs

NEW!



A versatile extension lead, and a separate matching range of interchangeable mini plugs, for powering a wide range of portable equipment from battery eliminators and low voltage power supplies. The 6ft. straight coloured-coded 2-core lead is terminated at one end with two spade connectors, and at the other with a moulded socket to accept the one plug. The range of eight plugs cover almost all power sockets found on personal stereos, portable phones, portable CD players, toys, games, calculators, musical instruments, etc. The plugs can be inserted either way round to make the centre positive or negative to suit the equipment being powered.

The following plugs are available:

Size	Type
2.5mm mono	A
3.5mm mono	B
3 x 1mm power	C
5 x 2.1mm power	D
5.5 x 2.1mm power	E
5 x 2.5mm power	F
5.5 x 2.5mm power	G
3.5 x 1.35mm power	H
4 x 1.7mm power	I
4.75 x 1.75mm power	J
5 x 1.5mm power	M
5.5 x 1.5mm power	N
5.5 x 2.8mm power	P
6.3 x 3mm power	Q
7 x 1mm power	R
2.5 x 0.75mm miniature style power plug	S

The connector lead is not supplied with any plugs.

Order Code	Type	Price each
AQ81C	Power Adaptor Lead	49p
AQ84F	Power Tip A	36p
AQ85G	Power Tip B	36p
AQ86T	Power Tip C	45p
AQ87U	Power Tip D	36p
AQ88V	Power Tip E	36p
AQ89W	Power Tip F	36p
AQ90X	Power Tip G	36p
AQ91Y	Power Tip H	36p
AR22Y	Power Tip I	45p
AR23A	Power Tip J	45p
AR24B	Power Tip M	36p
AR25C	Power Tip N	36p
AR26D	Power Tip P	36p
AR27E	Power Tip Q	36p
AR28F	Power Tip R	69p
AR29G	Power Tip S	45p

5 and 6-Way Spider Connectors

NEW!



A pair of spider connectors for use with power supply units, battery eliminators and games adaptors. AQ82D is a 5-way connector with 2.5 and 3.5mm jack plugs, 2.1 and 2.5mm power plugs, and a PP3 type connector. AQ84E is similar in construction but with the addition of a 'Walkman' style power plug. Both leads are terminated with an in-line reversible 2-pin plug, for connection to either an in-line socket, or directly to a plug-in battery eliminator.

Order Code	Type	Price each
AQ82D	25770	99p
AQ83E	25771	£1.29

3-2mm Split Pin Type Plug

Nickel plated brass wander plugs with a split-pin construction. Available in Black, Green and Red.

Overall length: 33mm.
Pin length: 12.7mm. Pin diameter: 3.2mm. Overall diameter: 9.3mm.



Order Code	Type	Price each
HF50E	Wander Plug Black	29p
HF52G	Wander Plug Green	29p
HF53H	Wander Plug Red	29p

Socket

Wander socket with plated contact. Will fit panels up to 6.6mm thick. Available in Black, Green and Red.

Overall length: 21mm.
Bezel diameter: 11.7mm. Socket diameter: 3.3mm.
Mounting hole: 8mm dia.



Order Code	Type	Price each
HF56L	Wander Socket Black	29p
HF58N	Wander Socket Green	29p
HF59P	Wander Socket Red	29p

4mm Size

Low Cost Plug



A 4mm plug suitable for use with 4mm sockets below. Sprung plug ensures good contact with socket. Available with red and black handles. Overall length 50mm. Pin length 15mm. Overall diameter 11mm.

Order Code	Type	Price each
JB24B	Banana Plug Red	22p
JB25C	Banana Plug Black	22p

Plug



A 4m plug with nickel alloy plated brass pin and stainless steel spring to maintain adequate pressure in 4mm sockets. Available in Black, Blue, Green, Red, White and Yellow. Overall length: 44mm. Pin length: 19mm. Overall diameter: 8mm.

Order Code	Type	Price each
HF62S	4mm Plug Black	39p
HF63T	4mm Plug Blue	39p
HF65V	4mm Plug Green	39p
HF66W	4mm Plug Red	39p
HF67X	4mm Plug White	39p
HF68Y	4mm Plug Yellow	39p

Socket

4mm socket with silver-plated contact. Available in Black, Blue, Green, Red, White and Yellow. Overall length: 29.2mm. Bezel diameter: 11.7mm. Mounting hole: 8mm dia.



Order Code	Type	Price each
HF69A	4mm Socket Black	35p
HF70M	4mm Socket Blue	35p
HF72P	4mm Socket Green	35p
HF73Q	4mm Socket Red	35p
HF74R	4mm Socket White	35p
HF75S	4mm Socket Yellow	35p

PCB Mounting 4mm Sockets

Single 4mm PCB mounting sockets, ideal for use in test and measurement equipment.

Sockets are provided with interlocking slots/ridges which allow groups of sockets to be butted together. Pins are rectangular (1 x 1.5mm) and are arranged on a 0.1 inch matrix. Single sockets measure 10 x 12 x 23.5mm. Sockets are available in red and black. Fixing centres are 0.6 inch.



Order Code	Type	Price each
JP20W	4mm PCB Skt Sngl Blk	46p
JP22Y	4mm PCB Skt Sngl Red	46p

Stackable 4mm Plugs



A range of 4mm banana plugs which have an integral 4mm socket allowing plugs to be stacked one into another. The sprung contact ensures good electrical connection with the socket. Available in black, blue, green, red and yellow.

Order Code	Type	Price each
JM00A	Stack Plg 4mm Black	54p
JM43W	Stack Plg 4mm Blue	54p
JM44X	Stack Plg 4mm Green	54p
JM45Y	Stack Plg 4mm Red	54p
JM46A	Stack Plg 4mm Yell	54p

4mm Patch Cord



50cm (20 inches) and 100cm (40 inches) long patch cords for setting up test gear etc., comprising an extra

Continued on next page.

WANDER CONNECTORS

Miniature 1mm Size Plug

1mm plug suitable for low voltage circuits. Strong acetal moulding and silver-plated pin. Available in red and black. Overall length: 16mm. Pin length: 6mm. Overall diameter: 6mm.



Order Code	Type	Price each
WL57M	1mm Plug Black	22p
WL58N	1mm Plug Red	22p

Socket

1mm socket suitable for low voltage circuits. Strong acetal moulding and silverplated contact. Available in red and black. Overall length: 16mm. Bezel diameter: 6mm. Mounting hole: 5mm dia.



Order Code	Type	Price each
WL59P	1mm Socket Black	20p
WL60Q	1mm Socket Red	20p

2mm Size

Plug

2mm plug with silver plated pin rated at 10A. Available in black and red. Note that to unscrew body, hold in one hand and turn plastic body clockwise with other hand. Overall length: 32mm. Pin length: 9mm. Overall dia: 6mm.



Order Code	Type	Price each
HF38R	2mm Plug Black	32p
HF41U	2mm Plug Red	32p

Socket

2mm socket with silver-plated contact, rated at 10A. Available in Black and Red. Overall length: 19.5mm. Bezel: 6 x 6mm. Mounting hole: 5mm dia.



Order Code	Type	Price each
HF44X	2mm Socket Black	32p
HF47B	2mm Socket Red	32p

Continued from previous page.

flexible wire terminated at each end with a piggy-back 4mm plug and integral socket. Any number of these can be stacked. Each plug pin is 18mm long and has high quality sprung contacts. 50cm types available in three colours, Black, Red and Green. 100cm types available in Red and Black only. Sold singly.

Order Code	Type	Price each
ZB25C	4mm Patch Cord Blk	£1.29
ZB26D	4mm Patch Cord Grn	£1.29
ZB27E	4mm Patch Cord Red	£1.29
BZ23A	100cm Patch Cord Blk	£1.49
BZ24B	100cm Patch Cord Red	£1.49

Touchproof 4mm Socket

Cliff

A touchproof 4mm polypropylene socket with gold-plated contact that will accept both touchproof and non-touchproof 4mm plugs. Panel isolation of 3KV AC makes it suitable for use in test instruments, and educational equipment. Fixing is by a nylon nut. The socket complies with BS4743 and is rated at 30A max. Overall length: 29mm. Bezel diameter: 14mm. Mounting



Order Code	Type	Price each
KC49D	Shroud Skt Black	32p
CK66W	Shroud Socket Red	32p

Touchproof 4mm Plug and Unshrouded 4mm Plug

Cliff



A touchproof stackable 4mm plug, designed to be used with the touchproof socket, but fits most similar style sockets. The standard contact finish is gold-plated and connection is by soldering. The contact is pushed into the case moulding and locked in place by the rear case moulding. Thick wires should be preformed into an 'S' shape to fit into the built in cable restraint. Rated at 30A max. (with appropriate cable). Available in red and black. The unshrouded (touchable) version is similar and fits all standard 4mm sockets and terminals.

Note: The contact has to be purchased separately.

Order Code	Type	Price each
KC50E	Shroud Cov Black	16p
CK67X	Shroud Plg Covr Red	16p
KC51F	Unshroud Plg Cov Blk	16p
CK68Y	Unshroud Plg Cov Red	16p
KC52G	Contact Probe	34p

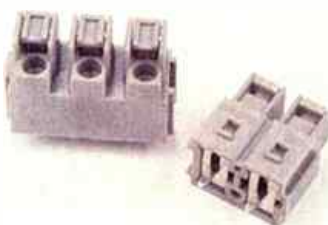
PCB CONNECTORS

Printed Circuit Connectors Quick Connecting PCB Terminal Blocks

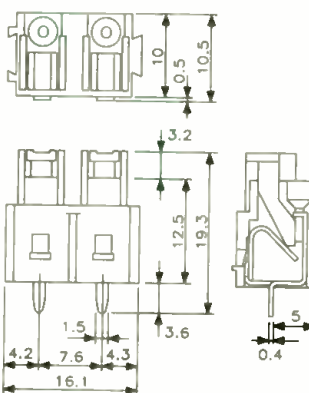
Cliff

PCB mounting terminal blocks for attaching wires to a board, but using spring-loaded wire grips instead of a screw clamp. Facilitates very fast connection and disconnection of cables from a PCB, ideal for

prototyping, after which the board can become a permanent installation with the same connectors.



Available in 2-way and 3-way versions. The release buttons on top are shrouded to prevent accidental disconnection and the wire entry behind the button, which is vertical, will accept up to 1mm diameter solid core wire. Clamps can resist pulling force on the wire of up to 5.1kg. Buttons and body are made from grey nylon with 15% glass fibre content, and terminals are tin plated brass. Requires 1.6mm dia. PCB holes spaced 7.6mm apart (0.3in.).



Specification

Contact rating: 7A @ 250V AC 50Hz
 Contact resistance: <math><10\text{m}\Omega</math>
 Contact heating: up to 30°C over ambient temperature at max. rating
 Insulation resistance: >100M Ω
 Withstand voltage: 1.5kV AC @ 50Hz for 1 minute
 Operating temperature range: -10°C to +80°C

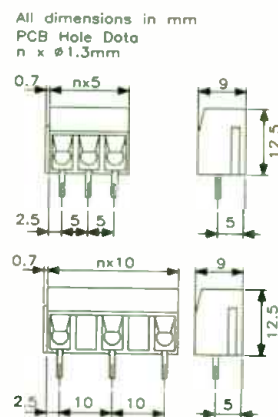
Order Code	Type	Price each
JZ03D	2W QC Term	49p
JZ04E	3W QC Term	69p

PCB Terminal Blocks

Terminal blocks which mount directly onto a printed circuit board or stripboard and provide a quick, easy means of connecting conventional wiring to the board. There are basically four ranges. Types 300, 301 and 320 are soldered to the board while type 332 acts as a free socket, being quickly removable from soldered PCB plug pins. Furthermore the blocks are modular, consisting of 2 and 3-way sections which can be stacked lengthwise with their dovetail joints to make any number of ways in one length of each type. In all cases the body material is flame retardant glass filled polyester to UL94 V0, designed to withstand operating temperatures in the range -33°C to +120°C. Most types feature 'wire guards' (metal leaves) under each screw to protect the wire against any twisting or cutting action by the screw.

All types are available with 5mm (0.197in.) and some with 10mm (0.394in.) pitch between pins. The 10mm pitch is achieved by leaving every even numbered position blank or empty. These pitches are very close to 0.2in. and 0.4in. respectively for stripboard etc, but be aware that blocks will only sit comfortably in 0.1in. stripboard for a maximum of 4 x 5mm pitches (1 x 4-way block). Longer lengths are best made with separate short blocks end to end with the dovetailing removed (soldered types only). Contacts are tin-plated brass bodies with galvanised and chromatised steel screws and tin-plated solder pins.

Standard 300 Series

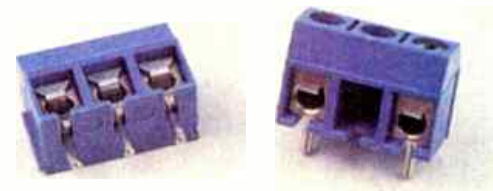


Soldered type PCB terminal block with 4.5mm long PCB pins requiring 1.2 to 1.4mm holes. Wire insertion direction is 90° to vertical (side entry), screws heads at top. Screw size: M3 x 5.8mm. Current rating: 16A max. Will accept wires up to 2mm thick. This type incorporates test probe holes behind the clamping screws which will hold standard sized (1.75mm dia.) multimeter type test probes or pins in contact with wire below. Height above PCB, 12.5mm. Width, 9mm. Tracking resistance between contacts conforms to VDE0110 Group B (250V @ 5mm, 500V @ 10mm). 2 and 3-way versions available.



Order Code	Type	Price each
JY92A	2W PC Term 300 5mm	29p
JY94C	3W PC Term 300 5mm	45p
JY93B	2W PC Term 300 10mm	34p
JY95D	3W PC Term 300 10mm	49p

Low Profile 301 Series

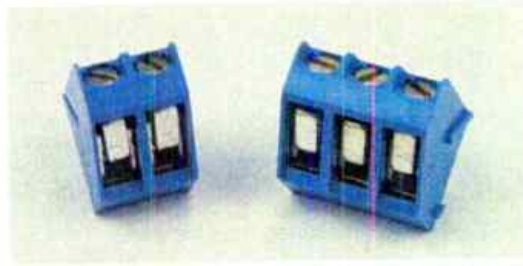


Soldered type PCB terminal block as type 300 but smaller, being 10mm high above PCB and 7.5mm wide. Screw size: M2.6 x 4.5mm. Current rating: 16A max. Will accept wires up to 1.5mm thick. Has small 'test probe' holes behind the clamping screws of 1.1mm dia. Tracking resistance between contacts conforms to VDE0110 Group B (125V @ 5mm, 250V @ 10mm).

Order Code	Type	Price each
FT38R	2W PC Term 301 5mm	27p
RK72P	3W PC Term 301 5mm	39p
JX38R	2W PC Term 301 10mm	32p
JR80B	3W PC Term 301 10mm	45p

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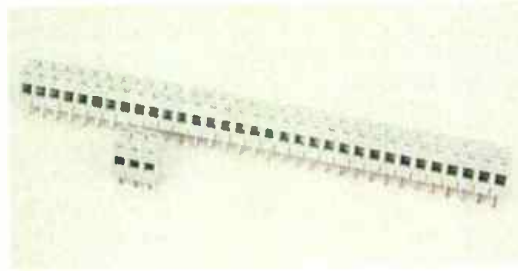
Angled 320 Series



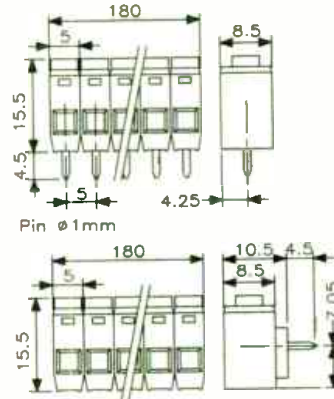
Soldered type PCB terminal block with wire entry at screw access offset at 45° from vertical. Particularly useful on a crowded PCB or in a restricted space. A 1.3 to 1.5mm PCB hole is recommended. Unlike the 300 and 301 types, wire gripping is achieved through a rising clamp method. When tightened the screw raises a block which traps the wire beneath a ribbed upper contact. The technique provides a more reliable and rugged method of anchoring the wire compared with the conventional screw pressure method, with or without wire guards. Pins are 4.5mm long. Both height and width are 12.5mm and front face is chamfered at 45°. Screw size, M2.6 x 4.5mm. Current rating, 16A max. Wire capacity up to 2.5mm thick. Tracking resistance between contacts conforms to VDE0110 Group B (60V @ 5mm). Only available in 5mm pitch 2-way and 3-way.

Order Code	Type	Price each
JY96E	2W PC Term 320 5mm	42p
JY97F	3W PC Term 320 5mm	65p

36-Pole Snap-Off Connectors or PCBs



All dimensions in mm
PCB Hole Data
36 x ø1.3mm



A 36-pole 5mm pitch professional connector that can easily be cut to the required size. Made from flame retardant material with a rising clamp, the connector will accept wire up to 3.5mm². Two versions are available, vertical or horizontal mounting. Overall length of 36-way strip is 180mm.

Specification

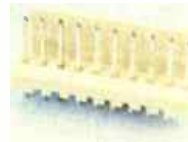
Rating:	13A 380V
Dielectric strength:	>5kV
Insulation resistance:	>40MΩ
Working temperature:	110°C
Moulding:	UL94-VO flame retardant
Lexan Pin/terminal:	5 micron tinned nickel-plated brass
Rising clamp:	Tinned nickel-plated steel

Order Code	Type	Price each
KC02C	36W Snap-off Vert	£4.69
KC03D	36W Snap-off Hori	£4.69

PCB Connectors

Low Cost Types

These connectors are intended as a simple and inexpensive method of making cable to printed circuit board connections. Available with pins on a 0.1in. pitch.



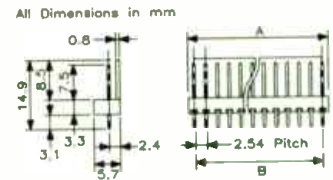
0.1in Series (2.54mm)

A range of connectors for PCB mounting that allow circuit boards to be plugged together at right angles or end-to-end, or cables to be plugged onto circuit boards at right angles or end-on at the edge of the PCB. Both plugs and sockets may be butted up end-to-end to form connectors with any number of ways from 2 upwards. Rated: 2.5A, 250V AC.

Straight Polarised Locking Plug Assembly

A wafer into which square, tinplated brass pins have been inserted. These pins protrude 3-4mm on one side, and these should be soldered flat to the PCB.

The nylon wafer sits flat on the PCB and is 3.3mm thick, and the back wafer provides the locking and polarising. The plug pins are 7.5mm long. Wafers are 2.3mm wide, and the pins require a 1mm dia. PCB hole.



All Dimensions in mm
Hole Data
No. x ø1mm

TYPE	A	B
2-way	5.0	2.54
3-way	7.5	2.54
4-way	10.2	2.54
5-way	12.4	10.16
6-way	15.3	12.7
8-way	20.2	17.78
10-way	25.2	22.86
12-way	30.2	28.86
17-way	43.2	40.64

Type	Length (mm)	Type	Length (mm)
2-way	3.5	8-way	19.5
3-way	7	10-way	24.5
4-way	9.5	12-way	29.5
5-way	12	17-way	42
6-way	14		

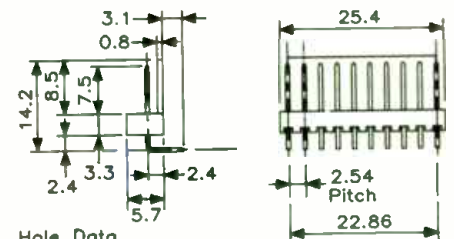
Order Code	Type	Price each
RK65V	PCB Latch Pl 2w	23p
BX96E	PCB Latch Pl 3w	29p
YW11M	PCB Latch Pl 4w	29p
FY93B	PCB Latch Pl 5w	38p
YW12N	PCB Latch Pl 6w	44p
YW13P	PCB Latch Pl 8w	49p
RK66W	PCB Latch Pl 10w	59p
YW14Q	PCB Latch Pl 12w	59p
BH61R	PCB Latch Pl 17w	65p

Right-Angled Polarised Locking Plug Assembly

Wafer connector similar to the above, but with a right-angled bend in it, enabling one PCB to be connected parallel to another, or a right-angle PCB Polarised Locking Plug Assembly. Available in 10 way only.



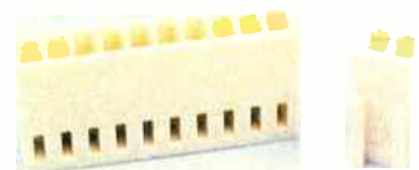
All Dimensions in mm



Hole Data
10 x ø1mm

Order Code	Type	Price each
RK68Y	RA Lch PCB Pl 10w	59p

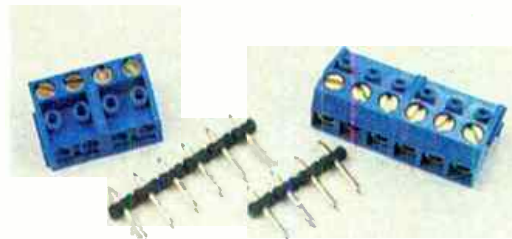
Socket Housing



A housing which accepts the PCB terminals and then plugs onto the wafer plug assembly. Solder the wire to the terminal, then push the terminal into the housing

Continued on next page.

Pluggable 332 Series



A system which combines the ease of wire connection via terminal blocks with the speedy access to equipment, provided by on board plugs and sockets for cables and looms. Allows for swift disconnection of wires from a board during testing, servicing or replacement. An added advantage is that, unlike fixed terminal blocks, wires will not be replaced wrongly. While the actual blocks are attached to the wires, the PCB has rows of pins soldered in position over which the blocks are plugged. The blocks can connect two different ways, with the wires exiting either vertically or horizontally. The pins are provided on a 24-way strip, which is broken down by hand into shorter lengths as required. The blocks then simply plug onto it and may be connected and disconnected up to 30 times. Wires are retained in the usual way as with types 300 and 301, again protected by wire guards. Larger numbers of ways can be made up by joining blocks together with the dovetailed jointing system. Blocks are 11mm high and 13mm wide (screw heads at top). Screw size is M2.6 x 4.8mm. Current rating, 10A max.; wire capacity 1.75mm thick. Tracking resistance between contacts conforms to VDE0110 Group B (125V @ 5mm). Only available in 5mm pitch as 2-way, 3-way, 4-way and 6-way. Strip(s) of 24 PCB pins need ordering separately.

Order Code	Type	Price each
JY98G	2W PC Term 332 5mm	30p
JY99H	3W PC Term 332 5mm	45p
JZ00A	4W PC Term 332 5mm	59p
JZ01B	6W PC Term 332 5mm	89p
JY91Y	PC Term Pins 24	73p

Continued from previous page.

until it latches and cannot be withdrawn. Housings are 13.5mm high and 4.8mm thick.

Order Code	Type	Price each
HB59P	PCB Latch Hsng 2-way	12p
BX97F	PCB Latch Hsng 3-way	12p
HB58N	PCB Latch Hsng 4-way	12p
BH66W	PCB Latch Hsng 5-way	12p
BH65V	PCB Latch Hsng 6-way	14p
YW23A	PCB Latch Hsng 8-way	14p
FY94C	PCB Ltch Hsng 10-way	15p
YW24B	PCB Ltch Hsng 12-way	19p
RK69A	PCB Ltch Hsng 17-way	19p

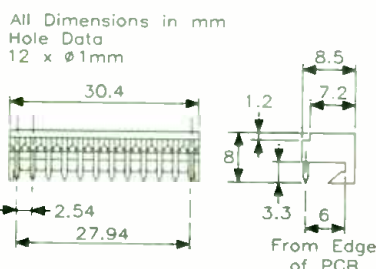
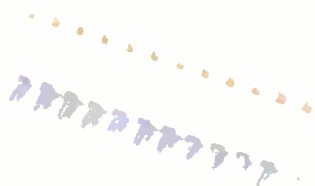
PCB Terminal



Tin-plated phosphor bronze terminals for use with the PCB Latch Housings. Designed for solder or crimp connections. Supplied in strips of ten.

Order Code	Type	Price each
YW25C	PCB Terminal	39p

Right-Angled Socket Assembly

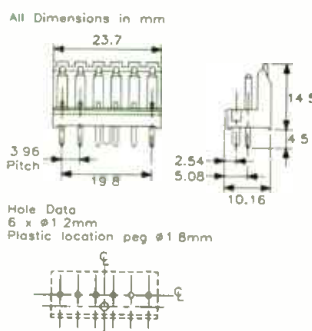


Housing with printed circuit type tin-plated phosphor bronze terminals pre-assembled with pins at right-angles to the housings for direct pcb mounting. Thus boards with straight plugs may be connected at right-angles and boards with right-angle plugs may be connected end to end. Housing is 7.9mm wide 4.7mm high. The housing has a clip which holds it against the edge of the pcb. Pin length: 3.3mm x 1mm dia. holes, which should be drilled 6mm from edge of pcb. Available in 12 way only. Length: 30-38mm.

Order Code	Type	Price each
YW30H	PCB Skt 12-way	59p

6 Pin 0.156in Spacing Polarised Power Connectors

Commonly used on PC type computer mother boards. Connector female housing and crimp/solder terminals in a strip of 10 are supplied separately. Available in male and female versions.



Order Code	Type	Price each
JW68Y	0.156in Power Conn M	49p
JW67X	0.156in Power Conn F	22p
JW66W	0.156in Power Term	39p

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0.1in Pin Strips

Pin strips which are used in conjunction with pin jumpers to provide 'option pins' on computers, disk drives and other electronic hardware. These pin strips provide an easy means of being able to select various firmware options. Four versions are available, single row of 36 straight pins (1x36ST) single row of 36 right angle pins (1x36RA), double row of 72 straight pins (2x36ST) and double row of 72 right angle pins (2x36RA). Strips may be shortened by cutting at V-notches so any required length may be formed.



Order Code	Type	Price each
JW59P	Pin Strip 1x36 St	64p
JW60Q	Pin Strip 1x36RA	84p
JW61R	Pin Strip 2x36 RA	£1.09
JW62S	Pin Strip 2x36St	99p

0.1in Miniature Pin Jumpers



Miniature jumpers for bridging 'option pins' on computers, disk drives and other electronic hardware. Used in conjunction with 0.1in pin strips, these jumpers provide an easy means of being able to select various firmware options. Two versions are available, with or without extraction handle.

Order Code	Type	Price each
UL71N	Mini Pin Jumper	14p
UL70M	Mini Pin Jumper&Extr	19p

0.1in. Strip Socket



20-way and 32-way strip sockets for use with our 0.1in. pin strips. The body is glass reinforced thermoplastic polyester to UL94-V0, contacts are beryllium copper with tin on nickel-plating, rated at 100V RMS/150V DC @ 1A. Strips may be shortened by means of 'V notches'.

Order Code	Type	Price each
KP51F	20 Way Socket Strip	£1.39
DC17T	32 Socket Strip	79p

PCB Connectors with Screw Terminals

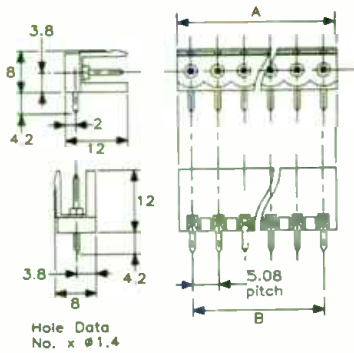


A range of two part PCB connectors with screw terminals, that can accommodate cables up to 2.5mm² (12 AGW), and have a rating of 250V AC horizontal mounting type. The pinstrips have open ends, and the rising clamp cable trap system gives a rugged and reliable connection where frequent rewiring is expected, and will not damage the wire by transmitting screw torque. The connectors meet VDE standards and are UL, CSA and SEMKO approved. Available in 2,3,4,5,6,8,10, and 12-way.

Specification	
Moulding material:	UL94V0 polyamide 6-6
Metal parts:	Phosphor bronze contact nickelled-brass cage steel M3 screw, Zinc passivated
Rating:	10A 250V AC
Operating temperature:	85°C
Pitch:	5.08mm (0.2in.)
PC hole diameter:	1.3 to 1.4mm
Insulation strip:	6mm



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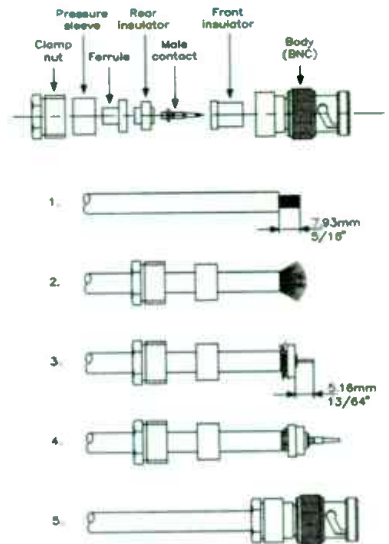
TYPE	A	B
2-way	10.16	5.08
3-way	15.24	10.16
4-way	20.32	15.24
5-way	25.40	20.32
6-way	30.48	25.40
8-way	40.64	35.56
10-way	50.80	45.72
12-way	60.96	55.88

Order Code	Type	Price each
KC22Y	PCB Conn 2W Skt	56p
KC23A	PCB Conn 3W Plug	75p
KC24B	PCB Conn 4W Plug	99p
KC25C	PCB Conn 5W Plug	£1.28
KC26D	PCB Conn 6W Skt	£1.49
KC27E	PCB Conn 8W Plug	£1.99
KC28F	PCB Conn 10W Plug	£2.25
KC29G	PCB Conn 12W Plug	£2.80
KC30H	PCB Conn Vert 2W Skt	26p
KC31J	PCB Conn Vert 3W Skt	34p
KC32K	PCB Conn Vert 4W Skt	39p
KC33L	PCB Conn Vert 5W Skt	46p
KC34M	PCB Conn Vert 6W Skt	54p
KC35Q	PCB Conn Vert 8W Skt	72p
KC36P	PCB Conn Vert 10WSkt	89p
KC37S	PCB Conn Vert 12WSkt	£1.06
CP43W	PCB Conn Hori 2W Skt	26p
CP44X	PCB Conn Hori 3W Skt	34p
CP45Y	PCB Conn Hori 4W Skt	39p
CP46A	PCB Conn Hori 5W Skt	46p
CP47B	PCB Conn Hori 6W Skt	54p
CP48C	PCB Conn Hori 8W Skt	72p
CP49D	PCB Conn Hori 10WSkt	88p
CP50E	PCB Conn Hori 12WPlg	£1.09

IT'S A FACT!

How to Assemble BNC/TNC and Other RF Connectors

1. Cut end of cable evenly and remove 7mm ($\frac{9}{16}$ in) of outer sheath.
2. Slide the clamp nut and pressure sleeve over cable. Comb out the braid.
3. Fold the braid back. Insert the ferrule between braid and dielectric. Trim off excess braid. Remove 5mm ($\frac{13}{64}$ in) of the dielectric without damaging the inner conductor. Tin end of conductor.
4. Slide rear insulator over conductor and locate shoulder of insulator inside recess in ferrule. Slide the contact over conductor until the shoulder of the contact is pressed hard against the rear insulator. Solder contact to the conductor but avoid over-heating.
5. Fit front insulator in body and push sub-assembly into the body as far as possible. Slide pressure sleeve into body and screw in the clamp nut tightly to clamp cable.



Crimp Plug

Union Brothers

Nickel plated brass plug with gold-plated centre pin. The plug is suitable for use with any 50Ω cable where the outside diameter of the sheath of the inner conductor is approx. 3mm and the outside diameter of the outer sheath is 5mm e.g. UR76, RG58 (our XR19V/XS51F). See Page 359 for suitable crimp tool (ZF41U).



Order Code	Type	Price each
JC23A	BNC Crimp Plug 50	£1.10

BNC Boot



An insulating boot for use with crimp plug JC23A. The boot is cut to suit the diameter of the cable if necessary, and then pushed on to the cable, before crimping. The hood is then forced over the crimp, and with the matching hood, the plug is now insulated. Colour black.

Order Code	Type	Price each
CK08J	BNC Boot	16p

THE BEST OF SERVICE

BNC CONNECTORS

A range of BNC series connectors with 50Ω and 75Ω impedances. Both types will mate with one another. Peak working voltage 500V. Max frequency 5GHz.

Free Plug



Nickel-plated brass plug with silver-plated centre pin and ferrule. Available in 50Ω and 75Ω impedance.

Order Code	Type	Price each
HH17T	BNC Plug 50	£1.59
FE99H	BNC Plug 75	£1.79

BNC Hood



An insulating hood for use with crimp plug JC23A. The hood is pushed over the plug before the cable is crimped on. Colour black.

Order Code	Type	Price each
CK07H	BNC Hood	19p

Twist-on Plug

Nickel-plated brass plug suitable for use with any 50Ω cable having a 5mm overall diameter e.g. UR76, RG58C (XR19V, XS51F). To fit, strip about 8mm of outer sheath then fold the screen back over the outer sheath, then strip 6mm of the inner sheath and screw the plug on.



Order Code	Type	Price each
JK21X	Twist-on BNC Plug	£1.39

Right Angled Free Plug

Union Brothers

A right-angled BNC plug with plastic body and strain relief sleeve, and solderless cable connections.



Order Code	Type	Price each
FJ72P	BNC R/A Plug	£1.19



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BS 5750 Part 2 1987 Level B: Quality Assurance RS12750

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Round Chassis Socket

Nickel-plated brass chassis socket with gold-plated centre pin and earth tag. Available in 50Ω and 75Ω impedance. Requires 9.7mm diameter panel cut-out.



Order Code	Type	Price each
HH18U	BNC Round Skt 50	£1.09
FE31J	BNC Round Skt 75	£1.15

Insulated Chassis Socket

An insulated earth version of the round chassis socket with gold-plated centre pin. Requires a 9.7mm diameter panel cut-out.



Order Code	Type	Price each
CK05F	Insulated BNC Skt	£1.39

Square Chassis Socket

Nickel-plated brass chassis socket with silver-plated centre pin. Square base 17 x 17mm with four 8BA threaded holes on 12.7mm centres.



Order Code	Type	Price each
YW00A	BNC Square Socket	£1.29

Free Socket

A BNC socket for cable mounting.



Order Code	Type	Price each
YW01B	BNC Line Socket	£1.29

BNC Terminator

A termination plug fitted with an encapsulated 50Ω resistor, and gold-plated centre pin. Suitably for end termination on network computer installations.



Order Code	Type	Price each
CK06G	BNC Terminator Plug	£1.39

Straight Female Adaptor



Two Free Plugs may be connected together with this adaptor.

Order Code	Type	Price each
YW02C	BNC Straight Adaptor	£2.09

Straight Male Adaptor



Back-to-back male plugs in nickel-plated brass with silver-plated centre pin.

Order Code	Type	Price each
FE86T	BNC Double Male	£2.29

'T' Adaptor



Two Free Plugs may be connected together then connected to one socket with this adaptor.

Order Code	Type	Price each
YW03D	BNC T Adaptor	£3.59

'Y' Adaptor



Fitted with a gold-plated pin, this adaptor connects two cables with BNC plugs to one socket.

Order Code	Type	Price each
CK01B	BNC Y Adaptor	£3.59

BNC Male to Phono Socket Adaptor

Union Brothers

A BNC plug to phono socket adaptor enabling a phono plug to be used with a BNC socket.



Order Code	Type	Price each
FA11M	Phono Skt/BNC Plg	£1.64

BNC Female to Phono Plug Adaptor

A BNC socket to phono plug adaptor enabling a BNC plug to be used with a phono socket.



Order Code	Type	Price each
FE88V	BNC Fem/Phono Plug	£1.49

BNC Connectors Mini UHF Male to BNC Female Adaptor

Allows a standard male BNC cable to be connected to a mini UHF female socket.



Order Code	Type	Price each
BZ21X	BNC Fem/Mini UHF Male	£1.49

Mini UHF Female to BNC Male

Allows a mini UHF cable with a male connector to be connected to a standard BNC female socket.



Order Code	Type	Price each
BZ22Y	BNC Male/Mini UHF Fem	£1.49



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01702 554161

CO-AXIAL CONNECTORS

Metal Plug

A standard co-ax plug with aluminium body and cap.



Order Code	Type	Price each
HH07H	Co-ax Plug Aly	45p

Plastic Plug

A standard co-ax plug with plastic covered body and plastic cap.



Order Code	Type	Price each
YW08J	Co-ax Plug Plas	29p

High Quality Socket

A standard panel-mounting co-ax socket with nickel-plated brass body. Single-hole fixing. Panel cut-out 9.5mm dia. Supplied with solder tag for screen connection.



Order Code	Type	Price each
FE10L	HQ Co-ax Socket	£1.29

Two Into One Y Adaptor



A low-cost Y-shaped 2 into 1 adaptor for splitting or combining co-axial feeders.

Order Code	Type	Price each
FS23A	2/1 Coax Adptr Typ Y	£1.29

High Quality Plug

Union Brothers

A standard co-ax plug with nickel-plated brass body. The centre conductor is terminated by means of a small grub screw.



Order Code	Type	Price each
FD85G	HQ Co-ax Plug	69p

Line Socket

A standard co-ax in-line socket with aluminium body and cap.



Order Code	Type	Price each
YW09K	Co-ax Line Skt	54p

Two Into One Adaptor



A simple plug-in 2 into 1 adaptor for splitting or combining coaxial feeders.

Order Code	Type	Price each
FT85G	2 into 1 Coax Adptr	£1.29

Coax Connector Crimping Tool



A coax crimping tool that has five separate sections to accept 1.72, 2.5, 5.4, 6.48 and 8.2mm connectors for crimping. The pressure necessary for crimping can be adjusted for individual requirements, and is made easy with the aid of long contoured, plastic covered handles.

Order Code	Type	Price each
ZF41U	Coax Crimper	£19.99

Plastic Line Socket

A standard co-ax socket with plastic covered body and plastic cap.



Order Code	Type	Price each
JB16S	Coax Line Skt Plas	39p

High Quality Line Socket

A standard co-ax in-line socket with nickel-plated brass body. The centre conductor is terminated by means of a small grub screw.



Order Code	Type	Price each
FD86T	HQ Co-ax Line Skt	69p

TV Aerial Flylead



Co-axial cable with co-ax plugs connected at both ends. Available in 2m, 5m and 10m length.

Order Code	Type	Price each
JW39N	Flylead 5m	£2.25
JW40T	Flylead 10m	£2.99

Chassis Socket

A panel mounting socket which protrudes above the chassis surface. Fixing centres: 19mm x 6BA clear.



Order Code	Type	Price each
HH08J	Co-ax Socket Pan	39p

Flush Socket

A panel mounting socket which fits flush to the chassis surface. Panel cut-out 12.7mm. Fixing centres: 19mm x 6BA clear.



Order Code	Type	Price each
HH09K	Co-ax Socket Flush	39p

Line Connector Plastic

A line connector for connecting two co-ax plugs together.



Order Code	Type	Price each
HH11M	Co-ax Conn	39p

Line Connector Metal

A screened line connector for connecting two co-ax plugs together.



Order Code	Type	Price each
FS22Y	Co-ax Conn Metal	49p

Aerial Extension Cable

Coaxial extension lead manufactured from 75Ω coaxial cable and terminated at one end in a coaxial plug and at the other end in a coaxial socket. The terminations are protected with a plastic strain relieving sheath. Length 2m.

Order Code	Type	Price each
GW61R	Aerial Extn Cable	£1.35

FM Aerial Plug

Moulded plugs for connecting aerials to radiograms etc.



Order Code	Type	Price each
HH16S	FM Aerial Plug	39p

F CONNECTORS

Plug

A plug for use with solid centre conductor cables. Plug simply pushes onto cable between inner sheath and screen. The centre wire of the cable takes the place of the centre pin of the plug.



Two types are available: 4mm type suits RG58/RG59 cable. (Order Code XS51F/XS52G). 5mm type suits our low loss co-ax cable (XR29G etc.). The crimping ring is supplied with both types.

Order Code	Type	Price each
JL62S	F Plug 4mm	26p
FE90X	F Plug 5mm	26p

Chassis Socket

A single-hole fixing socket. Requires a 9.5mm diameter panel cut-out.



Order Code	Type	Price each
FE98G	F Socket	39p

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Straight Female Adaptor

Adaptor to couple two F plugs together.



Order Code	Type	Price each
FE92A	F Double Fem	40p

F Male to BNC Female Adaptor

Allows a BNC plug to be used with an F socket



Order Code	Type	Price each
FE87U	BNC Fem/F Male	£1.29

TELEPHONE STYLE WIRELESS INTERCOM

A pair of two-way telephone style intercoms which are mains operated and which transmit and receive to and from each other via the common socket ring main. Low frequency RF (230 and 350kHz) is FM modulated and superimposed on the mains supply. The communication system includes phase locked loop receivers which provide a high quality sound with no interference from the mains. The two units are identical and have a call button for 'ringing' the other station. Operation is as with a telephone, communication is fully duplex (transmit and receive active simultaneously), and a telephone style receiver hook defeats both channels. Each unit has four non-slip feet for table-tops or alternatively a wall bracket with screws supplied can be used for wall mounting. Dimensions 225 x 102 x 70mm including handset. RF output power 20mW, audio output 100mW. Supplied with instructions and fitted with 1.5m approx. of twin core mains lead. Supplied in pairs only.



GREAT VALUE!
£44.99
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[B3]

TWIN AXIAL CONNECTORS

A range of connectors for rf applications particularly data transmission cables where screened twisted pairs are in use. The connectors have two pins in a metal body with screwed locking rings. The connectors have a keyway to ensure that plugs cannot be incorrectly mated. Ideal for any balanced pair system. Nominal impedance is 100Ω, and frequencies up to 250MHz are handled with minimum loss. Working voltage 500V peak. All connectors are nickel-plated brass with gold-plated pins and sockets for minimum insertion loss with long life.

Plug



Cable entry hole 9mm diameter. See BNC plug for assembly details.

Order Code	Type	Price each
JB07H	Twinax Plug	£3.29

Chassis Socket



Requires a 19mm diameter panel cut-out.

Order Code	Type	Price each
JB09K	Twinax Chassis Skt	£5.49

N SERIES CONNECTORS

Low Cost Range

Constant impedance 50Ω coaxial connectors, distinguished from the UHF style connectors by having a larger diameter. N series connectors are suitable for frequencies up to 10,000MHz, and have insulation strength up to 1000V peak. These connectors have a pressure-sleeve cable clamping system using compressible silicone rubber sealing gaskets. The bodies are nickel-plated brass, with silverplated contacts.

Plugs

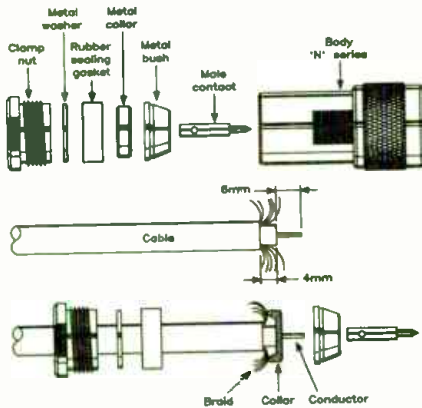


FOR CASHTEL
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Two N type coaxial plugs, to suit two sizes of coaxial cable.

Plug N-050 is compatible with coaxial cable of 5mm diameter, such as the Low C Cable/UR76.

Plug N-011 is compatible with heavy duty RF cable of 10/11mm dia., such as the UR67 RF Cable.



Order Code	Type	Price each
FJ77J	Plug N-050	£2.49
FJ78K	Plug N-011	£2.69

Straight Female Adaptor

Union Brothers



An inline adaptor for joining two N type Plugs.

Order Code	Type	Price each
FJ81C	N Double Female	£2.45

Straight Male Adaptor



Back-to-back male plugs.

Order Code	Type	Price each
FE96E	N Double Male	£2.85

N Male to BNC Female Adaptor

Allows a BNC plug to be used with an N type socket.



Order Code	Type	Price each
FJ82D	N Male to BNC Adapt	£2.99

N Female to BNC Male Adaptor

Allows an N type plug to be used with a BNC socket.



Order Code	Type	Price each
FJ83E	N Fem to BNC Male	£2.99

N Female to BNC Female Adaptor

Allows a BNC plug to be connected in-line with an N type plug.



Order Code	Type	Price each
FJ84F	N Fem to BNC Fem	£2.85

N Male to UHF Female Adaptor

Allows a UHF plug PL259 to be used with an N-type socket.



Order Code	Type	Price each
FE97F	N Male/UHF Fem	£2.69

N Female to UHF Male Adaptor

Allows an N-type plug to be used with a UHF socket SO239.



Order Code	Type	Price each
FE94C	N Fem/UHF Male	£2.55

TNC SERIES CONNECTORS

Low Cost Range

A range of RF connectors similar to BNC, but plugs and sockets screw together.

Plug



Nickel-plated brass plug with silver-plated centre pin and ferrule. 50Ω impedance. See BNC plug for assembly details.

Order Code	Type	Price each
FE80B	TNC Plug	£1.49

Crimp Plug

Nickel-plated brass plug with silver-plated centre pin. The plug is suitable for use with any 50Ω cable where the outside diameter of the sheath of the inner conductor is approx. 3mm, and the outside diameter of the outer sheath is 5mm e.g. UR76, RG58 (our XR19V/XS51F).



Order Code	Type	Price each
JC22Y	TNC Crimp Plug	£1.09

Twist-on Plug

Nickel-plated brass plug suitable for use with any 50Ω cable having a 5mm overall diameter e.g. UR76, RG58C (XR19V, XS51F). To fit, strip about 8mm of outer sheath then fold the screen back over the outer sheath, then strip 6mm of the inner sheath and screw the plug on.



Order Code	Type	Price each
JK22Y	Twist-on TNC Plug	£1.09

Chassis Socket

A single hole fixing N type chassis mounting socket, requires 16mm dia. cutout. Earth tag included.



Order Code	Type	Price each
FJ79L	N Type Chassis Skt	£1.79

Square Chassis Socket

Requires 16mm round cutout. Fixing centres: 18 x 18mm x 6BA (M3) clear.



Order Code	Type	Price each
FJ80B	N Type Chass Skt Sq	£1.85

Free Socket



Two N-type free sockets to suit two sizes of co-axial cable. Socket N-050 fits cables of 5mm diameter, such as UR76, while socket N-011 suits cables 10 to 11mm diameter such as UR67. For assembly details see BNC plug.

Order Code	Type	Price each
FP00A	Socket N-050	£2.45
FP01B	Socket N-011	£2.50

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Chassis Socket

Nickel-plated brass chassis socket with silver-plated centre pin and earth tag. 50Ω impedance. Requires 9.7mm diameter panel cut-out.



Order Code	Type	Price each
FE81C	TNC Socket 50	75p ¹⁵⁷⁹

Free Socket

Union Brothers



A TNC in-line socket for cable mounting.

Order Code	Type	Price each
FS44X	TNC In-Line Socket	99p ¹⁵⁸¹

Straight Female Adaptor



An in-line adaptor for joining two TNC plugs.

Order Code	Type	Price each
FE82D	TNC Fem/Fem Adaptor	99p ¹⁵⁸³

Straight Male Adaptor



An in-line adaptor for joining two TNC sockets.

Order Code	Type	Price each
FS46A	TNC Male/Male Adaptor	£1.29 ¹⁵⁸⁵

TNC Male to BNC Female Adaptor



Allows a BNC plug to be used with a TNC socket.

Order Code	Type	Price each
FE83E	TNC Male/BNC Fem	£1.35 ¹⁵⁸⁷

BNC Male to TNC Female Adaptor



Allows a TNC plug to be used with a BNC socket.

Order Code	Type	Price each
FS45Y	TNC Fem/BNC Male	£1.10 ¹⁵⁸⁸

TNC Male to UHF Female Adaptor



Allows a UHF plug PL239 to be used with a TNC socket.

Order Code	Type	Price each
FE84F	TNC Male/UHF Fem	£1.29 ¹⁵⁸⁹

UHF Male to TNC Female Adaptor



Allows a TNC plug to be used with a UHF socket.

Order Code	Type	Price each
FS47B	TNC Fem/UHF Male	£1.99 ¹⁵⁹⁰

UHF SERIES (M) CONNECTORS

Low Cost Range

A range of 'uhf' type high quality plugs and sockets. The nominal impedance is 50Ω, but this is not constant and although satisfactory up to 200MHz caution should be exercised between 200 and 500MHz. Working voltage: 500V peak. (Note that all 'uhf' series connectors of all makes have a non-constant impedance).

Plug (PL259)

Union Brothers



Suits cable UR67. Size 38 x 19mm dia. Cable entry hole: 11mm dia.

Order Code	Type	Price each
BW81C	Plug PL259	£1.18 ¹⁶⁰⁵

Reducer Small

Screws into plug PL259 to enable it to be used with cables around 5.3mm dia. e.g. UR76.



Order Code	Type	Price each
BW82D	UHF Reducer Small	29p ¹⁶⁰⁸

Reducer Large

Screws into plug PL259 to enable it to be used with cables around 6.4mm dia.



Order Code	Type	Price each
BW83E	UHF Reducer Large	29p ¹⁶⁰⁹

Right Angled UHF Plug (PL259)

A right-angled UHF plug in a plastic body with strain relief sleeve, and solderless cable connections.



Order Code	Type	Price each
FJ73Q	UHF R/A Plug	£1.29 ¹⁶¹¹

Right-Angle Plug (PL259)

A twist-on PL259 plug with a right angle cable input and reducer for connection to RG58/UR76-type cable.



Order Code	Type	Price each
HL95D	RA PL259 Plug	£1.39 ¹⁶¹²

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Access, Visa, American Express**

Round Socket

Mounting hole: 16.5mm dia. Earth tag fitted.



Order Code	Type	Price each
BW84F	UHF Socket Round	£1.10

Lightning Arrester Adaptors

On both these adaptors a terminal is attached for connection to earth. In the event of a lightning strike, the current is diverted to earth thus protecting the equipment. Two types are available.

Female/Female



A straight through adaptor for connecting two PL259 plugs together with provision for connecting an earth wire.

Order Code	Type	Price each
RK01B	UHF Adaptor FFLA	£2.49

Male/Female



A straight through adaptor for connecting a PL259 plug to an SO239 socket, but with provision for connecting an earth wire.

Order Code	Type	Price each
RK02C	UHF Adaptor FMLA	£2.69

UHF Female to BNC Male Adaptor



A BNC plug internally connected to a UHF SO239 socket.

Order Code	Type	Price each
YW04E	Adaptor 239	£1.99

UHF Male to BNC Female Adaptor



A BNC socket internally connected to a UHF PL259 plug.

Order Code	Type	Price each
YW05F	Adaptor 259	£1.99

UHF Female to Phono Plug Adaptor



A UHF socket SO239 internally connected to a phono plug.

Order Code	Type	Price each
FE89W	UHF Fem/Phono Plug	99p

UHF Male to Phono Socket Adaptor



A UHF plug PL259 internally connected to a phono socket.

Order Code	Type	Price each
FE85G	UHF Plug/Phono Skt	99p

Square Socket

Union Brothers

Cut-out 16.5mm dia. Fixing centres: 18 x 18mm x 6BA (M3) clear.



Order Code	Type	Price each
BW85G	Socket SO239	£1.10

Elbow Adaptor

Union Brothers

A right-angle coupler. PL259 to SO239



Order Code	Type	Price each
BW86T	UHF Elbow Adaptor	£1.89

Straight Female Adaptor

Adaptor to couple two PL259 plugs together.



Order Code	Type	Price each
BW87U	UHF Straight Adaptor	£1.10

Straight Male Adaptor

Back-to-back male plugs PL259 to PL259.



Order Code	Type	Price each
FE91Y	UHF Double Male	£1.10

'T' Adaptor



Adaptor to couple two PL259 plugs and then join them to an SO239 socket.

Order Code	Type	Price each
BW88V	UHF T Adaptor	£1.99

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Wiring and Lighting

by Albert Jackson and David Day

This book will help anyone wanting to undertake household electrical tasks. It covers things as diverse as mending fuses and changing plugs through to good advice on complete rewiring. The diagrams and instructions here are full, many are step by step, and a lot of the matters left hanging in the small book are explained. There are also a number of extended special sections which discuss the wiring of fixed appliances, the basic home electricians toolkit and how to reduce the cost of electricity – legally! A short glossary explains some of the more basic terms as well as covering such matters as PME and ELCB. This is the book for the serious home electrician.

1988. 64 pages. 258 x 212mm, full colour illustrations.



Order Code	Type	Price each
WT56L	Wiring & Lighting	£6.99 NV

TERMINAL BLOCKS Screw Type

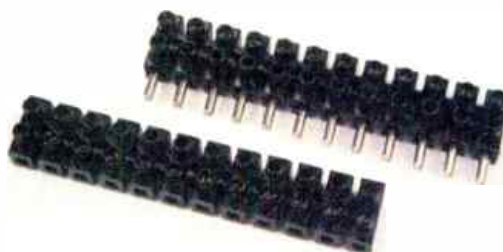


12-way flexible moulded terminal block strips that may be easily cut into shorter lengths. Screw terminals. Four types are available: 2 Amp, 5 Amp, 15 Amp and 30 Amp.

Order Code	Type	Price each
FE78K	Terminal Block 2A	59p
HF01B	Terminal Block 5A	75p
HL54J	Terminal Block 15A	99p
HL55K	Terminal Block 30A	£1.39

Terminal Block Plug and Socket

Union Brothers



A pair of 12-way flexible moulded terminal block strips that may be easily cut into shorter lengths. One block has one screw terminal and a plug per position and the other block has one screw terminal and a socket per position. Rating: 5 Amps.

Order Code	Type	Price each
HL56L	Terminal Block Conn	£2.65

PLUGS 5 Amp

A 5A mains plug moulded in hard wearing heat-resistant bakelite. Fitted with cordgrip. Not fused. Conforms to BS546A.



Order Code	Type	Price each
HL57M	5 Amp Plug Bakelite	£1.15

13 Amp Nylon Plug

A 13A mains plug moulded in hard-wearing heat-resistant white nylon. Fitted with 13A fuse and cord-grip. Conforms to BS1363A.



Order Code	Type	Price each
RW67X	13 Amp Plug Nylon	86p

13 Amp Rubber Plug

A 13A mains plug moulded in unbreakable tough white rubber. Fitted with a 13A fuse and cord-grip. Conforms to BS1363A.



Order Code	Type	Price each
HL58N	Rubber 13A Plug	£1.75

Super Grip Plug

A 13A mains plug moulded in tough white nylon with an integral handle for easier insertion and removal for people with arthritic fingers and similar problems of impaired gripping ability. Ideal for appliances which need frequent connection and disconnection, e.g. electric kettles, vacuum cleaners, toasters etc., and some power tools. The effort required to insert/remove this type of plug is considerably reduced compared with the normal type. Fitted with ASTA approved 13A fuse to BS1362. Manufactured to BS1363/A and ASTA approved. Maximum distance of handle from socket is 50mm (2 inches).



Order Code	Type	Price each
ZB88V	Super Grip Plug	£2.25

Plug Mate



A pull strap attachment for 13A plugs, as an aid for easy removal. Easy to fit and safe to use. Ideal for use in kitchens, workshops and around the home, or where access is difficult. Perfect for the elderly or disabled. Supplied in packs of three.

Order Code	Type	Price each
RZ37S	Plug Mate	£1.20

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THE BEST OF SERVICE

Moulded Mains Plug and Lead



This integrally moulded 13A mains plug with 2m of 0.75mm diameter 3-core cable is supplied prepared for fitting to an electrical appliance. The plug features double insulation, and wire connections that have been crimped on by specialised semi-automatic equipment, to ensure consistent safety and reliability. The plug is supplied with solid brass semi-insulated pins and is approved to BS1363A. Supplied fitted with a 5A fuse; cable end stripped 40mm, and cores bared 10mm. Available in either black or white.

Order Code	Type	Price each
CY32K	13A Plug+Cable Black	£3.25
CY33L	13A Plug+Cable White	£3.25

CEE Type Plugs and Sockets



A range of high quality 3-way CEE industrial type connectors rated at 16A that comply to BS 4343, where applicable, and IEC 309/1 + 2. The range includes a wall or panel mounted socket, a coupler and a plug. The socket and coupler have a spring loaded cap to protect the contacts, and when a plug is connected, the cap locks on to the plug and has to be lifted before the plug can be removed. This prevents the plug being removed by pulling on the cable. A keyway, and a larger diameter earth pin/socket make it impossible for a plug and socket/coupler to be incorrectly connected. The connectors are the standard type used on caravans etc. for connecting to mains supplies, and being splashproof are suitable for outside use. Available for use with 110/130V AC supplies (colour coded yellow) and 240V AC supplies (colour coded blue).

Order Code	Type	Price each
KC76H	110V Plug	£2.99
KC77J	110V Coupler	£4.25
KC78K	110V Socket	£5.99
KC79L	240V Plug	£2.99
KC80B	240V Coupler	£4.25
KC81C	240V Socket	£5.99

ADAPTORS

Flex Connector



A 10A 3-pin flex connector. The pins are shrouded and the earth pin is offset so that the connector is non-reversible. Connect mains to socket side and appliance to plug side. Fitted with cord-grip and moulded in hardwearing heat-resistant white nylon.

Order Code	Type	Price each
HL61R	Flex Connector	£2.49

Fax your orders to:
01702 553935

2-Way Multiplug



A 13A 3-pin adaptor that plugs into a standard 13A socket and allows up to two appliances to be plugged into it. Maximum total load: 13A. Unfused. Sockets are shuttered. White.

Order Code	Type	Price each
HL62S	Mains Adaptor 2-way	£2.99

3-Way Multiplug



A 13A adaptor that plugs into a standard 13A socket and allows up to three appliances to be plugged into it. Maximum total load: 13A. Unfused. Sockets are shuttered. White.

Order Code	Type	Price each
HL63T	Mains Adaptor 3-way	£3.99

Shaver Adaptor



Standard 13A 3-pin plug internally connected to a 2-pin socket rated at 1A suitable for accepting the plugs fitted to electric shavers. Sockets are shuttered. Fitted with 1A fuse. White. Imported type. This adaptor is suitable for use with standard 2-pin continental mains plugs.

Order Code	Type	Price each
HL64U	Shaver Adaptor	£1.35

Travel Plug



A one-piece earthed adaptor suitable for use worldwide. No need to change plugs when you travel abroad, just use this neat adaptor.

Suitable for hairdryers, heated curlers, shavers, travel irons, and in fact almost anything that does not exceed 110/220V AC 5Amp rating of the adaptor. Complete with instructions and a list of all the countries where it can be used.

Order Code	Type	Price each
RZ36P	Travel Plug	£4.99

House Wiring

No permission is required in Britain to carry out home electrical installation work, though where the house is rented, permission may be necessary from the owner. Neither electricity boards nor local authorities or any other official body has any jurisdiction in respect of wiring. The work should, however, conform to the IEE wiring regulations published by the Institute of Electrical Engineers and recognised as a code of good wiring practice by all official bodies, including electricity boards and government departments.

The regulations, contrary to popular belief, are not statutory, and an electricity board has no powers to refuse connection to its mains of an installation, or parts of it, which do not strictly conform to the current IEE wiring regulations, but a board can, and will, refuse connection to its mains of any installation which is dangerous and as such does not conform to the Electricity Supply Regulations. These are statutory, and are quoted in the application form signed by a consumer when requiring a supply of electricity.

An installation conforming to IEE wiring regulations is deemed to satisfy the requirements of the Electricity Supply Regulations and the electricity board must connect it to the mains. In these circumstances the board must connect the installation, whether work has been carried out by a recognised contractor or by the householder himself.

From a contractor the board requires a test certificate, and may waive its own test and inspection. The householder who is unable to complete a test certificate can expect the board to test the installation, though they are not obliged to do so. The test is at the option of the electricity board, and is mainly to satisfy them that the installation will not adversely affect the supply to other consumers. It is important to note that good workmanship using correct materials is necessary to conform to the regulations.

The various cables used in house wiring with their sizes, current ratings, and the principal circuits in which they are used are as follows:-

Cable size mm ²	Current rating amps	Circuits
1.0	16	Lighting
1.5	20	Lighting and 15A single socket ccts
2.5	28	Ring circuits and 20A radial circuits
4.0	36	Radial circuits 30A
6.0	46	Cooker circuits, shower unit ccts
10	64	Cooker circuits
16	85	Meter leads
25	108	Meter leads

These current ratings apply where the cables are clipped direct to the surface. Ratings are lower for enclosed cables and some other situations, but are all suitable for the circuits specified.

FAX
YOUR ORDER
NOW!
01702 553935

Three Way Mains Adaptor



This three-way adaptor has built-in overload protection and is designed to BSEN 60730 (1992) to allow you to convert a single 13A socket outlet, safely into three sockets. The adaptor can support a maximum load of 3.1kW and has an indicator to show that power is present at the output. If the socket is overloaded, the in-built protection cuts the supply to all three adaptor sockets and sounds an audible alarm. After the overload has been removed the adaptor can be reset by pressing the reset button. As an extra precaution, the adaptor is also provided with a 13A fuse. Correct use of this adaptor will prevent the cable serving the socket from overheating and causing a fire risk.

Please Note: This adaptor is not intended to be used as a substitute for safe wiring and good electrical practices.

Order Code	Type	Price each
RZ86T	3-Way Converter	£10.99

Double Pole Circuit Breaker



Safeguard yourself with this double pole residual current circuit breaker. Simply plug the circuit breaker into your existing 13A socket outlet and then plug the lawn mower, hedge trimmer or any two or three wire domestic appliance into the 13A socket outlet on the unit. The circuit breaker has a rated trip current of 30mA and will trip within 40ms, with a maximum operating current of 13A. A test button and an indicator flag is incorporated in the unit and allows you to visually check its operation. This facility must be used every time the circuit breaker is used to ensure that the unit is functioning correctly.

Please note, a circuit breaker is not a substitute for good electrical safety practices, and normal precautions should be observed when in use.

Order Code	Type	Price each
RZ85G	DP Circuit Breaker	£19.99

Appliance Residual Current Detector



A Residual Current Detector (RCD) for individual appliances that may be plugged into a 13A mains wall socket or distribution block. The device provides added protection for you and your family against the risk of electric shock and is suitable for use with most electrical household appliances and power tools. Once set and in use, it compares the Live terminal current against the Neutral return current. If this shows a difference of more than 30mA, because of a leak either to the Earth terminal or elsewhere, then the device will trip open circuit, disconnecting and isolating both Live and Neutral terminals.

Particularly suitable for use with electric lawnmowers and hedge trimmers where cables are in danger of being cut. Can also be used for all appliances around the home, especially in the kitchen for kettles and irons where water is present. Also for use with an extension lead, you can make sure that the RCD is connected to the plug of the lead. The device plugs into a conventional 3-pin mains socket, and the appliance then plugs into the device. A trip indicator window will show red when reset, indicating that power is available via the device. When tripped the window shows white. A 'TEST' button is included to make sure that the device operates correctly and should be tried before service every time it is used.

Dimensions of unit: 100 x 56 x 54mm deep not including pins.

Rated voltage:	240V AC @ 50Hz
Maximum operating current:	13A
Rated trip current:	30mA
Trip speed:	40ms nominal
Switching method:	Double pole break
Maximum load:	3kW

Order Code	Type	Price each
RC53H	RCD Adaptor	£19.99

Portable Residual Current Circuit Breaker

A portable and easy to use circuit breaker for use in the home, at work, in the garden or garage. Simple to use and ideal for protecting operators of all types of power-tools. Simply plug the circuit breaker into the wall and press the 'RESET' switch. Any attached equipment can now be operated safely. Should a fault develop, then the supply to the equipment will be cut, protecting the operator from shock. Being portable this unit can be moved around the house as necessary. A test button is also provided, to make sure that the circuit breaker is functioning properly. This unit will protect the user by isolating the supply when a leakage of 30mA or more occurs. Rated at 13A.



Order Code	Type	Price each
AQ70B	13 Amp RCD Adaptor	£19.99

Residual Circuit Breaker Wall Outlet



A wall mounted socket with an integrated residual circuit breaker. Ideal for garages and other places where power tools may be used. Once installed the unit will protect against leakages of current of 30mA or greater. Should a person be using a piece of equipment that is potentially dangerous the unit is designed to trip, protecting the operator from shock. The unit is no deeper than a standard wall socket, and may be used as a direct replacement. Normal electrical precautions should be taken when fitting this unit, i.e. ensure the supply is turned off at the distribution unit. Rated at 13A.

Order Code	Type	Price each
AQ68Y	RCD Socket Single	£34.99

JUNCTION BOXES

5 Amp

Centaur



A 4-terminal junction box rated 5A per terminal. Brown. Size 64mm diameter.

Order Code	Type	Price each
HL65V	Junction Box Small	£1.39

15 Amp

Centaur



A 4-terminal junction box rated 15A per terminal. Brown. Size 76mm diameter. Available individually and in packs of 10.

Order Code	Type	Price each
HL66W	Junction Box Lge	£1.69
YT01B A1	Junction Bx Lge 10pk	£12.99

IN-LINE RESIDUAL CIRCUIT BREAKER **NEW**

An attractive in-line circuit breaker designed for use with garden and power tools. Should a fault develop in the equipment being used, any current leakage will trip the circuit breaker and totally isolate the operator from risk of shock. The RCDs mechanism totally isolates both the live and neutral mains connections, and will not reconnect the supply until the fault has been cleared and the 'RESET' button pressed. This feature protects the user against faulty mains wiring where the live and neutral may have been reversed. Another safety feature of the circuit breaker is that when first plugged in, the 'RESET' switch must be pressed before current is supplied to the equipment. A test button is also provided, to make sure that the circuit breaker is functioning properly. The bright colour of the lead and circuit breaker mean that it is always clearly visible when mowing etc. The device will trip on a leakage of 30mA of current, or more. Rated at 13A.



GREAT VALUE!
£39.99
AQ69A

30 Amp



A 3-terminal junction box rated 30A per terminal. For inter-connections in ring main circuits. Brown. Size 89mm diameter. Available individually and in packs of 10.

Order Code	Type	Price each
HL67X	Junction Box RM	£2.29
YT02C A1	Junction Box RM 10pk	£18.99

Unswitched Double

Voilex



A double 13A socket without switches. White. BS1363. Supplied with fixing screws. Shuttered. Available individually and in packs of 5.

Order Code	Type	Price each
HL69A	Dble Skt Unswitched	£4.99
XJ82D A1	Double Skt Unsw 5pk	£22.99

SOCKET OUTLETS

Unswitched Single

RPP

A 13A socket without switch. White. BS1363. Supplied with fixing screws. Shuttered. Available individually and in packs of 10.



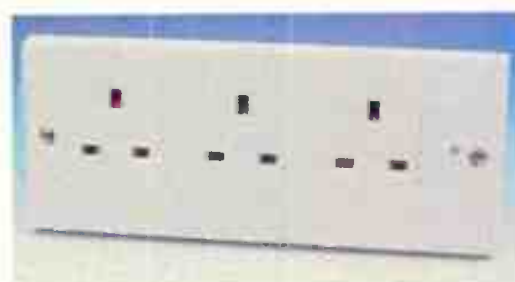
Order Code	Type	Price each
HL68Y	Single Skt Unswitched	£2.79
XJ81C A2	Single Skt Unsw 10pk	£24.99

HOT TIP

Always use PVC green/yellow insulation sleeving on all bare earth wires inside sockets, junction boxes and consumer units, etc.

Unswitched Triple

Voilex



A triple 13A socket without switches. Incorporates a 13A fuse which can be safely replaced from the front without turning the power off. The safety fuseholder is retained by the moulding. White. BS1363. Supplied with fixing screws. Shuttered. Available individually and in packs of 5.

Order Code	Type	Price each
JG35Q	Triple Skt Unswitched	£9.99
XJ94C B3	Triple Skt Unsw 5pk	£46.99

Switched Single

RPP

A 13A socket with single pole switch that switches live only. White. BS1363. Supplied with fixing screws. Shuttered.



Available individually and in packs of 10.

Order Code	Type	Price each
HL71N	Single Sw Socket	£3.29
XJ83E B2	Single Sw Skt 10pk	£28.99

Metal-Clad Switched Single

RPP

A 13A socket with single pole switch that switches Live only. Completely enclosed in a smart silver grey finished box, with earth terminal BS1363. Shuttered. Available individually and in packs of 5.



Order Code	Type	Price each
JG40T	Mtl Single Sw Skt	£7.49
XJ98G B2	Mtl Sngl Sw Skt 5pk	£31.99

Switched Double

RPP



A double 13A socket each with its own single pole switch that switches live only. White. BS1363. Supplied with fixing screws. Shuttered. Available individually and in packs of 5.

Order Code	Type	Price each
HL72P	Double Sw Socket	£5.79
XJ84F A1	Double Sw Skt 5pk	£26.99

Metal-Clad Switched Double

RPP



A double 13A socket each with its own single pole switch operating on the live side. Completely enclosed in a smart silver grey finished box, with earth terminal. BS1363. Shuttered. Available individually and in packs of 5.

Order Code	Type	Price each
JG41U	Mtl Double Sw Skt	£11.99
XJ99H C4	Mtl Dbl Sw Skt 5pk	£54.99

Trailing Single Socket

A single 13A socket without switch. Finished in resilient white thermoplastic. With cord grip. Shuttered. Designed to be fitted to the end of an extension lead.



Order Code	Type	Price each
HL73Q	Trailing Skt Single	£1.89

Trailing Double Socket

A double 13A unswitched socket made in resilient black thermoplastic. Includes cord grip, and both sockets are shuttered. Intended for fitting to the end of a cable to make up your own extension lead. Cable entry is at one end of the rectangular housing, and each socket has the unusual feature of being skewed by 45° to enable both 2 and 3-way multipug adaptors to be used as well, in both sockets. Wiring instructions included inside housing.



Order Code	Type	Price each
ZB41U	Trailing Dble Skt	£5.49

5-Metre Extension Lead



An extension lead having a 13A plug at one end and a trailing socket at the other. The plug and socket are not moulded on types and so can be easily replaced or changed. Rated at 13A and suitable for appliances up to 3kW. Colour white.

Order Code	Type	Price each
ZB82D	5m Lead	£6.49

10 Metre Extension Lead



An extension lead with a 13A plug (fitted with a 5A fuse) at one end and a trailing socket at the other. The 3-core cable is rated at 5A and the maximum load is 1200 watts. Colour white.

Order Code	Type	Price each
KR37S	10m Lead	£7.99

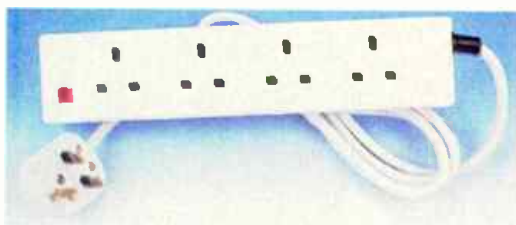
Distribution Board



A plug board with four 13A sockets moulded in unbreakable white PVC. Cord grip on cable inlet at left-hand end enables use with trailing lead or by knocking out two covers on the front, the unit may be fixed to a wall etc. Sockets have safety shutters and a neon pilot light is fitted. Total load must not exceed 13A, and a 13A 1in. fuse is fitted. To BS1363/A.

Order Code	Type	Price each
ZF55K	Dis Board 4-way	£6.99

Extension Lead



A 4 way distribution board ready connected to 2.5m (approx) of mains cable terminated in a 13A mains plug.

Order Code	Type	Price each
YN46A	Extn Lead 13A	£6.99

3 Metre Extension Reel

JoJo

A 3 metre extension reel that is suitable for all domestic household appliances with a maximum combined total capacity of 3120W. Light to carry, the reel is fitted with two childproof sockets and a 13A fused plug. Finished in white. Not for use in wet conditions.



Specification		
Cable length:	3m (10 feet approx.)	
Capacity:	8A (1920 watts) fully wound 13A (3120 watts) fully unwound	
Weight:	600g	

Order Code	Type	Price each
KR25C	3M Mains Cable Reel	£8.99

HOT TIP

Before discarding old cable runs when re-wiring a house, ask yourself whether they could be used as 'fish' wires to help pull new cables through awkward or hard to get at areas. Remember to always use PVC green/yellow insulation sleeving on all bare earth wires inside sockets, junction boxes and consumer units, etc.

10 Metre Extension Reel

JoJo

A 10 metre extension reel with a maximum combined capacity of 1200W. Suitable for use with DIY power tools, Hi-Fi, video, lighting and most domestic electrical appliances. A convenient finger-shaped recess in the base and a small handle on the front make winding in the cable fast and easy – no more tangled cable. Fitted with two childproof sockets and a 5A fused plug. Finished in black. Not for use in wet conditions.



Specification		
Cable length:	10m (33 feet approx.)	
Capacity:	3A (720 watts) fully wound 5A (1200 watts) fully unwound	
Weight:	850g	

Order Code	Type	Price each
KR24B	10M Mains Cable Reel	£9.99

15 Metre Extension Reel

JoJo

Manufactured with safety in mind, this extension reel is suitable for use with power tools, lighting, various household appliances and gardening equipment such as strimmers, lawn mowers etc. The maximum load is 1200 watts. The reel is fitted with a convenient carry handle and an additional handle is provided for easy winding of the cable. Fitted with two childproof sockets, the extension reel conforms to BS6500, BS61363/A and BS5733. Colour black and red. Not for use in wet conditions.



Specification		
Cable length:	15m (50 feet approx.)	
Capacity:	3A (720 watts) fully wound 5A (1200 watts) fully unwound	
Weight:	1.5kg	

Order Code	Type	Price each
KR23A	15M Mains Cable Reel	£14.99



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

Euro Socket to 13A Plug Lead

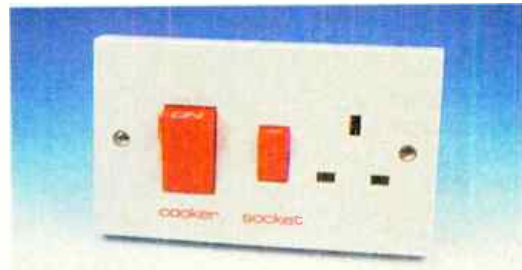


Moulded, high quality plug and socket non-rewirable cable assembly 2m long and rated at 5A 250V AC. The plug is supplied with a 5A fuse. Colour black.

Order Code	Type	Price each
MK41U	Euro-13A Lead	£3.49

Cooker Control

RPP



A cooker control produced to BS4177C. The cooker switch is a large double pole switch rated at 45A. A switched 13A socket is also provided for electric kettles etc. The socket is shuttered. For ease of wiring separate earth terminals are provided for socket and cooker. Both switches have red rockers and are double pole to switch both live and neutral for absolute safety. Supplied with fixing screws. White.

Order Code	Type	Price each
HL76H	Cooker Switch	£11.99

**FAX
YOUR ORDER
NOW!**

01702 553935

Shaver Socket for Bathrooms

Le Grand

A dual voltage shaver socket complying with BS3052. A dual-voltage socket is employed with one side providing 115V and the other 240V. Each is keyed to prevent insertion of the wrong style plug. Insertion of a plug automatically switches the sockets on, which are connected via a double wound safety isolating transformer, itself protected by a self-resetting overload device. Designed for use in bathrooms where it meets the relevant IEE regulations. Supplied with fixing screws. Colour White.

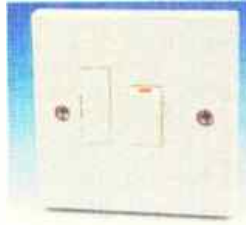


Order Code	Type	Price each
HL78K	B2 Shaver Skt Isolated	£26.49

Flex Outlet Switched

RPP

A connecting unit, max. load 13A with a fused flex outlet in a white plate cover and a double pole switch. BS1363. Supplied with fixing screws.



Order Code	Type	Price each
HL83E	Switched Flex Outlet	£6.99

Switched Flex Outlet with Red Neon

RPP

A fused connecting unit, max. load 13A, with a flex outlet in a white plate cover and a double pole switch which is illuminated by a red neon when energised. Supplied with fixing screws.



Order Code	Type	Price each
ZB38R	Sw Flex Outlet Neon	£9.49

Metal-Clad Switched Fused Spur Outlet

RPP

A switched connecting outlet with a double pole switch and fuse holder with 13A fuse. Includes two strapped earth terminals for easy carry through of an earth wire. BS3636.



Order Code	Type	Price each
ZB37S	Metal Sw Outlet	£9.49

Blanking-off Plate

RPP

A white plate that will blank off any spare single mounting box. BS1363. Supplied with fixing screws.



Order Code	Type	Price each
HL86T	Blanking Plate	£1.29

Double Blanking Plate

RPP



A white plate which can be used to blank off any spare double mounting box. Supplied with fixing screws.

Order Code	Type	Price each
ZB49D	Dbl Blank Plate	£2.29

HOT TIP

When running new electrical cable around the house, take every opportunity possible to write on the cable what its purpose is and where it is routed. Then, in a few years time when you, or someone else, decides to add to the household wiring, this information will be of great benefit. Use a black felt-tip pen for optimum readability.

SWITCHES

20A

RPP

A plain white plate switch with a single double pole switch rated 20A, plus flex outlet and cord-grid. Fixing screws supplied. BS3676. Available with or without neon indicator.



Order Code	Type	Price each
HL87U	20A Plateswitch	£4.99
JG30H	20A Neon Plateswitch	£6.99

Shower Wall Switch

RPP

A double-pole rocker switch with red rocker and heavy duty contacts for switching electric shower heaters. Rated at 45A 250V. BS3676 Part 1. Double pole make only. Includes two strapped earth terminals for easy carry through of an earth wire. Rocker includes the legend 'ON' when active. Fixing screws supplied. Switch should not be mounted inside a bathroom. Requires a 35mm deep flush or 40mm deep surface mounting box.



Order Code	Type	Price each
ZB39N	Wall Shower Switch	£9.49

MAPLIN KEY CALL

Phone 01702 556751

Ceiling Switch

RPP



A ceiling mounted, cord operated light switch to BS3676 for use in bathrooms (wall mounted switches are not permitted in bathrooms). Fitting has a one-way switch. Rated at 5A and suitable for fluorescent fittings. White with tough white nylon pull-cord. Fixing centres 51mm.

Order Code	Type	Price each
FQ00A	Ceiling Switch 1-way	£3.95

Shower Pull Switch



A ceiling mounted double-pole switch with heavy duty contacts for switching electric shower heaters. Rated at 40A 250V. BS3676. Double pole make only. Includes two strapped earth terminals for easy carry through of an earth wire. Escutcheon includes a red neon power-on indicator, and moving 'ON' and 'OFF' legends displayed in a window. The 1.7m long cord can be shortened as necessary. Fixing screws supplied. Requires a 35mm deep flush or 40mm deep surface mounting box.

Order Code	Type	Price each
ZB89W	Shower Pull Switch	£11.99

Single Light Switch 1-Way

RPP

A single one-way switch rated at 5A and also suitable for fluorescent fittings. White. Fixing screws supplied. BS3676. Available individually and in packs of 10.



Order Code	Type	Price each
HL89W	Light Swch ST Single	£1.79
XJ85G A1	Light Sw ST 1W 10pk	£14.99

Single Light Switch 2-Way

A single two way switch rated at 5A and also suitable for fluorescent fittings. For use where two switches are used to operate the light/s e.g. in hall and stairways. White. Fixing screws supplied. BS3676.



Order Code	Type	Price each
HL90X	Light Swch DT Single	£1.99

Metal-Clad Single Light Switch 2-Way

RPP

A single 2-way switch rated at 5A and also suitable for fluorescent fittings. Also for use where two switches are used to operate one light. Completely enclosed in smart hammertone grey finish box. BS3676. Available individually and in packs of 5.



Order Code	Type	Price each
JG39N	Mtl Light Sw DT	£5.49
XJ97F A2	Mtl Light Sw DT 5pk	£24.99

Intermediate Single Light Switch

RPP

A single 2-way switch specifically for 'three way' lighting control, where one light can be controlled from three different places. For example, where one lighting circuit covers the front hall and upstairs landing, there can be three switches, one near the front door, one at the end of the hallway and another on the upstairs landing. Two of these need to be 2-way type (HL90X), and the third must be an intermediate type as shown here. It serves to interrupt the three-core cable linking the other two switches, and has two 'L1' and two 'L2' terminals.



Order Code	Type	Price each
ZB61R	Intermediate Switch	£4.99

Double Light Switch

RPP

Two separate two-way switches rated at 5A and also suitable for fluorescent fittings. White. Fixing screws supplied. BS3676.



Order Code	Type	Price each
HL91Y	Light Swch Dual	£3.49

Double Metal-Clad Light Switch

RPP

A dual 2-way switch rated at 5A which can be used where two switches are used to operate one light. Completely enclosed in a smart silver grey finished box. BS3636.



Order Code	Type	Price each
ZB51F	Mtl Light Sw Dble	£7.99

Triple Light Switch

RPP

Three separate two-way switches rated at 5A and also suitable for fluorescent fittings. White. Fixing screws supplied. BS3676.



Order Code	Type	Price each
HL92A	Light Switch Triple	£5.49

LIGHT DIMMERS

Attractive modern light dimmers for filament lamps e.g. standard domestic light bulbs, having a total rating up to the rating shown. All types fit our 16mm flush or 20mm surface pattresses. These dimmers are extremely simple to fit. Switch off electricity at main fuse box, remove existing switch, connect the two wires to the dimmer and screw on to existing pattress. The dimmer switches the light on and off or sets brightness to desired level depending on position of knob.

Rotary Control

White plate with elegant spun aluminium knob. Rotary knob controls up to 400W. Not suitable for use with fluorescent lamps.



Order Code	Type	Price each
FQ10L	400W Rotary Dimmer	£6.99

White Push-on Push-off Single

White plate with elegant spun aluminium knob. Switching is push-on push-off so that light may be switched on or off at any brightness setting. Rated 400W. Not suitable for use with fluorescent lamps.



Order Code	Type	Price each
FQ12N	400W Push Dmr Sngl	£8.99

PATTRESSES Flush Mounting

A range of flush mounting metal boxes which are designed to be buried in the wall with the edges flush with the plaster. Four types are available. All are to BS1363.

Single 16mm

For all light switches. 16mm deep with one adjustable lug and 16mm and 25mm oval knockouts. A hole (9 x 32mm oval) is knocked out on one side. An earth terminal is provided. Available individually and in packs of 20.



Order Code	Type	Price each
JG31J	Metal Box 16mm	89p
XJ88V B3	Metal Box 16mm 20pk	£9.99

Single 25mm

For all socket outlets and plateswitches. 25mm deep with one adjustable lug and 20mm round knockouts. An earth terminal is provided. Available individually and in packs of 10.



Order Code	Type	Price each
JG32K	Metal Box 25mm	99p
XJ89W A1	Metal Box 25mm 10pk	£6.49

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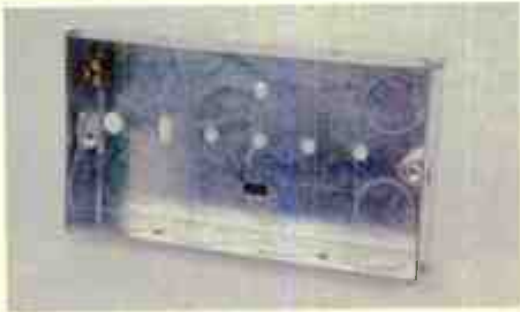
Single 35mm

35mm deep flush metal wall box. Suitable for use with the 45A shower wall switch or Shower Pull Switch BS4662. Includes brass earth terminal.



Order Code	Type	Price each
ZB75S	Shower Box 35mm	89p

Double 25mm



For all double panels except cooker and shaver. 25mm deep with one adjustable lug and 20mm round knockouts. An earth terminal is provided. Available individually and in packs of 5.

Order Code	Type	Price each
JG33L	Metal Box 2-way 25mm	£1.39
XJ90X A1	Metal Bx 2w 25mm 5pk	£4.49

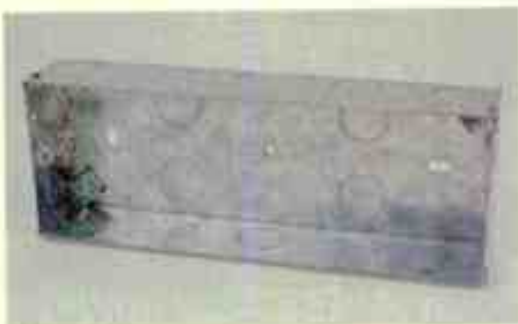
Double 47mm



For cooker panels and shaver adaptor. 47mm deep with one adjustable lug and 20mm and 25mm round knockouts. An earth terminal is provided.

Order Code	Type	Price each
JG34M	Metal Box 2-way 47mm	£1.89

Triple 35mm



35mm deep flush mounting triple metal wall box. Includes two earth terminals and 20mm knockouts.

Order Code	Type	Price each
KC73Q	Metal Box 3-way 35mm	£2.99

Plastic Wall Box Cover

A plastic cover that is clipped over wall boxes before plastering to stop plaster hardening in the box. When the plaster has dried, the plaster is cleaned back to the edges and a small screwdriver is inserted into one of the slots and the cover is removed, revealing a totally clean box. Even if covered completely with plaster the cover can easily be located by gently tapping the area with a small hammer. Inexpensive, re-usable, the cover is available in two sizes for single and double boxes.



Order Code	Type	Price each
KR39N	Pattress Cover Sngl	39p
KR38R	Pattress Cover Dble	49p

Surface Mounting

A range of surface mounting boxes, to BS 1363.

Single 20mm

RPP

For all light switches. 20mm deep with earth terminal. Available individually and in packs of 10.



Order Code	Type	Price each
YB14Q	Sur Patt 20mm Sngl	£1.29
YP99H A1	Patt 20mm Sngl 10pk	£9.99

Single 29mm

RPP

For all socket outlets. 29mm deep. Available individually and in packs of 10. Unsuitable for lighting circuits.



Order Code	Type	Price each
YB15R	Sur Patt 29mm Sngl	£1.39
XJ91Y A1	Patt 29mm Sngl 10pk	£10.49

Single 40mm

RPP

Single white plastic surface mounting pattress. Suitable for use with the 45A pull cord ceiling shower switch or shower wall switch. Internal depth is 40mm.



Order Code	Type	Price each
ZB40T	Shower Box 40mm	£2.19

Double 29mm

RPP



For all double panels except cooker and shaver units. 29mm deep. Available individually and in packs of 5.

Order Code	Type	Price each
YB16S	Sur Patt 29mm Dble	£2.15
XJ92A A1	Patt 29mm Dble 5pk	£9.49

Double 47mm



For cooker and shaver panels. 47mm deep.

Order Code	Type	Price each
YB17T	Sur Patt 47mm Dble	£3.59

Conversion Unit Double



May be fitted onto a single flush mounting box so that a double plate may be fitted. Available individually and in packs of 5.

Order Code	Type	Price each
YB18U	Conversion Pattress	£3.79
XJ93B A2	Conv Pattress 5pk	£15.99

Triple 29mm



For all triple socket outlets 29mm deep.

Order Code	Type	Price each
KC72P	Surf Patt 3-way 29mm	£6.79

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Conversion Unit Triple



A safe and convenient way to convert a single flush box to provide three sockets. The single socket is removed, the conversion unit fitted and triple unswitched socket outlet plate JG35Q screwed onto that. Available individually and in packs of 5.

Order Code	Type	Price each
JG36P	3-way Conv Pattress	£4.99
XJ95D B2	3w Conv Pattress 5pk	£22.99

Dry Lining Flush Mounting

Two flush mounting plastic boxes for hollow walls and partitions. A suitable hole is cut in the wall lining and the box inserted. Two retractable plastic pillars with lugs and brass threaded inserts, are pushed out. The socket is screwed on to the pillars which are pulled up on to a ratchet, the screws are tightened until the box and socket are held securely on the wall. The socket can be removed leaving the box securely fixed in the wall. Two knockouts are provided.

Single 36mm

Requires a cut-out 74 x 74mm and a depth of 36mm. Suitable for socket outlets and plate switches. Finished in white, overall size 83 x 83mm.



Order Code	Type	Price each
KC70M	Dry Line Single	£1.39

Double 36mm



Requires a cut-out 135 x 74mm and a depth of 36mm. Suitable for all double panels except cooker and shaver. Finished in white, overall size 145 x 83mm.

Order Code	Type	Price each
KC71N	Dry Line Double	£2.49

Spare Screws for Electrical Fittings



Spare screws as replacements for those supplied with single and double switch plates, blanking plates, sockets etc. The 3.5mm thread is standard for all electrical pattresses and wall boxes, but impossible to match from normal BA or metric sizes! Two lengths are available, a standard 30mm (to replace lost originals for example), and a 50mm, long reach type for deep or recessed pattresses. Sold in packs of ten.

Order Code	Type	Price each
JZ38R	Slot Screw M3.5 30mm	£1.10
JZ39N	Slot Screw M3.5 50mm	£1.40

TRUNKING

Coiled Mini-trunking



A new attractive alternative to standard trunking, that is easy to store, easy to install and economical to use. Supplied in bubble packs, in 3m coils, as a coil of white PVC trunking with a coil of white PVC click-on covering. Available in two sizes, 16 x 16mm and 25 x 16mm.

Order Code	Type	Price each
AP05F	3m 16mm Trunking	£4.99
AP07H	3m 25mm Trunking	£6.99

Switch and Socket Box

Grawater

Surface-mounted white moulded box suitable for use with switches or sockets. The 32mm deep box is fitted with 'pressouts' for conduit and trunking entry. To BS 1363.



Order Code	Type	Price each
RZ25C	Sw-Skt Box	£1.39

5 Amp Multipurpose Connector Blocks

Grawater



A pack of four 5 amp connector blocks for joining two core cables. Base can be surface mounted, and the screw terminals are protected by a press fit cover.

Order Code	Type	Price each
AP92A	4pk 5 Amp Conn Block	£1.99

LIGHT FITTINGS

BC Lampholder

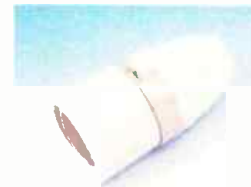
A standard BC lampholder to BS5042. With cord-grip and sprung plungers, plus wide skirt. White. Available individually and in packs of 10.



Order Code	Type	Price each
FQ02C	BC Lampholder	£1.49
YP98G	Lampholder 10pk	£11.99

Switched BC Lampholder

A standard BC lampholder to BS5042 with on/off switch, cord grip and sprung plungers plus wide skirt. White.



Order Code	Type	Price each
KC68Y	BC Lampholder Sw	£2.39

Ceiling Pendant



Lampholder type FQ02C and ceiling rose type FQ05F pre-wired together with 6in. (150mm) approx. of white flex. Available individually and in packs of 5.

Order Code	Type	Price each
JG37S	Rose and Pendant 6in	£3.79
YT00A A1	Rose/Pendant 6in 5pk	£15.99

Battenholder

A standard BC lampholder to BS5042 in a plastic mount with wide skirt. This battenholder has sprung plungers and is finished in white. Diameter of base 63.5mm. Fixing centres 51mm. Overall height 47mm. Available individually and in packs of 10.



Order Code	Type	Price each
LB63T	Bayonet L/Hldr	99p
XJ87U A1	Battenholder 10pk	£7.99

Angled Battenholder

An angled BC lampholder to BS5042 in a plastic mount with a wide skirt. The battenholder has sprung plungers and is finished in white. Diameter of base is 63.5mm. Fixing centres 51mm. Overall length 100mm.



Order Code	Type	Price each
KC69A	Angled Battenholder	£3.99

Force Fit Switched BC Lampholder



A standard BC lampholder to BS5042 with integral on/off switch and 2m of white flex. The base of the lampholder has a plastic adaptor to force fit into a suitable opening e.g. a bottle, to make an attractive and individual lamp. The flex is side entry into the lampholder so it is not necessary to drill holes in the bottle for the flex. The lampholder is screwed onto the plastic adaptor, so it can be removed for maintenance. A 60W lamp is the maximum permissible, depending on the shade used and adequate ventilation. Suitable for an opening 17mm to 23mm approx.

Order Code	Type	Price each
KR35Q	Force Fit Lamp Holdr	£1.49

Clip-on Light

A handy 240V AC mains lamp that is ideal for temporary lighting at home, in the office or studio. The standard white BC lampholder has an on/off switch and is attached to a large spring loaded clip for fixing to the edge of a desk, picture rail etc. The lampholder comes complete with 2m of white twin flex and a 13A plug (fitted with a 5A fuse). The lampholder must be used with a suitable shade, and a lamp not exceeding 60W (neither supplied). NB. This item is not recommended as an inspection lamp.



Order Code	Type	Price each
KR36P	Clip-on Lamp Holder	£3.29

Ceiling Rose

RPP

A white satin-finish ceiling rose that does not need a separate backplate or pattress. Designed to BS67 1969 with three separate terminals with captive screws housed in a transparent shield providing individual loop-in facilities. A separate earth terminal is also provided. Positive cable restraint. Diameter of base 82.5mm. Fixing centres 51mm. Available individually and in packs of 10.



Order Code	Type	Price each
FQ05F	Ceiling Rose	£1.79
XJ86T	A1 Ceiling Rose 10pk	£15.99

Ceiling Rose Lampholder

A white satin-finish ceiling rose with easy-wiring terminals as FQ05F, but with a BC lampholder integral with it. Ideal for bathrooms and kitchens. Available individually and in packs of 10.



Order Code	Type	Price each
JG38R	Rose Lampholder	£3.79
XJ96E	A2 Rose Lampholder 10pk	£31.99

Fluorescent Tube Starters

Two fluorescent tube starters suitable for use with most domestic fluorescent tubes and having standard 2-pin pygmy connectors. Fitted with radio interference suppressors and enclosed in white nylon case.



BS3772. Two differently rated types are available, 80W max. and 125W max.

Order Code	Type	Price each
FQ07H	Starter 80W	49p

Electronic Starter

An electronic fluorescent tube starter which can replace conventional starters that have a standard 2-pin pygmy connection and is designed for use with most fluorescent fittings. Suitable for tubes rated from 30W to 125W. The EFS600 starter is rated at 200/260V AC, 50/60Hz.



Order Code	Type	Price each
RZ29G	Elec Starter	£4.99

Brass BC Lampholders

A pair of smart brass bayonet connecting lamp holders with bases threaded for a lamp stem. The bodies are joined by a solid brass threaded collar and another threaded ring is provided for anchoring a lampshade. The base



includes a screw terminal for an earth wire. One type is plain unswitched and the other has an integral push-bar on-off switch. These lampholders must be earthed, therefore a 3-core mains cable is required.

Order Code	Type	Price each
ZB84F	Sw Brass BC Holder	£1.80
ZB85G	Brass BC Holder	99p

E.S. Bulb Holder

Bulgin

A chassis mounting ES bulb holder ideal for use in disco light show units. The holder has 1/4 in. blade connectors on the rear. Moulded in tough phenolic, max. working temperature 200°C.



Max. working voltage: 250V AC
 Max. dissipation: 150W
 Fixing centres: 46mm x 3-8mm dia.
 Panel cut out: 38mm dia.
 Overall depth: 49mm

Order Code	Type	Price each
JK70M	ES Panel Lampholder	£1.49

E.S. to B.C. Adaptor

An adaptor to convert Edison screw lampholder to bayonet fitting. Brown bakelite moulding, suitable for 250V AC.



Order Code	Type	Price each
BK69A	ES to BC Adaptor	£3.49

B.C. to E.S. Adaptor

An adaptor to convert a bayonet lampholder to Edison screw fitting. Black bakelite moulding, suitable for 250V AC. Max 60W.



Order Code	Type	Price each
BK70M	BC to ES Adaptor	£2.15

Downlighter 60W

A high quality recessed, circular downlight for mounting flush into apertures within false ceilings. The fitting is of pressed steel construction with a double-insulated Edison screw



lampholder of porcelain. A high temperature plastic cover protects the terminals, a length of high temperature cable is attached. Two fixing clips retain the fitting in the aperture. The fitting is supplied either in white or polished brass. Complete with fitting and safety instructions, which should be followed carefully, and a 60W 250V AC spotlight. Diameter 115mm. Overall height without lamp 130mm.

Order Code	Type	Price each
RZ32K	Downlight White 60W	£11.99
RZ33L	Downlight Brass 60W	£13.99

Downlighter 100W

A high quality recessed, circular downlight for mounting flush into apertures within false ceilings. The fitting is of pressed steel construction with a double-insulated porcelain Edison screw



lampholder. A high temperature plastic cover protects the terminals, a length of high temperature cable is attached. Two fixing clips retain the fitting in the aperture. The fitting is supplied finished either in white, or polished brass. Complete with fitting and safety instructions, which should be followed carefully, and a 100W 250V AC spotlight. Diameter 135mm. Overall height without lamp 136mm.

Order Code	Type	Price each
RZ34M	Downlight White 100W	£12.49
RZ35Q	Downlight Brass 100W	£14.49

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Economy Floodlamp

A tungsten Edison screw PAR38 economy floodlamp, designed for optimum efficiency, for use in recessed downlighters. These lamps provide a 20% cost saving over conventional floodlamps. Rating 250V AC 80W. Diameter 125mm. Overall depth 135mm.



Order Code	Type	Price each
RZ26D	Econ FloodLamp	£4.99

EMERGENCY LIGHTING Emergency Bulkhead Fitting

A range of indoor 6W maintained and non-maintained emergency fluorescent lighting suitable for illuminating stairways, corridors, small workshops and similar sized areas. The maintained fitting is designed to remain illuminated at all times, whilst the non-maintained version will only be illuminated when a mains failure occurs. The bulkhead fitting is manufactured from impact resistant polycarbonate and the gear tray from pressed steel. The opaque cover is retained by two lugs; removal is achieved by squeezing the sides. The electronics and battery pack are assembled on a single gear tray, easily removable for installation and servicing. Battery charging is indicated by an LED attached to the gear tray. Supplied with 6W fluorescent tube, and full installation and maintenance instructions. Base colour white. A spare 9in. 6W fluorescent tube (RZ31J) is available separately. Overall dimensions 275 x 140 x 95mm.



Order Code	Type	Price each
RZ27E	A1 Bulkhead Maint	£59.99
RZ28F	A1 Bulkhead NonMaint	£74.99
RZ31J	Bulkhead 6W Tube	£1.99

PIR LIGHT SWITCH NEW

This in-door light switch features an integral PIR which detects body movement and switches on a light for a pre-determined length of time, which is adjustable from 5s to 5m. The unit can also act as a normal ON/OFF or 2-way light switch. A slide switch is used to set the mode of operation. The PIRs light level sensitivity and the operational range are individually adjustable - the detection distance has a maximum of 8m in front of the unit, and 5m to the sides. Easy to install, the unit requires a minimum load of 40W and a maximum of 300W. NOT suitable for fluorescent lights.



SUPERB VALUE!
£29.99
AQ23A

THERMOSTATS

Room

A room thermostat with an easy-to-use control for all kinds of heating systems. Mounted on the wall, this thermostat, once set to the required temperature, will automatically trigger the heating system to come on and go off in order to maintain that temperature. Can be linked to any pump to control gas, solid fuel or oil fired central heating, warm-air and electric underfloor or ceiling systems. Includes an 'accelerator' which reacts quickly to changes in room temperature so as to maintain an even level. Fits a standard pattress. Knob marked 5° to 30°C. Rated 20A resistive, 4A inductive, 240V AC. Switch SPST. Supplied with instructions.



Order Code	Type	Price each
YB20W	Room Thermostat	£10.99

Plug-In Thermostat



A thermostat that will plug straight into a 13A socket outlet and will provide thermostatically controlled power to its 13A mains into which a heater or fire can be plugged. The unit can supply a load up to 13A and thermostatically switch at eight temperature settings from frost to 35°C. The unit has two neon indicators; one illuminates when the mains power is supplied to the unit, and the other when the power is being supplied to the load.

Order Code	Type	Price each
AQ20W	Plug-In Thermostat	£16.99

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01702 553935

Frost

A wall mounting, pattress style frost thermostat designed to operate remotely from the heat source. A bi-metal strip is the sensing element and trips at approx 0°C to switch on the heating or other appliances before the temperature falls below freezing. Thermal 'feed forward' is provided by low powered heating resistors adjacent to the thermostat and switched with the load. Maximum switching capacity is 16A @ 250V AC. Connections are to heavy duty copper screw terminals. Both earth and neutral must be connected. Grills in the top and bottom of the cover ensure air circulation over the thermostat for realistic room temperature sensing, and the cover has two break-outs provided in the bottom left-hand corner if required. Attached to wall by four 3mm screws in base (not provided). Overall dimensions 86mm square x 38mm deep.



Order Code	Type	Price each
ZB86T	Frost Thermostat	£19.99

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7 Day Programmable Thermostat Timer

NEW



A 7 Day programmable room thermostat that features presettable comfort and economy temperatures plus a defrost setting (7°C). Suitable for use with heating or cooling systems.

Specification

Control Range: 5 to 30°C
 Temperature Accuracy: ± 1°C
 Programs: 6 Preset, 3 User defined
 Switching: 230V AC 50Hz, 5A resistive
 Power: 2x AA alkaline cells (not supplied).
 Dimensions: 154(W) x 80(H) x 30(D)

Order Code	Type	Price each
DK62S	7 Day Thermo Timer	£29.99

TIMESWITCHES

Immersion Heater Timer

A 24-hour immersion heater timer that is designed to provide programmable on/off times, and fit directly to a suitable wall surface. Each switching 'rider' provides an on period of 15 minutes minimum, so that the heater can be on for as long as desired, and as often as required, during the course of a day. If 'Economy 7' is available, this enables consumers to make use of cheap rate electricity overnight. A three position switch enables the immersion heater to be on continuously, timed, or off. The timeswitch must be used with a localised isolation point (fused spur). Supplied with full mounting hardware and fitting instructions. Size: 86 x 86 x 84mm. Rated at 240V 50Hz 13A.



Order Code	Type	Price each
CY35Q	Heater Timer	£22.99

24 Hour Plug-In Timer

NEW



Plugging this timer into your existing 13A socket outlet gives automatic control over a 24 hour period to any electrical appliance. Simply plug the appliance that you wish to be controlled, up to 13A resistive or 2A inductive loading, into the 13A socket outlet of the unit and set the time interval. The unit is switchable in 15 minute intervals with a minimum time between settings of 30 minutes.

Available singularly, (RZ81C) or as a twin pack, (RZ83E).

Order Code	Type	Price each
RZ81C	24h Plug-In Timer	£16.99
RZ83E	Twin Pk 24h Timer	£26.99

7-Day Immersion Heater Controller

A wall mounted, 7-day electronic immersion heater time controller providing economical and convenient control of electric immersion heater systems. Easily programmable, the controller allows up to 7 ON/OFF switching programmes with automatic everyday allocation, providing up to 49 ON/OFF settings per week. An optional 'boost' facility enables instant override for one or two hour periods.

In addition it features a 24-hour, digital clock/timer display, self cancelling override, a shortest switching time of 1 minute, day or days 'omit' facility, programme review, and an internal memory back-up battery retains programmes in the event of a power failure.

Specification

Switching load: 13A or 3kW max. resistive
 Supply: 240V AC @ 50Hz
 Battery (supplied): 1 x SR44 1.5V button cell
 Operating temperature: 0°C to 50°C
 Connecting cable required: 1.5mm² to 2.5mm² conductor size, heat resistant HOFR type.

Dimensions: 140 x 90 x 40mm. Fitting instructions supplied. Must not be used with a load greater than 3kW resistive.

Order Code	Type	Price each
MK43W	Immersion Controller	£27.99

24 Hour Programmable Light Switch



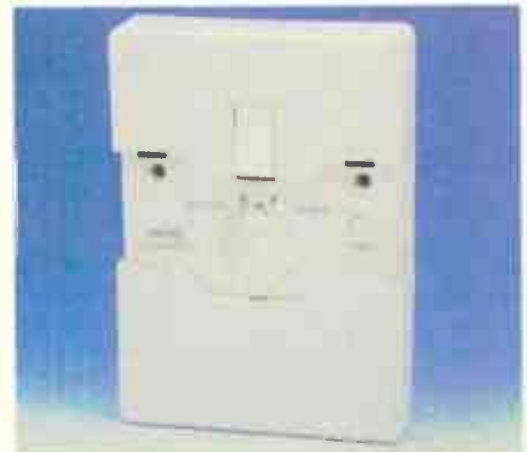
This 24 hour programmable light switch can be programmed for up to 4 pairs of ON/OFF switch settings per day or for random switching which turns the load ON/OFF for 10 - 30 minute periods throughout the programmed times.

Order Code	Type	Price each
AQ22Y	24H Prog Lightswitch	£24.99

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Programmable Lightswitch

NEW



This unit is designed to replace a conventional lightswitch and can be programmed to copy up to 9 switch settings of the previous 24 hour's switching pattern and repeat the programme daily until it is altered. The unit can be used as a normal lightswitch and is able to switch a minimum load of 40 Watts and a maximum load of 200 Watts. Please note: Unit not designed for switching fluorescent lighting.

Order Code	Type	Price each
AQ21X	Copy Lightswitch	£19.99

24 Hour Slimline Digital Timer



This timer is a slimline digital controller that can be plugged straight into your existing 13A socket outlet and can be programmed to switch loads of up to 13A resistive or 2A inductive. The timer can switch up to 4 ON/OFF programmes per day, with a minimum of 1 minute between switch settings, each of which can be manually overridden. The override function is cancelled at the next automatic ON or OFF switching time. The unit has a back up battery in order that timing is kept accurately, even during a power cut.

Order Code	Type	Price each
RZ84F	24h Digital Timer	£18.99

Weekly Plug-in Timer

NEW

A compact, digital plug-in timer with up to four programmes per day, that is ideal for domestic appliances, lighting, heating and similar applications. The timer can operate one set of four daily programmes for weekdays, and a different set of daily programmes for the weekends. The unit has battery back-up



Order Code	Type	Price each
RZ30H	Digital Weekly Timer	£16.99

24-Hour Programmable Timer

A 24-hour programmable timer with many security and energy saving uses. Lights and radios can be timed to switch on and off throughout the day and night for security purposes, and a random program mode allows lights to be switched at random for better protection of your home. When used in conjunction with economy 7, washing machines, dishwashers and tumble driers can be timed to operate at the most economical times. An accurate clock with LCD allows precise timing to the nearest minute. Up to 8 switch actions can be set in one 24-hour period, 4 ON, and 4 OFF, but ON times are restricted to a period between 18:00 and 05:59 the next morning, and OFF times between 00:00 and 05:59. When in random mode the timer will operate lights at random between the hours of 18:00 and 05:59 the next day. The timer will switch on for short random periods in the OFF set times. Manual override provides for continuously ON or continuously OFF. The LCD clock is powered by a button battery, supplied.



Specification

Rated voltage:	240V @ 50Hz
Maximum operating current:	13A
Maximum load:	3kW
Dimensions:	125 x 65 x 58mm deep excluding pins

Order Code	Type	Price each
RC57M	Electronic Timer	£27.99

7 Day Plug-In Timer



This timer can be plugged into your existing 13A socket outlet and gives automatic control of an electrical appliance over a 7 day period. The time controller can switch up to 13A resistive or 2A inductive loads. The minimum time interval is 2 hours with a minimum time between settings of 4 hours. The timer can be extremely useful as a security device turning on such appliances as radios and table lamps to give a potential intruder an impression that your home is occupied.

Order Code	Type	Price each
RZ82D	7 Day Plug In Timer	£16.99

Electric Shower

Heatstore



An elegant and efficient shower unit, that complies with the very stringent British Standards for safety, including water splashproofing, enabling the unit to be mounted inside the showering area or positioned for a hair wash facility. However, the unit must not be positioned where it could be subjected to the continuous direct spray from the shower head. The unit is rated at 8.5kW and has an energy saving feature that allows the power setting to be reduced to 4.7kW for summer use. The unit must have its own separate 240V AC supply, 6mm square cable being suitable for most installations, providing that the total length of the run does not exceed 23m. The supply circuit must be protected by its own fuse or miniature circuit breaker, rated at 35A for a cartridge fuse, or 40A for a miniature circuit breaker.

A 40A double pole isolating switch with a contact separation of at least 3mm in each pole should be incorporated in the wiring. The unit is designed for direct connection to a cold water mains supply. It is recommended that a UK W.F.B.S. listed isolating valve be fitted between the mains water supply and the shower unit. In use the water control knob is turned anticlockwise to obtain water flow. The required temperature is obtained by continuing to turn anticlockwise for cool water or clockwise for hot water. When at the desired temperature, the number displayed in the window can be remembered for future setting. This control also adjusts the flow stabilisation valve, which ensures that a constant water temperature is received at the shower head. The valve automatically compensates for water pressure fluctuations. An additional feature is a solenoid valve which gives push button 'on/off' operation. The shower unit comes complete with handset, hose, rise rail, soap dish and full fitting instructions.

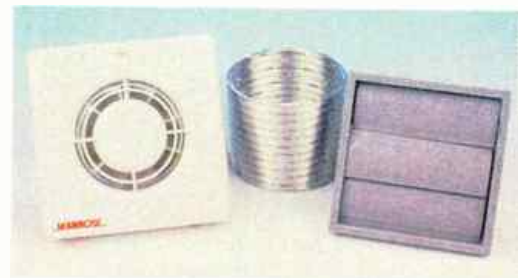
Specification

Power rating (240V AC):	4.7/8.5kW
Water connections:	15mm connection to rising main
Pressure min:	11.8psi/0.8bar
max:	145psi/10bar
Installation:	Splashproof tested cover allows for installation in the shower area
Dimensions:	255 x 209 x 110mm (H x W x D)
Casings:	White/grey high impact thermoplastic

Order Code	Type	Price each
KC75S	H6 Heatstore Plus	£99.99

EXTRACTOR FANS

4 Inch Type



Two 100mm (4in.) diameter extractor fans for bathrooms, toilets, showers, kitchens etc. Each comprises a kit which includes the interior fan housing and grille, a 400mm long, flexible aluminium wall ducting and an external wall grille with gravity controlled non-return shutters. The interior housing surround is 160 x 160 x 30mm deep. The cover is removable to reveal the synchronous fan motor and connecting terminal block. Requires only mains Live and Neutral since assembly is double insulated. The motor is rated at 20W and the fan is a positive displacement airscrew type shifting up to 90m³ per hour. Colour of interior side is white, exterior shutter grille is light grey. Can be fitted in walls up to 4 1/2 inches thick, partition walls and ceilings. Needs eight additional wall fixing screws (not supplied). Two types are available: the first is a basic, remotely switched (by separate switch or by splicing into lighting supply) extractor fan; while the second can be connected to a permanent supply and energised by a control wire connection. On the lamp switching off, a built in electronic delay timer system will keep the fan running for several minutes. Fitting instructions included.

Order Code	Type	Price each
GK70M	C4 Remote Fan 4in	£26.99
GK71N	B2 Permanent Fan 4in	£34.99

6 Inch Type



A 150mm (6in.) diameter extractor fan for kitchens, laundry rooms, bathrooms, toilets, etc. The complete fan housing, with external, gravity controlled back draught shutters, can be mounted directly in a window pane requiring a 184mm (7 1/4 in.) diameter cut-out (probably best provided by a professional glazier), and a length of rubber gasket material is provided for sealing. The housing is 203 x 203 x 115mm deep. Fitted with 1.5 metres of 3A twin core mains cable, using only Live and Neutral since assembly is double insulated. Cable entry is from above. Contains integral on-off switch controlled by a one metre long pull cord. The motor is rated at 25W and the fan is a positive displacement airscrew type displacing 230m³ per hour. Colour white. Supplied with fitting instructions.

Order Code	Type	Price each
GK69A	B3 6in Extractor Fan	£39.99

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01702 553935

HOT TIP

To peel back the insulation on 'twin & earth' PVC cable, take hold of the copper earth wire using a pair of pliers and pull this backwards. This has a similar effect to that of a cheese cutter and will slice open the cables outer sheath.

CONSUMER UNITS

1-Way 45A Switched Consumer Unit

Proteus

A fully-insulated consumer unit in a dove-grey plastic case 155 x 93 x 100mm deep. The unit is fitted with a 45A isolator switch and has space for one MCB (NOT supplied). A self-adhesive label is included that can be written on to identify the circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices.



Order Code	Type	Price each
CY34M	Consumer Unit 1W	£14.99

2-Way 60A Switched Consumer Unit

Proteus

A fully insulated consumer unit in a white plastic case 170 x 100 x 130mm deep overall. The unit includes a 60A isolator switch at the right-hand side and up to two MCBs can be accommodated in the remaining positions. A self-adhesive paper label printed with the numbered positions can be attached and on which you can write the identity of each circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with full instructions. MCBs must be ordered separately.



Order Code	Type	Price each
ZB78K	Consumer Unit 2W	£16.99

2-Way Steel 63A ELCB Distribution Board

Proteus

A consumer unit in a light grey painted, steel case measuring 220 x 160 x 110mm deep overall, including a smoked perspex front cover protecting the ELCB unit and MCBs against dust and dirt. The ELCB (Earth Leakage Circuit Breaker) at the right hand end is provided as the main isolator switch to give maximum safety, and will carry up to 63A total. The ELCB trips out if there is a discrepancy between live and neutral of $\pm 30\text{mA}$, e.g. a current flow to earth of 30mA or more. Circuit breaker is 2-pole and isolates neutral also. Two MCBs can be accommodated. A self-adhesive paper label printed with the numbered positions can be attached and on which you can write the identity of each protected circuit. Ideal for use in outhouses, garages, sheds etc.



The unit is not waterproof. The steel case must be earthed, and earth continuity to the lid proven on installation. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with instructions. MCBs must be ordered separately.

Order Code	Type	Price each
ZB64U	2W ELCB	£64.99

4-Way 100A Switched Consumer Unit

Proteus

A fully insulated consumer unit in a white plastic case 160 x 195 x 110mm deep overall including the smoked perspex front cover over the main switch and MCBs. The unit includes a 100A isolator switch at the right-hand side and up to four MCBs can be accommodated in the remaining positions. A self-adhesive paper label printed with the numbered positions can be attached and on which you can write the identity of each circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with full instructions. MCBs must be ordered separately.



Order Code	Type	Price each
ZB79L	Consumer Unit 4W	£19.99

8-Way 100A Switched Consumer Unit

Proteus

A fully insulated consumer unit in a white plastic case 230 x 195 x 110mm deep overall including the smoked perspex front cover protecting the main switch and MCBs. The unit includes a 100A isolator switch at the right-hand side and up to eight MCBs can be accommodated in the remaining positions, and there is a blanking plate provided for



any unused position. A self-adhesive paper label printed with the numbered positions can be attached and on which you can write the identity of each MCB protected circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with full instructions. MCBs must be ordered separately.

Order Code	Type	Price each
GK07H	Consumer Unit 8W	£29.99

MCB's



A range of miniature circuit breakers (MCB's) with type 2 time/current characteristics to BS3871 Part 1 for use with Consumer Units.

The following types are available:

- 6A for lighting circuits.
- 16A for immersion heater etc.
- 20A for radial circuits etc.
- 32A for ring mains.
- 40A for cookers and showers up to 9.6kW etc.

The MCB breaks when the current exceeds its rating and can be reset as soon as the overload is removed, and eliminates the need for fuses and fuse wire.

Order Code	Type	Price each
ZA22Y	6A MCB	£6.99
ZA23A	16A MCB	£6.99
ZA24B	20A MCB	£6.99
ZA25C	32A MCB	£6.99
ZA26D	40A MCB	£6.99

Fax your orders to:
01702 553935

Safety Electrical Earthing Straps

Electrical earthing straps specifically intended to connect system earths to real earth via a grounding rod or to provide for crossbonding to metal gas and water pipes as required by IEE regulations. Type A-E is intended as a main earth connection to a grounding rod and has a wire clamp which can take a single conductor up to 7mm thick (e.g. 68A earth bonding wire XS13P). Type A-D is for close coupled applications, It has a single screw terminal around which the wire is wrapped. Will take high current wire up to 4mm thick, e.g. XR57M etc. Both are fitted by wrapping the strap around the earthed member, passing the free end through the clamp body and pulling tight with strong pliers. Then a clamping screw is used to lock the strap in place, a locknut is attached to secure the screw and prevent tampering. Will take a tube or rod from 20 to 30mm diameter. Strap carries an alloy 'Do not remove' label. Constructed from brass and other non-ferrous alloys and will not rust.



Order Code	Type	Price each
JZ27E	Earth Strap A-D	£1.39
JZ28F	Earth Strap A-E	£1.99

FOR CASHTEL
Phone 01702 552941

10-Way 80A ELCB Distribution Board

Proteus



A fully insulated consumer unit in a white plastic case measuring 300 x 195 x 110mm deep overall, including the smoked perspex front cover which protects the ELCB unit and MCBs against dust. The ELCB (Earth Leakage Circuit Breaker) at the right-hand end is provided as the main isolator switch giving maximum safety throughout the house, and will carry up to 80A total. The ELCB trips out if there is a discrepancy between live and neutral of $\pm 30\text{mA}$, e.g. a current flow to earth of 30mA or more. Circuit breaker is 2-pole and isolates neutral also. It includes a test button which can be used to ensure that the ELCB is fully functional at the recommended six-monthly intervals. Up to ten MCBs can be accommodated and there are two blanking plates for unused positions. A self-adhesive paper label printed with the numbered positions can be attached and on which you can write the identity of each protected circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with instructions. MCBs must be ordered separately.

Order Code	Type	Price each
GK08J	H3 Consmr Unit wth ELCB	£79.99

4-Way Consumer Unit with 4-Way 63A ELCB Distribution

Proteus



A fully insulated consumer unit in a light grey plastic case measuring 300 x 195 x 110mm deep overall, including a smoked perspex front cover over the isolator, ELCB unit and MCBs. A 100A isolator switch is at the right-hand end, and up to four MCBs and their associated circuits can be run from it. A 63A ELCB is at the centre, and a further four MCBs and their associated circuits can be connected to this. The advantage of this type of split distribution system is that relatively hazardous circuits can be connected to the ELCB-controlled MCBs (such as ring mains with washing machines, electric cookers, outdoor circuits etc.) whilst circuits where it can be more hazardous if they fail when the ELCB trips (such as indoor lighting circuits), or relatively non-hazardous circuits where it's important that power is maintained at all times (such as circuits connected to freezers) can be connected to the switch-controlled MCBs. The ELCB trips out if there is a discrepancy between live and neutral of $\pm 30\text{mA}$, e.g.

a current flow to earth of 30mA or more. The ELCB circuit breaker is 2-pole and isolates neutral also. It includes a test button which can be used to ensure that the ELCB is fully functional at the recommended test intervals. Up to eight MCBs can be accommodated in total. Self-adhesive paper labels, printed with the numbered positions, can be attached and on which you can write the identity of each protected circuit. Only suitable for indoor use. Conditional short-circuit capacity is 16kA, based on the assumption that short-circuits are unlikely to occur in the first three metres of the cable connected to the over-current devices. Supplied with instructions. MCBs must be ordered separately.

Order Code	Type	Price each
ZB80B	E4 4W CU + 4W ELCB	£89.99

UV FLY TRAPS Ultra-Violet Insect Killer

NEW

Use this ultra-violet insect trap to help you control the number of flying insects around your home, office or workplace. Simply plug the fly trap into an existing 13A socket outlet, suspend it approximately 1.8m above floor level, making sure that it is out of the reach of children and turn on the power. It's that easy. For optimum performance suspend the trap above entrances or windows where insects may be intercepted. The ultra-violet light, which is effective for approximately 2 metres around the trap, attracts light sensitive insects towards the high voltage grid of the trap and electrocutes them. Supplied with small dusting brush and approximately 1.5m of mains cord.



Order Code	Type	Price each
RZ45Y	A3 UV Insect Killer	£12.99

FUSE HOLDERS

Flush Fitting 20mm Type

A flush-mounting 20mm panel fuseholder with screw-driver release to meet the latest safety regulations. Rated 10A at 250V. Overall length 33mm (plus 5.5mm tag). Bezel diameter 16mm. Panel cut-out 12mm diameter flattened to 11mm on opposing sides to provide anti-twisting lock.



Order Code	Type	Price each
KU33L	Fuseholder 20 Flush	70p

Fuseholder Insulating Boot

Bulgin

A pliable PVC insulating boot for enclosing and covering cables connected to the terminals at the rear of any of our panel mounting cartridge fuseholders.



Order Code	Type	Price each
FT35Q	Fuseholder Boot	48p

20mm Type

A panel mounting 20mm fuseholder with screwdriver release to meet the latest safety regulations. Rated 10A at 250V AC. Contact resistance 10m Ω at 1A. Insulation resistance 100M Ω at 500V DC. Insulation will withstand 1500V AC for 1 minute between terminals. Overall length 40mm (plus 6mm tag). Bezel diameter 15mm. Panel cut-out 12.5mm diameter flattened to 11.5mm on opposing sides to provide anti-twisting lock.



Order Code	Type	Price each
RX96E	Safuseholder 20	81p

20mm Panel Mount Fuseholder

Bussmann

A panel mount fuseholder that has a threaded cap fuse carrier, and has SEMKO, UL and CSA approval.



General Specification

Electrical rating:	250V, 6-3A, 2-5W
Contact resistance:	$\leq 10\text{m}\Omega$
Insulation resistance:	$\geq 10\text{M}\Omega$
Dielectric strength:	$\geq 2000\text{V AC}$
Flammability rating:	UL94VO
Panel cut-out:	12.7mm diameter flattened to 11mm on one side.
Overall length:	37mm

Manufacturer's Code HTC 35M.

Order Code	Type	Price each
DA59P	20mm P/Mount F/Hold	47p

20mm Vertical PCB Type Fuseholder

A PCB mounting fuseholder that has Semko, UL and CSA approval. The fuseholder has a bayonet fixing cap fuse carrier, and is available in vertical PCB mounting style.



Specification

Electrical rating:	250V, 6.3A, 2.5W
Contact resistance:	$\leq 10\text{m}\Omega$
Insulation resistance:	$\leq 10\text{M}\Omega$
Dielectric strength:	$\leq 2000\text{V AC}$
Flammability rating:	UL94VO
Fixing pin spacing:	10mm
Overall length:	33.1mm (excluding pins)
Diameter:	13mm, flattened on one side to 11.3mm

Order Code	Type	Price each
DA60Q	20mm PCB F/Hold Vert	47p

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01702 554161
Access, Visa, American Express

6A 1 1/4 in Type

A panel mounting 1 1/4 in fuseholder with a flush fitting, square red coloured cap bearing the legend 'FUSE' in black. Fuse cartridge is simply inserted into the cap which pushes into the body, but the latch must align with slot in bevel.



Only a small narrow screwdriver or similar tool can be pushed down into the slot to release the latch in order to gain access to the fuse. Restrain the cap to prevent it flying out of the body. Complies with BS standards.

Max rating 6A @ 250V AC.
Length: 50mm. Bezel 16mm x 16mm square. Panel cut-out 15mm (5/8 in.)

Order Code	Type	Price each
FA39N	1.1.4 Clickcatch F/H	79p

10A 1 1/4 in. Type

A panel mounting 1 1/4 in. fuseholder with screw-driver release to meet the latest safety regulations. Rated 10A at 250V AC. Contact resistance 10mΩ at 1A.



Insulation resistance 100MΩ at 500V DC. Insulation will withstand 1500V AC for 1 minute between terminals. Overall length 48mm (plus 6mm tag). Bezel diameter 18mm. Panel cut-out 15mm diameter flattened to 13.5mm on opposing sides to provide anti-twisting lock.

Order Code	Type	Price each
FD77J	10A Fuseholder 1.1.4	87p

Chassis Mounting 1 1/4 in. Fuseholders Lugged Type



Heavy duty 1 1/4 in. fuseholder with 1/4 in. spade lugs. Nickel-plated clips rated at 30A. There is a 4mm dia. recessed fixing hole and two 3mm dia. plugs on the underside of the holder to locate the holder onto additional holes drilled in the chassis, which prevents unwanted movement. Overall size: 66mm long, 22mm high, 12mm wide.

Order Code	Type	Price each
KU30H	1.25 F/H with Lugs	48p

Screw Type



Chassis mounting moulded 1 1/4 in. fuseholder with tinned phosphor-bronze clip. Single 6BA clear fixing hole. Size: 41mm long, 16mm high, 12mm wide.

Order Code	Type	Price each
RX50E	1.25 F/H with Screws	99p

20mm PCB Type with Cover



A high quality PCB-mounting fuseholder for 20mm fuses equipped with a snap-fitting transparent cover, so that although the live contacts are screened safely, the state of the fuse can be seen clearly. Contacts rated at 6-3A; lead pitch 23.5mm; overall dimensions with cover (excluding lugs): 27mm long x 16mm high x 9mm wide.

Order Code	Type	Price each
KU29G	PCB F/H with Cover	24p

20mm Fuse Block



A quality PCB mounting fuse block for 20mm fuses with an optional protective cover.

General Specification

Electrical rating:	250V, 6-3A, 1-6W
Contact resistance:	≤10mΩ
Insulation resistance:	≥10MΩ
Dielectric strength:	≥2000V AC
Flammability rating:	UL94V1, cover UL94VO
Fixing pin spacing:	23mm
Overall length:	24mm, 26.5mm with cover
Height (excluding lugs):	13mm, 15mm with cover
Width:	8mm, 9mm with cover

Order Code	Type	Price each
DA61R	20mm Fuse Block	14p
DA62S	Fuse Block Cover	18p

20mm Chassis Mounting Fuseholder



A chassis mounting moulded 20mm fuseholder with a 3mm dia. recessed fixing hole. Size 40mm long, 14mm high, 11mm wide.

Order Code	Type	Price each
KC01B	Chassis F/H 20mm	18p



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Fuse Clips

Bulgin

20mm Type 1

Tinned brass clips for 20mm fuses. The lugs are on a 2.54 x 2.54mm (0.1 x 0.1 in.) matrix and will fit into 1.5mm dia. holes.

Two clips are required per fuse.



Order Code	Type	Price each
WH49D	20mm Fuse Clip Type1	5p

20mm Type 2

Tin-plated spring brass fuse clips rated for currents up to 10A. Two required per fuse. The lugs have a lead pitch of 5mm (0.18 in.) and will fit into 1.5mm dia. holes.

Overall dimensions (excluding pins): 10mm high x 4.5mm x 5.5mm.



Order Code	Type	Price each
KU27E	20mm Fuse Clip Type2	5p

1 1/4 in. Fuse Clip

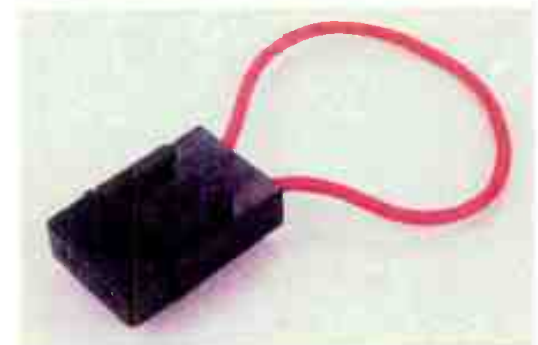
Tin-plated spring brass fuse clips rated for currents up to 15A. Two required per fuse. The lugs have a lead pitch of 7mm (0.28 in.) and will fit into 2mm dia. holes. Overall dimensions (excluding pins): 11.5mm high x 7mm x 8mm.



Order Code	Type	Price each
KU28F	1.25 Fuse Clip	5p

FOR TOP QUALITY & VALUE!

Plug-in In-Line Fuse Holder



A black nylon in-line fuseholder suitable for use with the plug-in type fuses becoming increasingly common in vehicle electrical systems. To use, cut the red wire connected between both terminals to give lead-outs to each terminal. Access to the fuse is by means of a snap-fit lid on the top of the holder, and several of these holders can be fitted together by virtue of a tongue and groove moulded into opposite sides of the casing. The tinned brass contacts are rated for currents up to 30A. Dimensions of body (lid closed): 27mm long, 37.5mm high, 18mm wide.

Order Code	Type	Price each
KU34M	Plug-in Fuseholder	69p

In-Line Type



Bayonet-action in-line car type fuseholder with moulded body, suitable for 1 1/4 in fuses. Length 52mm, diameter 14mm.

Order Code	Type	Price each
RX51F	F/H Car	25p

In-Line 1 1/4 in. Fuseholder

Bulgin



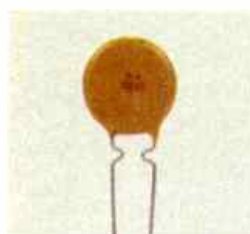
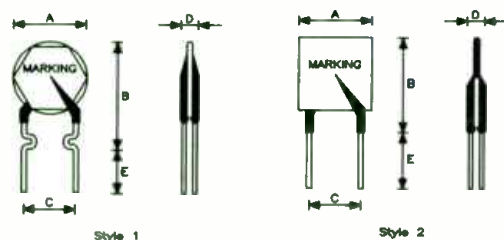
In-car type fuseholder moulded from clear plastic in two parts. These screw-together items house two collars and a spring. Accepts 1 1/4 in. long fuses. Length: 62mm, diameter: 15mm.

Order Code	Type	Price each
RC70M	In-line F/H	£1.10

THE BEST OF SERVICE

FUSES

Electronic Fuses



An overcurrent protection device offering significant advantages over normal fuses, PTC resistors, bimetal strips etc. The device operates in a similar way to a slow-blow fuse yet is solid state and can be simply soldered into the circuit. It latches into a safe high resistance state under overload conditions yet returns to normal operation as soon as the fault is removed.

Dimension D = 3.0mm.

Dimension C = 5.1mm.

In all versions E = 7.6mm except MFR020 = 12mm.

Type	Vmax	Style	A (mm)	B (mm)
MFR020	60	1	6	12.2
MFR030	60	1	7.4	13.0
MFR050	60	1	7.9	13.7
MFR090	60	1	11.7	15.7
MFR110	30	1	8.9	14.5

MFR160	30	1	11.2	15.5
MFR400	30	2	16.0	21.1

Max operating voltage (rms) @ 20°C.

Current and resistance ratings

Ratings @ 20°C; I_h = hold current, fuse will not trip;

R_{nom} = nominal resistance; I_{trip} = typical trip current; Pd = typical power dissipation in tripped state.

Type	I _h A rms	R _{nom} Ω	I _{trip} A rms	Pd W
MFR020	0.20	2.67	0.30	0.40
MFR030	0.30	1.27	0.45	0.50
MFR050	0.50	0.75	0.75	0.75
MFR090	0.90	0.34	1.35	1.00
MFR110	1.10	0.09	1.98	0.70
MFR160	1.60	0.06	2.88	0.90
MFR400	4.00	0.02	7.20	2.50

Absolute maximum interrupt current = 40A RMS.

Resistance in tripped state = V²/PdΩ. Maximum surface temperature in tripped state = +125°C. Typical reset time = <20 seconds @ 20°C.

Order Code	Type	Price each
CP58N	MFR020	£2.99
CP59P	MFR030	£2.99
CP60Q	MFR050	£3.49
UL68Y	MFR090	£3.40
CP61R	MFR110	£3.49
CP62S	MFR160	£3.59
CP63T	MFR400	£4.50

20mm Quickblow Type

Glass tube fuses with nickel-finish brass end caps overall size 20 x 5mm diameter. Fuses rupture within 2 minutes max (1s typical) at 25°C at twice the rated current.

Rupture capacity 35A or 20 times the rated current whichever is greater.

Available in the following ratings:

50mA, 63mA, 80mA, 100mA, 125mA, 160mA, 200mA, 250mA, 315mA, 400mA, 500mA, 630mA, 800mA, 1A,

Order Code	Type	Price each
WR93R	Fuse 20mm 50mA	20p
UJ73Q	Fuse 20mm 63mA	13p
UJ74R	Fuse 20mm 80mA	12p
WR00A	Fuse 20mm 100mA	8p
UJ75S	Fuse 20mm 125mA	8p
WR94C	Fuse 20mm 160mA	8p
UJ76H	Fuse 20mm 200mA	8p
WR01B	Fuse 20mm 250mA	8p
RA01B	Fuse 20mm 315mA	8p
UJ77J	Fuse 20mm 400mA	8p
WR02C	Fuse 20mm 500mA	8p
RA02C	Fuse 20mm 630mA	8p
RA03D	Fuse 20mm 800mA	8p
WR03D	Fuse 20mm 1A	8p
UJ78K	Fuse 20mm 1.25A	8p
WR04E	Fuse 20mm 1.6A	8p
WR05F	Fuse 20mm 2A	8p
UJ79L	Fuse 20mm 2.5A	8p
WR06G	Fuse 20mm 3.15A	8p
UJ80B	Fuse 20mm 4A	8p
WR07H	Fuse 20mm 5A	8p
UJ81C	Fuse 20mm 6.3A	8p
UJ82D	Fuse 20mm 10A	8p



20mm Time Delay Type

Glass tube fuses with nickel-finish brass end caps and silver-plated copper springs, overall size 20 x 5mm diameter. Fuses will not rupture for 5s min (up to 3A rating), 12s min (over 3A) at twice the rated current. Rupture capacity 35A or 20 times the rated current whichever is greater.

Available in the following ratings:

50mA, 63mA, 80mA, 100mA, 125mA, 160mA, 200mA, 250mA, 315mA, 400mA, 500mA, 630mA, 800mA, 1A, 1.25A, 1.6A, 2A, 2.5A, 3.15A, 5A, 6.3A, 10A.

Order Code	Type	Price each
UJ90X	Fuse T/D 50mA	29p
UJ91Y	Fuse T/D 63mA	29p
RA04E	Fuse T/D 80mA	29p
UJ92A	Fuse T/D 100mA	20p
UJ93B	Fuse T/D 125mA	20p
RA05F	Fuse T/D 160mA	20p
UJ94C	Fuse T/D 200mA	20p
RA06G	Fuse T/D 250mA	20p
RA07H	Fuse T/D 315mA	20p
UJ95D	Fuse T/D 400mA	20p
WR18U	Fuse T/D 500mA	20p
RA08J	Fuse T/D 630mA	20p
RA09K	Fuse T/D 800mA	20p
WR19V	Fuse T/D 1A	20p
UJ96E	Fuse T/D 1.25A	20p
RA10L	Fuse T/D 1.6A	20p
WR20W	Fuse T/D 2A	20p
UJ97F	Fuse T/D 2.5A	20p
RA11M	Fuse T/D 3.15A	20p
RA12N	Fuse T/D 5A	20p
RA13P	Fuse T/D 6.3A	20p
UJ98G	Fuse T/D 10A	20p



FOR CASHTEL
Phone 01702 552941

1 1/4 in. Quickblow Type

Glass tube fuses with nickel-finish brass end caps overall size 31.8 x 6.35mm (1 1/4 x 1/4 in.) diameter. Fuses rupture within 2 minutes max (1s typical) at 25°C at twice the rated current and will not rupture within 4 hours at 110% of the rated current. Rupture capacity 35A or 20 times the rated current whichever is greater.

Available in the following ratings:

100mA, 160mA, 250mA, 500mA, 630mA, 800mA, 1A, 1.25A, 1.6A, 2A, 2.5A, 3.15A, 4A, 5A, 6.3A, 10A, 15A.

Order Code	Type	Price each
WR08J	Fuse 1.1/4 100mA	9p
WR96E	Fuse 1.1/4 160mA	9p
WR09K	Fuse 1.1/4 250mA	10p
WR10L	Fuse 1.1/4 500mA	10p
UJ83E	Fuse 1.1/4 630mA	10p
UJ84F	Fuse 1.1/4 800mA	10p
WR11M	Fuse 1.1/4 1A	10p
UJ85G	Fuse 1.1/4 1.25A	10p
WR12N	Fuse 1.1/4 1.6A	10p
WR13P	Fuse 1.1/4 2A	10p
UJ86T	Fuse 1.1/4 2.5A	10p
WR14Q	Fuse 1.1/4 3.15A	10p
UJ87U	Fuse 1.1/4 4A	10p
WR15R	Fuse 1.1/4 5A	10p
UJ88V	Fuse 1.1/4 6.3A	10p
WR16S	Fuse 1.1/4 10A	10p
UJ89W	Fuse 1.1/4 15A	10p



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1 1/4 in. Time Delay Type

Glass tube fuses with nickel-finish brass end caps and silver-plated copper springs, overall size 31.8 x 6.35mm (1 1/4 x 1/4 in.) diameter. Fuses will not rupture for 5s min (up to 3A rating), 12s min (over 3A) at twice the rated current. Rupture capacity 35A or 20 times the rated current whichever is greater.



Available in the following ratings: 100mA, 160mA, 250mA, 500mA, 630mA, 800mA, 1A, 1.25A, 1.6A, 2A, 2.5A, 3.15A, 5A, 6.3A, 10A, 15A.

Order Code	Type	Price each
UK58N	Fuse 1.1/4 T/D 100mA	20p
UK99H	Fuse 1.1/4 T/D 160mA	20p
UK00A	Fuse 1.1/4 T/D 250mA	20p
UK01B	Fuse 1.1/4 T/D 500mA	20p
UK02C	Fuse 1.1/4 T/D 630mA	20p
UK03D	Fuse 1.1/4 T/D 800mA	20p
UK04E	Fuse 1.1/4 T/D 1A	20p
UK05F	Fuse 1.1/4 T/D 1.25A	20p
UK06G	Fuse 1.1/4 T/D 1.6A	20p
UK07H	Fuse 1.1/4 T/D 2A	20p
UK08J	Fuse 1.1/4 T/D 2.5A	20p
UK09K	Fuse 1.1/4 T/D 3.15A	20p
UK10L	Fuse 1.1/4 T/D 5A	20p
UK11M	Fuse 1.1/4 T/D 6.3A	20p
UK12N	Fuse 1.1/4 T/D 10A	20p
UK13P	Fuse 1.1/4 T/D 15A	20p

Blade-Type Fuses

Fuses intended as standard plug-in replacements for those fitted to recent European cars. Available in the following ratings: 5A (Tan), 7.5A (Brown), 10A (Red), 15A (Light Blue), 20A (Yellow), 25A (Clear), 30A (Green).



Order Code	Type	Price each
KU25C	Blade Fuse 5A	11p
KU26D	Blade Fuse 7.5A	11p
KU21X	Blade Fuse 10A	11p
KU22Y	Blade Fuse 15A	11p
KU23A	Blade Fuse 20A	11p
KU24B	Blade Fuse 25A	11p
CJ78K	Blade Fuse 30A	11p

1 in Type Domestic Mains Fuses

Standard electrical plug fuses to BS1362. Size 1 in (25.4mm) long x 1/4 in (6.4mm) dia.



Available in the following ratings: 2A, 3A, 5A, 7A, 10A, 13A. Available singly and in packs of 10

Order Code	Type	Price each
HQ31J	Plug Fuse 2A	16p
HQ32K	Plug Fuse 3A	16p
HQ33L	Plug Fuse 5A	16p
DK19V	Plug Fuse 7A	16p
DK20W	Plug Fuse 10A	16p
HQ34M	Plug Fuse 13A	16p
AR36P	Plug Fuse 2A 10pk	£1.29
AR37S	Plug Fuse 3A 10pk	£1.29
AR38R	Plug Fuse 5A 10pk	£1.29
AR39N	Plug Fuse 7A 10pk	£1.29
AR40T	Plug Fuse 10A 10pk	£1.29
AR41U	Plug Fuse 13A 10pk	£1.29

Thermal Fuses



A range of thermal fuses which will protect any equipment or appliance from excessive temperature rise by cutting off the supply, since they are connected into a circuit in the same way as an 'ordinary' fuse would be. These thermal fuses offer a low impedance when operational, but will go open circuit if their temperature range threshold is exceeded. They will serve to protect equipment from heat damage if the source of excess heat originates within the equipment itself as the result of a fault, cutting off the power where the ordinary fuse fails to do so because the current load is not great enough, yet there is enough power being converted to heat to start a fire. These devices are extensively applied in industry in the manufacture of sandwich toasters, water heaters, hair curlers etc. They are not resettable and must be replaced if 'blown'. NOTE: when installing any of these devices never solder directly to the wire leads - you must use screw terminals, terminal blocks or crimped on connectors. Size of body: 14mm long x 4mm dia. Lead length (each end): 34mm. Rating: 240V @ 10A max. Rupture current: 40A (resistive), 20A (inductive). Open circuit breakdown voltage: 1200V AC. Opening threshold temperature tolerance: +0°C -4°C.

General Purpose Range

A range of thermal fuses covering a wide range of operating temperatures, available as follows: 91°C, 128°C, 152°C, 167°C, 184°C, 192°C, 228°C, 240°C

Order Code	Type	Price each
RA14Q	Thermal Fuse 91C	60p
RA15R	Thermal Fuse 128C	60p
RA17T	Thermal Fuse 152C	60p
RA18U	Thermal Fuse 167C	60p
RA19V	Thermal Fuse 184C	60p
RA20W	Thermal Fuse 192C	60p
RA22Y	Thermal Fuse 228C	60p
RA23A	Thermal Fuse 240C	60p

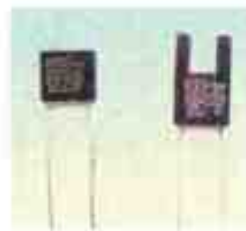
Audio Range

A range of thermal fuses formulated especially for applications in audio equipment, test instruments etc. Temperature ratings available are: 72°C and 110°C.

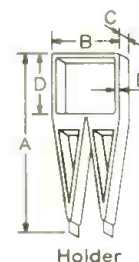
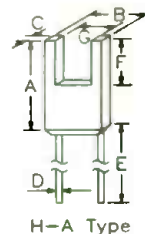
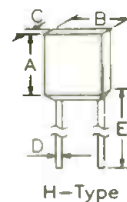
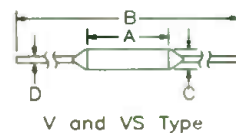
Order Code	Type	Price each
RA61R	Thermal Fuse 72C	60p
RA64U	Thermal Fuse 110C	60p

Thermal Cut-outs Cliff

A range of low-cost, one-shot, thermal cut-outs for circuit protection applications, that are available with either radial or axial leads. They can be used to prevent overheating of electrical components such as motors, transformers and solenoids, and electronic equipment such as computers, switching power supplies etc. The cut-outs are manufactured using tin/lead-plated soft copper wire leads that are welded to a fusible alloy with a specific melting point. To prevent surface oxidation and to ensure complete cut-off function at melting point, the alloy is coated with special resins. The fusible alloy is completely insulated within the case by sealing the leads and the case with a special resin compound. The radial lead type is available in a PCB/hard wiring (H type) or screw mounting version (H-A type), and the axial lead (V type) is additionally available in a subminiature version (VS type). Rated at 2A 250V AC (axial subminiature rated at 1A 250V AC). Approved (or in some cases pending) by UL, CSA, VDE and JEAML. A simple plug-in holder for



mounting H type cut-outs is available that is made from PBT and does not require an insulation tube. Note: IEC specifications state that thermal cut-outs when conducting the detection current, and subject to the increasing rate of temperature designated by the specification, must function in the tolerance range +0°C to -10°C of the nominal operating temperature.



Type	Dimensions mm			
	A	B	C	D
H type	6	7	2.5	0.55
H-A type		11	7	2.5 0.55
V type	9	2.50	145	0.58
VS type		6.4	2.00	145 0.53
Holder	20	8	2.4	8

	Dimensions mm		
	E	F	G
H type	68	—	—
H-A type		68	4.5 3.2
Holder	0.5		

Manufacturer's Code	Type	Nom. operating temp. °C	Stock Code
H100	radial	103	DA68Y
H125	radial	127	DA69A
H145	radial	150	DA70M
H110A	screw mount	117	DA77J
H130A	screw mount	136	DA78K
H160A	screw mount	165	DA79L
V125	axial	131	DA71N
V130	axial	135	DA72P
V145	axial	150	DA73Q
VS12	submin axial	128	DA74R
VS13	submin axial	135	DA75S
VS14	submin axial	150	DA76H

Order Code	Type	Price each
DA68Y	Thermal Cutout H100	35p
DA69A	Thermal Cutout H125	35p
DA70M	Thermal Cutout H145	35p
DA77J	Thermal Cutout H110A	35p
DA78K	Thermal Cutout H130A	35p
DA79L	Thermal Cutout H160A	35p
DA71N	Thermal Cutout V125	35p
DA72P	Thermal Cutout V130	35p
DA73Q	Thermal Cutout V145	35p
DA74R	Thermal Cutout VS12	35p
DA75S	Thermal Cutout VS13	35p
DA76H	Thermal Cutout VS14	35p
DA80B	Therm Cutout Holder	9p

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Auto-Reset Circuit Breaker



A useful range of compact circuit breakers with an auto-reset facility. Designed to withstand overload but to trip quickly on short circuits, the circuit breaker latches into an 'off' state under fault conditions and automatically returns to the 'on' state after a set period of time. If the fault condition still exists the unit will immediately latch 'off' again. This process of checking the circuit will continue until the fault is cleared. The range is suitable for working at voltages up to 250V AC, and offers seven rated 'holding-current' values. Connections are via two solder tags 7mm long. Overall dimensions: 29 x 12.5 x 6mm. Range available: 1.0A, 1.6A, 2.2A, 3.0A, 5.0A, 7.0A, 10.0A.

Order Code	Type	Price each
AK07H	Auto Breaker 1.0A	99p
AK08J	Auto Breaker 1.6A	99p
AK09K	Auto Breaker 2.2A	99p
AK10L	Auto Breaker 3.0A	99p
AK11M	Auto Breaker 5.0A	99p
AK12N	Auto Breaker 7.0A	99p
AK13P	Auto Breaker 10.0A	99p

Fuse Wire

A card on which is wound three pieces of fuse wire. 5A, 15A and 30A.



Order Code	Type	Price each
HB51F	Fuse Wire	32p

TEMPERATURE INDICATOR LABELS



A range of non-reversible temperature labels that are designed for monitoring rises in temperature, operating temperatures, or the failure to reach a particular temperature. Each label has 8 temperature levels which turn from grey/white to black when the indicated temperature has been reached. A black label would clearly indicate that a component or product has failed due to excessive heat, and a white label would indicate that a product has failed due to insufficient heat e.g., a fusing process. Up to 100°C, the label has

an accuracy of $\pm 1^\circ\text{C}$, and $\pm 1\%$ of its rating above 100°C. Sold in packs of 5, the labels are self-adhesive and very easy to use.

Temperature ranges °C								
	40	43	46	49	54	60	66	71
Level A	40	43	46	49	54	60	66	71
Level B	77	82	88	93	99	104	110	116
Level C	121	127	132	138	143	149	154	160

Order Code	Type	Price each
KR17T	Level A Temp Label	£2.25
BT41U	Level B Temp Label	£2.25
BT42V	Level C Temp Label	£2.25

SUPPRESSORS

RF Suppressor Chokes



Designed for use at 250V AC these small heavy current rf chokes are ideal for the suppression of motor-driven appliances and in input circuits of power units. Inductance is approximately 6µH. PVC sleeve is colour coded. Three types are available.

Rating	Length	Diameter	Colour code
1 Amp	15mm	5.1mm	White
2 Amp	19mm	5.1mm	Yellow
3 Amp	23mm	7.6mm	Black

Order Code	Type	Price each
HW04E	RF Supp Choke 1A	38p
HW05F	RF Supp Choke 2A	42p
HW06G	RF Supp Choke 3A	52p

Contact Suppressor

A 120Ω resistor ($\pm 30\%$ tolerance) and 0.1µF ($\pm 20\%$ tolerance) capacitor connected in series. Connect directly across switch or relay contacts etc. to suppress interference when switching reactive loads. Also useful as a snubber network in SCR and triac protection. Max voltage 250V AC.



Order Code	Type	Price each
YR90X	R-C Network	£1.99

Transient Suppressors

These devices are simply connected directly across the power supply. They have a very high resistance up to the V_m voltage shown in the table below and therefore usually may be ignored, but the moment a transient spike appears on the supply line which exceeds V_m , the impedance of the device drops immediately to a very low level while it dissipates the unwanted energy. Choose the suppressor to have a V_m voltage equal to or above the voltage of the power supply it is to be connected across. For example, Suppressor 5-5V DC is ideal for 5V logic power supplies, while both Suppressor 250V AC and Suppressor 275V AC can be connected directly across the UK mains supply.

Type	Device marking	Continuous voltage (max) V_m	Continuous voltage (max) V_m	Peak current*	Clamping voltage*
5-5V DC	08Z1	4V	5-5V	100A	22V @ 5A
14V DC	18Z1	10V	14V	250A	42V @ 5A
18V DC	22Z1	14V	18V	250A	47V @ 5A
22V DC	27Z1	17V	22V	250A	57V @ 5A
26V DC	33Z1	20V	26V	250A	68V @ 5A
31V DC	39Z1	25V	31V	250A	79V @ 5A
38V DC	47Z1	30V	38V	250A	92V @ 5A
56V DC	68Z2	40V	56V	250A	127V @ 5A

Type	Device marking	Continuous voltage (max) V_m	Continuous voltage (max) V_m	Peak current*	Clamping voltage*
130V AC	1305	130V	175V	2500A	340V @ 25A
250V AC	250L	250V	330V	2500A	650V @ 25A
275V AC	275L	275V	369V	2500A	710V @ 25A

DC types: Average power dissipation 0.25W max
Diameter 8.25mm ± 0.75 mm
Lead pitch 4.5mm ± 1.5 mm

AC types: Average power dissipation 0.4W max
Diameter 11.25mm ± 1.25 mm
Lead pitch 7.5mm ± 1 mm

Please note that the use of DC and AC in the description is simply an indication of its most likely use. All types can be used equally in AC or DC circuits up to the V_m stated.



* Current ratings are for a typical transient pulse where peak current is reached in 8µs and the pulse has decayed to 50% of its peak value after a further 12µs. It is a standard method of rating these devices and is usually described as an 8/20µs current wave rating.

For voltage transient suppressors with low clamping voltages, and near instantaneous response times (≈ 1 ps) see Table 21 in Semiconductors Section.

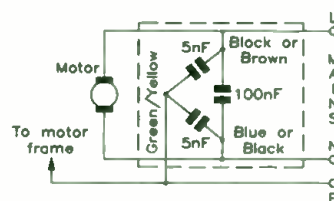
Order Code	Type	Price each
CP67X	Suppressor 5.5VDC	48p
CP68Y	Suppressor 14VDC	48p
CP69A	Suppressor 18VDC	36p
CP70M	Suppressor 22VDC	45p
CP71N	Suppressor 26VDC	50p
CP72P	Suppressor 31VDC	40p
CP73Q	Suppressor 38VDC	40p
CP74R	Suppressor 56VDC	50p
CP75S	Suppressor 130VAC	45p
HW13P	Suppressor 25CVAC	60p
CP76H	Suppressor 275VAC	45p

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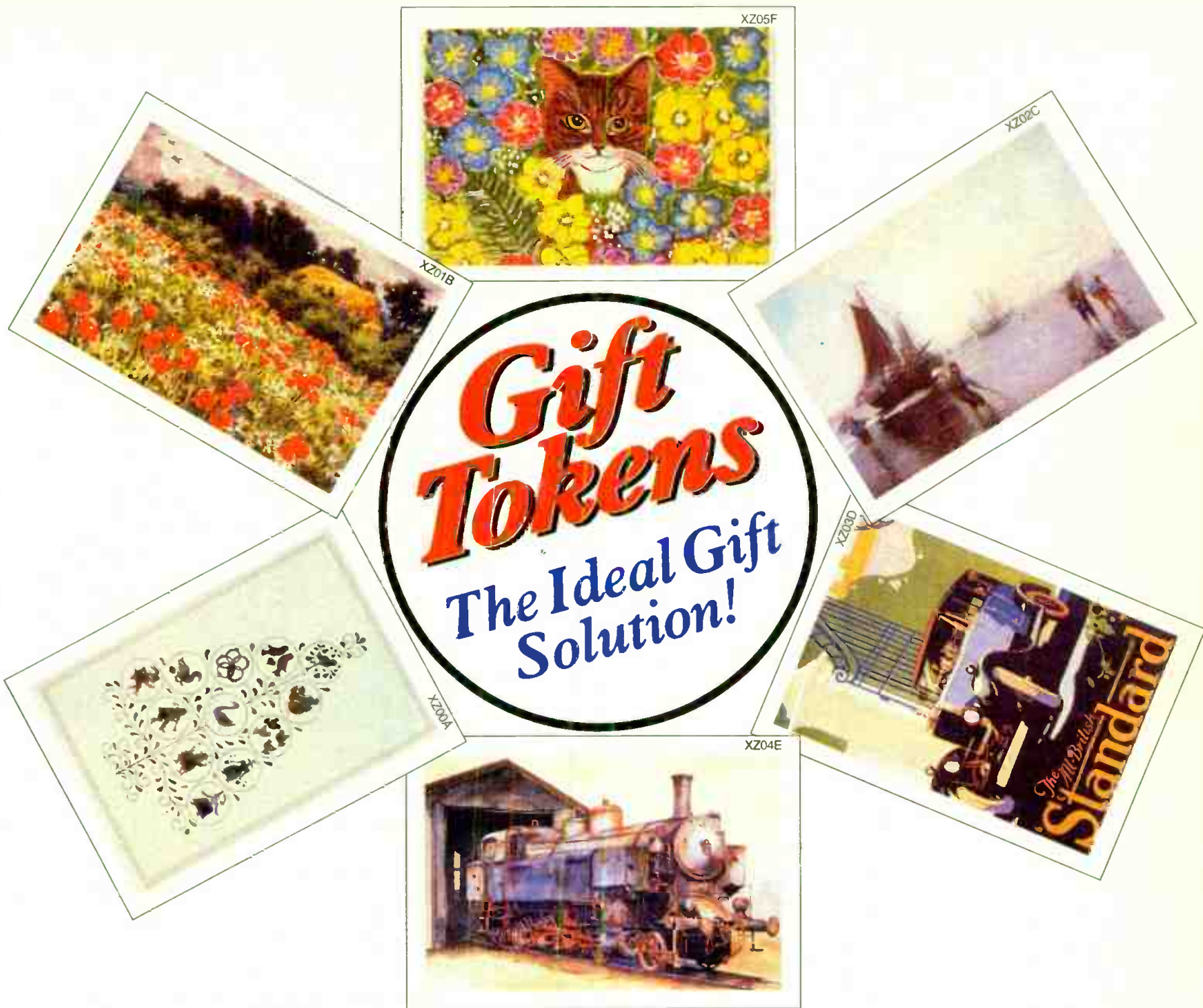
Motor Suppressor



For radio suppression of small electric motors and domestic appliances. 250V AC. Connect as close as possible to the source of interference. 0.1µF + 0.005µF + 0.005µF.



Order Code	Type	Price each
HW07H	Delta Cap	£1.20

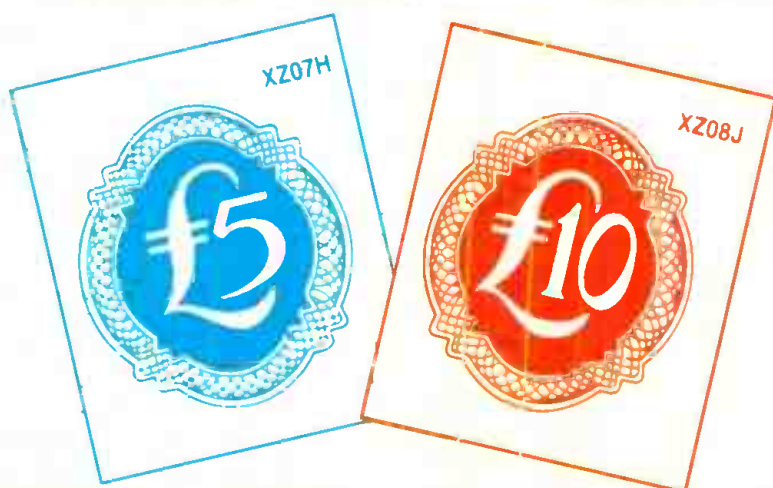


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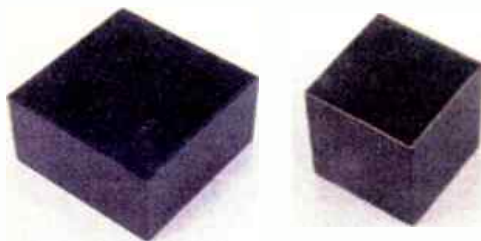
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Accessories for Enclosures	585	Fans	598	Plastic Enclosures	572
Aluminium Knobs	590	Instrument Cases	580, 583	Plastic Knobs	589
Collet Knobs	591	Metal Enclosures	579	Spacers	595
Dials and Accessories	592	Miscellaneous Hardware	597	Wall Box	582

PLASTIC BOXES

Potting Boxes



A range of Potting Boxes for use with our Potting Compound (see end of Tools section). Boxes are moulded in black ABS.

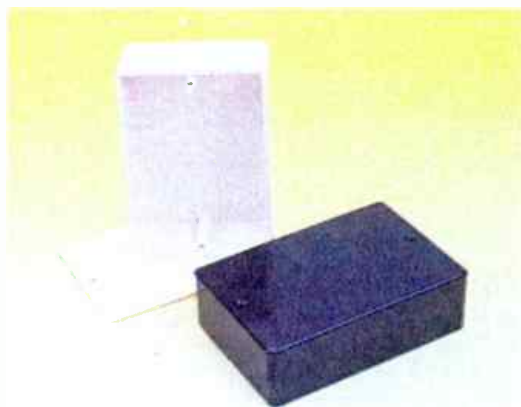
Internal dimensions (mm):

Type	Length	Width	Height
Cube	23	23	24
Miniature	28	18	14
Small	38	38	19
Medium	48	48	29
Large	73	48	34
Extra Large	98	58	24

Wall thickness is 1mm (except Extra Large where it is 1.3mm). Length and width are a fraction less at base of box as sides taper slightly. Dimensions shown are measured at top of box.

Order Code	Type	Price each
FD96E	Potting Box Cube	32p
LH56L	Potting Box Min	25p
LH57M	Potting Box Small	35p
FD97F	Potting Box Medium	39p
LH59P	Potting Box Large	49p
FD98G	Potting Box Ex Large	59p

Small Plastic Boxes



Small plastic box available in black or white. Size: 114 x 76 x 38mm.

Order Code	Type	Price each
LF01B	Box PB1 White	£1.39
LH14Q	Box PB1 Black	£1.39

Small Narrow Box

This small box conveniently fills the gap between matchbox sized plastic cases and the more 'conventionally' sized hand-held boxes where the latter may be too unwieldy for certain uses. The moulded black plastic box is 124mm long by 33mm wide by 30mm deep, internal; 120mm long by 30mm wide by 25mm deep. It has a removable lid which forms a good seal, and is secured with four self-tapping screws, supplied. Ideal for small, hand-held probes, miniature circuits or even as a housing for the protection of a block of screw terminals serving as a junction box for a number of cables etc.



Order Code	Type	Price each
FT31J	Small Narrow Box	89p

Probe Box

Union Brothers

A small box designed for use as logic probes etc. The black injection moulded box comes in a total of seven parts, comprising left and right shell halves, a top panel, a pair of internal fixing pillars which join both shells together, and a moulded probe boss and fixing grommet. A metal probe is included. The top panel includes a rectangular cutout 17 x 10mm, 33mm from one end, which has recessed edges on the underside into which a piece of coloured display filter or celluloid can be glued. The shell halves have a central hole in each end, 5mm diameter for the probe boss, and 4mm for cable entry. Four countersunk screws are provided for fitting. The box has rounded edges and corners.

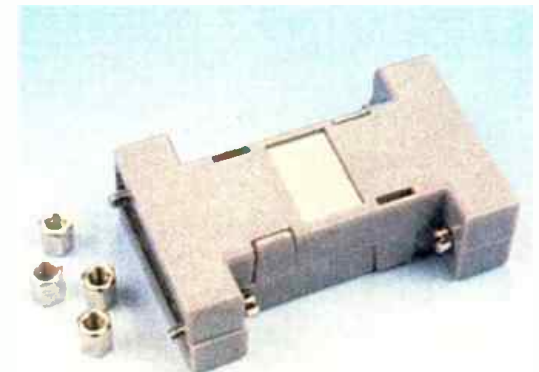
External dimensions, 130 x 34 x 30mm.
Internal, 126 x 26 x 26mm.



Order Code	Type	Price each
JX57M	Logic Probe Box	£1.60

9 Way D-type Box

Union Brothers



A small plastic box designed to house two 9 way D-type connectors. Small circuits may be built into the box, there is a 27.5 x 14.5mm area between the connectors which can accommodate items up to 12mm high. The box is in two parts that clip together. Both parts of the case have 16 x 9.5mm recesses, through which LEDs etc may be mounted. The box is supplied with two pairs of jack screws and posts. Connectors type RK60Q, RK61R, JB39N and JB42V from our range of connectors will fit this box.

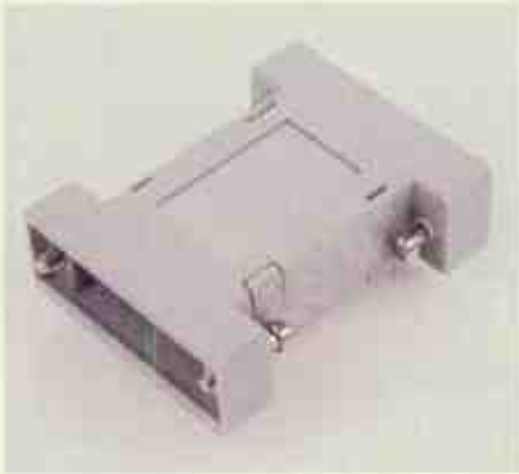
Order Code	Type	Price each
JM07H	9 way Plastic D Box	89p

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15 Way D-type Box

Union Brothers

A small plastic box designed to house two 15 way D-type connectors. Small circuits may be built into the box, there is a 37 x 21.5mm area between the connectors which can accommodate items up to 12mm high. The box is in two parts that clip together. Both parts of the case have 15.8 x 25.8mm recesses through which LED's etc. may be mounted. The box is supplied with two pairs of jack screws. Connectors type BK58N, BK59P, JB30H and JB34M from our range of connectors will fit this box.



Order Code	Type	Price each
JW53H	15W Plastic D Box	69p

25 Way D-type Boxes



A novel plastic case designed so that a 25-way D connector will fit in each end. Small circuits may be built into the box which has a useful internal size of 38mm between connectors, 36mm wide and 11mm deep. Boxes snap together with interlocking clips. Two



types of box are available. One has a 33 x 21.5mm window cut in one side for access to wiring panel, switches, LED's or whatever. The boxes are a very versatile means of making small in-line testers or projects on RS232 circuits. The boxes are supplied with two pairs of screws and washers which will mate with standard jack posts. Connectors type YQ48C, YQ49D, FS82D and FS84F from our range will fit in these boxes.

Order Code	Type	Price each
JB03D	Plastic D Box	89p
JB04E	Plastic D Box + Open	89p

25 Way D-type to 36 Way Centronics Box



A small plastic box designed to house one 25 way D-type connector and one 36 way centronics connector. Small circuits may be built into the box, there is a 33.5 x 35.5mm area between the connectors which can accommodate items up to 12mm high. The box is in two parts that clip together. Both parts of the case have 32.8 x 21.8mm recesses through which LED's etc. may be mounted. The box is supplied complete with one pair of jack screws. Connectors type FV87U, YQ48C, YQ49D, FS82D and FS84F from our range of connectors will fit this box.

Order Code	Type	Price each
JW56L	25D/36Cent Plas Box	89p

36 Way Centronics Box

Union Brothers



A small plastic box designed to house two 36 way centronics connectors. Small circuits may be built into the box, there is a 36 x 43mm area between the connectors which can accommodate items up to 14mm high. The box is in two parts that clip together. Both parts of the case have 21.8 x 32.8mm recesses through which LED's etc may be mounted. Connector type FV87U from our range of connectors will fit this box.

Order Code	Type	Price each
JW54J	36W Cent Plastic Box	89p

9 Way D-type to 25 Way D-type Box

Union Brothers

A small plastic box designed to house one 9 way D-type connector and one 25 way D-type connector. Small circuits may be built into the box, items up to 12mm high can be accommodated. The box is in two parts that clip together. The box is supplied complete with two pairs of jack screws. Connectors type RK60Q, RK61R, JB39N, JB42V, YQ48C, YQ49D, FS82D and FS84F will fit this box.



Order Code	Type	Price each
JW55K	9W/25W Plastic D Box	84p

Multi-purpose Plastic Boxes



A range of three small boxes moulded in high impact ABS to give maximum strength. The lid is retained by four countersunk self-tapping screws.

External dimensions (mm):			
Type	Length	Width	Depth
T2	75	56	25
T3	75	51	25
T4	111	57	22

Order Code	Type	Price each
KC91Y	T2 Box	90p
KC92A	T3 Box	90p
KC93B	T4 Box	£1.15

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MB Plastic Boxes

A range of glossy and matt finish black plastic boxes moulded in ABS with brass inserts. Lid and screws to fix lid are supplied. Lid is lipped to ensure a good fit. Insides of all except MB6 are grooved on all walls to accept pcb's etc. Types MB4 and MB6 have a matt external finish.



Type	Internal (mm)	External (mm)
MB1	76 x 58 x 38.5	79 x 61 x 40
MB2	97 x 73 x 39.5	100 x 76 x 41
MB3	115 x 95 x 43.5	118 x 98 x 45
MB4	208 x 122 x 81	216 x 130 x 85
MB5	145 x 95 x 57.5	150 x 100 x 60
MB6	214 x 143 x 61	220 x 150 x 64
MB7	172 x 115 x 79	177 x 120 x 83
MB8	145 x 75 x 46	150 x 80 x 50



Order Code	Type	Price each
LH20W	ABS Box MB1	£1.59
LH21X	ABS Box MB2	£1.79
LH22Y	ABS Box MB3	£1.99
LH23A	ABS Box MB4	£5.99
YN40T	ABS Box MB5	£2.89
YN39N	ABS Box MB6	£4.59
KC89W	ABS Box MB7	£3.99
KC90X	ABS Box MB8	£2.49

VIDEO BANK

Designed to complement the 'Audio Bank', the 'Video Bank' is made to the same high quality, and includes the same automatic compartment slip out when the unit is opened. The 'Video Bank' vertically holds 10 VHS cassettes for optimum use of storage space and media protection. Complementary side labels are included for easy identification of the video cassettes.
 Dimensions: 390 x 209 x 141mm.

GREAT VALUE!

£9.99

BZ08J

[A2]

Small Mountable Boxes



Dimensions (mm):	Internal	External
PX-1	49.5 x 99.5 x 4C	54.5 x 104.5 x 42
PX-2	58 x 123.5 x 40.5	64.5 x 129.5 x 42.5
PX-3	84.5 x 144.5 x 50	90 x 149.5 x 52.5
PX-4	109.5 x 179.5 x 60	114.5 x 184.5 x 62.5

Order Code	Type	Price each
YU52G	ABS Box PX1	£1.10
YU53H	ABS Box PX2	£1.29
YU54J	ABS Box PX3	£1.89
YU55K	ABS Box PX4	£2.79

A group of three small boxes having the distinctive feature of being provided with two holes in the base, whereby the boxes may be attached or mounted to a wall or panel. The holes are countersunk from the inside. The boxes are white in colour and have removable lids with chamfered edges retained by four screws.

Dimensions (mm):	Type	Length	Width	Depth
	1521	50	37	24
	321	75	50	25
	3415	102	76	38

Order Code	Type	Price each
FK72P	Box 1521	79p
FK73Q	Box 321	99p
FK74R	Box 3415	£1.49

PX Plastic Boxes

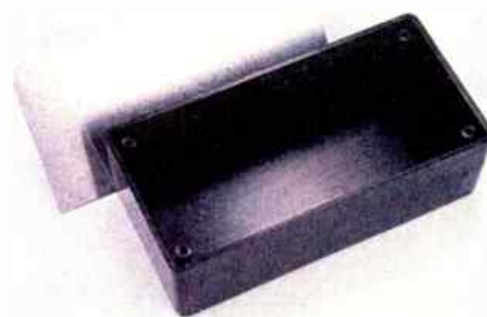
Union Brothers



A range of glossy finish grey plastic boxes, moulded in ABS. Lid and screws to fix lid are supplied. The lid is lipped to ensure a good fit. The insides of all the boxes have slotted walls to accept PCBs etc. Note: the walls of the box have a slight slant from top to bottom of the box.

Plastic Boxes with PCB Guide Slots

Union Brothers

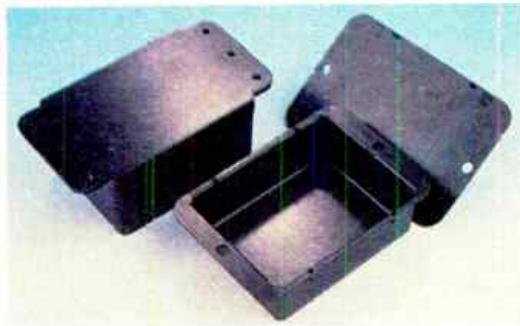


A range of glossy black finished plastic boxes with a recessed aluminium top panel. The box has guide slots for holding 1.5mm thick PCBs etc. The aluminium panel is 1mm thick and secured by four self-tapping screws, supplied with the box. Type M4005 is for the Audio Waveform Generator Project LP01B.

Type	Internal (mm)	External (mm)
SB-1BA	100 x 50 x 37	105 x 55 x 42
SB-2BA	125 x 60 x 37	130 x 65 x 42
SB-3BA	145 x 85 x 48	150 x 90 x 53
SB-4BA	180 x 110 x 58	185 x 115 x 63
M4005	156 x 92 x 50	161 x 96 x 59

Order Code	Type	Price each
BZ27E	PCB Slot Box 1BA	£1.89
BZ28F	PCB Slot Box 2BA	£2.10
BZ29G	PCB Slot Box 3BA	£2.69
BZ30H	PCB Slot Box 4BA	£3.49
WY02C	Box M4005	£3.45

Boxes with Base



Boxes with loose fitting bases which may be secured when the box is fixed to a panel or bulkhead. Alternatively, the base may be riveted to the box flange to form a tamper-proof housing. The boxes are moulded in black ABS.

Dimensions (mm):

Type	Dimensions of base	Internal dimensions	Overall height
1	49 x 28.5	33 x 25 x 10	13
2	105 x 72	82 x 64 x 28	32
3	116 x 64	80 x 60 x 42	46

Fixing centres: Type 1: 43 x 22 x 2mm dia. holes.

Type 2: 94 x 5mm dia. holes.

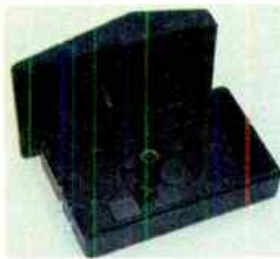
Type 3: 100 x 42 x 4mm dia. holes.

There is a slot (e.g. for cable entry) 7 x 4mm cut near one corner, on Type 2 Box; 6 x 4.5mm on Type 1 Box.

Order Code	Type	Price each
JX56L	Box and Base Type 1	69p
YN36P	Box and Base Type 2	£1.06
YN37S	Box and Base Type 3	99p

Miniature Sloping Case

A highly adaptable miniature case ergonomically designed for desk, dashboard, pocket etc. that can be used either way up for the desired application. The case is made from high-impact ABS with a matt finish on all

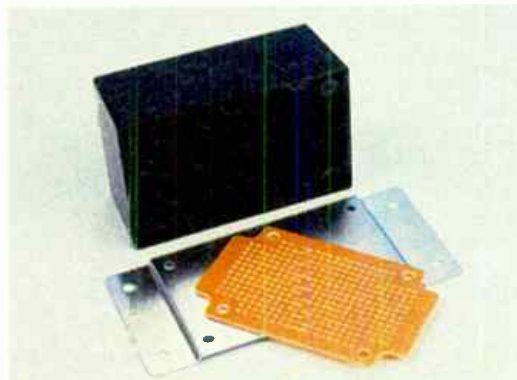


surfaces except for a polished recessed panel on the largest flat surface. The two halves of the case are held together by a single self-tapping screw and a cable knock-out is provided for flying lead applications. Overall dimensions (mm): 71 x 44 x 28 at highest, 22mm and 17mm at the ends.

Order Code	Type	Price each
KC96E	Min Sloping Case	69p

Boxes with Base and Matrix Board

Union Brothers



A range of neat black plastic boxes with aluminium base plates. Boxes are supplied with 0.1 inch pitch matrix board for circuit assembly. The boxes have extra mounting pillars for fixing the board in place.

Supplied complete with screws for base plate and board. The matrix board has rows of circular copper pads, to which component leads are soldered, connection between components may be made using the wiring system described in the PCB Equipment Section of this catalogue. Clearance from the wiring side of the board is 5mm, care should be taken to ensure that there are no protruding wires to short against the base plate.

Dimensions (mm):

Type	Internal	Base
TB-14	49 x 79 x 33.5	50.5 x 114
TB-15	64 x 101 x 38	65.5 x 139.5
TB-16	79 x 129 x 38	80 x 171.5

Type	Height	Fixing centres
TB-14	37	100 x 34 x 4
TB-15	42	123 x 45 x 4
TB-16	42	155 x 56 x 4

Order Code	Type	Price each
YU45Y	Base Box & PCB TB14	£2.99
YU46A	Base Box & PCB TB15	£3.99
YU47B	Base Box & PCB TB16	£4.99

Transparent Box



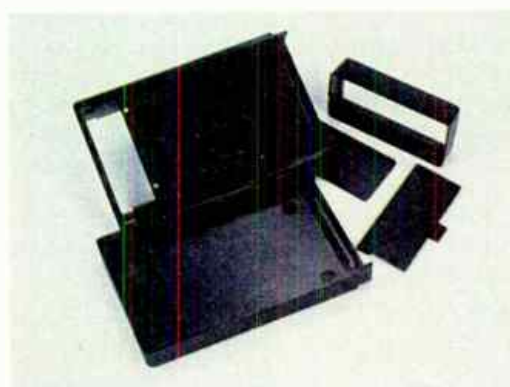
A transparent box manufactured in smoked plastic. The two halves of the box slide together and guides are provided to hold a PCB in place. There is sufficient room for a 9V PP3 type battery. Additionally the two halves may be cut-down lengthways to make the box shorter. Ideal for hand held devices such as infra-red remote controls and other similar projects.

External Dimensions (mm)

141.5 x 57 x 23.5

Order Code	Type	Price each
YU94C	Transparent Box	£5.49

Small Remote Control Box

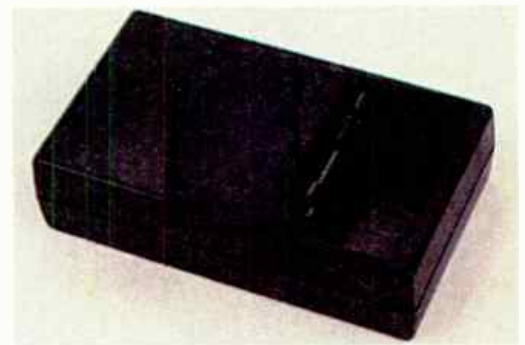


A small, flat box with a smart recessed panel and surround at one end, readily suitable as a hand-held transmitter/sender as part of a remote control system. The box includes a battery compartment with removable slide-on lid, particularly suitable for PP3 etc. The box is split in two halves using a tongue and groove type joint, secured by two screws. The 'front panel' surround is removable as a unit, allowing access to the plastic panel itself, which is then free to allow hole-cutting for ultrasonic/infra-red transmitting devices, cables etc. The box is 119mm long x 67mm wide x 32.5mm deep. Front panel area is 62 x 27mm. The box is moulded in matt black finish plastic. Two fixing screws supplied.

Order Code	Type	Price each
LH90X	Small Remote Cntrl Bx	£3.99

Plain Hand-Held Boxes

Retex



Injection moulded black rectangular boxes ready to be drilled or cut to your own design, having no preformed apertures or panels unlike many other boxes of this type. Each comprises top and bottom halves with lipped joint. Each includes a battery compartment which can contain one PP3 battery, with a removable door with quick release catch and lipped edges.

Type HH1

Type HH1 has four PCB mounting pillars in the base and the two halves are attached with just two screws. Supplied with four short and two long self-tap screws. Outer dimensions: 105 x 61 x 28mm. PCB space (absolute max.): 66 x 50mm x height 15mm. Battery space: 55 x 29 x 19mm.

Type HH2

Type HH2 has five PCB mounting pillars in the base and the two halves are attached with four screws. Supplied with five short and four long self tap screws. Outer dimensions: 145 x 80 x 34mm. PCB space (absolute max.): 94 x 74mm x height 18.5mm. Battery space: 74 x 30 x 28mm.

Order Code	Type	Price each
ZB17T	Plain HH1 Box	£2.49
ZB16S	Plain HH2 Box	£4.29

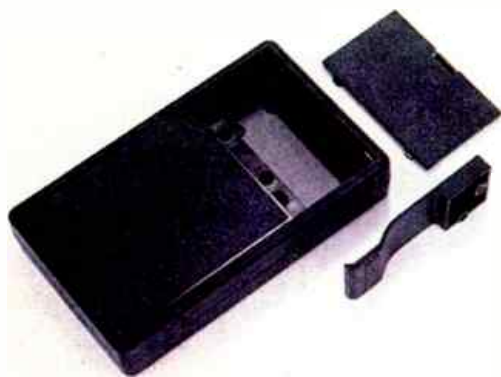


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Hand Held Case with Pocket Clip Option

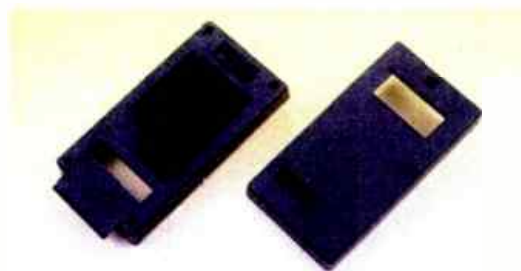


A moulded, high-impact ABS case with integral PP3 battery compartment that is accessible by a separate removable cover. Clip-in battery terminals are supplied as standard, and the pocket clip, if required, can be easily fixed to the case by the two self-tapping screws supplied. The two main halves of the case are held together by the two self-tapping screws supplied, which are concealed by the battery cover. Four integral location pegs and sockets will hold a PCB in place without further fixing. The overall finish of the case is matt with highlighted feature panels making it ideal for personalised products.

Overall dimensions: 103 x 62 x 23mm (without clip).

Order Code	Type	Price each
KC95D	Pocket Clip Case	£3.29

Calculator-Style Hand-Held Box



An attractive calculator-style hand-held box moulded in black ABS plastic with a textured finish. A battery compartment is moulded into the case and has its own clip-on cover. The compartment will accept two PP3 batteries. Three pillars are provided in the base to which a PCB measuring 105 x 56mm may be fixed using No. 4 self-tapping screws. A PCB (107 x 71mm) can also be mounted in the top section using the pillar next to the battery compartment. The box is supplied with four self-tapping screws for holding the two parts together. In the top section of the case (window end) there is a removable insert to facilitate cable entry.

Overall size: 154 x 81 x 37.5/33mm.

Window size: 49 x 20mm.

Order Code	Type	Price each
YK24B	Calc-Style Box	£4.99

Grey ABS Plastic Box



A plastic box moulded in grey ABS with brass inserts. Lid is lipped to ensure a good fit and fixing screws are supplied. The box has guide slots for holding 1.5mm thick pcb's.

Type	Internal (mm)	External (mm)
2002	96 x 46 x 21	100 x 50 x 25

A slotted plastic strap is supplied with this box so that boards mounted lengthwise are supported at the top in the middle. However, if this strap is used the height available will be reduced to 50mm.

Order Code	Type	Price each
WY03D	ABS Box 2002	£1.89

ABS Plastic Boxes



A range of matt black, mottled finish plastic boxes moulded in ABS. The lid is lipped to ensure a good fit and fixed by four recessed, self-tapping screws. All boxes have slotted walls inside, to accept PCBs etc. The walls of the box have a slight slant from top to bottom of the box.

Dimensions:

Type	Internal	External
H2855	79 x 49 x 26mm	83 x 53 x 31mm
H2853	125 x 62 x 38mm	130 x 68 x 46mm
H2851	152 x 89 x 47mm	158 x 95 x 54mm
H2852	191 x 106 x 52mm	198 x 112 x 64mm

Order Code	Type	Price each
BZ72P	ABS Box H2855	99p
BZ73Q	ABS Box H2853	£1.39
BZ74R	ABS Box H2851	£1.79
BZ75S	ABS Box H2852	£2.29

Two Part ABS Plastic Boxes

Two boxes are available, the smaller has a mottled black finish including the front and back panels. The larger box has the top and bottom parts in a light grey mottled finish and the front and back panels in a black mottled finish. The top and bottom sections are held together by two screws. Both boxes have slotted sections inside to accept PCBs etc., and numerous mounting pillars for fixing boards in place. It is possible to have a combination of vertical and horizontally mounted boards. The larger box has ventilation slots along the edges of the top and bottom sections, the bottom section also has a circular slotted area that would be suitable for a small loudspeaker.



Dimensions:

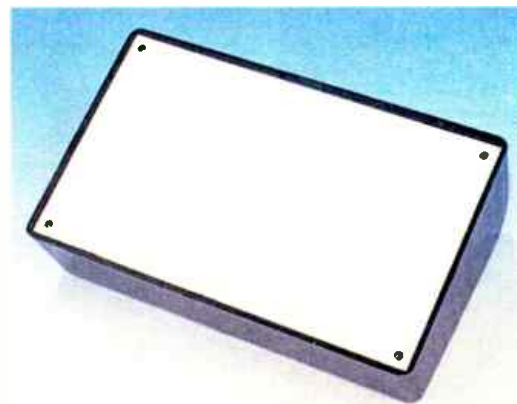
Type	Internal	External
Small	197 x 145 x 55mm	203 x 158 x 65mm
Large	250 x 175 x 74mm	257 x 190 x 85mm

Order Code	Type	Price each
BZ76H	H2505 Small	£4.99
BZ77J	H2507 Large	£6.99

Desk Console Style 1

Boss

Glossy black finish boxes moulded in ABS with brass inserts and having a sloping aluminium front panel that sits recessed into the top of the box. The box has guide slots for holding 1.5mm thick pcb's and 3mm high stand-off bosses in the base (for use with self-tappers No. 4). The aluminium front panel is finished in a matt light grey on one side and is 1mm thick. Front panel fixing screws and stick-on feet are supplied.

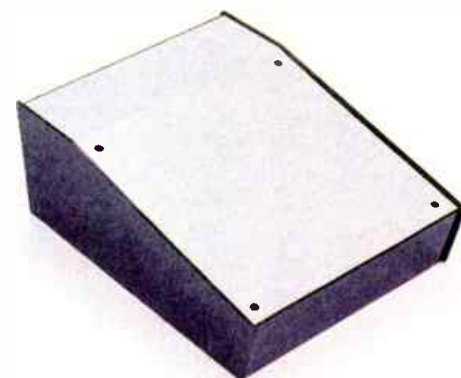


Type	Internal (mm)	External (mm)
M1005	156 x 91 x 47/34	161 x 96 x 61/39
M1006	210 x 125 x 62/41	215 x 130 x 78/47

Order Code	Type	Price each
LH63T	ABS Console M1005	£3.49
LH64U	ABS Console M1006	£5.29

Desk Console Style 2

Boss



Glossy black finish boxes moulded in ABS with brass inserts and having an aluminium front panel flat at the rear then sloping down to the front. The box has 3mm high stand-off bosses in the base (for use with No. 4 self-tapping screws). The aluminium front panel is finished in a matt light grey and is 1mm thick. Front panel fixing screws and stick-on feet are supplied.

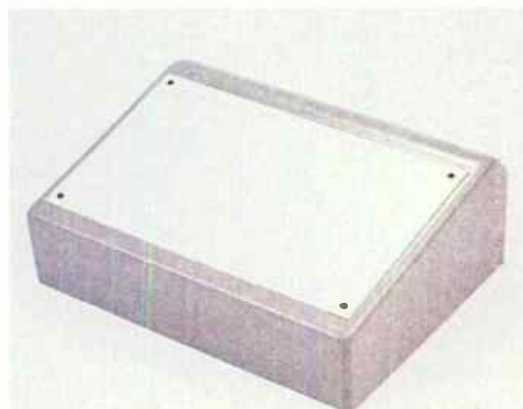
Type (mm)	External (mm)	Max pcb size
M6005	105 x 143 x 55/31	80 x 128
M6006	170 x 143 x 55/31	140 x 128
M6007	170 x 213 x 82/31	140 x 198

Order Code	Type	Price each
LH65V	ABS Console M6005	£3.99
LH66W	ABS Console M6006	£4.99
LH67X	ABS Console M6007	£6.99

Desk Console Style 3

Boss

A three-part construction box moulded in grey ABS with brass inserts, a sloping aluminium front panel and a separate ABS base. The base has 3mm high stand-off bosses for use with No. 4 self-tapping screws and the main part has slotted sides for pcb mounting. The aluminium front panel is finished in a matt light grey and is 1mm thick. Front panel and base fixing screws and four stick-on feet are supplied.



Type M8005 dimensions (mm):

External:	169 x 126 x 70/45
Internal:	163 x 121 x 55/35
Front panel:	157 x 92
Max pcb size in base:	160 x 100

Type M8007 dimensions (mm):

External:	243 x 187 x 103/66
Internal:	237 x 182 x 85.55
Front panel:	225 x 136
Max pcb size in base:	233.4 x 160

Order Code	Type	Price each
LH68Y	ABS Console M8005	£5.99
LH69A	ABS Console M8007	£9.99

PCB Guide Adaptor

Boss

A plastic moulding that can be slid into the pcb guide slots on Desk console style boxes types M1005-6, M6006-7 and M8005-7.



The adaptor grips the board horizontally and with one adaptor on each of the four corners of a pcb the whole assembly may be slid into a box. PCB's may be stacked using the adaptor then finally the adaptor cut so that the box lid holds it in place. Adaptors are 52mm long.

Order Code	Type	Price each
YR72P	Pcb Guide Adaptor	14p

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Desk Console Style 4

Boss

A glossy finish box moulded in ABS with grey upper and lower sections. The satin finish front panel is 1.3mm thick aluminium. Screws for the front panel and push-fit rubber feet are supplied.

Overall dimensions in mm.

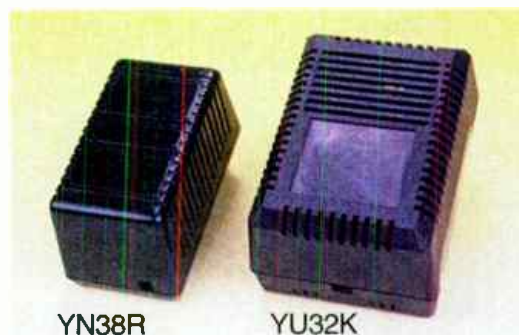
Type	Width	Depth	Min Height	Max Height
2801	190	120	33	62
2802	260	185	33	78



Order Code	Type	Price each
YN29G	ABS Console 2801	£9.99
YN30H	A1 ABS Console 2802	£15.99
YN31J	A1 ABS Console 2803	£17.99

Free Standing PSU Box

Union Brothers



A neatly styled black plastic box, moulded in two parts and held together by four screws. The box is primarily intended to house a free standing power supply. Both case parts have ventilation slots to facilitate cooling of transformer/regulator etc. For cable entry grommet use JM16S, see page 578.

External dimensions: 129.5 x 91.5 x 70mm.

Order Code	Type	Price each
YU32K	Free Stndng PSU Box	£2.99

PSU Box

A power supply style case with an attractive rugged appearance, moulded in black ABS. The case will house E154, S35 or S147 size transformers with space for other components. The top and base are normally glued together although it is possible to drill the base and use self-tapping screws (not supplied) to hold them together. The inside of the box is moulded to hold the specified transformer and our types YJ50E and WB11M fit quite snugly. Overall dimensions: 117 x 63 x 62mm. See picture above.

Order Code	Type	Price each
YN38R	Power Supply Case	£1.59

Small PSU Box with Plug

A moulded plastic case in a matt stone-colour finish designed to house power supplies for low voltage equipment. The case has a plastic earth pin and brass live and neutral pins so that it plugs directly into a 13A socket.

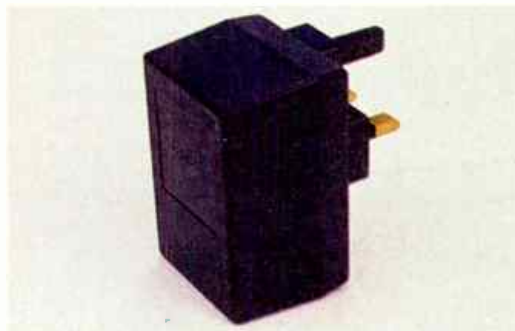
An extra moulding is provided to separate the mains and low-voltage parts of the circuit. A shallow recess in the lid is provided for a label. The two parts of the box fit tightly together and two screws are supplied for firm fixing. External dimensions: 76 x 49 x 43mm.



Order Code	Type	Price each
YN18U	Small PSU Box	£1.99

PSU Box with Plug

West Hyde

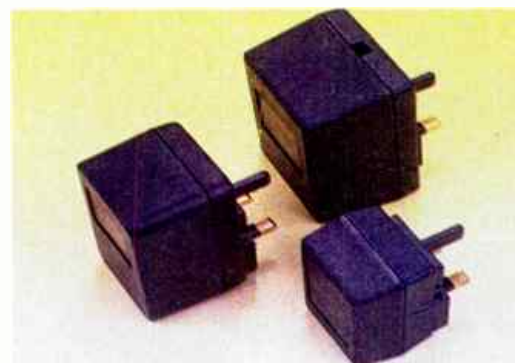


A moulded black plastic case specifically designed to house power supplies for low voltage equipment. The case features a plastic earth pin and brass live and neutral pins to allow the unit to plug directly into a 13A socket. It will accommodate the components of a power supply including the transformer, and safety is assured with the inclusion of a special internal moulding which, as well as retaining the earth pin, separates the mains input from the low voltage output circuitry and transformer laminations. The case is in impact resistant ABS in two screw together sections and incorporates a shallow recess intended for a label. External dimensions: 56.5 x 92 x 62.5mm.

Order Code	Type	Price each
FG41U	PSU Box and Plug	£2.99

PSU Boxes with Plug

Union Brothers



A range of three plastic boxes with integral plug pins to suit a 13A 240V AC mains socket. The boxes are intended to house power supplies for low voltage equipment. The matt black plastic case is in two parts which should be glued together after the components have been fitted. The base part houses the plug pins; the earth is plastic and the live and neutral are brass. The live and neutral pins also incorporate plastic shrouds for safety. The top part has a shallow recess provided for a label. Dimensions are given excluding pins, which protrude 23mm from the base.

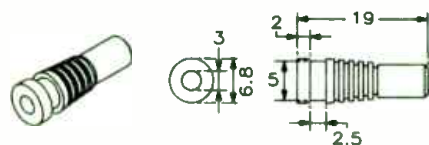
Type	External dimensions (mm)
Small	50 x 59 x 46
Medium	56 x 81.5 x 56
Large	68 x 85.5 x 61.5

Order Code	Type	Price each
YU29G	PSU Box Small	£1.25
YU30H	PSU Box Medium	£1.35
YU31J	PSU Box Large	£1.49

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Small Cable Exit Grommet

Union Brothers



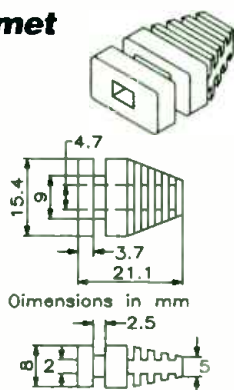
A neat, flexible cable exit grommet, moulded in black plastic. Although intended for use with the Small PSU box (YU29G), the grommet will find uses in many other applications.

Order Code	Type	Price each
JP42V	Small PSU Grommet	7p

Cable Exit Grommet

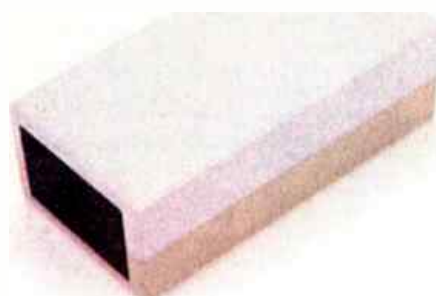
Union Brothers

A neat, flexible cable exit grommet, moulded in black plastic. Although intended for use with the above Medium and Large PSU boxes (YU30H and YU31J), the grommet will find uses in many other applications. Requires a 9 x 5mm rectangular slot.



Order Code	Type	Price each
JM16S	PSU Grommet	10p

Plastic Project Boxes



Two-tone grey plastic project boxes in three different sizes. Each box has PCB mounting pillars with M3 brass inserts on the base. The lid and base are held together using four M3 screws for the smaller sizes, M4 screws for the large sizes.

Each box has a removable plastic panel at each end which can be entirely removed to make a window for displays, I/R senders/receivers, or for easy working while drilling holes for cable entry or exit, switches or controls. Tongue and groove joints are used throughout. Both lid and base include raised ribs at the midway position to support the longest sides of a PCB.

Dimensions

Type	External mm	Internal mm	End panels mm	PCB size max. mm	PCB fixing centres, mm
D-003	130 x 67 x 47	123 x 59 x 40	52 x 22 offset	98 x 58	86 x 48 and 43
D-009	160 x 80 x 60	152 x 72 x 52	61 x 30	128 x 70	116 x 63 and 58
D-014	197 x 110 x 56	189 x 103 x 48	92 x 42	162 x 102	150 x 90 and 85

	D-003	D-009	D-014
Lid depth	35	44	38
Base depth	12	16	18

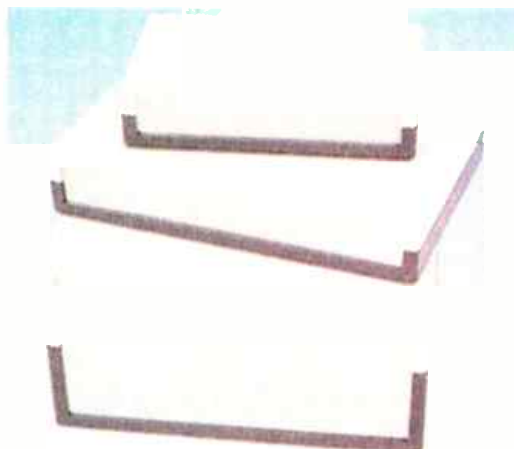
Order Code	Type	Price each
ZB01B	Proj Box D-003	£4.79
ZB02C	Proj Box D-009	£5.49
ZB03D	Proj Box D-014	£6.49

Veroboxes

Vero

A range of high quality moulded boxes featuring a tongue and groove construction to ensure a perfect fit.

200 Series



Type 200 boxes are moulded in two-tone grey high impact ABS. Top and bottom sections which include fixing points for circuit boards or chassis plates are held together by four screws entering through the base concealed by plastic feet through which they pass. Anodised aluminium front and rear panels are automatically retained in position when the two halves of the box are screwed together. Moulded guide slots are provided to allow circuit boards to be mounted



vertically. On 210 types, the boxes clip together and therefore have no screws, though four self-adhesive feet are provided. Type 217 is different in that the front panel is fixed with four screws and vertical guide slots are not provided.

300 Series

These boxes are moulded in high impact ABS and are supplied with lid and four self-tapping screws. All types are black.



401 Box

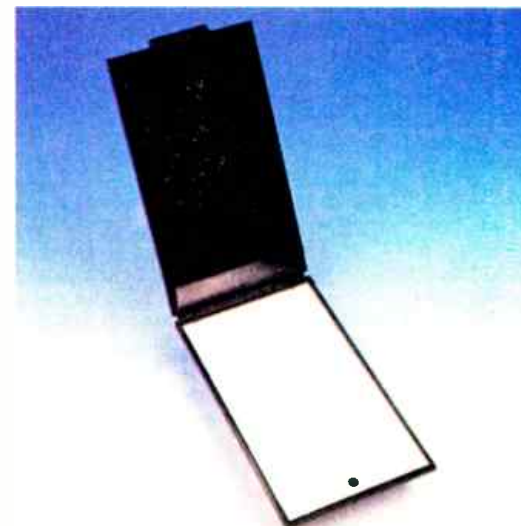


This box is moulded in white high impact ABS. It is designed as a hand-held plastic control box and will find many applications including model control, car racing controllers, ultrasonic controllers etc.

601 Box

A box with hinged snap-shut lid. Moulded in black matt finish polypropylene. A clear anodised aluminium alloy front panel is supplied which clips into box. Pillars are moulded into base and a pcb may be mounted on

these using self-tapping screws (supplied). A flat area is located at the back of the box, designed for mounting sockets etc.



Overall Dimensions

Type	Vero Part No.	Width (mm)	Depth (mm)	Height (mm)
201	202-21034J	205	140	40
202	202-21035F	205	140	75
203	202-21036G	205	140	110
211	202-21040F	153	84	39.5
212	202-21041C	153	84	59
213	202-21042L	153	84	79
214	202-21037L	180	120	40
215	202-21038H	180	120	65
216	202-21039N	180	120	90
217	202-21033A	171	121	75/37.5
301	202-21024B	71.5	49	24.5
303	202-21390D	120	80	35
305	202-21391A	180	110	55
401	202-21026G	94	61	27
601	202-21317D	75	130	34

Order Code	Type	Price each
LL05F	Verobox 201	£10.65
LL06G	A1 Verobox 202	£11.75
LL07H	A1 Verobox 203	£14.75
LL08J	Verobox 211	£6.25
LL09K	Verobox 212	£6.75
LL10L	Verobox 213	£8.45
LQ07H	Verobox 214	£8.25
LQ08J	Verobox 215	£8.75
LQ09K	Verobox 216	£8.99
LL11M	Verobox 217	£9.25
LL12N	Verobox 301	£1.15
LH50E	Verobox 303	£2.65
LH51F	Verobox 305	£4.25
LL14Q	Verobox 401	£1.40
LQ03D	Flip-Top Box 601 Blk	£4.75

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Tilt Leg Assembly

Vero



A tilt leg which fits Veroboxes type 201, 202 and 203. Supplied with four rubber feet and a tilt leg which hinges up when not in use.

Order Code	Type	Price each
HQ47B	Tilt Leg Large	£2.99

ABS Plastic Instrument Case



A high-quality black ABS plastic two-part instrument case with matching front and back panels. The two parts are held together by four recessed screws, and the parts are tongued and grooved to make the box rigid when assembled. Both parts have six pillars, 4mm high, for fixing PCBs, and ventilation grills. Finished in matt mottled black. Internal size: 170 x 122 x 50mm. External size: 175 x 130 x 58mm

Order Code	Type	Price each
KC61R	Plastic Instrm Case	£3.99

Instrument Cases

Boss

A range of instrument cases with built-in fixing points for various size Eurocards. The boxes have pre-punched metal side-chassis supports to which are screwed 1mm thick brushed satin-finish aluminium front and rear panels. Dark grey ABS top and bottom covers screw together around the chassis and front and rear panel assembly ensuring a very stylish and rigid unit.

On the larger unit, tilt legs are supplied which can be fitted to the front or rear of the bottom cover, the rubber feet supplied being used in the alternative positions. Both the rear and base panels have ventilation slots.



Type	Overall size (w x d x h mm)	Panel aperture (mm)
3501	90 x 145 x 41	71 x 25
3502	171 x 145 x 56	152 x 40

Order Code	Type	Price each
YN32K	Case 3501	£8.99
YN33L	Case 3502	£11.99

Foot Switches

Re-An



A pair of tough moulded plastic foot switches that are extremely robust and reliable. Available in double and single switch format, they also form the ideal basis for effects units, as they include PCB mounting bosses, a 0.25in jack socket, and one or two switches. The single switch box also has a built-in battery compartment suitable for a PP3 size battery. Dimensions: 125 x 87 x 47mm (max).

Order Code	Type	Price each
YK74R	Single Foot Switch	£8.99
YK75S	Double Foot Switch	£9.99

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Waterproof Boxes



A range of external waterproof boxes in a self-extinguishing, light-grey thermoplastic material which is highly resistant to impact, heat and chemical and atmospheric agents. The medium size is also available with a transparent polycarbonate cover. All boxes are sealed with a neoprene washer. The large box has ball-headed fixing screws which when removed on one side and partially unscrewed on the other form a hinge to flap down the lid.

Internal dimensions:

Small	100 x 100 x 50mm
Medium	150 x 110 x 70mm
Large	240 x 190 x 90mm

Order Code	Type	Price each
YM90X	Small Waterproof Box	£2.99
YM91Y	Medm Waterproof Box	£4.49
YM92A	Large Waterproof Box	£12.49

METAL ENCLOSURES

Aluminium Boxes

A range of low cost aluminium boxes with lid.



Type	Length mm (in.)	Width mm (in.)	Height mm (in.)
AB12	76 (3in.)	51 (2in.)	25 (1in.)
AB11	102 (4in.)	64 (2 1/2 in.)	51 (2in.)
AB9	102 (4in.)	70 (2 3/4 in.)	38 (1 1/2 in.)
AB28	102 (4in.)	70 (2 3/4 in.)	64 (2 1/2 in.)
AB23	102 (4in.)	102 (4in.)	64 (2 1/2 in.)
AB7	133 (5 1/4 in.)	70 (2 3/4 in.)	38 (1 1/2 in.)
AB10	133 (5 1/4 in.)	102 (4in.)	38 (1 1/2 in.)
AB24	133 (5 1/4 in.)	102 (4in.)	64 (2 1/2 in.)
AB13	152 (6in.)	102 (4in.)	51 (2in.)
AB31	152 (6in.)	114 (4 1/2 in.)	76 (3in.)
AB15	203 (8in.)	152 (6in.)	76 (3in.)
PC25	298 (11 3/4 in.)	152 (6in.)	51 (2in.)
PC24	298 (11 3/4 in.)	253 (10in.)	51 (2in.)
PC26	398 (15 5/8 in.)	253 (10in.)	51 (2in.)

Order Code	Type	Price each
LF08J	Box AB7	£1.49
LF10L	Box AB9	£1.29
LF11M	Box AB10	£1.79
LF12N	Box AB11	£1.39
LF13P	Box AB12	99p
LF14Q	Box AB13	£2.29
XB71N	Box AB15	£3.99
LF15R	Box AB23	£1.79
LF16S	Box AB24	£2.29
LH10L	Box AB28	£1.49
XB69A	Box AB31	£2.79
KR55K	Box PC24	£5.79
KR56L	Box PC25	£4.79
KR57M	Box PC26	£7.49



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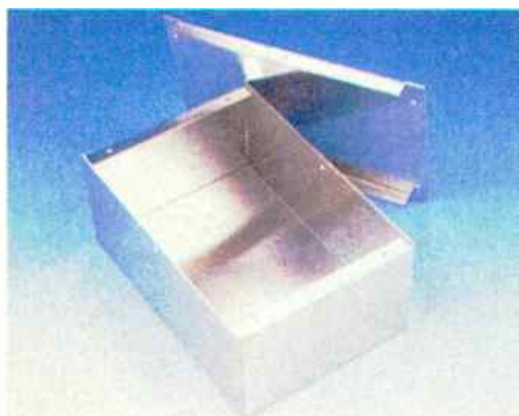
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Chassis



Aluminium chassis with four sides and corner plates, and aluminium base panel.

Dimensions:

Type No.	Length	Height	Width
AC64	152.5	63.5	102
AC86	203	63.5	152.5

Order

Code	Type	Price each
XB56L	Chassis AC64	£2.29
XB68Y	Chassis AC86	£2.99

Vinyl-Effect Boxes



A range of very low cost aluminium boxes consisting of a 'U' shaped base and an aluminium cover of black painted finish giving a vinyl looking effect.

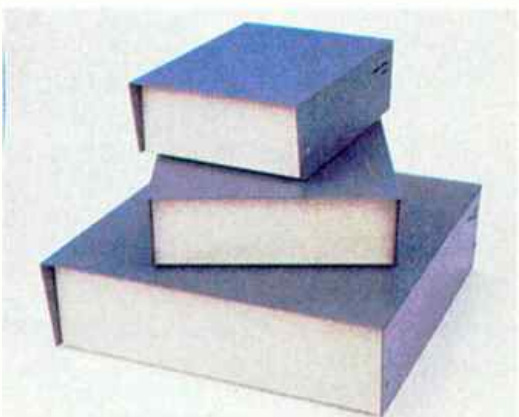
Dimensions (mm)

Type No.	Width	Depth	Height	Type No.	Width	Depth	Height
WB1	127	63.5	57	WB5	279	159	76
WB2	152	114	44	WB6	279	190	89
WB3	203	127	51	WB7	305	159	133
WB4	230	133	63.5				

Order

Code	Type	Price each
LF02C	Case WB1 Vinyl	£2.99
LH37S	Case WB2 Vinyl	£3.99
LH38R	Case WB3 Vinyl	£4.49
LH39N	A1 Case WB4 Vinyl	£5.49
LH40T	A2 Case WB5 Vinyl	£5.99
LH41U	A2 Case WB6 Vinyl	£7.49
LH42V	A2 Case WB7 Vinyl	£9.99

Aluminium Instrument Cases



A range of superbly finished instrument cases having a two-part construction and including a chassis. The cases have a visor-shaped top with ventilation slots

punched in the sides. Top and sides section is finished in glossy blue hammertone and the base, front and rear section is finished in glossy birch grey. The base is fitted with self-adhesive feet. The chassis which fits into the base of the box is 10mm high.

The following sizes are available (mm)

Model	Width	Depth	Height
235	100	150	100
212	150	100	75
231	150	150	75
236	150	150	100
222	200	125	75
226	200	125	100
237	200	150	100
233	250	150	75
238	300	150	100

Order

Code	Type	Price each
XY41U	Blue Case 235	£6.49
XY43W	Blue Case 212	£5.79
XY44X	Blue Case 231	£6.99
XB67X	A1 Blue Case 236	£7.99
XY45Y	Blue Case 222	£6.79
XY46A	A1 Blue Case 226	£7.99
XY47B	A1 Blue Case 237	£9.49
XY48C	A1 Blue Case 233	£8.99
XY49D	A2 Blue Case 238	£10.99

Aluminium Instrument Cases



A range of superbly finished cases having a two part construction. The visor-shaped top is finished in matt grey hammertone and has ventilation slots punched in the sides. The base, front and rear are finished in cream. The base is fitted with self-adhesive feet.

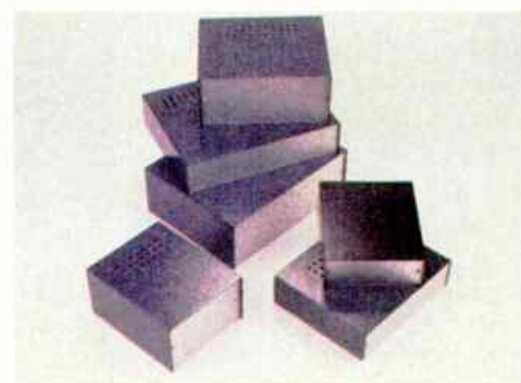
The following sizes are available (mm):

Model	Width	Depth	Height
S2:39	250	200	75
S2:40	250	250	75
S2:41	150	200	75
S2:42	200	250	75
S2:43	300	250	75
S2:44	300	300	75
S2:45	300	300	100

Order

Code	Type	Price each
KR10L	A1 Grey Case S2:39	£9.49
KR11M	A2 Grey Case S2:40	£9.99
KR12N	Grey Case S2:41	£7.99
KR13P	A1 Grey Case S2:42	£9.49
KR14Q	A2 Grey Case S2:43	£11.49
KR15R	A2 Grey Case S2:44	£11.99
KR16S	B3 Grey Case S2:45	£12.99

Steel Instrument Cases



A very attractive range of superbly finished instrument cases with a 1mm thick galvanised steel base which has ventilation slots and 4 fixing holes for mounting a PCB. The 1mm thick steel cover is powdercoated and baked in an attractive dark grey leatherette polyester finish. There are ventilation slots in the top rear of the cover. A 1mm thick front panel in anodised aluminium is supplied along with a 1mm thick zinc-passivated steel rear panel. A set of screws and 4 self adhesive feet are provided.

The following sizes are available (mm)

Model	Width	Depth	Height
1105	125	155	58
1108	125	155	89
1605	175	155	58
1608	175	155	89
2105	225	175	58
2108	225	175	89

Order

Code	Type	Price each
XJ25C	Steel Case 1105	£5.99
XJ26D	A1 Steel Case 1108	£6.99
XJ27E	A1 Steel Case 1605	£7.49
XJ28F	A1 Steel Case 1608	£7.99
XJ29G	A2 Steel Case 2105	£8.99
XJ30H	B3 Steel Case 2108	£9.99

HOT TIP

Aluminium chassis and boxes look much nicer painted. However, most paints will not bond to aluminium very well and generally you will get best results using cellulose paints (not metallic) from car colour spray cans. Even so you must always put on a white or grey cellulose primer undercoat as well. It is also a good idea, after removing the protective plastic film from the aluminium, to leave it for several days or more to oxidise naturally. This will then form a strong bond with the primer and produce the most durable finish, without any need to roughen the surface with sand paper.

Instrument Case with Handle

A range of steel instrument cases which incorporate an adjustable handle. The handle may be set at the desired angle and locked in position using the knobs on each side of the case. The case has ventilation slots and is finished in matt black. The back panel is flush with the edges of the case whilst the front is recessed, so as to protect controls, switches etc. Knobs protrude by approximately 11mm either side of the case.



Type	External Dimensions (excluding handle)
Small	92 x 60 x 150mm
Medium	137 x 60 x 150mm
Large	137 x 92 x 225mm
Very large	200 x 93 x 250mm
Extra large	300 x 300 x 110mm

Order Code	Type	Price each
YZ01B	Tilt Inst Case Small	£8.99
YZ02C	Tilt Inst Case Med	£9.99
YZ00A	Tilt Inst Case Large	£12.99
MJ64U	Tilt Inst Case VLg	£14.99
MJ63T	Tilt Inst Case ELg	£19.99

Instrument Case with Carrying Handles

A range of general purpose instrument cases with fold away carrying handles. The top and bottom panels are semi-matt black coated steel, whilst the front and rear panels are cream plastic. The two carrying handles and side mouldings are made from black plastic. Handles protrude by 10mm on either side of the cases.



Type	External dimensions
IB-1	210 x 60 x 112mm
IB-2	180 x 92 x 116mm
IB-3	210 x 60 x 212mm
IB-4	180 x 92 x 217mm

Order Code	Type	Price each
YU96E	Instrument Case IB-1	£8.99
YU97F	Instrument Case IB-2	£9.49
YU98G	Instrument Case IB-3	£9.99
YU99H	Instrument Case IB-4	£10.99

Shoulder Strap



A shoulder strap terminated at both ends with karibina type hooks, which can be clipped to the folding carrying handles of the general purpose instrument cases above. For this purpose the strap also comes with a pair of replacement handles for the case, having V shaped extensions to locate the hooks centrally whilst carried by the strap. The actual strap can be varied in length from 450mm to 350mm.

Order Code	Type	Price each
JR30H	Shoulder Strap	£5.49

Steel Instrument Case with Handle

A smart, superbly finished, large instrument case in grey and black painted steel, covers with 1mm thick anodised aluminium end panels. The ventilated steel covers can be removed to leave the side and end panels intact for inspection. The side panels are of two-part construction, consisting of a black painted support strap attached to a galvanized side-plate. The handle, constructed of plastic side pieces and square cross-section anodised aluminium tube, is attached to the support straps. The base is fitted with feet. External dimensions 355 x 355 x 138mm. The handle protrudes a further 16mm from each side and 76mm (maximum) from the front.



Order Code	Type	Price each
MJ65V	Inst Case Large	£37.99

Diecast Boxes



Aluminium alloy diecast boxes finished in grey hammertone. The boxes have close-fitting flanged lids to provide fully screened enclosures. The box has guide slots for holding 1.5mm thick pcb's. Fixing screws are supplied.

Type	Internal (mm)	External (mm)
M5002	96 x 46 x 21	100 x 50 x 25
M5004	116 x 61 x 36	120 x 65 x 40
M5007	116 x 91 x 56	120 x 95 x 60
M5005	146 x 76 x 46	150 x 80 x 50
M5006	186 x 106 x 56	190 x 110 x 60

Order Code	Type	Price each
LH70M	Box DCM5002	£3.79
LH71N	Box DCM5004	£5.25
LH72P	Box DCM5007	£7.25
LH73Q	Box DCM5005	£6.75
LH74R	Box DCM5006	£9.99

Extruded Aluminium Interlocking Boxes

A very versatile new range of boxes which can interlock with one another to form racks of separately cased and screened circuits. Printed circuit boards slide into grooves inside the boxes and power transistors may be fitted to the special heatsinks and the pcb, and both then slide into the box together in their own slots. The special heatsink then dissipates the heat through the outer box. Five different size boxes are available and any side on one will interlock with any side on any other size. Accessories available include the slide-in heatsinks (mentioned above) in two widths, angle brackets which slide onto the sides of the boxes for permanent fixing, rubber foot in continuous lengths which slides into the grooves in the boxes, and gaskets to make the boxes waterproof.

Boxes



The CAN style box is available in two lengths 40mm for circuit boards 55 x 40mm and 80mm for circuit boards 55 x 80mm. The CCN style box is available in three lengths, 80mm, 160mm and 220mm, to suit circuit boards 100 x 80mm, 100 x 160mm and 100 x 220mm. Up to 30mm space above circuit board gives room for transformers etc. Supplied in natural aluminium with two end plates and eight self-tapping screws.

Thermal resistance case to air:

CAN40	8.3°C/W
CAN80	6.5°C/W
CCN80	3.7°C/W
CCN160	2.9°C/W
CCN220	2.2°C/W

Order Code	Type	Price each
YN53H	Box CAN40	£3.29
YN49D	Box CAN80	£4.29
YN50E	Box CCN80	£6.49
YN51F	Box CCN160	£9.99
YN52G	Box CCN220	£12.99

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Mounting Lugs



Extruded aluminium mounting bracket for fixing housings to walls, panels etc. The bracket slides into any external slot on the boxes and is retained by the end plates. Supplied in natural aluminium in two lengths: 40mm and 80mm. A 5.2mm diameter hole is drilled in the middle of one face.

Order Code	Type	Price each
FE36P	Lug 40	49p
FE37S	Lug 80	59p

Heatsinks

Extruded aluminium heatsink bracket for mounting power semiconductors, including those with T03, T0220



cases (but not high-top T03 types – in our range these are: 2SJ48-50 and 2SK133-135). The heatsink slides into the special receiving slots on the inside of every box. It can be both pcb mounted and in thermal contact with the box if correctly mounted. Heatsink is drilled to suit T03 case. Fix transistor with mounting kit and 6BA bolts. Supplied in natural aluminium in two lengths: 20mm and 40mm (note 20mm is not wide enough to seat whole T03 transistor).

Order Code	Type	Price each
FE38R	Sink 20	£1.79
FE39N	Sink 40	£2.15

Gaskets



Oil resistant nitrile bonded cork gaskets to BS F66 and ASTM F104. Coated one side with a pressure sensitive adhesive. Thickness 1mm. Supplied in pairs in two sizes to suit CAN or CCN boxes. Please note, gaskets may be supplied with centre removed.

Order Code	Type	Price each
FE40T	Gasket CAN	79p
FE41U	Gasket CCN	£1.39

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Rubber Foot



Black extruded rubber foot which slides into any external slot on any box. It is retained when the end plates are attached. Sold in 1m lengths.

Order Code	Type	Price each
XR93B	Rubber Foot	£2.10

Sloping Front Cases



High quality sloping front all aluminium construction cases. Top is finished in a matt black stove enamel with a narrow brushed aluminium trim at the front (which could be lettered with a name for example). Base is finished in a textured light stone colour. The control area slopes at 15° from the horizontal. Self-adhesive feet are supplied.

The following sizes are available (mm).

Model	Width	Height Rear	Height Front	Length of Front	Length of Top	Base
103	165	76	33	160	56	211
108	431	76	33	160	56	213

Order Code	Type	Price each
XY59P	A1 Console 103	£10.99
XY60Q	A2 Console 108	£15.99

Steel Sloping Front Case



A sloping front case with a 1mm thick steel base epoxy painted in dark grey and baked at 190°C. The top part is made in 1mm thick anodised aluminium. The control area slopes at 15° from the horizontal. The box is supplied with aluminium handles and self-adhesive feet. An internal chassis is also available and must be ordered separately. The chassis is 0.8mm thick galvanised steel and supplied with fixing screws.

Dimensions (mm)	
Width	300
Depth	205
Height at front	60
Height at rear	100
Length of top	40
Length of front	165
Chassis	280 x 190
Chassis height	20

Order Code	Type	Price each
XJ36P	A2 Sloping Case 3020	£17.99
XJ35Q	Sloping Case Chassis	£3.99

Wallbox

A large, plain undrilled case, measuring 250mm square by 100mm deep. The flanged lid is hinged along the length of one side, and is secured in the closed position by two 2BA round-head screws, not supplied. Although primarily intended to be mounted on a wall, the case may find applications in many other areas where a tough, durable enclosure is required, but it is not really suitable for use outdoors. The case is finished in grey enamel.



Order Code	Type	Price each
YJ11M	C6 Wallbox Plain	£13.99

G-Range Cases

Vero



A range of beautifully finished cases featuring a black PVC clad aluminium alloy upright front panel surrounded by a sloping visor. The case top which slides on over the front and rear panels and is fixed by four screws through the feet on the base is 14swg (2mm thick) solid aluminium alloy etched and anodised to give a superb hard glistening silver finish. The front and rear panels are also removable and although the working surfaces, front, rear and base are totally accessible for drilling and component assembly, the fastenings that hold the box together are completely hidden when the box is assembled.

The boxes are available in two sizes:

Overall dimensions (mm)			
Type	Width	Depth	Height
3G	224	176	64
4B	304	210	84

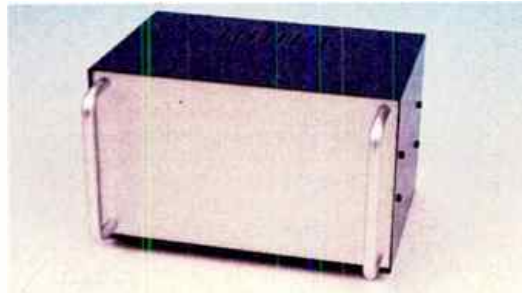
Order Code	Type	Price each
XQ09K	B1 G-Range 3G	£24.99
XQ10L	C3 G-Range 4B	£32.99

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Steel Instrument Cases with Handles

Very attractive, high quality instrument cases manufactured in 1mm thick sheet steel. The case is made as two half-cases, with ventilation holes punched in each half, then painted in dark grey epoxy and baked at 190°C. The front panel is 1mm thick anodised aluminium and the rear panel is 1mm thick zinc passivated steel. All models are supplied with natural-finish aluminium handles and self-adhesive feet. Chassis are also available and must be ordered separately. They are manufactured in 0.8mm galvanised steel and are supplied with fixing screws.



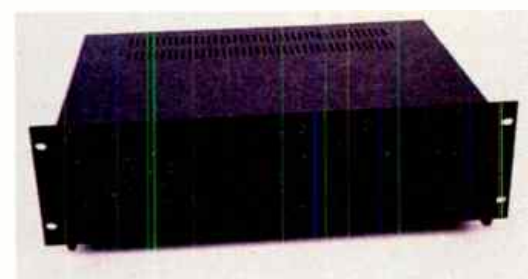
The following sizes are available (mm).

Model	Width	Depth	Height
2012/130	200	130	120
2012/250	200	250	120
2408/160	240	160	80
2610/180	260	180	100
2610/280	260	280	100
3012/200	310	200	120

Chassis	Width	Depth
2012/130	192	88
2012/250	192	208
2408/160	233	118
2610/180	255	152
2610/280	255	246
3012/200	303	168

Order Code	Type	Price each
XJ31J	B3 Steel Case 2012/130	£14.99
XJ32K	B4 Steel Case 2012/250	£19.99
XJ33L	A2 Steel Case 2408/160	£14.99
XJ34M	B3 Steel Case 2610/180	£17.99
XJ38R	C5 Steel Case 2610/280	£21.99
XJ37S	B4 Steel Case 3012/200	£21.99
XJ39N	Chassis 2012/130	£2.49
XJ40T	Chassis 2012/250	£3.29
XJ41U	Chassis 2408/160	£2.99
XJ42V	Chassis 2610/180	£3.99
XJ43W	Chassis 2610/280	£7.49
XJ44X	Chassis 3012/200	£6.49

19 Inch Rack Mounting Instrument Cases



A range of high quality rack mounting cases, fabricated mild steel and finished in a hard wearing semi-matt black epoxy coating. The base plate is punched with a matrix of holes for securing PCBs, transformers etc. and the top cover is provided with ventilation slots to assist cooling. The black anodised aluminium front panel has two handles and there are four holes punched to facilitate fixing the case in a rack. The cases are supplied flat packed and are easy to assemble.

Available in 1U, 2U, 3U and 4U standard sizes.

Dimensions (mm):

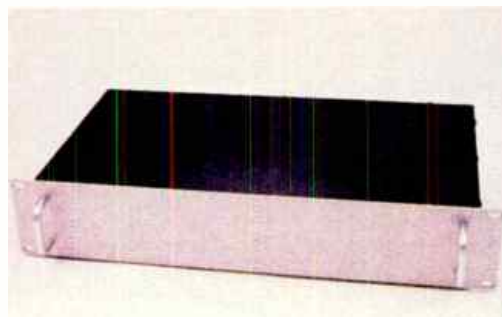
Type	External	Internal	Front panel
1U	437 x 42 x 305	432 x 40 x 293	483 x 44
2U	437 x 80 x 305	432 x 78 x 293	483 x 88
3U	437 x 122 x 305	432 x 120 x 293	483 x 132
4U	437 x 168 x 305	432 x 166 x 293	483 x 177

Order

Code	Type	Price each
XM69A	C6 19in Rack Case 1U	£29.99
XM68Y	D8 19in Rack Case 2U	£32.99
XM70M	E10 19in Rack Case 3U	£38.99
XM71N	F12 19in Rack Case 4U	£41.99

19 Inch Rack Style Instrument Cases

A range of high quality heavy-duty instrument cases for mounting in 19in. equipment racks, with fixing slots pre-punched in the ends of the front panel. The case is manufactured from 1mm thick sheet steel painted with high grade black epoxy and baked at 190°C. Ventilation holes are punched in the front and rear of the top and base panels. The front panel is 3mm thick anodised aluminium to which natural-finish aluminium handles are fitted. A 1mm thick galvanised steel sub-panel is fitted approx. 9mm behind the rear of the aluminium front panel to provide extra rigidity, and for fixing front panel components so that fixing-nuts and bushes do not show. The top and base panels can be removed separately for easy access to the interior.

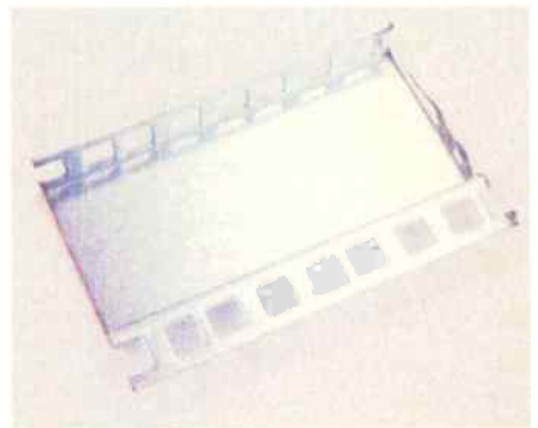


Three sizes available (dimensions in mm).

Type	Width	Depth	Height	Front panel Width	Front panel Height
4809	440	250	80	483	88
4813	440	250	120	483	132
4817	440	350	165	483	177

Order Code	Type	Price each
XJ24B	C7 19" Case 4809	£34.99
XJ23A	D9 19" Case 4813	£39.99
XM12N	G12 19" Case 4817	£49.99

19 Inch Rack Mounting Rail

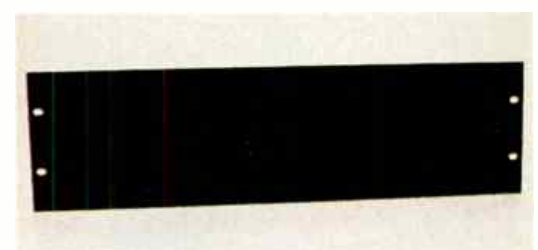


A 1.5m long, plain steel rail which is punched to accept the mounting 'ears' of 19in. rack frames. Rails may be fitted into an enclosure or attached to a frame, producing a free standing assembly which can contain up to eleven 3U racks. The front rails should have the special captive nuts attached for anchoring the front panels at their edges. Additional adaptor brackets are available which will enable non-standard items to be included in the structure, such as cassette tape decks and similar equipment, or shelves made for these. Fitting hardware comprising 4 x M6 caged nuts, 4 x M6 x 12mm zinc plated pan-head slotted bolts, and 4 x nylon safety washers, are also required for fitting 19in. style cases.

Order

Code	Type	Price each
GK41U	D3 19in Rack Strip	£9.99
ZB00A	A1 19in Rack Bracket	£3.79
KW35Q	19in Rack Hardware	£2.29

Undrilled 19 inch Rack Panels

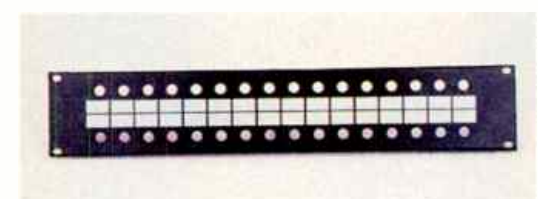


Plain black painted aluminium 19in. rack panels undrilled except for the standard four rack mounting holes at the corners. Panels are 3mm thick. Available in sizes 1U, 2U, 3U and 4U.

Order

Code	Type	Price each
ZA96E	A1 Front Panel 1U	£5.99
ZA97F	A1 Front Panel 2U	£7.99
ZA98G	A1 Front Panel 3U	£8.99
ZA99H	A1 Front Panel 4U	£11.99

19 Inch Rack Jackfield



A 482mm wide x 89mm (2U) high black painted, front panel which will fit into a 19in. racking system. The panel includes 32, 11mm diameter holes for jack sockets, signal lamps, switches etc. Each location has an adjacent rectangular, white printed label area for writing its identity. Made from 1.7mm thick steel and includes 13mm deep folded edges top and bottom for strength.

Order

Code	Type	Price each
KW61R	A1 Rack Jackfield	£10.99



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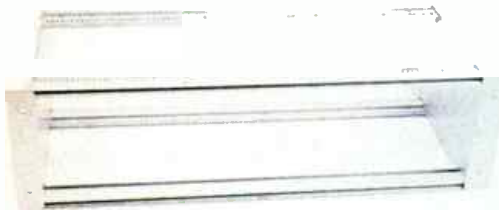
BS 5750 Part 2 1987 Level B: Quality Assurance RS12750

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19 INCH MODULAR EUROCARD SUB-RACK SYSTEM (DIN 41494)

A very high quality modular sub-rack system (conforming to DIN 41494) for housing Eurocard modules and cards. The user can tailor the layout of the sub-rack to suit a particular application. As well as the sub-rack units themselves, a wide range of accessories are available, including mounting plates for DIN 41612 connectors.

Sub-Rack Frames & Enclosures

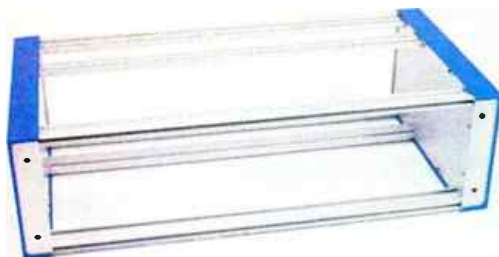


A range of 19 inch, 84E, 3U/single height eurocard sub-racks. All three types are modular and are constructed from anodised aluminium panels and extrusion. A wide range of accessories, such as guide rails, handles, plates, covers, etc. are available separately. The basic version is a 'skeleton sub-rack', which has four horizontal fixing bars, two side plates and 19 inch rack mounting 'ears'. The 'free standing sub-rack' is as the 'skeleton sub-rack', but also has two rear panel fixing bars, two extra mounting 'ears' and two carrying handle/end cheeks.



The 'enclosed sub-rack' is as the 'free standing sub-rack', but also has top and bottom panels. These panels are punched to assist ventilation.

Type	Dimensions (mm):
Skeleton Sub-rack	483 x 132 x 237
Free Standing Sub-rack	486 x 136 x 243
Enclosed Sub-rack	486 x 136 x 243



Sub-racks are supplied flat packed and assembly fixings are supplied.

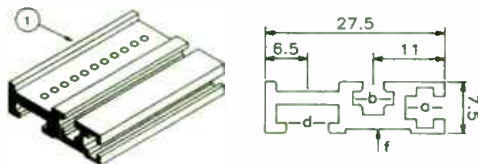
Order Code	Type	Price each
XM74R	B2 19in Skeleton Rack	£25.99
XM76H	C3 19in Free Std Rack	£36.99
XM75S	D5 19in Enclosed Rack	£64.99

Sub-rack Accessories

The following sub-rack accessories are available, as indicated in the exploded drawings.

Item

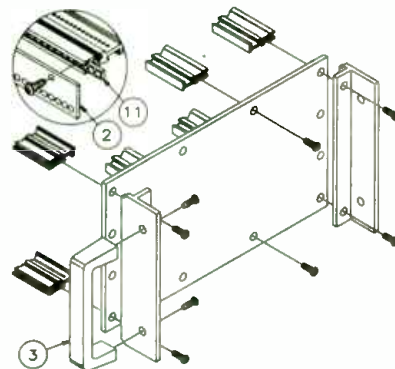
1. Horizontal Mounting Rail, 84E/17 inch extruded anodised aluminium, punched with 84 holes, for use as an extra mounting rail, to allow extra panels, etc. to be fitted to the sub-rack.



2. Connector Mounting Plate, 84E/17 inch punched anodised aluminium plate, for mounting DIN 41612 connectors on horizontal support rails. Two are required.



3. Case Handles, manufactured from silver/grey ABS plastic, these handles, which may be fitted to the sub-rack mounting 'ears', provide a convenient way to lift the sub-rack or remove it from an enclosure. Supplied in pairs with fixing screws.



4. Front Panel 4E (0.8 in.) wide x 3U high anodised aluminium panel.

5. Front Panel 5E (1 in.) wide x 3U high anodised aluminium panel.

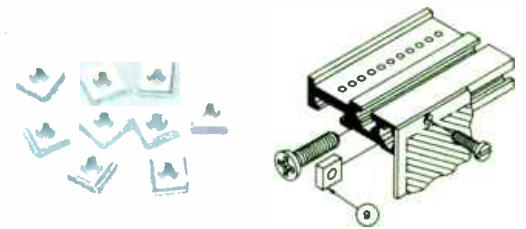
6. Front Panel 10E (2 in.) wide x 3U high anodised aluminium panel.

7. Front Panel 20E (4 in.) wide x 3U high anodised aluminium panel.

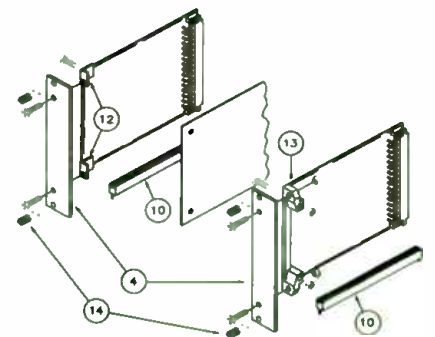
8. Front/Rear Panel 84E (17 in.) wide x 3U high anodised aluminium panel.



9. M3 Square Nut, zinc coated square nut tapped to accept M3 bolts, intended to fit the aperture in horizontal mounting rail. Supplied in packs of 100.



10. Eurocard Guide Rail, black plastic eurocard guide rails which clip into the assembled sub-rack. Sub-racks are supplied without guides, therefore must be ordered separately. Guides are supplied in pairs.



11. Threaded Panel Mounting Rail, 84E/17 inch steel rail with 84 holes tapped to accept M3 bolts, may be used in place of individual M3 square nuts. Panel mounting rail slides into the aperture on horizontal mounting rail.



12. Metal Fixing Attachment, fixing bracket for attaching eurocards to front panels. Supplied in pairs.



13. Plastic Fixing Attachment, fixing bracket for attaching eurocards to front panels.



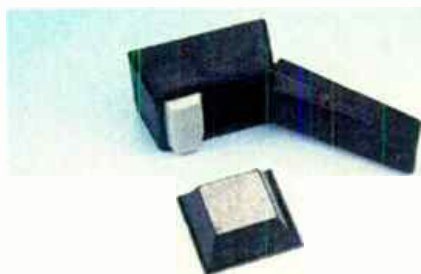
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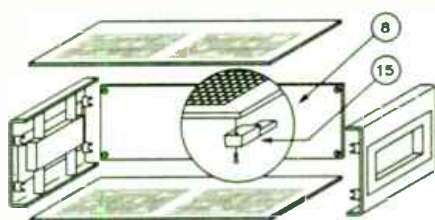
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14. Panel Locking Posts, metal locking posts for use with front panels as a quick release panel fixing. Post is fitted to panel and engages with a slot in the horizontal mounting rail, the outer collar is then tightened to secure the panel. Supplied in pairs. One pair required for 4E and 5E panels, two pairs required for 10E and 20E panels.

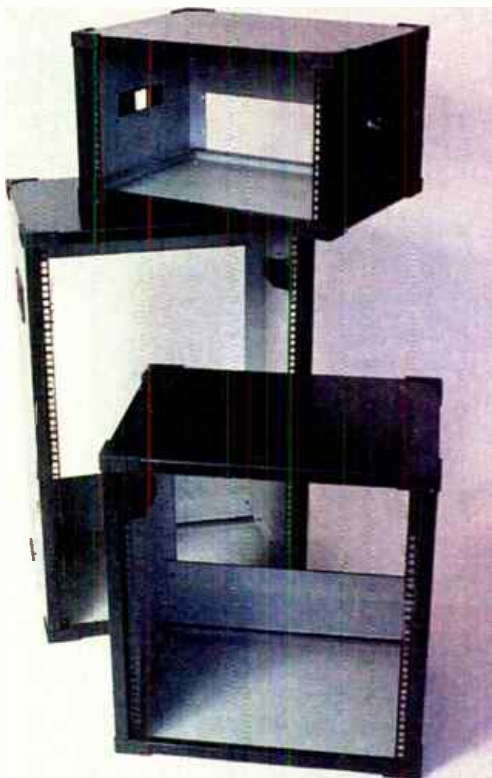


15. Sub-rack Tilt Leg, plastic folding leg (front) and rubber foot (rear). Intended for use with enclosed sub-rack to ensure good airflow through sub-rack and to allow front of sub-rack to be tilted upward at a convenient angle. Two required per sub-rack.



Order Code	Type	Price each
JP24B	Horizontal Mtg Rail	£4.99
JP25C	Connector Mtg Plate	£2.99
JP26D	Case Handles	£4.49
JP41U	Front Panel 4E	£1.39
JP29G	Front Panel 5E	£1.59
JP28F	Front Panel 10E	£2.29
JP27E	Front Panel 20E	£3.99
JP33L A1	Front/Rear Panel 84E	£7.99
JP34M	M3 Square Nut 100	£3.99
JP30H	Eurocard Guide Rail	£1.59
JP31J	Thrd Panel Mtg Rail	£2.99
JP32K	Metal Fixing Attmnt	99p
JP35Q	Plas Fixing Attmnt	99p
JP36P	Panel Locking Posts	£1.49
JP38R	Sub-rack Tilt Leg	£2.79

Rack Cabinets



A range of high quality stylish rack cabinets fabricated in mild steel and suitable for a wide range of 19in. racking equipment. The main panels are formed from steel sheet, coated and finished in matt black. The corners of these cabinets are protected by moulded plastic corner pieces and recessed moulded plastic carrying handles are provided in each side panel. The unit consists of top, base and side panels with smaller rear panels to increase rigidity and provide ventilation. Rack mounting framework is built into the side panels. The cabinets are supplied as flatpacks, and are easy to assemble, with the kit including all fixtures and plastic fixings.

Order Code	Rack Height	Overall Dimensions
MJ66W	267mm	542 x 324 x 409mm, with 1 rear panel
MJ67X	533mm	542 x 590 x 409mm, with 2 rear panels
MJ68Y	800mm	542 x 854 x 409mm, with 2 rear panels

Note: The rear panels are 144.5 x 493mm.

Order Code	Type	Price each
MJ66W H	Rack Cabinet Small	£69.99
MJ67X H	Rack Cabinet Medium	£84.99
MJ68Y H	Rack Cabinet Large	£94.99

ACCESSORIES FOR ENCLOSURES

Cabinet Feet



Black soft synthetic rubber feet 15.9mm dia. 4BA clearance mounting hole. Supplied in packs of four.

Order Code	Type	Price each
FW19V	Feet Cab	20p

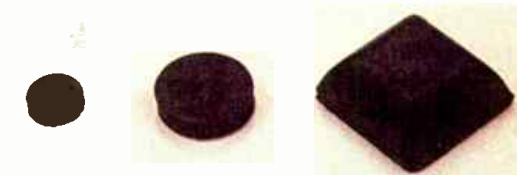
Small Cabinet Feet

A small black PVC cabinet foot that attaches by means of a hole drilled in a panel. The foot push fits into the hole and locks into place. Height of foot when fitted, 8mm. Diameter, 10mm. Panel hole diameter, 6-8mm. Supplied in packs of four.



Order Code	Type	Price each
JU45Y	Small Cab Feet	39p

Stick-on Feet



Flexible black synthetic rubber stick-on feet with a strong adhesive backing. Will adhere to most surfaces. Available in three sizes.

Small: 8mm dia., 2.2mm thick
 Large: 12.7mm dia., 3.2mm thick
 Square: 21mm square, 9mm thick

Supplied in packs of four.

Order Code	Type	Price each
FE32K	Stick-on Feet Small	24p
FW38R	Stick-on Feet Large	28p
FD75S	Stick-on Feet Square	52p

Large Rubber Foot



Large heavy-duty rubber foot with metal insert. 5mm or 2BA fixing hole. Size: 38mm dia., 10.6mm thick. Sold singly.

Order Code	Type	Price each
FP02C	Large Rubber Foot	26p

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Extra Large Rubber Foot



An extra-large heavy-duty rubber foot with 6mm fixing hole. Size: 38mm dia., 20mm thick. Sold singly.

Order Code	Type	Price each
FS25C	Extra Large Foot	40p

Heavy-Duty Foot

Re-An



Large heavy-duty plastic moulded cabinet foot with 2BA fixing hole. Overall diameter: 37mm. Height: 15mm. Supplied singly.

Order Code	Type	Price each
FW39N	HD Foot	20p

Castors



A heavy duty castor with a 50mm (2in.) diameter synthetic rubber wheel connected via a ball race to a 54mm square mounting plate. Fixing by four corner holes 40 x 40 x 6.8mm. dia. Supplied in pairs only.

Order Code	Type	Price each
FX96E	Castors	£4.79

Recess Plate

Union Brothers



A recess plate to allow flush mounting of our jack sockets and some other panel mounting components. Overall diameter: 44mm. Overall depth: 8mm. Fixing centres: 36mm.

Order Code	Type	Price each
HH23A	Recess Plate	16p

Recess Dish

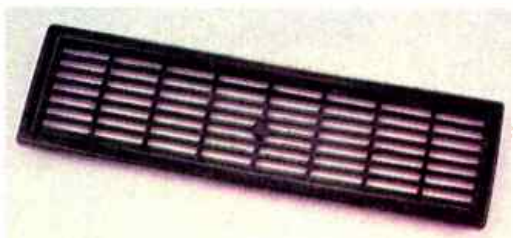


A 1mm thick, black-finish recess dish ideal for fixing panel mounting components on wooden cabinets. The dish requires a cut-out 115 x 65mm and has 6 fixing holes 4mm clear punched around the edge. Overall size: 136 x 89 x 15.5mm deep. May be internally or externally mounted.

Order Code	Type	Price each
FS34M	Recess Dish	£1.49

Ventilation Grille

Re-An



Manufactured in black in a specially heat-resistant nylon. Fits cut-out size 142 x 35mm.

Order Code	Type	Price each
FX06G	Cool Grille	49p

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Plastic Handle

Cliff



A strong handle moulded from glass filled nylon and with an elegant matt black appearance with very high strength. The handle has a black plastic insert and is supplied with fixing bolts. Fixing centres: 63mm. Overall size: 89 x 38 x 8mm. Bolts require 4BA hole. 4BA nuts not supplied.

Order Code	Type	Price each
FG42V	Plastic Handle	99p

Rectangular Handle

West Hyde

This attractive handle has a ground, de-burred and black anodised finish, and is available in three standard heights for 19in. rack mounted equipment. Supplied with screws and washers. Overall height 40mm.



Manufacturer's Code	To suit	Fixing centres (mm)	Overall length (mm)	Stock Code
RS10254	1U	25	40	CW16S
RS10554	2U	55	69	CW17T
RS10884	3U	88	102	CW18U

Order Code	Type	Price each
CW16S	1U Handle	£3.90
CW17T	2U Handle	£4.20
CW18U	3U Handle	£4.65

Heavy-Duty Strap Handle with Recess Plate

Cliff



This is a high quality all-plastic assembly designed for use on all types of portable instrumentation. The design and materials give a breaking strength above 200kg. Fixing is by four woodscrews or suitable nuts and bolts. The recess plate permits flush mounting so cabinets can be stacked. Supplied in black matt only. Fits recess size 210 x 85mm, 15mm deep. Overall size is 250 x 110mm. Comes as four pieces, screws are not supplied.

Order Code	Type	Price each
BK29G	HD Strap + Recess	£4.29

Carrying Handle



Strap-type carrying handle, with chrome end pieces and fixing bolts and black plastic handle. Overall length with handle fully retracted 165mm approx.

Order Code	Type	Price each
FW81C	Handle	£1.49

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Heavy-Duty Strap Handle

Cliff

A heavy duty strap-type flexible carrying handle. Moulded in a smart, ribbed black flexible plastic with an internal steel reinforcement strip. The end pieces are moulded in a tough black plastic and each should be fixed with two 5mm diameter counter-sunk screws or bolts. Rectangular snap-in covers are supplied to hide the screw heads for a nice clean appearance. Provided that the fixing method chosen – taking care to select suitably large wood screws or nuts and washers as appropriate – is adequate, the handle will lift up to 15kg. Overall length when fitted: 250mm. Overall width 30.3mm.



Order Code	Type	Price each
FW82D	HD Strap Handle	£1.59

Heavy-Duty Strap Handle



A heavy duty strap-type flexible carrying handle. Moulded in a smart black ribbed flexible PVC with a strong heat treated sprung steel carrier strip. End pieces are black painted steel. Fixing is by means of two countersunk M5 steel bolts or screws (not supplied). Overall length with handle fully retracted: 255mm. Fixing centres: 213 x 5mm dia.

Order Code	Type	Price each
JY70M	Black Strap Handle	£1.69

Leather Strap Handle



A very strong 12 to 15mm thick leather strap handle with chrome-plated fixing cleats. Handle size 165 x 28mm.

Order Code	Type	Price each
FS27E	Strap Handle Leather	£4.79

Flexible Handle

Cliff



A flexible handle in matt black glass filled nylon for extra strength despite its slim and stylish appearance. Rated at 60lbs loading capacity. It is provided with two recessed screw holes suitable for self tapper No.8, 2BA etc. Length 179mm, width 25mm, height 20mm. Fixing centres: 155 x 5.4mm diameter.

Order Code	Type	Price each
FG79L	Flex Handle	99p

Recess Handle

Re-An



A flush fitting cabinet handle made from tough black impact and shatterproof material ideal for amplifier cabinets and other heavy casings. Cut-out required: 48 x 105mm. Total depth in cabinet: 75mm. Bezel dimensions: 134 x 68mm. Fixing centres: 118.5 x 54mm.

Order Code	Type	Price each
LH08J	Recess Handle	69p

Large Cabinet Handle

Cliff

A heavy duty bar handle, which is designed for use on large, heavy, wood or metal cabinets. It comprises a front and back-plate which are snapped together prior to fixing into the cabinet. The mounting flange is provided with a moulded sealing rib which will give a reasonable airtight seal on cloth or plastic covered cabinets. If a watertight seal is required, then a sealing compound should be used under the flange. A moulded recess in the bar can accept a name plate or trade logo.

Overall size 210 x 165mm. Cut-out 164 x 122mm. Depth 50mm maximum. Nameplate 73 x 16mm approx., and 1.5mm deep.



Order Code	Type	Price each
CW30H	Large Cab Handle	£2.79

Heavy Duty Handle

A metal heavy duty flush fitting black cabinet handle with a strong 25.4mm bar. Ideal for speaker cabinets and other very heavy casings. Cut-out required: 235 x 120mm. Total depth in cabinet: 70mm. Bezel dimensions: 161 x 280mm. Fixing centres: 85 x 85 x 85 x 140mm (5.5mm clear).



Order Code	Type	Price each
LH11M	Heavy Duty Handle	£3.99

Flight Case Handle



A heavy-duty flip handle as used on flight cases. Fits cut-out size 128 x 75 x 10mm deep. Overall size 154 x 100mm. A matching backing plate to provide an extra strong fixing is also available.

Order Code	Type	Price each
YL05F	Flip Handle	£2.99
FS26D	Flip Handle Backplate	79p

Plastic Cabinet Corner

Re-An



Moulded in extra tough black nylon, it is designed to protect the corners of portable cabinets.

Order Code	Type	Price each
FX04E	Cab Corner Large	20p

Plastic Heavy-Duty Cabinet Corners

Union Brothers



Heavy-duty black plastic corner protectors available as either two or three sided fixing. Each flange requires two M5 screws or similar. Not stackable.

Order Code	Type	Price each
JY71N	Plas Corner 2-Side	60p
JY72P	Plas Corner 3-Side	60p

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Metal Cabinet Corners



High quality chromed metal corner protectors available for two or three-side fixing.

Order Code	Type	Price each
FX94C	Corner Two-Side	49p
FX95D	Corner Three-Side	49p

Heavy Duty Cabinet Corners



Heavy-duty zinc-plated metal corner protectors available with two or three-sided fixing. The three-sided fixing is also available with a recess in one side for stacking.

Order Code	Type	Price each
FS28F	HD Cab Corner 2 Side	89p
FS29G	HD Cab Corner 3 Side	89p
FS30H	HD Cab Corner Stack	89p

Cabinet Corner/Foot



Moulded from rigid black PE, they are designed for use on ply or chipboard cabinets. Fixing is by countersunk screws, and screw holes are rebated to avoid abrasion. They are available in two sizes, approx heights are 85mm and 55mm.

Order Code	Type	Price each
BK25C	Cab Corner/Foot Lge	54p
BK26D	Cab Corner/Foot Sm	42p

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MITRE BOX & SAW

A quality, precision engineered tool, this mitre box and saw is designed for making accurate joints in wood, plastic and alloys. It is the ideal tool for the enthusiast, useful for making picture frames, door frames, and in fact, all types of mitre work, enabling four, five, six, and eight-sided frames to be made up accurately, using the readily located preset angles. Alternatively, provision is made for those odd angles to be set up. The mitre box is manufactured as an aluminium pressure casting with a precision ground finish. It carries an arm of similar manufacture, having four saw guides attached. This swings about a graduated scale marked out in degrees on the mitre box. The arm carries a sprung-loaded lever that locates in any one of nine preset positions to lock the guide rods to a selected angle. The bow saw frame is a pre-tensioned



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RJ08J
[F3]

assembly of aluminium and steel with a comfortable cast aluminium handle at one end. The blade is of high tensile steel and provided with adjustment at the handle. An adjustable clamp is supplied to restrain the workpiece and an end stop or depth guide is supplied to enable identical work to be repeated. A spare saw blade is available, RJ09K price £3.99.

Trim and Corner

An attractive extrusion and separate corner piece for use on cabinet corners. Extrusion is 40 x 40mm by 3mm thick and sold in 1m lengths. Corner height is 93mm.



Order Code	Type	Price each
FP03D	A1 Trim Extrusion	£1.99
FP04E	Trim Corner	59p

Small Hinge



A small chromed, permanently joined hinge. Overall size 49 x 41mm. Two per pack.

Order Code	Type	Price each
FS33L	Mini Hinge Pack	£1.10

Strut Hinges



Chrome-plated strut hinges in two sizes. Overall size (excluding strut) 80 x 20mm small type, and 77 x 37mm large type. Two per pack.



Order Code	Type	Price each
FS31J	Sml Strut Hinge Pack	£1.20
FS32K	Lrg Strut Hinge Pack	£1.79

Small Lift-Off Hinge



A small chromed hinge, overall size 47 x 39mm. Two per pack.

Order Code	Type	Price each
YL24B	Small Lift-off Hinge	£1.49

Lift-Off Hinge



A chromed lift-off hinge, overall size 57 x 45mm. Two per pack.

Order Code	Type	Price each
YL04E	Lift off Hinge	£1.79

Drawbolt Catch



A chromed steel drawbolt type catch with a sprung lever action to hold it closed securely yet remain in the open position when required. Fitted using five countersunk M3 size screws (not supplied). Overall size: 63 x 35mm. Two per pack.

Order Code	Type	Price each
JY66W	Drawbolt Catch	£3.49

Padlock Catch

A chromed steel drawbolt type catch with a sprung lever action to hold it closed securely yet remain in the open position when required. Fitted using five M3 size screws (not supplied). The lever can be secured to the hasp and ring with a padlock, the pin of which must not exceed 6mm dia. Overall size: 95 x 50mm. Two per pack.



Order Code	Type	Price each
JY67X	Padlock Catch	£2.99

Lockable Catch

A spring loaded lockable catch. Overall size: 55 x 33mm. Supplied with two keys. Two per pack.



Order Code	Type	Price each
YL25C	Lockable Catch	£2.15

Locking Catch



A chromed steel drawbolt type catch with a sprung lever action to hold it closed securely. Fitted using four countersunk M5 size screws (not supplied). The lever can be locked in the closed position with one of the two keys supplied. Overall size: 92 x 50mm. Two per pack.

Order Code	Type	Price each
JY68Y	Locking Catch	£3.99

ALUMINIUM LAMINATE

Brushed Aluminium Effect Flexible Laminate Panel



This effect is ideal for front panels since holes can be very easily cut and trimmed neatly and transfer lettering sticks positively. The effect is extremely attractive and gives an apparent non-reflective depth to the panel. Size: 292 x 241mm.

Order Code	Type	Price each
XY19V	Laminate Alum Small	£3.69

Aluminium Sheet

Aluminium sheet having one side coated with a protective polythene layer to prevent scratching.

Two sizes are available:
18swg 295 x 195mm (12 x 8in)
16swg 490 x 295mm (20 x 12in)

Order Code	Type	Price each
LH12N	Aly Sheet 18 swg	£2.49
LH13P	Aly Sheet 16 swg	£5.29

KNOBS

A range of attractive modern knobs. All types have grub-screw fixing (except Push-On types) and are suitable for 6 or 6.35mm (1/4in.) shafts (except JZ86T). All knobs are black unless stated.

PLASTIC KNOBS

Matt Finish Knob For 3mm Spindle

An attractive matt black finish grub screw secured knob with serrated finger-grip sides and a narrow skirt. It is similar in style to the K14 range but is designed to fit 3mm shafts, and makes an excellent replacement for knobs fitted to some types of manufactured equipment.



External diameter 12mm max., height 12mm.

Order Code	Type	Price each
JZ86T	Knob 3mm Spindle	28p

Low-Height Knob

Small knob with serrated sides and spun aluminium insert with arrowhead pointer. Diameter: 21mm. Height: 13mm.



Order Code	Type	Price each
RX99H	Knob RN92	39p

Small Ridged Knobs



Two knobs with white pointer line and a skirt. Sides have narrow raised ridges for a firm grip. Fitted with a spun aluminium insert. KB3 has recess for control fixing nut. KB4: Diameter 20mm. Height 17mm. KB3: Diameter 35mm. Height 22mm.

Order Code	Type	Price each
RW87U	Knob KB4	39p
RW86T	Knob KB3	49p

Recessed Knob

A knob with a deeply recessed spun aluminium insert marked with a black line. Side is serrated. Knob has a recess for control fixing nut.



Diameter 26mm. Height 18mm.

Order Code	Type	Price each
HB23A	Knob K1	49p

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Skirted and Unskirted Pair Cliff

An identical pair of knobs except that one has a skirt and one has not. Both are fitted with a spun aluminium cap and have serrated sides. They have a recess for control fixing nut. Skirted M2 version has a white indicator spot on the skirt.



M1: Diameter 19mm.
Height 16mm.
M2: Diameter 25mm.
Height 16mm.

Order Code	Type	Price each
RW88V	Knob M1	59p
RW89W	Knob M2	59p

Mirror Finished Pair Cliff

A matching pair of knobs with a mirror-finish chrome insert and white pointer spot on the skirt. Sides are wide ridged and both types have a recess for control fixing nuts.

M3: Diameter 26mm. Height 15mm.
M4: Diameter 36mm. Height 17mm.



Order Code	Type	Price each
RW90X	Knob M3	49p
RX00A	Knob M4	79p

Pointer Knob

Standard pointer knob with white line. Length 32mm.
Width (max) 19mm.
Height 13mm.



Order Code	Type	Price each
RW75S	Knob BK12	35p

Heavy Duty Pointer Knob

A pointer knob with white line giving a very firm grip for heavy switches etc. Diameter: 27mm. Height: 16mm. Has recess for control fixing nut.



Order Code	Type	Price each
FD76H	Knob HDP	40p

Pointer Knobs with Coloured Caps



A range of attractive knobs with pointer bar with a white line. Knobs have serrated sides and coloured cap. Knobs are available in two sizes with blue, green, red or yellow caps.

RN15: Length 15mm.
Width 13mm.
Height 13mm.
RN18: Length 23mm.
Width 19.3mm.
Height 16.5mm.

Order Code	Type	Price each
FE74R	Knob RN15 Blue	39p
FE75S	Knob RN15 Green	39p
FE76H	Knob RN15 Red	39p
FE77J	Knob RN15 Yellow	39p
FD65V	Knob RN18 Blue	44p
FD66W	Knob RN18 Green	44p
FD67X	Knob RN18 Red	44p
FD68Y	Knob RN18 Yellow	44p

Calibrated And Pointer Pair



A matching pair of knobs with a spun aluminium skirt. Sides are serrated. Type PK2 has a black arrowhead on the skirt and type NK2 is numbered 0 to 10 on the skirt. Both types have recess for control fixing nut. Both types: Diameter 37mm. Height 15mm.

Order Code	Type	Price each
RX01B	Knob NK2	69p
RX02C	Knob PK2	69p

Calibrated and Pointer Pair

A matching pair of knobs with a spun aluminium insert and a wide aluminium skirt. Sides are serrated. Type F11 has a black indicator line on the skirt and type F10 is calibrated 0 to 9.8. Both types have recess for control fixing nut. Both types: Diameter 30mm. Height 18mm.



Order Code	Type	Price each
RW78K	Knob F10	79p
H26D	Knob F11	79p

Fluted Range

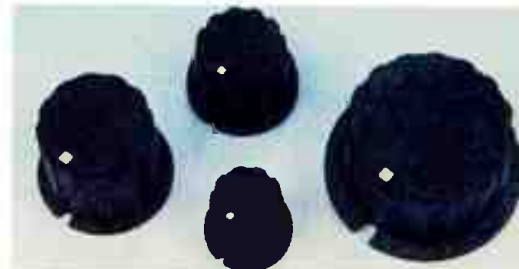
A range of black fluted knobs with white indicator line, narrow skirt and spun aluminium insert. All types have recess for control fixing nut except K7A.

K7A: Diameter 19mm. Height 12mm.
K7C: Diameter 33mm. Height 16mm.
K7B: Diameter 27mm. Height 16mm.
K7D: Diameter 45mm. Height 21mm.



Order Code	Type	Price each
YX01B	Knob K7A	49p
YX02C	Knob K7B	59p
YX03D	Knob K7C	69p
YX04E	Knob K7D	79p

Matt Finish Range



An attractive range of matt black finish knobs with serrated finger-grip sides and a narrow skirt. The top of the knob features a shallow channel which matches in with the serrated finger-grip pattern. One end of the channel has a square, white pointer dot which complements a square cut-out or recess in the skirt. Knob K14D has a recess for a control fixing nut.

K14A: Diameter 15mm. Height 14mm.
K14C: Diameter 24mm. Height 20mm.
K14B: Diameter 19.5mm. Height 15mm.
K14D: Diameter 35mm. Height 17mm.

Order Code	Type	Price each
FK38R	Knob K14 A	35p
FK39N	Knob K14 B	39p
FK40T	Knob K14 C	45p
FK41U	Knob K14 D	52p

SOLID ALUMINIUM KNOBS

Brushed Aluminium Range



Very attractive solid brush aluminium knob with a groove cut as an indicator line. All sizes except K8A have a recess for control fixing nut.

K8A: Diameter 15mm. Height 14mm.
K8B: Diameter 22mm. Height 14mm.
K8C: Diameter 28mm. Height 14mm.

Order Code	Type	Price each
YR64U	Knob K8A	£1.25
YR65V	Knob K8B	£1.59
YR66W	Knob K8C	£1.90

Black Aluminium Range



A range of knobs identical to the K8 series, except that they have a matt black finish.

Order Code	Type	Price each
RK89W	Knob K10A	£1.25
RK90X	Knob K10B	£1.59
RK91Y	Knob K10C	£1.90

COLLET KNOBS

10mm Knob

Re-An

Base diameter 10mm, height 14mm. Available for the following spindle diameters: 4mm (JZ45Y) and 1/8in. (JZ46A). Caps available in red, white, grey and black.



Order Code	Type	Price each
JZ45Y	10mm Collet 4 Knob	56p
JZ46A	10mm Collet 1/8 Knob	56p
JZ61R	10mm Cap Red	8p
JZ65V	10mm Cap White	8p
JZ66W	10mm Cap Grey	8p
JZ67X	10mm Cap Black	8p

15mm Knob

Re-An

Base diameter 15mm, height 14mm. Available for the following spindle diameters: 4mm (JZ48C), 1/8in. (JZ49D), 6mm (JZ50E), 1/4in. (JZ47B). Caps available in red, green, yellow, blue, white, grey, orange, beige and black.



Order Code	Type	Price each
JZ48C	15mm Collet 4 Knob	56p
JZ49D	15mm Collet 1/8 Knob	56p
JZ50E	15mm Collet 6 Knob	56p
JZ47B	15mm Collet 1/4 Knob	56p
JZ68Y	15mm Cap Red	10p
JZ69A	15mm Cap Green	10p
JZ70M	15mm Cap Yellow	10p
JZ71N	15mm Cap Blue	10p
JZ72P	15mm Cap White	10p
JZ73Q	15mm Cap Grey	10p
JZ74R	15mm Cap Orange	10p
JZ75S	15mm Cap Beige	10p
JZ76H	15mm Cap Black	10p

Collet Knob Nut Spinner

Re-An

A box spanner designed for tightening or loosening collet knobs as used on 4mm diameter spindles. Shaft length 140mm.



Order Code	Type	Price each
CK99H	Nut Spinner	£5.99

21mm Knob

Re-An

Base diameter 21mm, Height 17mm. Available for 1/4in. diameter shaft only. Caps available in black, red, green, yellow, blue, white and grey. Knob base is recessed to hide control fixing nut.



Order Code	Type	Price each
JZ51F	21mm Collet Knob	68p
JZ77J	21mm Cap Black	10p
JZ78K	21mm Cap Red	10p
JZ79L	21mm Cap Green	10p
JZ80B	21mm Cap Yellow	10p
JZ81C	21mm Cap Blue	10p
JZ82D	21mm Cap White	10p
JZ83E	21mm Cap Grey	10p

28mm Knob

Re-An

Base diameter 28mm, Height 17mm. Available for 1/4in. diameter shaft only. Caps available in red and black. Knob base is recessed to hide control fixing nut.



Order Code	Type	Price each
JZ52G	28mm Collet Knob	86p
JZ84F	28mm Cap Red	15p
JZ85G	28mm Cap Black	15p

Nut Covers for 10mm and 15mm Knobs

Re-An

These plug into the base of the knob and hide the potentiometer fixing nut. Three types are available: black with white line, for 10 and 15mm knobs (JZ56L and JZ57M respectively) and black, for 15mm knobs only (JZ58N).



Order Code	Type	Price each
JZ58N	No Line 15mm Cover	16p
JZ57M	Lined 15mm Cover	24p
JZ56L	Lined 10mm Cover	24p

Numbered Skirts and Stator for 15mm Collet Knobs

Re-An



These plug into the base of the knob, and have on them black numerals set against a clear background. There are two versions available: one is numbered from 1 to 10 (JZ54J); the other 1 to 12 (JZ53H). A stator is also available (JZ55K). This is a black, adhesive-backed disc with one white segment which is fitted to the panel, allowing the figure dial to rotate over it. Thus only one of the numbers on the figure dial stands out clearly against the white segment of the stator whilst the remaining numbers 'disappear' against the black background.

Order Code	Type	Price each
JZ54J	Skirt 1 - 10	26p
JZ53H	Skirt 1 - 12	26p
JZ55K	Stator	38p

Low Cost 'Collet' Knobs

Re-An

An attractive black silk-finish plastic knob in a style similar to true collet knobs, but having grub-screw fixing for standard 1/4in. shaft. The knob has an integral nut-cover, and seven different colour caps are available separately to plug in the top of the knob body. Has recess for control fixing nut.



Diameter: 19mm.
Height: 21mm (with cap).
Caps are engraved with white indicator line. (White cap has black line.)

Order Code	Type	Price each
YG40T	Low-Cost Collet Knob	49p
QY00A	LC Cap Black	10p
QY01B	LC Cap Blue	10p
QY02C	LC Cap Green	10p
QY03D	LC Cap Grey	10p
QY04E	LC Cap Red	10p
QY05F	LC Cap White	10p
QY06G	LC Cap Yellow	10p

KNOBS FOR SLIDE POTS

Type A

A matt finish, black knob with white line. Knob will only fit with line at right angles to the length of the pot. Flared sides. Size of base: 20 x 14mm. Size at top: 16 x 8mm. Height: 13.5mm. Shaft depth: 8mm.



Order Code	Type	Price each
RX22Y	Slide Knob A	24p

Type B

A miniature version of our Type A knob. Size of base: 12 x 8.5mm. Size at top: 9 x 4.5mm. Height: 9mm. Black with a white line. Shaft depth: 6mm.



Order Code	Type	Price each
YG09K	Slide Knob B	24p

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Type F

A matt finish knob with serrated top and white line. Knob will only fit with line at right angles to the length of the pot. Size of base: 22.5 x 10.5mm. Height: 11mm. Shaft depth: 8.5mm. Available in the following colours:



Order Code	Type	Price each
RX24B	Slide Knob F Blk	22p
RX25C	Slide Knob F Blue	22p
RX26D	Slide Knob F Green	22p
RX27E	Slide Knob F Grey	22p
RX28F	Slide Knob F Red	22p

DIALS AND ACCESSORIES

Spindle Coupler

Brass spindle coupling. Precision turned from brass rod for extending all types of 1/4 in. spindles. Four flush-fitting grub screws ensure non-slip trouble-free operation. Length 15mm. Outer diameter 9.5mm.



Order Code	Type	Price each
RX29G	Spindle Coupler	£1.99

Extension Spindle



Brass extension spindle that fits all 6.35mm (1/4 in.) spindles. Spindle retainer has two 6BA screws and extension spindle is 64mm long x 6.35mm (1/4 in.).

Order Code	Type	Price each
RX30H	Ext Spindle	£1.79

Nylon Rod



1/4 in. (6.35mm) dia. rod for extending spindles. Strong and slightly flexible. It is supplied in 6in. (152mm) lengths (nominal).

Order Code	Type	Price each
RX38R	Nylon Rod	39p

Steel Cord Drive

Jackson



A brass bush (panel cut-out 3/8 in.) through which a standard 1/4 in. shaft revolves in a ball race. Spindle extends at rear of bush to allow flywheel to be fitted. Total length: 62mm. Length from front of bush: 36mm.

Order Code	Type	Price each
RX46A	Cord Drive Steel	£4.49

Brass Bush

Jackson

A brass bush (panel cut-out 3/8 in.) to support long spindle in front panel or guide spindle fixed in sub-chassis through front panel. Suits standard 1/4 in. spindles. Overall length: 13.5mm.



Order Code	Type	Price each
RX31J	Brass Bush	60p

Drive Cord

A nylon covered spun-glass-cored drive cord. Non-stretch and non-slip. Diameter: 0.56mm. Breaking strain: 10lb. Sold per metre.



Order Code	Type	Price each
BL73Q	Drive Cord	12p

Aluminium Dial

Jackson

Dial incorporates a ball drive type 4511F. Output shaft fits standard 6.3mm (1/4 in.) shaft. Unit has an aluminium scale printed 0 to 100 in 180° and a 25.4mm (1 in.) solid aluminium diamond knurled knob. Dial diameter: 44mm (1 3/4 in.).



Order Code	Type	Price each
HB45Y	Aluminium Dial	£12.99

Epicyclic Ball Drive Type 4511F

Jackson

A powerful friction drive with a reduction ratio of approx 6:1. Fits standard 6.3mm (1/4 in) shafts and knobs. Two grub screws for fixing shaft. Base of shaft tapped with two 8BA threaded holes for direct fixing of Rotary Pointer. Shaft length: 26.7mm. Overall length: 47mm. Output torque: 1.8kgm.cm.(26oz.in) to 2.7kgm.cm.(38oz.in). Input torque: <216gm.cm. (3oz. in.)



Order Code	Type	Price each
RX42V	Ball Drive	£4.69

Miniature Type Ball Drive

Jackson

A small friction drive with a reduction ratio of approx 10:1. Fits standard 6.3mm (1/4 in.) shafts and knobs. Two grub screws for fixing shaft. Mounting bracket has two 8BA clearance holes on 20mm centres. Shaft length: 17mm. Overall length: 32.5mm. Output torque: 570gm.cm. (8oz.in.) minimum.



Order Code	Type	Price each
HB42V	Mini Ball Drive	£3.10

Vernier Dials



Heavy black phenolic base and black printed aluminium scale. Moulded knob has fluted grips and internal parts are phosphor bronze and brass for long life. No backlash, positive logging, 'large' dial can be read to a tenth of each scale division. Planetary slow motion drive. Fits standard 6.3mm (1/4 in.) shaft. Scale marked 0 to 100 in 180°. Please note that only the 'large' dial has a true vernier scale.

Type	Dial diameter	Reduction ratio (approx.)
Vernier Dial Small	36mm	6.3:1
Vernier Dial Medium	50mm	7.5:1
Vernier Dial Large	70mm	8.1:1

Order Code	Type	Price each
RX39N	Vernier Dial Small	£5.10
RX40T	Vernier Dial Medium	£6.65
RX41U	Vernier Dial Large	£11.49

Ball Drive Pointer

Jackson



A perspex pointer, transparent with a crimson hair line. Fits the ball drive type 4511F. Length of pointer: 86mm.

Order Code	Type	Price each
HB47B	Ball Drive Pointer	£1.99

Cord Tension Springs

Jackson

Springs have 3.2mm (1/8 in.) inside diameter loops at each end. Three sizes are available.

Length (between loop centres)	Number of coils
8mm (5/16 in.)	6
12.7mm (1/2 in.)	14
21.4mm (27/32 in.)	26

Order Code	Type	Price each
HB48C	Spring Short	20p
HB49D	Spring Medium	20p
HB50E	Spring Long	20p

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THE BEST OF SERVICE

NUTS AND BOLTS

Countersunk Head Metric Steel Bolts

Ewan James

Zinc plated steel countersunk-head bolts with Pozidrive head available in the following sizes. All sizes in mm. All types in packs of ten.

M5	M4	M3	M2.5	M2
		6	6	6
	10	10	10	10
		12	12	12
		16		
	20	20	20	
	30	30		
40		40		

Order Code	Type	Price each
JC81C	Pozi Screw M5 40mm	36p
JC73Q	Pozi Screw M4 10mm	15p
JC75S	Pozi Screw M4 20mm	18p
JC76H	Pozi Screw M4 30mm	24p
BF36P	Pozi Screw M3 6mm	16p
LR57M	Pozi Screw M3 10mm	16p
BF37S	Pozi Screw M3 12mm	17p
JC70M	Pozi Screw M3 16mm	16p
JC71N	Pozi Screw M3 20mm	18p
JC72P	Pozi Screw M3 30mm	20p
LR58N	Pozi Screw M3 40mm	89p
BF39N	Pozi Screw M2.5 6mm	18p
JC68Y	Pozi Screw M2.5 10mm	16p
BF40T	Pozi Screw M2.5 12mm	16p
JC69A	Pozi Screw M2.5 20mm	36p
BF41U	Pozi Screw M2 6mm	20p
JC66W	Pozi Screw M2 10mm	20p
JC67X	Pozi Screw M2 12mm	46p

Panel Head Metric Steel Bolts

Ewan James

Zinc-plated steel panel head bolts with Pozidrive head available in the following sizes. All sizes in mm. All types in packs of ten.



M5	M4	M3	M2.5	M2
	6	6	6	6
10	10	10	10	10
12	12	12	12	12
16	16	16		
20	20	20	20	
25	25	25		
	30	30		
40	40	40		

Order Code	Type	Price each
JY07H	M5 10mm Steel Screw	20p
JY08J	M5 12mm Steel Screw	22p
JY09K	M5 16mm Steel Screw	24p
JY10L	M5 20mm Steel Screw	24p
JY11M	M5 25mm Steel Screw	28p
JY12N	M5 40mm Steel Screw	42p
JY13P	M4 6mm Steel Screw	18p
JY14Q	M4 10mm Steel Screw	18p
JY15R	M4 12mm Steel Screw	18p
JY16S	M4 16mm Steel Screw	20p
JY17T	M4 20mm Steel Screw	20p
JY18U	M4 25mm Steel Screw	20p
JY19V	M4 30mm Steel Screw	26p
JY20W	M4 40mm Steel Screw	36p
JY21X	M3 6mm Steel Screw	16p
JY22Y	M3 10mm Steel Screw	16p
JY23A	M3 12mm Steel Screw	16p
JY24B	M3 16mm Steel Screw	16p
JY25C	M3 20mm Steel Screw	16p
JY26D	M3 25mm Steel Screw	20p
JY27E	M3 30mm Steel Screw	20p
JY28F	M3 40mm Steel Screw	26p
JY29G	M2.5 6mm Steel Screw	16p
JY30H	M2.5 10mm Steel Screw	16p
JY31J	M2.5 12mm Steel Screw	16p
JY32K	M2.5 20mm Steel Screw	35p
JY33L	M2 6mm Steel Screw	20p
JY34M	M2 10mm Steel Screw	30p
JY35Q	M2 12mm Steel Screw	32p

Metric Brass Full Nut

Ewan James

Nickel-plated brass M3 full nut. Supplied in packs of ten.



Order Code	Type	Price each
BF58N	Isonut M3	20p

SCREW SIZES

The size of a metric screw is defined by the numbers M5, M4, M3, M2.5 etc, where the number after the M is the overall diameter of the thread in mm., and by the length in mm.

6mm = 1/4 in. approx, 9mm = 3/8 in. approx, 12mm = 1/2 in. approx and 40mm = 1 1/2 in. approx. For comparison the overall diameter of the thread in BA sizes is as follows:
 8BA = 2.25mm, 6BA = 2.85mm, 4BA = 3.68mm, 2BA = 4.78mm, 0BA = 6.12mm.
 In No. screws:
 No.8 = 4.25mm, No.6 = 3.6mm, No.4 = 3mm, No.2 = 2.25mm.

Metric Steel Washers

Ewan James

Zinc-plated steel plain washers available in the following sizes:



M5, M4, M3, M2.5, M2

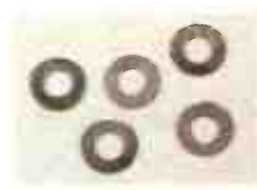
All types supplied in packs of ten.

Order Code	Type	Price each
JD74R	Steel Washer M5	10p
JD75S	Steel Washer M4	10p
JD73H	Steel Washer M3	10p
JD77J	Steel Washer M2.5	10p
JD78K	Steel Washer M2	10p

Metric Brass Washer

Ewan James

Nickel-plated brass M3 plain washer. Supplied in packs of ten.

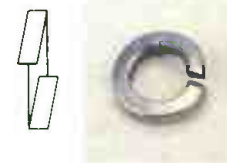


Order Code	Type	Price each
BF62S	Isowasher M3	12p

Metric Spring Washers

Ewan James

Zinc-plated steel spring washers available in the following sizes:



M5, M4, M3, M2.5, M2

All types supplied in packs of ten.

Order Code	Type	Price each
JD94C	Springwash M5	10p
JD95D	Springwash M4	10p
JD96E	Springwash M3	10p
JD97F	Springwash M2.5	10p
JD98G	Springwash M2	10p

Metric Shakeproof Washers

Ewan James

Zinc-plated steel shakeproof washers in the following sizes:



M5, M4, M3, M2.5, M2

All types available in packs of ten.

Order Code	Type	Price each
BF42V	Isoshake M5	10p
BF43W	Isoshake M4	10p
BF44X	Isoshake M3	10p
BF45Y	Isoshake M2.5	10p
LR61R	Isoshake M2	10p

Countersunk Head Metric Brass Bolts

Ewan James

Nickel-plated brass countersunk head bolts with slotted head available in the following sizes. All sizes in mm. M3 x 6; M3 x 10; M3 x 12. All types in packs of ten.

Order Code	Type	Price each
JY36P	M3 6mm Screw	26p
JY37S	M3 10mm Screw	26p
JY38R	M3 12mm Screw	26p

Panel Head Metric Brass Bolts

Ewan James

Nickel-plated brass panel head bolts with slotted head available in the following sizes. All sizes in mm. M3 x 6; M3 x 10; M3 x 12; M3 x 16.

All types in packs of ten.

Order Code	Type	Price each
BF51F	Isobolt M3 6mm	20p
HY30H	Isobolt M3 10mm	20p
BF52G	Isobolt M3 12mm	20p
JD16S	Isobolt M3 16mm	20p

Metric Steel Full Nuts

Ewan James

Zinc-plated steel full nuts supplied in the following sizes.

M5, M4, M3, M2.5, M2.

All types supplied in packs of ten.



Order Code	Type	Price each
JD59P	Steel Nut M5	12p
JD60Q	Steel Nut M4	10p
JD61R	Steel Nut M3	10p
JD62S	Steel Nut M2.5	12p
JD63T	Steel Nut M2	12p

Metric Solder Tags

Ewan James



Heavily tinned solder tags available in the following sizes:

M5, M4, M3, M2.5

All types supplied in packs of ten.

Order Code	Type	Price each
LR62S	Isotag M5	35p
LR63T	Isotag M4	35p
LR64U	Isotag M3	35p
LR65V	Isotag M2.5	35p

BA Round-Head Bolts

Ewan James



Nickel-plated brass round-head bolts. The following sizes are available.

2BA 1/2in.	4BA 1/4in.	6BA 3/16in.	8BA 1/4in.
2BA 1in.	4BA 1/2in.	6BA 1/2in.	8BA 1/2in.
	4BA 1in.	6BA 1in.	
	4BA 1 1/2in.		

All types supplied in packs of ten.

Order Code	Type	Price each
BF00A	Bolt 2BA 1/2in.	45p
BF01B	Bolt 2BA 1in.	58p
BF02C	Bolt 4BA 1/4in.	26p
BF03D	Bolt 4BA 1/2in.	30p
BF04E	Bolt 4BA 1in.	38p
LR52G	Bolt 4BA 1.1/2in.	60p
JR71N	Bolt 6BA 3/16in.	30p
BF05F	Bolt 6BA 1/4in.	22p
BF06G	Bolt 6BA 1/2in.	26p
BF07H	Bolt 6BA 1in.	35p
BF08J	Bolt 8BA 1/4in.	28p
BF09K	Bolt 8BA 1/2in.	35p

Countersunk-Head BA Bolts

Ewan James



Zinc-plated steel countersunk-head bolts. The following sizes are available:

4BA 1/2in.	6BA 1/4in.	8BA 1/4in.
	6BA 1/2in.	
	6BA 1in.	

All types supplied in packs of ten.

Order Code	Type	Price each
BF10L	C/S Screw 4BA 1/2in.	16p
LR56L	C/S Screw 6BA 1/4in.	12p
BF12N	C/S Screw 6BA 1/2in.	12p
BF13P	C/S Screw 6BA 1in.	32p
LR00A	C/S Screw 8BA 1/2in.	18p

Panel Bolts

Nickel-plated steel bolts. Supplied individually.

Two types are available: 4BA 1/2in. slotted panel headed (BF14Q). 4BA 1in. slotted domed countersunk (LR75S).



Order Code	Type	Price each
BF14Q	Panel Screw	6p
LR75S	C/S Panel Screw	10p

BA Full Nuts

Ewan James

Nickel-plated brass full nuts available in the following sizes.

2BA, 4BA, 6BA, 8BA

All types supplied in packs of ten.



Order Code	Type	Price each
BF16S	Nut 2BA	30p
BF17T	Nut 4BA	20p
BF18U	Nut 6BA	18p
BF19V	Nut 8BA	18p

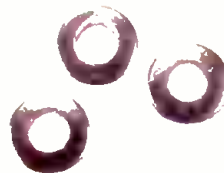
BA Washers

Ewan James

Nickel-plated brass washers available in the following sizes.

2BA, 4BA, 6BA, 8BA

All types supplied in packs of ten.



Order Code	Type	Price each
BF20W	Washer 2BA	16p
BF21X	Washer 4BA	12p
BF22Y	Washer 6BA	12p
BF23A	Washer 8BA	12p

Cup Washer

Ewan James

A chrome-plated steel cup washer for use with our domed countersunk panel screw.

Sold in packs of ten.



Order Code	Type	Price each
JX78K	Cup Washer	29p

Spring Clip



A black finish 4BA panel-fixing spring clip for use where it would be impractical or impossible to hold a nut still while turning the screw. Supplied in packs of ten.

Order Code	Type	Price each
JX59P	Spring Clip	89p

BA Shakeproof Washers

Zinc-plated steel shakeproof washers available in the following sizes.

2BA, 4BA, 6BA, 8BA

All types supplied in packs of ten.



Order Code	Type	Price each
BF24B	Shake 2BA	12p
BF25C	Shake 4BA	12p
BF26D	Shake 6BA	12p
LR01B	Shake 8BA	12p

BA Solder Tags

A heavily tinned solder tag available in the following sizes.

2BA, 4BA, 6BA, 8BA

All supplied in packs of ten.



Order Code	Type	Price each
BF27E	Tag 2BA	28p
BF28F	Tag 4BA	28p
BF29G	Tag 6BA	28p
LR02C	Tag 8BA	28p

Nylon BA Bolts

An ivory finish nylon cheese-head bolt available in the following sizes.

2BA x 1/2in. 4BA x 1in.
2BA x 1in. 6BA x 1/2in.
4BA x 1/2in. 6BA x 1in.

All types supplied in packs of ten.



Order Code	Type	Price each
BF70M	Nyl 2BA 1/2in.	86p
BF71N	Nyl 2BA 1in.	£1.16
BF72P	Nyl 4BA 1/2in.	89p
BF73Q	Nyl 4BA 1in.	99p
BF75S	Nyl 6BA 1/2in.	92p
BF76H	Nyl 6BA 1in.	99p

Nylon BA Nuts

Ivory finish nylon nuts available in the following sizes.

2BA, 4BA, 6BA

All types supplied in



Order Code	Type	Price each
BF78K	Nyl Nut 2BA	80p
BF79L	Nyl Nut 4BA	80p
BF80B	Nyl Nut 6BA	80p

Nylon BA Washers

Ivory finish nylon washers available in the following sizes.

2BA, 4BA, 6BA

All types supplied in packs of ten.



Order Code	Type	Price each
BF82D	Nyl Washer 2BA	32p
BF83E	Nyl Washer 4BA	32p
BF84F	Nyl Washer 6BA	32p

Nylon Metric Nut and Bolt

An ivory finish M3 metric-thread nylon full nut and M3 x 12mm countersunk bolt. Supplied in packs of ten.



Order Code	Type	Price each
JX79L	Nyl C/S Bit M3x12nm	69p
JX80B	Nylon Nut M3	60p

Self-Tapping Screws



Steel self-tapping screws available in the following sizes.

Order Code	Type	Price each
No. 2 x 3/16 in.	No. 2 x 3/8 in.	No. 4 x 1/4 in.
No. 8 x 3/8 in.	No. 6 x 3/8 in.	No. 4 x 3/8 in.
No. 8 x 1/2 in.	No. 6 x 1/2 in.	No. 4 x 1/2 in.

All types supplied in packs of ten.

Order Code	Type	Price each
BF68Y	Slf-Tpr No. 8 x 3/8 in	20p
BF69A	Slf-Tpr No. 8 x 1/2 in	20p
LR67X	Slf-Tpr No. 6 x 3/8 in	20p
BF67X	Slf-Tpr No. 6 x 1/2 in	20p
FE68Y	Slf-Tpr No. 4 x 1/4 in	20p
BF65V	Slf-Tpr No. 4 x 3/8 in	20p
BF66W	Slf-Tpr No. 4 x 1/2 in	20p
BF64U	Slf-Tpr No. 2 x 3/16 in	20p
LR68Y	Slf-Tpr No. 2 x 3/8 in	20p

Japanned Woodscrew



A No 4 x 1/2 in. black japanned woodscrew with a slotted round head. Supplied in packs of ten.

Order Code	Type	Price each
LB99H	Blk Wdscrw No 4 1/2"	20p

Small Handwheel Bolt



A six sided scolloped handwheel bolt, ideal for fixing portable frames or legs, etc. Supplied with T-nut. Matt black knob with M6 x 20mm bc.ft. Knob diameter 40mm.

Order Code	Type	Price each
JU48C	Hand Wheel M6x20mm	69p

Large Handwheel Bolt



A handwheel bolt ideal for fixing portable frames or legs etc. Matt black knob with 35mm long bolt is supplied with T-nut internally threaded to fit bolt. Nut requires a 10mm hole in the woodwork and spikes pull into wood when bolt first tightened to ensure secure

Order Code	Type	Price each
YL23A	Hand Wheel Bolt	79p

Brass Studding



A 6in. length of screwed brass rod. Available in 2BA, 4BA and 6BA.

Order Code	Type	Price each
FW13P	Studding 2BA	69p
FW14Q	Studding 4BA	79p
FW15R	Studding 6BA	89p

SPACERS Round Clearance

Harwin

Circuit board mounting spacers, 4BA, 6BA, M3 or M4 clearance nickel-plated brass tubes. Available in the following sizes.

4BA x 1/8 in.	6BA x 1/8 in.	M3 x 1/8 in.
4BA x 1/4 in.	6BA x 1/4 in.	M3 x 1/4 in.
4BA x 1/2 in.	6BA x 1/2 in.	M3 x 1/2 in.
		M4 x 1/2 in.

Supplied in packs of ten.

Order Code	Type	Price each
FW30H	4BA Spacer 1/8 in.	99p
FW31J	4BA Spacer 1/4 in.	£1.05
FW32K	4BA Spacer 1/2 in.	£1.39
FW33L	6BA Spacer 1/8 in.	92p
FW34M	6BA Spacer 1/4 in.	89p
FW35Q	6BA Spacer 1/2 in.	£1.10
FG32K	M3 Spacer 1/8 in	99p
FG33L	M3 Spacer 1/4 in	89p
FG34M	M3 Spacer 1/2 in	£1.09
FG37S	M4 Spacer 1/2 in	£1.39

Hex Clearance

Harwin

A rigid grey PVC spacer, 12.7mm long, with a hexagonal cross-section. Spacer is 6.35mm (approx) across flats and the central hole is 2.8mm diameter. 6BA or M2.5 screws will pass through the hole or No.4 self-tappers may be used for direct fixing. Supplied in packs of ten.



Order Code	Type	Price each
FE69A	Hex Clear Spacer	79p

Round Threaded

Harwin



Nickel-plated brass spacers with the centre hole tapped to accept a 4BA, 6BA, M3 or M4 screw. Length of the 4BA and 6BA types, is 1/2 in., the M3 and M4 types is 14mm. Overall diameter of 4BA, 6BA and M4 is 6.35mm (1/4 in.) and M3 is 4.75mm.

Supplied in packs of ten.

Order Code	Type	Price each
LR71N	Threaded Spacer 4BA	£1.25
LR72P	Threaded Spacer 6BA	99p
FG38R	Threaded Spacer M3	99p
FG39N	Threaded Spacer M4	£1.40

Hex Threaded

Harwin

Nickel-plated brass spacers with the centre hole tapped to accept a 6BA screw. Supplied in packs of ten. Two lengths available: 1/4 in.: 6.35mm long. 7/8 in.: 22.23mm long. Width across flats 4.9mm.



Order Code	Type	Price each
FD10L	6BA Tapped Spacr 1/4	80p
JG20W	6BA Tapped Spacr 7/8	£1.49

Insulated



A range of insulated spacers with brass inserts and cross-head M3 bolts with spring washer at both ends. Bolts are 5mm long. Spacers are available in seven lengths 10mm, 15mm, 20mm, 25mm and 30mm. Overall diameter 8mm. Sold in packs of four.

Order Code	Type	Price each
FS36P	M3 Insultd Spacer 10	99p
FS37S	M3 Insultd Spacer 15	£1.09
FS38R	M3 Insultd Spacer 20	£1.19
FS39N	M3 Insultd Spacer 25	£1.20
FS40T	M3 Insultd Spacer 30	£1.29

Rubber Coupling

For use with spring-lines, the coupler drastically reduces transmission of acoustic shocks and vibrations to the springs. The coupler has an M4 stud on each end.

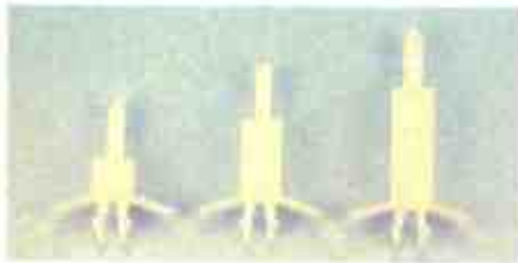
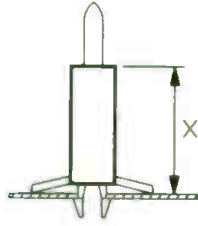


Dimensions in mm:
 Rubber length: 9
 Rubber diameter: 9.5
 Overall length: 29

Order Code	Type	Price each
FB98G	Rubber Coupling	£1.49

Stand-Offs

A range of plastic snap-in stand-offs which eliminate the need for nuts and bolts when mounting printed circuit boards etc. The bottom snaps permanently into a chassis hole 5mm dia. in any chassis with a thickness 1mm to 2.5mm. The top snaps into a 4mm dia. hole in the circuit board which can be removed and re-fitted as required. These stand-offs provide mechanically secure, insulated mounting, yet boards can be quickly removed.



Short and medium types are also available in packs of 40.

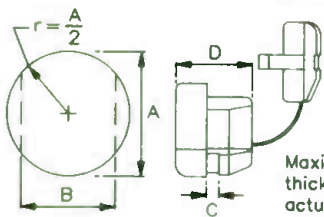
Type	Dimension X (mm)	Overall length (mm)
Short	9	22
Medium	15	28
Long	20	33

Order Code	Type	Price each
JK44X	Standoff Short	8p
AQ05F	Stand Off-Short 40Pk	£2.20
JK45Y	Standoff Medium	8p
AQ06G	Stand Off Med 40Pk	£2.20
JK46A	Standoff Long	8p

GROMMETS

Strain Relief Grommets

A range of moulded black nylon strain-relief grommets which eliminate the need for knot tying, screw-down cable clamps etc. Simply place cable in grommet, squeeze closed and snap into chassis cut-out. Five sizes are available.

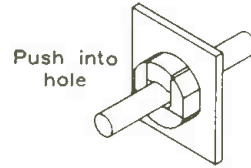
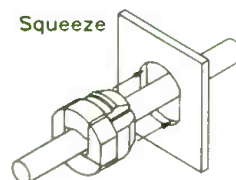
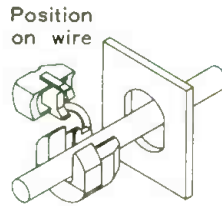


All Dimensions in mm:

B - to stop twisting

C - max chassis thickness

Type	To fit cable	B	A	C	D
F31	Twin Mains DS	9.9	11.0	1.6	10.3
5R2	Min Mains	11.5	12.7	2.5	11.0
6W2	Twin 6A Mains/ Cotton Mains	11.8	12.7	2.3	11.0
6R1	C6A Mains	14.0	15.9	1.6	14.8
7R3	HD Mains/ 4-Core Mains	16.5	19.8	3.2	19.0



Supplied individually.

Order Code	Type	Price each
LR47B	SR Grommet F31	7p
LR48C	SR Grommet 5R2	8p
LR49D	SR Grommet 6W2	9p
JH23A	SR Grommet 6R1	10p
LR50E	SR Grommet 7R3	15p

Waterproof Cable Glands

A range of four high quality cable glands which offer both mechanical anchorage and environmental sealing. Fixing is by means of a hexagonal nut fitted on the inside of the enclosure. The gland is tightened externally and facilitates cable removal/fitting when the gland is fitted. The two bigger sizes feature a dual-sized gland so that two ranges of cable diameter can be accommodated. (For the larger sizes, the inner gland is removed, but for smaller cables it is left in place.) The body is manufactured from a very tough grey nylon.



Comparison chart for cable glands

All Dimensions in mm:

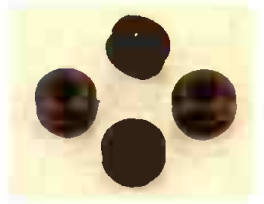
Order Code	Panel Cut-out	Max. Panel Thickness	Hex Nut Size	Cable dia. range	Overall length (before tightening)
JR76H	15.2	5	19 A/F	5 to 8mm	30mm
JZ40T	20.4	6	24 A/F	9 to 12.5mm	40mm
JZ41U	28.3	7	32 A/F	8 to 10mm (S) 17 to 20mm (L)	50mm
JZ42V	37	7	41 A/F	13.5mm to 15mm (S) 21 to 26mm (L)	55mm

S-smaller gland within larger gland;
L-larger gland only.

Order Code	Type	Price each
JR76H	Gland 5 - 8mm	49p
JZ40T	Gland 9 - 12.5mm	50p
JZ41U	Gland 8 - 20mm	75p
JZ42V	Gland 13.5 - 26mm	99p

Grommets

A range of black PVC grommets for preventing cables chaffing when passing through panels.

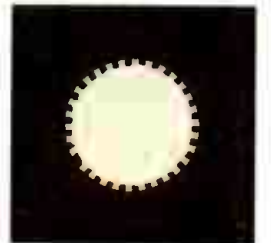
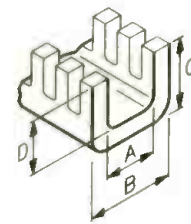


Order Code	Hole Dia (mm)	Chassis Hole dia (mm)	Thkns (mm)	Overall Dia (mm)	Overall Thkns (mm)
JX64U	4.0	6.4	1.6	9.5	6.4
JX65V	6.4	9.5	1.6	14.2	4.9
JX62S	6.4	9.5	2.4	14.2	7.0
JX63T	9.5	12.5	1.6	17.0	7.0
JX66W	15.5	20.0	1.6	24.0	7.5

Supplied in packs of ten.

Order Code	Type	Price each
JX64U	Std Grommet 4.0mm	28p
JX65V	Std Grommet 6.4mm	36p
JX62S	Thk Grommet 6.4mm	36p
JX63T	Std Grommet 9.5mm	48p
JX66W	Std Grommet 15.5mm	65p

Flexible Grommet Strip



A unique continuous grommet strip ideal for all shapes and sizes of holes in panels. Easily cut with scissors and fitted without the aid of tools or adhesives, it can be used on any type of panel material. Available in white polythene in three sizes:

Size	Dimensions (mm)				For panel thickness	
	A	B	C	D	mm	swg
A	1.4	3.8	4	2.5	0.4 to 1.3	27 to 18
B	2.3	4.5	4	2.5	1.3 to 2.1	16 and 14
C	3.3	5.6	4	2.5	2.1 to 3.3	12 and 10

Order Code	Type	Price each
BL74R	Flexigrommet A	39p
BL75S	Flexigrommet B	49p
BL76H	Flexigrommet C	52p

Cable Sealing Grommets



PVC grommets for providing a seal around cables when passing through panels.

Type	Cable Size (mm)	Chassis Hole Dia (mm)	Panel Thkns (mm)	Overall Dia (mm)	Overall Thkns (mm)
JX77J	up to 11	16	1.5	19	6.4
JX72P	up to 14	19	1.5	25.5	8
JX73Q	up to 19	25.5	2.4	36.5	9.5

Supplied in packs of ten.

Order Code	Type	Price each
JX77J	Seal Grommet 16.0mm	99p
JX72P	Seal Grommet 19.0mm	89p
JX73Q	Seal Grommet 25.5mm	£1.19

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THE BEST OF SERVICE

Cable Exit Grommet with Sleeve



A cable exit grommet with protective sleeve, ideal to prevent chafing when cables exit an enclosure. The grommet will accept cables up to 5.1mm diameter. Panel hole diameter 8.7mm, panel thickness 1.6mm.

Order Code	Type	Price each
JX71N	Siv Grommet 5.1mm	79p

Blanking Grommets



A range of black PVC grommets for blanking-off holes in panels.

Type	Chassis Hole Dia (mm)	Panel Thkns (mm)	Overall Dia (mm)	Overall Thkns (mm)
JX67X	15.5	1.6	22.0	7.5
JX68Y	20.0	1.6	25.5	9.3
JX69A	25.4	1.6	32.0	9.0

Supplied in packs of ten.

Order Code	Type	Price each
JX67X	Blnk Grommet 15.5mm	85p
JX68Y	Blnk Grommet 20.0mm	85p
JX69A	Blnk Grommet 25.4mm	£1.10

MISCELLANEOUS HARDWARE

Cabinet Assembly Block



A white plastic cabinet assembly block that provides a convenient and easy way of fixing wooden cabinet panels together. The 30 x 14 x 14mm block has two countersunk 4.5mm holes on one face and one countersunk 4.5mm hole on the other face. Ideal for use in loudspeaker cabinets. Supplied in packs of ten.

Order Code	Type	Price each
JX74R	Modesty Block White	65p

Metal 'L' Bracket

A plated, right-angled steel 'L' shaped bracket which can be used in a variety of different roles including that of a cabinet corner protector. Each side is 31mm long with a 5mm dia. hole at 21.5mm away from the angle, and a half-round end. Width is 18mm. Colour silver.



Order Code	Type	Price each
JP12N	L Corner	20p

Cabinet Shelf Support



A white plastic shelf support, as used with self-assembly furniture. Spigot diameter, 5.9mm. Spigot length, 6.9mm. Supplied in packs of ten.

Order Code	Type	Price each
JX75S	Shelf Support	39p

Graphic Transfers



A range of very high quality rub-down letters, numbers and symbols. Letter sheets are available in 2.5mm and 4.2mm heights and each sheet contains capital and lower-case letters as well as punctuation marks and a few numerals.

The number sheets contain 54 of each numeral 0 to 9 and are 3.5mm high. The symbols sheet contains several of each of 24 different front and rear panel symbols commonly used on electronic equipment. All types are available in black and in white.

Sheet size: 210 x 94mm.

Order Code	Type	Price each
XH73Q	Trnsfr Ltr 2.5mm; Blk	75p
XH74R	Trnsfr Ltr 2.5mm; Wht	75p
XH77J	Trnsfr Ltr 4.2mm; Blk	75p
XH78K	Trnsfr Ltr 4.2mm; Wht	75p
XH75S	Transfer Number; Blk	75p
XH76H	Transfer Number; Wht	75p
XH71N	Transfer Symbol; Blk	75p
XH72P	Transfer Symbol; Wht	75p

High Voltage Warning Label



A self adhesive label with the legend 'DANGER: High Voltage' in black on a yellow background. Size: 50mm.

Order Code	Type	Price each
DM55K	HV Warning Label	95p

Mains Warning Label



A self-adhesive label bearing the legend "WARNING Disconnect the mains supply before removing this cover" printed in black on a yellow background. Size 50 x 25mm.

Order Code	Type	Price each
WH48C	Mains Warning Label	19p

Cable Exit Gland with Sleeve



A sealed cable exit gland combined with a coiled strain relief sleeve designed to prevent chafing when cables exit an enclosure. The gland contains a rubber grommet which will accept cables up to 5mm diameter, but this may be removed so that the whole gland will accommodate a 10mm diameter loom. The threaded sleeve part screws into the gland and squeezes a separate plastic collet ring to grip the cable. The gland body has a 12mm long thread and is attached to the enclosure with a nut, and includes a neoprene sealing washer. Requires a panel hole diameter of 15mm (5/8 in.). Maximum panel thickness is 4mm. Sleeve length is 50mm. Colour black.

Order Code	Type	Price each
JZ43W	Cable Exit Gland	89p

Cable Exit Grommet Large



A cable exit grommet for use with large diameter cables. The grommet is tapered and should be trimmed to accommodate the cable it is protecting. Suitable for cable diameters 8 to 16mm. Panel hole diameter 20mm, panel thickness 1.8mm. Supplied in packs of ten.

Order Code	Type	Price each
JX70M	Tpr Grommet 8-16mm	85p

Hole Plugs

Moulded nylon plugs which snap-lock with finger pressure into holes in chassis which are to be blanked off. Two sizes are available. Colour: black.



Dimensions in mm:

Type	Fits hole dia.	Head dia.	Overall height	Max chassis thickness
1/4 in.	6.35	7.94	7.94	1.57
3/8 in.	9.53	11.91	10.32	3.18

Supplied in packs of ten.

Order Code	Type	Price each
JX60Q	Hole Plug 1/4 in.	56p
JX61R	Hole Plug 3/8 in.	69p

Quality Control' Write-on Labels



A range of write-on labels designed for quality control processes such as BS5750, ISO9000 etc. The peel off, self-adhesive, labels are made from vinyl cloth, and are primarily designed for indoor use.

Label Size	Label Size (in.)	Number Per Card
Code B	1 1/2 x 5/8	14
Code C	1 1/2 x 15/32	18

Maplin Code	Description	Size Code
CY39N	Calibration	B
CY40T	Blank	B
CY41U	Serial No.	C
CY42V	Tested	B
CY43W	Inspected by	B
CY44X	Serviced by	B
CY47B	Tested for electrical safety	B

Sold per card.

Order Code	Type	Price each
CY39N	Calibration Label	69p
CY40T	Blank Label	69p
CY41U	Serial No. Label	69p
CY42V	Tested Label	69p
CY43W	Inspected By Label	69p
CY44X	Serviced By Label	69p
CY47B	Tested Elect Safety	69p

'Warning' Labels

A range of self-adhesive, electrical warning labels that are made from vinyl cloth, and are suitable for use on a wide range of electrical and electronic equipment, and apparatus. The labels are primarily intended for indoor use.



Label Size	Label Size (in.)	Maplin Code	Description (on label)	Size Code	Number Per Card
Code A	1 1/2 x 3/4	CY52G	Warning - This equipment must be earthed	A	11
Code B	2 1/4 x 1	CY53H	Danger - Isolate mains supply before removing cover	B	8

Sold per card.

Order Code	Type	Price each
CY52G	Earth Warning Label	99p
CY53H	Isolated Mains Label	£1.32

PCB Guide



A moulded nylon support and guide for vertically mounted PCB's. Guide is push fixed and requires an 8 x 4mm mounting slot. Overall height: 39mm, width: 8mm, thickness: 4.5mm. The guide has a slot for a PCB on each side & slots are 3mm deep.

Order Code	Type	Price each
XX31J	PCB Guide	39p

PVC Beading



A flexible, black PVC beading of slotted section intended to provide a protective edging to metal panels, chassis and covers etc, will also protect persons coming into contact with metal edges, for example. May have to be glued in position if firm fixing is required. Sold per metre.

Order Code	Type	Price each
XR78K	PVC Beading Section	29p

Self-Adhesive Pads



A small foam pad 25 x 12mm (1mm thick) with a strong adhesive coating on both sides. Adhesive will bond to most materials. Supplied in strips of ten pads.

Order Code	Type	Price each
HB22Y	Quickstick Pads	20p

Snap Rivets



Small plastic rivets which may be used as a quick and cheap alternative to screws and nuts for holding together panels, PCB's onto brackets and chassis etc, providing the fixture is reasonably permanent. The rivet comes in two parts, the head and sleeve. The sleeve pushes through holes in the items to be attached, and the pin is pushed into the sleeve. The insertion of the pin makes the sides of the sleeve splay out, providing a secure grip.

Requires 3mm minimum hole diameter.

Supplied in packs of ten.

Order Code	Type	Price each
BK87U	Snap Rivet	69p

Terry Clip

Available in 1/2 in. diameter. Supplied in packs of ten.



Order Code	Type	Price each
JX76H	Terry Clip 1/2 in.	£1.20

Velcromounts



A versatile self-adhesive mounting and fixing system consisting of two nylon tapes, one covered in thousands of tiny loops, the other in thousands of tiny hooks. When pressed together, the hooks grip the loops forming a tight secure closure capable of resisting very strong lateral pulls. Yet to separate the strips, you simply peel them apart. The strips have a strong pressure-sensitive adhesive backing and are ideal for securing the grille in front-loading loudspeaker cabinets for example. The strips are 25mm (1 in. approx.) wide and sold in separate 1m lengths of hooks and loops or in packs of four pairs of 1 in. squares. Colour of both parts is black.

Order Code	Type	Price each
FE45Y	4prs 1 in. Velcro	29p
FE46A	Velcro Hooks 1m	£1.10
FE47B	Velcro Loops 1m	£1.10

FANS

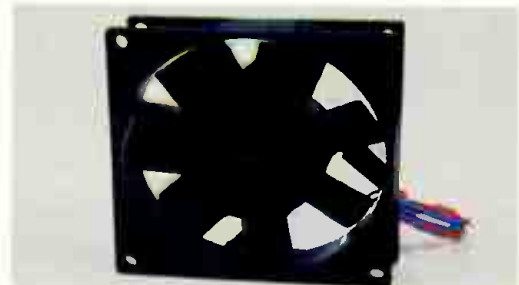
Brushless 12V DC Axial Fans



A range of 12V DC axial fans with plastic housings and blades to UL49V-0. These fans have brushless motors for long life. Slimline style. Connection is by 300mm flying leads, red is positive, blue is negative.

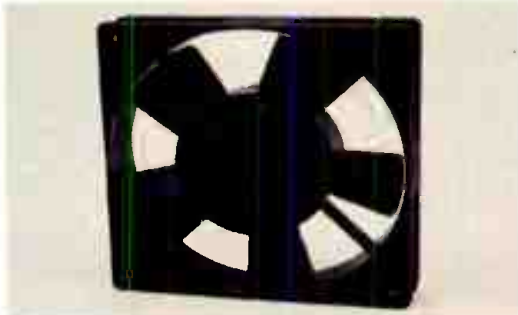
Specification

Type:	40mm
Operating Voltage:	10-2V to 13-8V
Rated Voltage:	12V
Current:	160mA
Noise Level:	35dBA
Max Airflow:	210 litres/min
Continuous Life:	20000 hrs @ 40°C
Operating Temperature:	-10°C to +70°C
Insulation Resistance:	10MΩ @ 500V DC
DC Dielectric Strength:	5mA @ 500V AC
Weight:	40g
Overall Size:	40 x 40 x 20mm
Fixing Centres:	32 x 32 x dia 3.5mm



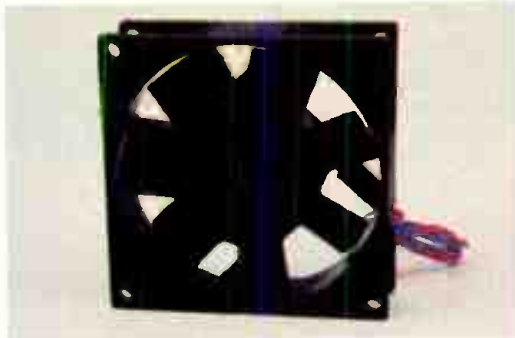
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Specification
 Type: 60mm
 Operating Voltage: 10-2V to 13-8V
 Rated Voltage: 12V
 Current: 200mA
 Noise Level: 35dBA
 Max Airflow: 420 litres/min
 Continuous Life: 60000 hrs @ 40°C
 Operating Temperature: -10°C to +70°C
 Insulation Resistance: 10MΩ @ 500V DC
 DC Dielectric Strength: 5mA @ 500V AC
 Weight: 110g
 Overall Size: 60 x 60 x 25.5mm
 Fixing Centres: 50 x 50 x dia 4.2mm



Specification
 Type: 80mm
 Operating Voltage: 10-2V to 18-8V
 Rated Voltage: 12V
 Current: 180mA
 Noise Level: 31dBA
 Max Airflow: 900 litres/min
 Continuous Life: 60000 hrs @ 25°C
 Operating Temperature: -10°C to +70°C
 Insulation Resistance: 10MΩ @ 500V DC
 DC Dielectric Strength: 5mA @ 500V AC
 Weight: 140g
 Overall Size: 80 x 30 x 25.5mm
 Fixing Centres: 71.5 x 71.5 x dia 4.5mm

Specification
 Type: 92mm
 Operating Voltage: 10-2V to 13-8V
 Rated Voltage: 12V
 Current: 300mA
 Noise Level: 35dBA
 Max Airflow: 1200 litres/min
 Continuous Life: 60000 hrs @ 25°C
 Operating Temperature: -10°C to +70°C
 Insulation Resistance: DC 10MΩ @ 500V DC
 DC Dielectric Strength: 5mA @ 500V AC
 Weight: 150g
 Overall Size: 92 x 92 x 25.5mm
 Fixing Centres: 82.5 x 82.5 x dia 4.5mm

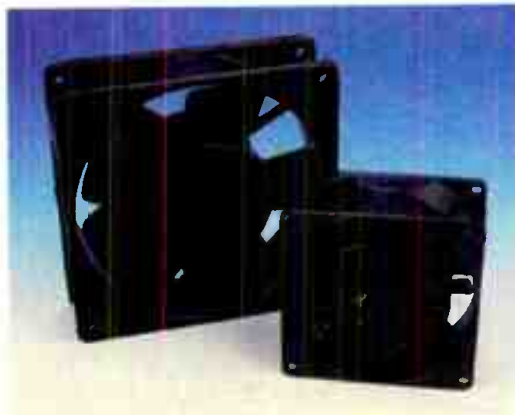


Specification
 Type: 120mm
 Operating Voltage: 10-2V to 13-8V
 Rated Voltage: 12V
 Current: 700mA
 Noise Level: 42dBA
 Max Airflow: 2200 litres/min
 Continuous Life: 60000 hrs @ 25°C
 Operating Temperature: -10°C to +70°C
 Insulation Resistance: 10MΩ @ 500V
 DC Dielectric Strength: 5mA @ 500V AC
 Weight: 200g
 Overall Size: 119.5 x 119.5 x 25.5mm
 Fixing Centres: 104.8 x 104.8 x dia 4.5mm

Order Code	Type	Price each
YZ41U	40mm 12V Fan	£9.99
YZ38R	60mm 12V Fan	£9.99
YP40T	80mm 12V Fan	£9.99
YZ39N	92mm 12V Fan	£9.99
YZ40T	120mm 12V Fan	£9.99

240V Mains

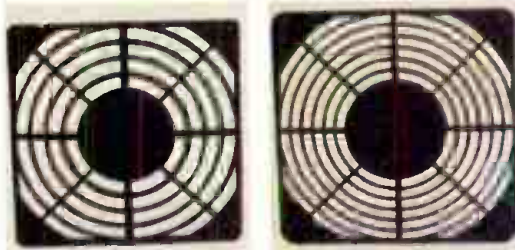
A 240V AC mains axial fan for cooling, extraction, intake, ventilation etc. Available in two standard sizes 80mm (3in.) and 120mm (4 1/2 in.). The fans feature an impedance protected shaded-pole motor with a sintered iron sleeve bearing. The frame is diecast aluminium with steel impeller all finished in black epoxy paint. The 120mm unit has five blades and the 80mm has nine blades. The 120mm fan has solder tag connections and one fixing hole is 2BA (M5) clear for earth connection. The 80mm fan has 280mm flying leads for connection inside equipment only, and a hole in the chassis is tapped M4 for earth connection.



Specification	80mm	120mm
Power consumption	13W	22W
Continuous life	20,000 to 40,000 hours at 40°C	
Motor current	85mA	140mA
Stall current	105mA	180mA
Noise level	33dBA	45dBA
Max. airflow	28CFM	80CFM
Speed	2700rpm	2650rpm
Overall size	80 x 80 x 38mm	119 x 119 x 38mm
Fixing centres	71.5 x 71.5 4.5mm clear	105 x 105 4.5mm clear
Operating temp	-10°C to +60°C	

Order Code	Type	Price each
YP46A	Standard 80mm Fan	£12.99
WY08J	Standard 120mm Fan	£12.99

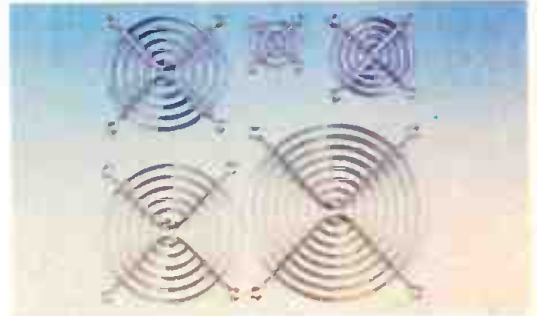
Plastic Finger Guards



Plastic finger guards that press-fit onto the above fans. Available to suit 80 and 120mm fans.

Order Code	Type	Price each
JU26D	80mm Plastic Guard	89p
JU27E	120mm Plastic Guard	99p

Chromed Steel Finger Guards



Heavily chromed steel finger guards that fit any standard fan. Available to suit 40, 60, 80, 92 and 120mm types.

Order Code	Type	Price each
JU25C	40mm Fan Guard	85p
JU23A	60mm Fan Guard	99p
FS19V	80mm Fan Guard	£1.10
JU24B	92mm Fan Guard	£1.20
FS20W	120mm Fan Guard	£1.30

LOCKS

Cam Lock



A quality product containing parts manufactured from brass, steel and alloy materials. The body is finished in chrome with a polished bezel. Suitable for use with metal cabinets, tool boxes and drawers with a panel thickness of up to 4mm. The body is 12.5mm diameter across the threads and 10mm across the flat surfaces. Diameter of bezel is 15mm. The blade is 19mm long from the centreline by 10mm wide. Overall length of lock is 22mm. Two keys provided.

Order Code	Type	Price each
CJ13P	Cam Lock	£1.85

Tumbler Lock



A quality product containing parts manufactured from brass, steel and alloy materials. The barrel is finished in chrome with a polished bezel. The lock is a separate item with a chrome finished body that fits into the barrel, after mounting, in any one of four positions. The tumblers of the lock are made from brass, steel and bronze. Suitable for use with metal cabinets, tool boxes and drawers with a panel thickness of up to 5mm. The barrel is 19.5mm diameter across the threads and 16mm across the flat surfaces. Diameter of bezel is 21.5mm. The blade is 32mm long from the centreline by 15.5mm wide. Overall length of lock when assembled is 29mm. Two keys provided.

Order Code	Type	Price each
CJ14Q	Tumbler Lock	£1.60

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Fibre Optic Light Guide	620
Infra-Red Diodes	617
Lampholders	600

Laser Diodes	622
Laser Tube	621
LEDs	604
Lenses	621
Light Responsive Devices	618
Liquid Crystal Display	613
Message Display	615

Multicolour LEDs	607
Neons	603
Opto-Isolators	615
Oven Bulbs	603
Seven-Segment Displays	612
Solar Power	618
Xenon Tubes	621

BULBS AND BULB HOLDERS

MES Lampholders

Miniature

Optum

A miniature MES lampholder with two solder tags for making the connections. Overall size 19mm across tags, 10mm diameter, 13mm high.



Order Code	Type	Price each
JX87U	Min MES Lampholder	27p

Batten Holder

An MES bulb holder in a bakelite base, with screw terminals.

Dimensions:
Dia. of base: 31mm.
Fixing centres: 23mm.
Total height: 18mm



Order Code	Type	Price each
RX86T	MES Batten Hldr	39p

LES Lampholders

Miniature

Optum

A miniature LES lampholder with two solder tags for making the connections. Overall size 15mm across tags, 6mm diameter, 9mm high.



Order Code	Type	Price each
UJ72P	LES Lampholder	27p

Domed Type

Optum

A panel lampholder with smart chromed bezel and domed translucent polycarbonate cap available in five colours. Panel fixing requires 10mm dia. cut out and, when fixed, lamp can be removed from either side of panel. Dia. of bezel: 12mm. Colours available Blue, Green, Red, White and Yellow.



Order Code	Type	Price each
RX76H	Dmd LES Lhldr Blue	63p
RX77J	Dmd LES Lhldr Green	63p
RX78K	Dmd LES Lhldr Red	63p
RX79L	Dmd LES Lhldr White	63p
RX80B	Dmd LES Lhldr Yellow	63p

Flat Top Type

Optum

A panel lampholder with smart chromed bezel and flat topped, transparent red polycarbonate cap. Panel fixing requires 11mm dia cut-out and, when fixed, lamp can be removed from either side of panel. Dia. of bezel: 14mm.



Order Code	Type	Price each
RX69A	Flat-Tp LES Lhldr Red	67p

LES Lamp Covers

Optum

High temperature, coloured translucent, silicone rubber covers for 5mm diameter bulbs. The covers stretch over the glass bulb on LES types and our Wire Bulb and will withstand the high temperature reached by the bulb. The covers also offer a very inexpensive method of mounting the bulb to a panel (up to 18swg thickness). Panel cut-out required 6.3mm (1/4 in.). Overall size 12.5 x 9mm dia. Available in Amber, Blue, Green, Red and Yellow.



Order Code	Type	Price each
YY00A	LES Cover Amber	30p
YY01B	LES Cover Blue	30p
YY02C	LES Cover Green	30p
YY04E	LES Cover Red	30p
YY06G	LES Cover Yellow	30p

Bulbs

Wire-Ended Neon Type

Wire-ended neon indicator lamp. For 250V operation use a series 270kΩ 1/4W resistor. Bulb diameter 5.95mm. Bulb length 21.5mm (max).



Order Code	Type	Price each
RX70M	Wire Neon	16p

Wire-Ended Filament Type

A wire-ended filament type bulb, dia. 5mm, 12V, 0.08A, 0.96W, 2 Lumens (nom). Nominal life: 5000 hours.



Order Code	Type	Price each
WQ13P	Wire Bulb 12V	52p

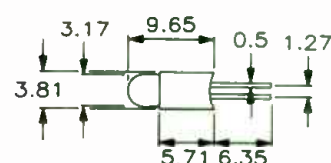
Wire Terminal Type

A small wire terminal type, 3.17mm dia. and 6.35mm long (excl. wire), two voltages available; 12V, 60mA average life 16000 hours and 28V, 24mA average life 5000 hours.



Order Code	Type	Price each
BT43W	Wire Lamp 12V	32p
BT44X	Wire Lamp 28V	49p

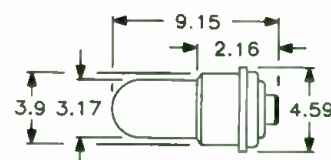
Bi-Pin Type



This 28V bulb has a pin spacing of 2.54mm. Current consumption is 24mA with a light output of 1.8 lumens, size is 3.8 x 9.65mm approx. (excl. pins).

Order Code	Type	Price each
BT46A	Bi-Pin Bulb Wide	89p

Sub-Midget Flange Type



Size 9.15 x 3.9mm, one voltage available, 28V, 24mA, 1.8 lumens and average life of 5000 hours.

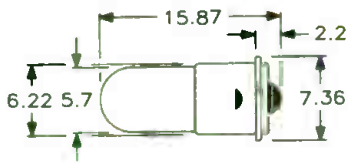
Order Code	Type	Price each
BT49D	Submidget Flange 28V	£1.15



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01702 554161

Midget Flange Type

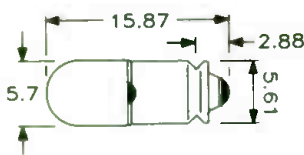


Two voltages available.

Volts	mA	Lumens	Av. life (hours)
12	100	5	5000
28	40	3.7	25000

Order Code	Type	Price each
BT50E	Midget Flange 12V	43p
BT51F	Midget Flange 28V	39p

Midget Groove Type

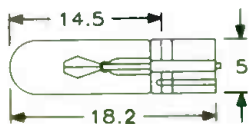


Two voltages available.

Volts	mA	Lumens	Av. life (hours)
14	80	3.7	50000
28	40	3.7	25000

Order Code	Type	Price each
BT52G	Midget Groove 14V	43p
BT53H	Midget Groove 28V	39p

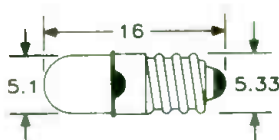
Wedge Base Capless Type



Two versions available, both rated at 24 to 30V, current either 30mA or 42mA. Average life 1000 hours.

Order Code	Type	Price each
BT47B	Capless Wedge 30mA	39p
BT48C	Capless Wedge 42mA	39p

Lilliput LES Type



A range of Lilliput Edison Screw (LES) E5 type bulbs, size 5.1 x 16mm.

Volts	mA	Lumens	Av. life (hours)
6	60	1	5000
6.5	150	4	2500
12	127	5.2	5000
14	50	3	1000
24	40	3	10000
28	40	3.7	25000

Order Code	Type	Price each
BU12N	LES Lamp 6V	39p
BU13P	LES Lamp 6.5V	39p
BU14Q	LES Lamp 12V	44p
BU15R	LES Lamp 14V	44p
BU16S	LES Lamp 24V	47p
BU17T	LES Lamp 28V	47p

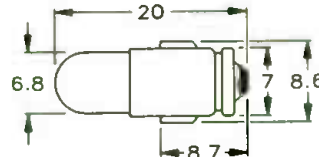
Tubular LES Type

Two types are available 6V and 12V. 6V, 0.16A, 0.96W, 1.0 Lumens (nom). Nominal life 5000 hours. Post Office type 41C. 12V, 0.08A, 1W, 2 Lumens (nom). Nominal life 5000 hours.



Order Code	Type	Price each
WL74R	LES Bulb 6V	45p
WL75S	LES Bulb 12V	45p

Type R7 Bulb

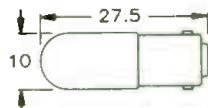


Three voltages available with Ba7s base, size 6.8 x 20mm.

Volts	mA	Watts	Av. life (hours)
6	100	0.6	1000
24	50	1.2	5000
60	20	1.2	1000

Order Code	Type	Price each
BT76H	R7 Bulb 6V	39p
BT77J	R7 Bulb 24V	47p
BT78K	R7 Bulb 60V	62p

MCC Tubular R10 Bulb

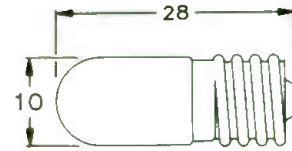


A range of voltages are available with Ba9s (MCC) base, size 10 x 27.5mm.

Volts	mA	Watts	Av. life (hours)
6	200	1.2	1000
6	700	4	1000
6.3	150	0.95	20000
6.5	300	1.95	1000
12	183	2.2	1000
12	340	4	1000
24	50	1.2	1000
24	83	2	1000
24	125	3	1000
28	40	1.12	1000
28	100	2.8	1000
48	40	1.92	1000
50	50	2.5	1000
60	50	3	1000
110/130	20	2.6	1000
240		3 to 4	1000

Order Code	Type	Price each
BT79L	R10 MCC 6V 200mA	39p
BT80B	R10 MCC 6V 700mA	39p
BT81C	R10 MCC 6.3V 150mA	39p
BT82D	R10 MCC 6.5V 300mA	39p
BT83E	R10 MCC 12V 183mA	39p
BT84F	R10 MCC 12V 340mA	39p
BT85G	R10 MCC 24V 50mA	39p
BT86T	R10 MCC 24V 83mA	39p
BT87U	R10 MCC 24V 125mA	39p
BT88V	R10 MCC 28V 40mA	41p
BT89W	R10 MCC 28V 100mA	41p
BT90X	R10 MCC 48V 40mA	43p
BT91Y	R10 MCC 50V 50mA	43p
BT92A	R10 MCC 60V 50mA	49p
BT93B	R10 MCC 110V 20mA	65p
BT94C	R10 MCC 240V	£1.20

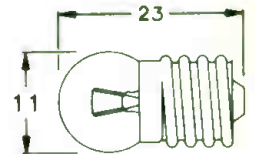
MES Tubular R10 Type



Volts	mA	Watt	Av. life (hours)
6.5	150	0.97	1000
12	100	1.2	1000
12	183	2.2	1000
24	50	1.2	1000
24	125	3	1000
50	50	2.5	1000
60	50	3	1000
130	20	2.6	1000

Order Code	Type	Price each
BU18U	R10 MES 6.5V 150mA	40p
BU20W	R10 MES 12V 100mA	40p
BU21X	R10 MES 12V 183mA	40p
BU22Y	R10 MES 24V 50mA	40p
BU23A	R10 MES 24V 125mA	40p
BU24B	R10 MES 50V 50mA	49p
BU25C	R10 MES 60V 50mA	54p
BU26D	R10 MES 130V 20mA	62p

Round MES Type



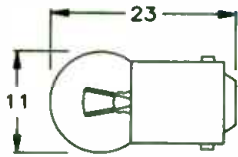
Volts	Watts	Amps	Nominal lumens	Nom. life (hours)
3.5	0.7	0.2	1.5	1000
6	0.24	0.04	0.45	1000
6	0.36	0.06	-	1000
6	0.6	0.1	3	1000
6.5	0.97	0.15	-	3000
6.5	1.95	0.3	12	3000
12	1.2	0.1	5	1000
12	2.2	0.18	11	3000
24	1.2	0.05	-	1000
24	3	0.12	11	1000

Order Code	Type	Price each
WL76H	Bulb MES 3.5V	40p
WL77J	Bulb MES 6V 0.24W	40p
BT99H	Bulb MES 6V 0.36W	40p
WL78K	Bulb MES 6V 0.6W	40p
BU00A	Bulb MES 6.5V 0.97W	40p
WL79L	Bulb MES 6.5V 1.95W	40p
WL80B	Bulb MES 12V 1.2W	40p
WL81C	Bulb MES 12V 2.2W	40p
BU04E	Bulb MES 24V 1.2W	40p
WL82D	Bulb MES 24V 3W	40p

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Round MCC Type

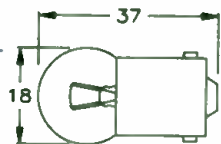


A range of voltages available with Ba9s (MCC) base, size 11 x 23mm.

Volts	mA	Watts	Av. life (hours)
6	300	1.8	3000
6.5	150	0.97	3000
6.5	300	1.95	3000
12	183	2.2	1000
24	50	1.2	1000
24	125	3.0	1000

Order Code	Type	Price each
BU06G	Bulb MCC 6V 1.8W	39p
BU07H	Bulb MCC 6.5V 0.97W	39p
BU08J	Bulb MCC 6.5V 1.95W	39p
BU09K	Bulb MCC 12V 2.2W	39p
BU10L	Bulb MCC 24V 1.2W	39p
BU11M	Bulb MCC 24V 3W	39p

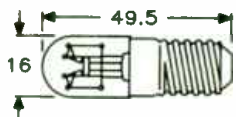
SCC Round K18 Type



Two voltages available, 12V and 24V, both rated at 5 watts with an average life of 1000 hours.

Order Code	Type	Price each
BT71N	K18 Round 12V	39p
BT72P	K18 Round 24V	39p

SES 1648 Tubular

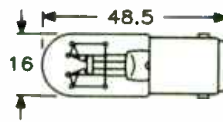


Three voltages available with E14 (SES) screw cap, size 49.5 x 16mm.

Volts	mA	Watts	Av. Life (hours)
24	125	3	2000
110 to 130	53	5 to 7	2000
220 to 260	26	5 to 7	2000

Order Code	Type	Price each
BT73Q	SES Tubular 24V	67p
BT74R	SES Tubular 110V	77p
BT75S	SES Tubular 240V	£1.00

Tubular SBC Type



A range of lamps available with SBC, Ba15d cap, in various voltages, size 16 x 48.5mm.

Volts	mA	Watts	Av. life (hours)
24	208	5.0	2500
110/130	53	5 to 7	2000
220/260	26	5 to 7	2000

Order Code	Type	Price each
BT57M	SBC Tubular 24V	67p
BT58N	SBC Tubular 110V	77p
BT59P	SBC Tubular 240V	£1.00

Backlighting Lamps

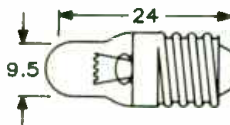
Lamps which will fit into standard $1\frac{1}{4} \times \frac{1}{4}$ in. chassis fuseholders and clips and which give a bright light over the length of the filament. The lamps have the appearance of standard $1\frac{1}{4} \times \frac{1}{4}$ in. fuses. Two voltages are available.



Volts	Watts	Amps
6V	0.6	0.1
12V	3.0	0.3

Order Code	Type	Price each
UJ70M	Lamp Fuse-shape 6V	58p
UJ71N	Lamp Fuse-shape 12V	58p

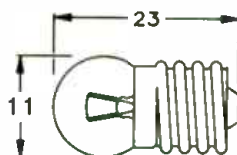
Lens End MES Type



Two voltages available; 2.2V 250mA, average life 5 hours and 3.7V 300mA, average life 10 hours.

Order Code	Type	Price each
BT69A	MES Lens 2.2V	29p
BT70M	MES Lens 3.7V	29p

Round MES Torch & Flash Light Bulbs

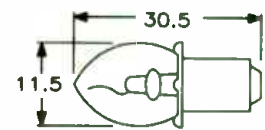


Three bulbs suitable for a wide range of torches and flash lights, with E10 (MES) end caps, size 11 x 23mm.

Volts	mA	Watts	Av. Life (hours)
1.25	250	0.31	10
2.5	300	0.75	100
3.5	300	1.05	1000

Order Code	Type	Price each
BT95D	Torch Bulb 1.25V	32p
BT96E	Torch Bulb 2.5V	32p
BT97F	Torch Bulb 3.5V	32p

Pre-Focus Bulb



Cap fitting, size 30.5 x 11.5mm.

Volts	Amps	Watts	Nom. Life (hours)
2.4	0.5	1.2	5
3.7	0.3	1.1	15
6.0	0.5	3.0	15

Order Code	Type	Price each
BT66W	Bulb 2.4V Prefocus	29p
BT67X	Bulb 3.7V Prefocus	29p
BT68Y	Bulb 6V Prefocus	29p

Miniature Krypton Bulbs

A miniature 'krypton' bulb with 4mm leadouts, producing a bright light for its size. Rated at 3V and 310mA.



Order Code	Type	Price each
JX48C	Krypton 3V 310mA	39p

Krypton Bulbs

These offer a much increased light output and greater efficiency when compared to standard types. As a result, they make enhanced substitute bulbs for applications such as cycle lamps, torches and security products. However, because they are much brighter than standard bulbs, life is reduced to between 15 and 20 hours. Available only with a miniature flanged (P9) base. There are 6 bulbs in the range: 2.4V 0.7A (KU00A), 2.4V 0.95A (KU01B), 3.6V 0.8A (KU02C), 4.8V 0.7A (KU03D), 6V 0.65A (KU04E) and 7.2V 0.7A (KU05F). Overall dimensions: length 30mm, dia. 13mm.

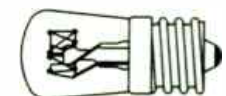


These offer a much increased light output and greater efficiency when compared to standard types. As a result, they make enhanced substitute bulbs for applications such as cycle lamps, torches and security products. However, because they are much brighter than standard bulbs, life is reduced to between 15 and 20 hours. Available only with a miniature flanged (P9) base. There are 6 bulbs in the range: 2.4V 0.7A (KU00A), 2.4V 0.95A (KU01B), 3.6V 0.8A (KU02C), 4.8V 0.7A (KU03D), 6V 0.65A (KU04E) and 7.2V 0.7A (KU05F). Overall dimensions: length 30mm, dia. 13mm.

Order Code	Type	Price each
KU00A	Krypton 2.4V 0.7A	50p
KU01B	Krypton 2.4V 0.95A	50p
KU02C	Krypton 3.6V 0.8A	50p
KU03D	Krypton 4.8V 0.7A	50p
KU04E	Krypton 6V 0.65A	50p
KU05F	Krypton 7.2V 0.7A	50p

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Pygmy Lamps



Two types are available; a bayonet fitting B22d (BC), size 29 x 59mm and a screw cap type E27 (ES), size 29 x 59mm.



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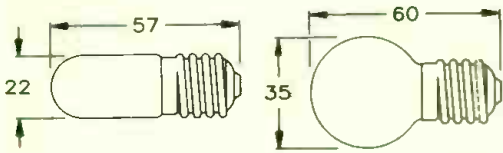
BS 5750 Part 2 1987

Level B: Quality Assurance RS12750

29 x 61mm. Both types are rated 200 to 250V 15W and have an average life of 1000 hours. Note: Switch off/isolate power before changing bulb.

Order Code	Type	Price each
BT60Q	Pygmy Bayonet	79p
BT61R	Pygmy Screw Cap	£1.12

Microwave Oven Lamps

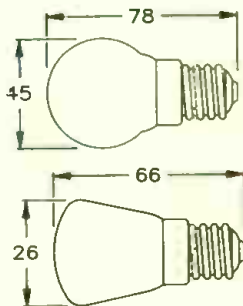


Two types of lamp to suit Japanese microwave ovens with non-standard 17mm diameter screw cap. The tubular type is 22 x 57mm 250V 15W, the round type is 35 x 60mm 250V 25W.

Order Code	Type	Price each
BT62S	Microwave Tubular	£1.29
BT63T	Microwave Round	£1.29

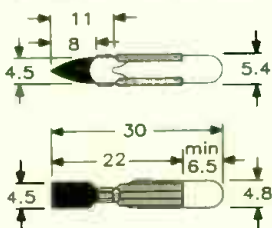
Oven Lamps

Two types of lamp specially constructed to withstand the high temperatures (300°C) found in ovens. The smaller type is 26 x 66mm 240V 25W, and the larger version is 45 x 78mm 240V 40W, both versions are E14 screw cap.



Order Code	Type	Price each
BT64U	Oven Lamp 25W	£1.49
BT65V	Oven Lamp 40W	£1.99

Lilliput Type Telephone Lamps



Three voltages available with T5.5 end, size 5 x 30mm approx.

Volts	mA	Lumens	Av. life (hours)
12	100	4	5000
24	50	3.3	6000
60	20	2	5000

Order Code	Type	Price each
BT54J	Lilliput Lamp 12V	56p
BT55K	Lilliput Lamp 24V	62p
BT56L	Lilliput Lamp 60V	70p

Low Voltage Dichroic Lamps



A range of 12V low voltage dichroic lamps in a variety of wattages and beam angles with bi-pin single ended GX 5.3 caps. The dichroic reflector has the advantage that it radiates the majority of the heat in the opposite direction to the light beam, meaning that little infra-red is radiated forward. This makes the lamps particularly suitable for illumination of heat sensitive material, such as transparencies in slide projectors for example. Further advantages of using dichroic lamps are the higher light output (a 50W lamp has the same light intensity of a 150W PAR lamp), longer life and superior colour rendition when compared to standard PAR lamps.

Available in the following wattages and beam angles:

Part No.	Watts	Beam Angle	Order Code
ESX/CG	20W	13°	AB73Q
BAB/CG	20W	40°	AB74R
EXT/CG	50W	12°	AB75S
EXZ/CG	50W	26°	AB76H
EXN/CG	50W	40°	AB77J
FNV/CG	50W	55°	AB78K
EYF/CG	75W	14°	AB79L
EYC/CG	75W	42°	AB81C

Diameter: 50mm
Length: 45mm

Order Code	Type	Price each
AB73Q	ESX/CG	£4.99
AB74R	BAB/CG	£4.99
AB75S	EXT/CT	£4.99
AB76H	EXZ/CG	£4.99
AB77J	EXN/CG	£4.99
AB78K	FNV/CG	£4.99
AB79L	EYF/CG	£4.99
AB81C	EYC/CG	£4.99

240V 300W and 500W Halogen Lamps

High-powered halogen tubes with a brilliant white light (colour temp. 2900°K) which can provide 9000 lumens of illumination for 500W tube and 5000 lumens for 300W tube. To fit standard R7S base, these tubes are suitable for any application where a very bright light is required (for example, video work). Also suitable as replacement bulbs for our Security Light (GK05F). Important note: please avoid touching the glass itself with bare fingers as the grease will reduce the life of the tube. Average life 2000 hours. Overall dimensions: 119.6mm long x 10mm dia.



Order Code	Type	Price each
KP50E	300W Halogen Tube	£3.99
JX53H	500W Halogen Tube	£3.99

150W Halogen Tube



A halogen tube rated at 250V AC, 150W, for use with the mini halogen lamp DM50E.

Order Code	Type	Price each
DM51F	150W Halogen Tube	£3.99

NEON INDICATORS

Miniature Round Panel Type



Moulded body with built-in resistance for 250V use, Red, Green or Amber lens. Requires a 7mm mounting cut-out in panel. Overall dimensions: 33mm long, 8mm diameter round lens.

Order Code	Type	Price each
BK52G	Min Neon Red	79p
BK53H	Min Neon Green	79p
BK54J	Min Neon Amber	79p

Small Square Panel Type

Optum

Moulded body with built-in resistance for 250V use. Red, Green or Amber lens. Requires a 10mm mounting cut-out in panel. Overall dimensions: 38mm long, 12mm square lens.



Order Code	Type	Price each
RX82D	Pan Neon Amber	75p
RX83E	Pan Neon Red	75p
BK51F	Pan Neon Green	75p

Square Panel Type

Optum



Moulded body with built-in resistance for 250V use. Green or Red lens. Requires a 10mm dia. mounting hole in panel. Lens size 15 x 12mm, overall length 43mm.

Order Code	Type	Price each
RX81C	Square Neon Red	75p
RX98G	Square Neon Green	75p

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Snap-In Plastic Type



Moulded body with integral retaining ears which lock onto the edge of a panel when the lamp is snapped-in. The lamp has integral resistance for 240V use. Available in red, green or amber. Panel cutout required is 10mm diameter. Connections are a pair of 1/4in. push-on blades separated by plastic insulator. Overall dimensions: 56 long x 12mm diameter lens.

Order Code	Type	Price each
MK78K	Red Snap-In Neon	65p
MK79L	Green Snap-In Neon	69p
MK80B	Orange Snap-in Neon	69p

Chrome Bezel Type

Optum



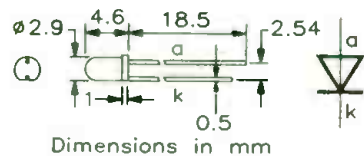
Chrome-plated metal body with built-in resistance for 250V use. Red or Green lens. Requires a 9mm mounting cut-out in panel. Overall dimensions: 41mm long, 11mm diameter round chrome bezel.

Order Code	Type	Price each
BK55K	Chrome Neon Red	£1.55
BK56L	Chrome Neon Green	£1.55

LIGHT EMITTING DIODES

3mm Diameter LEDs

A range of high quality 3mm LEDs available in various colours and light outputs. Suitable panel mounting clips are sold separately. The cathode is denoted by a flat on the body and by the short lead.



Dimensions in mm

Standard Type	Red	Green	Orange
Peak wavelength:	665nm	565nm	625nm
Light output typical at $I_F=20\text{mA}$:	3mcd	12mcd	20mcd
Forward voltage at $I_F=20\text{mA}$:	2V	2.2V	2V
Forward current max:	20mA	30mA	30mA
Power dissipation:	120mW	105mW	105mW
Viewing angle:	120°	120°	120°
Stock code:	WL32K	WL33L	WL34M

Standard Type	Yellow	Pure Green	Pure Orange
Peak wavelength:	595nm	555nm	610nm
Light output typical at $I_F=20\text{mA}$:	20mcd	20mcd	40mcd
Forward voltage at $I_F=20\text{mA}$:	2.1V	2V	2.2V
Forward current max:	30mA	50mA	50mA
Power dissipation:	105mW	105mW	105mW
Viewing angle:	120°	120°	120°
Stock code:	YY38R	CK35Q	CK36P

Standard Type	Clear Blue	Diffused Blue	Transparent Blue
Peak wavelength:	470nm	470nm	470nm
Light output typical at $I_F=20\text{mA}$:	14mcd	1mcd	14mcd
Forward voltage at $I_F=20\text{mA}$:	3V	3V	3V
Forward current max:	50mA	50mA	50mA
Power dissipation:	100mW	100mW	100mW
Viewing angle:	20°	60°	20°
Stock code:	CJ60Q	CJ59P	UL88V

High Brightness	Red	Red Super	Red Ultra
Peak wavelength:	625nm	660nm	660nm
Light output typical at $I_F=20\text{mA}$:	20mcd	80mcd	500mcd
Forward voltage at $I_F=20\text{mA}$:	2V	1.8V	1.8V
Forward current max:	30mA	30mA	30mA
Power dissipation:	105mW	100mW	100mW
Viewing angle:	120°	120°	30°

Stock code: Diffused Diffused Clear
 WL83E UK18U UF72P
 Standard red LED (WL32K) is available in a pack of 25.

Order Code	Type	Price each
WL32K	Mini LED Red	12p
AQ14Q	Mini LED Red 25 Pack	£2.79
WL33L	Mini LED Green	16p
WL34M	Mini LED Orange	16p
YY38R	Mini LED Yellow	16p
CK35Q	Mini LED Pure Green	20p
CK36P	Mini LED Pure Orange	20p
CJ60Q	3mm Blue Clear	£1.99
CJ59P	3mm Blue Diffused	£1.99
UL88V	3mm Blue Trans	£1.99
WL83E	Hibri LED Red Min	26p
UK18U	Superbri LED Red 3mm	49p
UF72P	Ultrabri LED Red 3mm	57p

3mm Low Current Types

A range of 3mm very low current (2mA) LEDs available in four colours. The LEDs will fit the appropriate clips (see LED clips). Packages are diffused with the cathode denoted by the shorter of the two leads. Viewing angle is 60° for all types.



Type	Wavelength	Luminous Intensity @ $I_F=2\text{mA}$	Stock Code
3mm orange	625nm	0.8 to 2mcd	CJ55K
3mm green	565nm	0.8 to 2mcd	CJ56L
3mm yellow	590nm	0.8 to 2mcd	CJ57M
3mm superbright red	660nm	8 to 20mcd	CJ58N

3mm 5V and 12V LEDs

A range of standard 3mm coloured LEDs which are designed to connect directly across 5V DC and 12V DC power supply rails, having a built-in resistor thus greatly simplifying design and assembly. The encapsulation is standard and will fit the front panel



clips (see LED clips). The cathode of each is denoted by the flat on the body and the shorter of the two leads. Viewing angle of all types is 120°. 12V Superbright versions are also available.

3mm LEDs

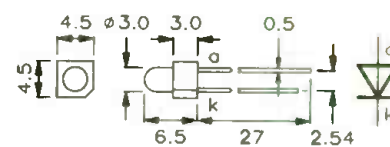
Type	Wavelength @ $I_F=10\text{mA}$	Luminous Intensity	Stock Code
5V red	625nm	2 to 8mcd	CJ64U
5V green	565nm	2 to 8mcd	CJ65V
12V red	625nm	2 to 8mcd	CJ66W
12V green	565nm	2 to 8mcd	CJ67X
12V yellow	590nm	2 to 8mcd	CJ68Y

3mm Superbright

Type	Wavelength @ $I_F=20\text{mA}$	Luminous Intensity	Stock Code
12V red	660nm	70 to 90mcd	CJ70M
12V green	565nm	50 to 60mcd	CJ69A

Order Code	Type	Price each
CJ64U	3mm 5V LED Red	35p
CJ65V	3mm 5V LED Green	35p
CJ66W	3mm 12V LED Red	35p
CJ67X	3mm 12V LED Green	35p
CJ68Y	3mm 12V LED Yellow	35p
CJ70M	3mm 12V Red Spr LED	52p
CJ69A	3mm 12V Green S LED	42p

3mm Flashing LEDs



Dimensions in mm

A range of LEDs which flash approximately twice a second when a voltage between 3.5V and 13V is applied to them. Within the supply voltage range no series resistor is required. The cathode is denoted by a flat or chamfer on the body and the short lead.

Specification

Voltage range:	3.5V to 12V (13V maximum)
Maximum reverse voltage:	0.5V
Flash frequency:	2Hz ($\pm 1\text{Hz}$) at 9V

Standard Type	Red	Green	Yellow
Peak wavelength:	660nm	565nm	595nm
Light output typical at $V_F=9\text{V}$:	2mcd	8mcd	8mcd
Forward current at 9V:	8.5mA	9m	9.5mA
Power dissipation:	200mW	200mW	200mW
Diffuse viewing angle:	100°	100°	100°
Stock code:	UK30H	UK31J	UK32K

High Brightness Type	Red High	Red Super
Peak wavelength:	625nm	660nm
Light output typical at $V_F=9\text{V}$:	8mcd	60mcd
Forward current at 9V:	9.5mA	16.5mA
Power dissipation:	200mW	240mW
Diffused viewing angle:	100°	100°
Stock code:	UK33L	UK34M

Order Code	Type	Price each
UK30H	Flashing LED Red 3mm	69p
UK31J	Flashing LED Grn 3mm	69p
UK32K	Flashing LED Ylw 3mm	69p
UK33L	HiBri Flash Red 3mm	86p
UK34M	Super Flash Red 3mm	99p

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LED FACTS

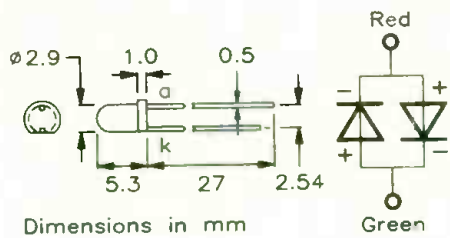
Light emitting diodes (LED) are made from semiconductor type materials such as gallium arsenide (GaAs) or gallium arsenide phosphide (GaAsP). The LED emits light when it is forward biased, that is, the anode of the diode is positive with respect to the cathode. As electron and hole combine near the junction of the diode, sufficient energy is released in the form of light. A current limiting resistor is used in series with the LED to limit the current flow through the LED, preferably less than 20mA, and to prevent the LED overheating.

3mm Bi-Coloured LED

A two-lead LED with a red and green die connected in inverse parallel. Only one series resistor is required. The positive is connected to the short lead and the negative is connected to the long lead for green and vice versa for red. The viewing angle is 120°.



	Red	Green
Peak wavelength:	665nm	565nm
Light output typical at $I_F=20mA$:	2mcd	8mcd
Forward voltage at $I_F=20mA$:	2V	2.2V
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation:	105mW	105mW
Diffused viewing angle:	120°	120°



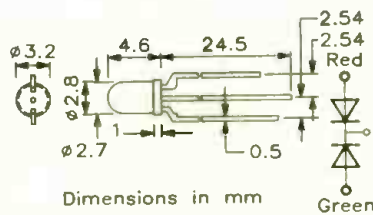
Order Code	Type	Price each
UF96E	Min Bi-Colour LED	65p

3mm Tri-Colour LED

A single LED with three leads that can be made to emit light of any colour of the spectrum from green through to red. The LED is encapsulated in a diffused white package. The central, longest, lead is the common cathode. The red anode is the medium length lead and the green anode is the shortest lead.



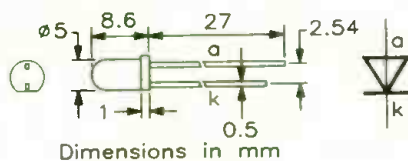
	Red	Green
Peak wavelength:	665nm	565nm
Forward voltage at $I_F=20mA$:	2V	2.2V
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation max:	105mW	105mW
Light output typical at $I_F=20mA$:		20mcd
Diffused viewing angle:		60°



Order Code	Type	Price each
GW62S	Multicolour LED 3mm	60p

5mm Diameter LEDs

An extensive range of high quality 5mm LEDs available in various colours and light outputs. Suitable panel mounting clips are sold separately. The cathode is denoted by a flat on the body and by the short lead.



Standard Type	Red	Green	Orange
Peak wavelength:	665nm	565nm	625nm
Light output typical at $I_F=20mA$:	8mcd	8mcd	30mcd
Forward voltage at $I_F=20mA$:	2V	2.2V	2V
Forward current max:	20mA	30mA	30mA
Power dissipation:	120mW	105mW	105mW
Viewing angle:	120°	120°	120°
Stock code:	WL27E	WL28F	WL29G
Standard Type	Yellow	Pure Green	Pure Orange
Peak wavelength:	595nm	555nm	610nm
Light output typical at $I_F=20mA$:	30mcd	20mcd	40mcd
Forward voltage at $I_F=20mA$:	2.1V	2V	2.2V
Forward current max:	30mA	50mA	50mA
Power dissipation:	105mW	105mW	105mW
Viewing angle:	120°	120°	120°
Stock code:	WL30H	CK37S	CK38R
Standard Type	Clear Blue	Diffused Blue	Transparent Blue
Peak wavelength:	470nm	470nm	470nm

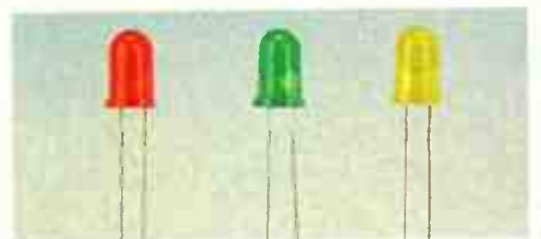
Light output typical at $I_F=20mA$:	14mcd	1mcd	14mcd
Forward voltage at $I_F=20mA$:	3V	3V	3V
Forward current max:	50mA	50mA	50mA
Power dissipation:	100mW	100mW	100mW
Viewing angle:	20°	60°	20°
Stock code:	UL89W	CP56L	CP57M
High Brightness	Red	Green	Green
		Clear	Diffused
Peak wavelength:	625nm	565nm	565nm
Light output typical at $I_F=20mA$:	30mcd	300mcd	50mcd
Forward voltage at $I_F=20mA$:	2V	2.2V	2.2V
Forward current max:	30mA	25mA	25mA
Power dissipation:	105mW	105mW	105mW
Viewing angle:	140°	30°	120°
Stock code:	WL84F	CK39N	CK40T
Superbright	Red	Red	Red
	Super	Ultra	Hyper
Peak wavelength:	660nm	660nm	660nm
Light output typical at $I_F=20mA$:	150mcd	1cd	3.5cd
Forward voltage at $I_F=20mA$:	1.8V	1.8V	1.8V
Forward current max:	30mA	30mA	30mA
Power dissipation:	100mW	100mW	100mW
Viewing angle:	120°	30°	30°
Stock code:	UK19V	UK51F	UK20W

Standard LED red (WL27E) and standard LED green (WL28F) are available in packs of 25.

Order Code	Type	Price each
WL27E	LED Red	12p
AQ12N	LED Red 25 Pack	£2.79
WL28F	LED Green	16p
AQ13P	LED Grn 25 Pack	£3.29
WL29G	LED Orange	16p
WL30H	LED Yellow	16p
CK37S	LED Pure Green	20p
CK38R	LED Pure Orange	20p
UL89W	5mm Blue Clear	£1.99
CP56L	5mm Blue Diffused	£1.99
CP57M	5mm Blue Trans	£1.99
WL84F	Hibri LED Red Std	26p
CK39N	Hibri LED Grn Clr	30p
CK40T	Hibri LED Grn Dif	30p
UK19V	Superbri LED Red 5mm	49p
UK51F	Ultrabri LED Red 5mm	57p
UK20W	Hyperbri LED Red 5mm	75p

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5mm Low Current Types



A range of 5mm very low current (2mA) LEDs available in four colours. The LEDs will fit the appropriate clips (see LED clips). Packages are diffused with the cathode denoted by the shorter of the two leads and a flat on the body. Viewing angle is 60° for all types.

Continued on next page.

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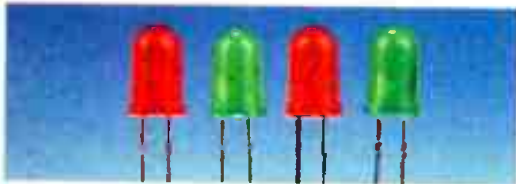
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Type	Wavelength	Luminous Intensity @ I _F =2mA	Stock Code
5mm orange	625nm	0.8 to 20mcd	UK48C
5mm green	565nm	0.8 to 2mcd	UK49D
5mm yellow	590nm	0.8 to 2mcd	UK50E
5mm superbright red	660nm	8 to 12.5mcd	CJ54J

The orange LED (UK48C) is available in a pack of 25.

Order Code	Type	Price each
UK48C	LED Red 5mm 2mA	28p
AQ09K	Led Red 5mm 2uA 25Pk	£4.99
UK49D	LED Green 5mm 2mA	28p
UK50E	LED Yellow 5mm 2mA	28p
CJ54J	Lo I 5mm Red LED	48p

5mm 5V and 12V LEDs



A range of standard 5mm coloured LEDs which are designed to connect directly across 5V DC and 12V DC power supply rails, having a built-in resistor, thus greatly simplifying design and assembly. The encapsulation is standard and will fit the front panel clips (see LED clips). The cathode of each is denoted by the flat on the body and the shorter of the two leads. Viewing angle of all types is 120°. 12V Superbright versions are also available.

5mm LEDs

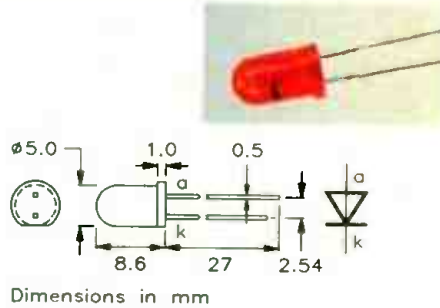
Type	Wavelength	Luminous Intensity @ I _F =10mA	Stock Code
5V red	625nm	2 to 8mcd	CK46A
5V green	565nm	2 to 8mcd	CK47B
12V red	625nm	2 to 8mcd	CK48C
12V green	565nm	2 to 8mcd	CK49D
12V yellow	590nm	2 to 8mcd	CJ61R

5mm Superbright

Type	Wavelength	Luminous Intensity @ I _F =20mA	Stock Code
12V red	660nm	90 to 100mcd	CJ63T
12V green	565nm	40 to 50mcd	CJ62S

Order Code	Type	Price each
CK46A	LED 5V Red	35p
CK47B	LED 5V Green	35p
CK48C	LED 12V Red	35p
CK49D	LED 12V Green	35p
CJ61R	LED 12V Yellow	35p
CJ62S	5mm 12V Green S LED	42p
CJ63T	5mm 12V Red Spr LED	52p

5mm Flashing LEDs



A range of LEDs which flash approximately twice a second when a voltage between 3.5V and 13V is applied to them. Within the supply voltage range no series resistor is required. The cathode is denoted by a flat or chamfer on the body and the short lead.

Specification

Voltage range: 3.5V to 12V (13V maximum)
 Maximum reverse voltage: 0.5V
 Flash frequency: 2Hz (±1Hz) at 9V

Standard Type	Red	Green	Yellow
Peak wavelength:	660nm	565nm	595nm
Light output typical at V _F =9V:	2mcd	8mcd	12.5mcd
Forward current at 9V:	8.5mA	9mA	9.5mA
Power dissipation:	200mW	200mW	200mW
Diffused viewing angle:	120°	120°	120°
Stock code:	QY96E	QY97F	UK35Q

High Brightness Type

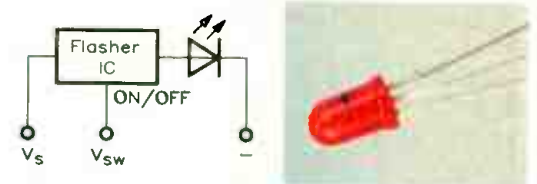
	Red High	Red Super
Peak wavelength:	625nm	660nm
Light output typical at V _F =9V:	12.5mcd	70mcd
Forward current at 9V:	9.5mA	16.5mA
Power dissipation:	200mW	240mW
Diffused viewing angle:	120°	120°
Stock code:	UK36P	UK37S

Standard red LED (QY96E) is available in a pack of 10.

Order Code	Type	Price each
QY96E	Flashing LED Red	72p
AQ08J	Flash LED Red 10Pk	£5.99
QY97F	Flashing LED Green	72p
UK35Q	Flashing LED Ylw 5mm	72p
UK36P	HiBri Flash Red 5mm	86p
UK37S	Super Flash Red 5mm	99p

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5mm Continuous/Flashing LED



A 5mm red LED that can be switched to flashing or continuous mode and has a wide viewing angle. Within the supply voltage range no series resistor is required. By applying 5V to the lead denoted by the flat on the body, the LED may be made to stop flashing. Connect the LED supply voltage to the longest outer lead and negative to the centre lead. Fits YY40T clip.

Specification

Peak wavelength: 660nm
 Voltage range: 4.75V to 7V
 Supply current: 12mA typical
 Light output at V_S=5V: 1.6mcd typical
 Reverse voltage: 0.4V maximum
 Switch current at V_{SW}=5V: 25µA
 Power dissipation: 200mW maximum
 Flash rate: 1.3Hz to 5.2Hz (3Hz typical)

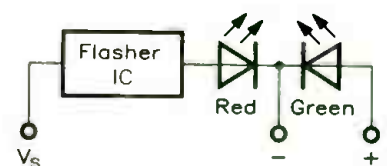
Order Code	Type	Price each
QY98G	Swth Flshng LED Red	99p

5mm Continuous Green/Flashing Red LED

A 5mm red flashing and continuous green LED that fits clip YY40T. Within the supply voltage range the red LED requires no series resistor. The green LED does require a series resistor. The LEDs have a common cathode, the centre lead. The green anode is denoted by the flat on the body. The supply voltage for the flasher IC and the red LED is applied to the longest lead. The LED has a wide viewing angle.

Specification

Supply voltage (red): 4.75V to 7V
 Forward voltage green: 20mA at I_F=20mA
 Supply current red: 12mA
 Forward current green: 30mA
 Typical light output red: 6mcd (V_S=5V)
 green: 6mcd (I_F=20mA)
 Peak wavelength red: 630nm
 green: 560nm
 Maximum reverse voltage red: 0.4V
 green: 5V
 Power dissipation: 200mW total
 Flash rate red: 1.3Hz to 5.2Hz (3Hz typical)



Order Code	Type	Price each
QY99H	Flsh Red/Cont GrnLED	£1.10

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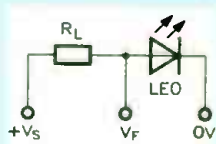
IT'S A FACT!

LED CURRENT LIMITING RESISTOR CHART

The correct resistance value is given by the formula:

$R_L = (V_S - V_F) / I_F \Omega$
 where I_F is in amps, V_S is the applied voltage, V_F is the forward voltage as shown in the tables and I_F is the forward current.

The following chart gives the preferred value of resistor, assuming an LED with a voltage drop of 2.1V. The values are NOT suitable for the blue LEDs (3V voltage drop), the super bright LEDs (1.8V voltage drop) and the low current LEDs (2mA current).



LED Forward Current

	10mA	20mA	30mA	40mA	50mA
3V	91	47	30	22	18
5V	300	150	100	75	62
6V	390	200	130	100	82
9V	680	360	220	180	150
12V	1000	510	330	240	200
15V	1300	680	430	330	270

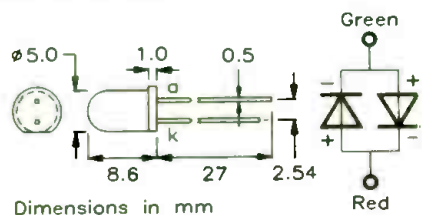
All values in Ohms

5mm Bi-Coloured LED

A two-lead LED with a red and green die connected in inverse parallel. Only one series resistor is required. The positive is connected to the short lead and the negative is connected to the long lead for green and vice versa for red. The viewing angle is 120°. The LED fits YY40T clip.



	Red	Green
Peak wavelength:	665nm	565nm
Light output typical at $I_F=20\text{mA}$:	2mcd	8mcd
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation:	105mW	105mW
Diffused viewing angle:	120°	120°



Order Code	Type	Price each
QY83E	Bi-colour LED	65p

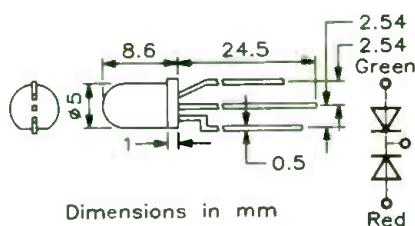
5mm Tri-Colour LED

A single LED with three leads that can be made to emit light of any colour of the spectrum from green through to red. The LED is encapsulated in a diffused white package. The central, longest, lead is the common cathode. The red anode is the medium length lead and the green anode is the shortest lead. A high brightness version is also available.



Standard Type (YH75S)	Red	Green
Peak wavelength:	665nm	565nm
Forward voltage at $I_F=20\text{mA}$:	2V	2.2V
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation max:	105mW	105mW
Light output typical at $I_F=20\text{mA}$:	5mcd	
Diffused viewing angle:	120°	

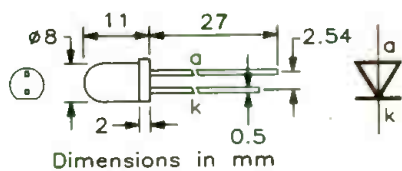
High Brightness Type (CJ53H)	Red	Green
Peak wavelength:	660nm	565nm
Forward voltage at $I_F=20\text{mA}$:	2V	2.2V
Forward current (max.):	30mA	30mA
Reverse voltage (max.):	5V	5V
Power dissipation (max.):	105mW	105mW
Light output typical at $I_F=20\text{mA}$:		
min:	100mcd	40mcd
max:	40mcd	80mcd
Diffused viewing angle:	60°	



Order Code	Type	Price each
YH75S	Multicolour LED 5mm	59p
CJ53H	Multicolour Hi-Bri	65p

8mm Diameter LEDs

A range of high brightness 8mm LEDs available in various colours and light outputs. Suitable panel mounting clips are sold separately. The cathode is denoted by a flat on the body and by the short lead.



Standard Type	Red	Green	Yellow
Peak wavelength:	665nm	565nm	595nm
Light output typical at $I_F=20\text{mA}$:	32mcd	32mcd	32mcd
Forward voltage at $I_F=20\text{mA}$:	2V	2.2V	2.1V
Forward current max:	30mA	30mA	30mA
Power dissipation:	105mW	105mW	105mW
Diffused viewing angle:	140°	140°	140°
Stock code:	UK21X	UK22Y	UK23A

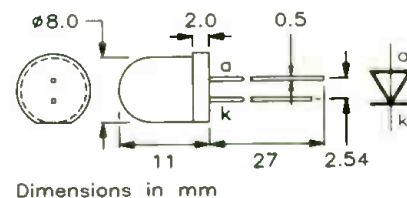
Superbright Type	Red Super	Red Hyper
Peak wavelength:	660nm	660nm
Light output typical at $I_F=20\text{mA}$:	200mcd	1.6cd
Forward voltage at $I_F=20\text{mA}$:	1.8V	1.8V
Forward current max:	30mA	30mA
Power dissipation:	100mW	100mW
Viewing angle:	140°	20°
	Diffused	Water Clear
Stock code:	UK52G	UK24B

Order Code	Type	Price each
UK21X	LED Red 8mm	42p
UK22Y	LED Green 8mm	42p
UK23A	LED Yellow 8mm	42p
UK52G	Superbri LED Red 8mm	60p
UK24B	Ultrabri LED Red 8mm	69p

8mm Flashing LEDs



A range of LEDs which flash approximately twice a second when a voltage between 3.5V and 13V is applied to them. Within the supply voltage range no series resistor is required. The cathode is denoted by a flat or chamfer on the body and the short lead.



Specification	
Voltage range:	3.5V to 12V (13V maximum)
Maximum reverse voltage:	0.5V
Flash frequency:	2Hz ($\pm 1\text{Hz}$) at 9V

Standard Type	Red Hibri	Green	Yellow
Peak wavelength:	625nm	565nm	595nm
Light output typical at $V_F=9\text{V}$:	12.5mcd	8mcd	12.5mcd
Forward current at 9V:	8.5mA	9mA	9.5mA
Power dissipation:	200mW	200mW	200mW
Diffused viewing angle:	140°	140°	140°
Stock code:	UK38R	UK39N	UK40T

Super Brightness Type	Red Super	Red Ultra
Peak wavelength:	625nm	660nm
Light output typical at $V_F=9\text{V}$:	120mcd	800mcd
Forward current at 9V:	9.5mA	16.5mA
Power dissipation:	240mW	240mW
Viewing angle:	140°	90°
	Diffused	Water Clear
Stock code:	UK41U	UK42V

Order Code	Type	Price each
UK38R	Hibri Flash Red 8mm	£1.20
UK39N	Flashing LED Grn 8mm	£1.20
UK40T	Flashing LED Ylw 8mm	£1.20
UK41U	Super Flash Red 8mm	£1.28
UK42V	Ultra Flash Red 8mm	£1.28

▶ IT'S A FACT! ◀

FLASHING LED FACT

A flashing 5V LED draws 10mA approximately when 'ON' and less than 1mA when 'OFF'. This makes the device suitable to 'pulse' devices. Typical applications include using a continuous piezo buzzer, such as KU56L, to produce a pulsed beep, and to pulse a suitable small reed relay, such as JH12N, JH15R, FX88V or FX90X.

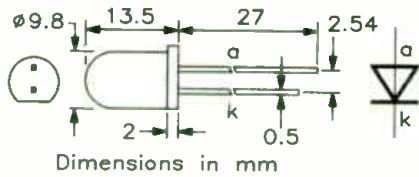
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Access, Visa **01702 554161** American Express

10mm Diameter LEDs

A range of high brightness 10mm LEDs available in various colours and light outputs. Suitable panel mounting clips are sold separately. The cathode is denoted by a flat on the body and by the short lead.



Standard Type	Red	Green	Yellow
Peak wavelength:	665nm	565nm	595nm
Light output typical at $I_f=20\text{mA}$:	32mcd	32mcd	32mcd
Forward voltage at $I_f=20\text{mA}$:	2V	2.2V	2.1V
Forward current max:	30mA	30mA	30mA
Power dissipation:	105mW	105mW	105mW
Diffused viewing angle:	140°	140°	140°
Stock code:	UK25C	UK26D	UK27E

Superbright Type	Red Super	Red Ultra
Peak wavelength:	660nm	660nm
Light output typical at $I_f=20\text{mA}$:	200mcd	1.6cd
Forward voltage at $I_f=20\text{mA}$:	1.8V	1.8V
Forward current max:	30mA	30mA
Power dissipation:	100mW	100mW
Viewing angle:	140°	20°
	Diffused	Water Clear
Stock code:	UK53H	UK28F

Order Code	Type	Price each
UK25C	LED Red 10mm	45p
UK26D	LED Green 10mm	45p
UK27E	LED Yellow 10mm	45p
UK53H	Suprbri LED Red 10mm	65p
UK28F	Ultrabri LED Red 10mm	75p

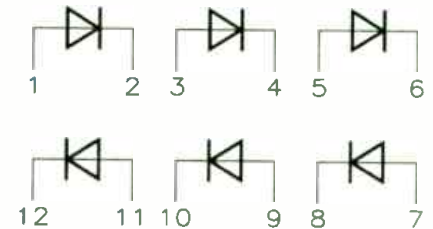
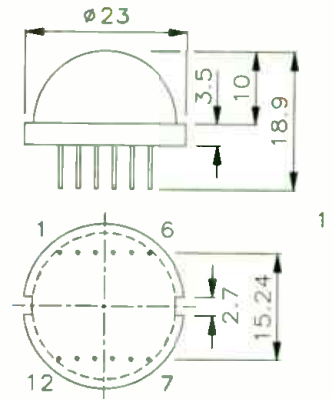
Specification

Voltage range: 3.5V to 12V (13V maximum)
 Maximum reverse voltage: 0.5V
 Flash frequency: 2Hz ($\pm 1\text{Hz}$) at 9V

Standard Type	Red	Green	Yellow
Peak wavelength:	625nm	565nm	595nm
Light output typical at $V_f=9\text{V}$:	12.5mcd	8mcd	12.5mcd
Forward current at 9V:	8.5mA	9mA	9.5mA
Power dissipation:	200mW	200mW	200mW
Diffuse viewing angle:	140°	140°	140°
Stock code:	UK43W	UK44X	UK45Y

Super Brightness Type	Red Super	Red Ultra
Peak wavelength:	625nm	660nm
Light output typical at $V_f=9\text{V}$:	120mcd	800mcd
Forward current at 9V:	9.5mA	16.5mA
Power dissipation:	200mW	240mW
Viewing angle:	140°	90°
	Diffused	Water Clear
Stock code:	UK46A	UK47B

Order Code	Type	Price each
UK43W	HiBri Flash Red 10mm	£1.25
UK44X	Flashing LED Gm 10mm	£1.25
UK45Y	Flashing LED Ylw 10mm	£1.25
UK46A	Super Flash Red 10mm	£1.29
UK47B	Ultra Flash Red 10mm	£1.29



Order Code	Type	Price each
GW65V	Giant Red LED	£1.68

LED SHAPES

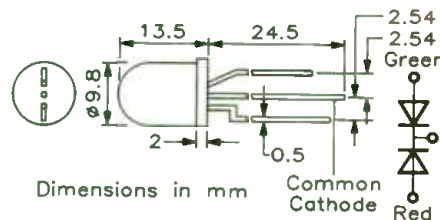
Rectangular Shaped LED's

A rectangular shaped LED that gives a bright, evenly lit, solid bar of colour over the area 5.6 x 3.2mm. The lamps may be easily stacked to form bargraph meters. Overall dimensions: 6.4 x 3.8 x 6.7mm deep. Available in Red, Green and Yellow. A panel mounting clip to suit these LED's is available. Panel cut-out 8 x 6mm (5/16 x 7/32in.). Bezel: 9.4 x 6.9mm. The cathode is the left hand lead when the package is placed with the indented circle in the package facing you. Forward voltage at $I_F = 20\text{mA}$ is 2V. Light output at $I_F = 20\text{mA}$ is 4mcd for all colours. Viewing angle is 120°.



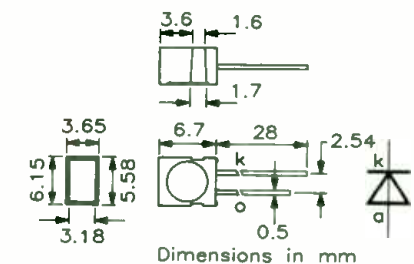
10mm Tri-Colour LED

A single LED with three leads that can be made to emit light of any colour of the spectrum from green through to red. The LED is encapsulated in a diffused white package. The central, longest, lead is the common cathode. The red anode is the medium length lead and the green anode is the shortest lead.



	Red	Green
Peak wavelength:	665nm	565nm
Forward voltage at $I_f=20\text{mA}$:	2V	2.2V
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation max:	105mW	105mW
Light output typical at $I_f=20\text{mA}$:	9mcd	
Diffused viewing angle:	140°	

Order Code	Type	Price each
UK29G	Multicolour LED 10mm	68p



Order Code	Type	Price each
QW96E	Rect LED Red	38p
YH60Q	Rect LED Green	38p
YH61R	Rect LED Yellow	38p
YH62S	Rect LED Clip	12p

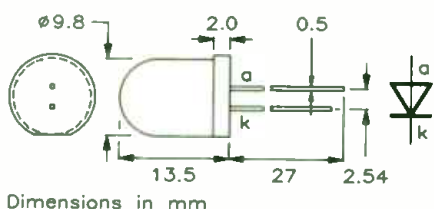
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10mm Flashing LEDs



A range of LEDs which flash approximately twice a second when a voltage between 3.5V and 13V is applied to them. Within the supply voltage range no series resistor is required. The cathode is denoted by a flat or chamfer on the body and the short lead.



Giant Red LED

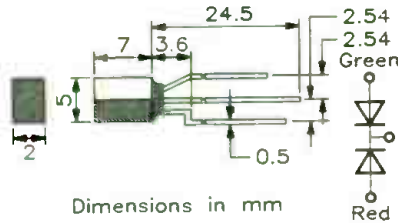
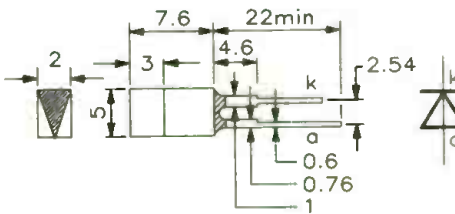
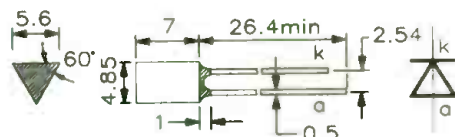
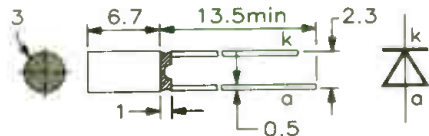
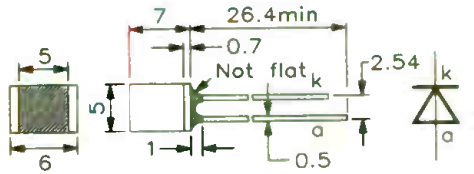
Kingbright

A giant round red LED made up from a group of six LEDs in a matrix with separate anodes and cathodes brought out to 12 PCB pins on a DIL matrix. Pins are placed at 0.1in. intervals in two rows of 6 pins each, spaced 0.6in. apart. LED body is 23mm in diameter with a dome 10mm high. Material is diffused red. Luminous intensity is 10 to 21.8mcd @ 10mA for each diode.



Rectangular Tri-Colour LED

A single LED with three leads that can be made to emit light of any colour of the spectrum from green through to red. The LED is encapsulated in a diffused white rectangular 5 x 2mm package. The central, longest, lead is the common cathode. The red anode is the medium length lead and the green anode is the shortest lead.



Dimensions in mm

	Red	Green
Peak wavelength:	665nm	565nm
Forward voltage at $I_F=20mA$:	2V	2.2V
Forward current max:	30mA	30mA
Reverse voltage max:	5V	5V
Power dissipation max:	105mW	105mW
Light output typical at $I_F=20mA$:	4mcd	
Diffused viewing angle:	100°	

Order Code	Type	Price each
QR54J	Multicolour LED Rect	59p

Panel Indicator LED's

Kingbright

A range of panel indicator LED's with flat tops moulded in various shapes: rectangular, square, cylindrical, triangular and arrowhead. The LED's are designed to press-fit into panels etc.

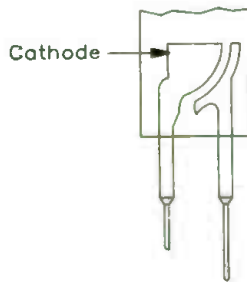
All shapes (typical ratings)

Colour	Light output at $I_F = 20mA$	Forward voltage at $I_F = 20mA$	Peak wavelength
Red	6mcd	2V	625nm
Green	4mcd	2.2V	565nm
Yellow	6mcd	2.1V	595nm

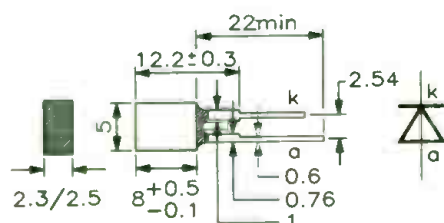
All colours:

Forward current (max):	30mA
Reverse voltage (max):	5V
Power dissipation (max):	105mW

The LED's have a diffused top to the lens which gives a viewing angle of 70° for arrowhead and triangular, 100° for cylindrical, and 120° for square and rectangular.



Shapes available:	Code	Size of top
Rectangular	R1	5x2.5mm
Square	S3	5x5mm
Cylindrical	C2	3mm diameter
Triangular (equilateral)	T4	5.6mm per side
Arrowhead (isosceles)	A5	5.1mm long sides, 2mm short side



Order Code	Type	Price each
YY45Y	Shape LED R1 Red	24p
YY46A	Shape LED R1 Green	24p
YY48C	Shape LED R1 Yellow	24p
YY51F	Shape LED S3 Red	24p
YY52G	Shape LED S3 Green	24p
YY53H	Shape LED S3 Yellow	24p
YH72P	Shape LED C2 Red	25p
YH73Q	Shape LED C2 Green	25p
YH74R	Shape LED C2 Yellow	25p
YY54J	Shape LED T4 Red	28p
YY55K	Shape LED T4 Green	28p
YY56L	Shape LED T4 Yellow	28p
YY57M	Shape LED A5 Red	28p
YY58N	Shape LED A5 Green	28p

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PCB Mounting LEDs

A range of PCB mounting LEDs with diffused coloured lens giving a very wide viewing angle. The LEDs are mounted in a black plastic housing, and viewed from the front the cathode is the right-hand lead.



Standard Type	Red	Green	Orange	Yellow
Peak wavelength:	625nm	565nm	625nm	595nm
Light output typical at $I_F=20mA$:	20mcd	10mcd	20mcd	20mcd
Forward voltage at $I_F=20mA$:	2V	2.2V	2V	2.1V
Forward current max:	30mA	30mA	30mA	30mA
Power dissipation:	105mW	105mW	105mW	105mW
Viewing angle:	160°	160°	160°	160°
Stock code:	QY86T	QY87U	QY89W	QY88V

High Brightness Type	Red	Green	Yellow
Peak wavelength:	625nm	565nm	595nm
Light output typical at $I_F=20mA$:	30mcd	20mcd	30mcd
Forward voltage at $I_F=20mA$:	2V	2.2V	2.1V
Forward current max:	30mA	30mA	30mA
Power dissipation:	105mW	105mW	105mW
Viewing angle:	120°	120°	120°
Stock code:	CP53H	CP54J	CP55K

Order Code	Type	Price each
QY86T	PCB LED Red	32p
QY87U	PCB LED Green	32p
QY88V	PCB LED Yellow	32p
QY89W	PCB LED Orange	32p
CP53H	PCB Hibri Red	32p
CP54J	PCB Hibri Green	32p
CP55K	PCB Hibri Yellow	32p

PCB Mounting Bi-Colour LED

Kingbright

A single PCB mounting LED that has three leads and emits green and high brightness red. The white diffused 5mm LED is housed in a black plastic housing, and viewed from the front, the common cathode is the centre lead and the red anode is the left lead. The viewing angle is 100°.



	Red	Green
Light output Typical at $I_F=20mA$:	20mcd	20mcd
Forward voltage at $I_F=20mA$:	2.0V	2.2V
Forward current (max):	30mA	25mA
Reverse voltage (max):	5V	5V
Power dissipation (max):	105mW	105mW
Peak wavelength:	625nm	565nm

Order Code	Type	Price each
CP52G	PCB LED Bi-Colour	65p

LED CLIPS AND COVERS

LED Clips



Panel mounting clips to suit 3mm, 5mm, 8mm and 10mm round LED's. The following types are available:

	Panel cut-out (diameter)	Bezel size (diameter)	Overall length
3mm Clip	4.4mm	6mm	5mm
5mm Clip	6.35mm	8mm	6.8mm
5mm Clip Convex	8mm	9.5mm	12.5mm
5mm Clip Concave	8mm	9.5mm	15mm
8mm Clip	12mm	14mm	16.5mm
10mm Clip	14mm	16mm	18mm

Order Code	Type	Price each
YY39N	LED Clip 3mm	6p
YY40T	LED Clip 5mm	8p
UK14Q	LED Clip Convex 5mm	15p
UK15R	LED Clip Concave 5mm	15p
UK16S	LED Clip 8mm	18p
UK17T	LED Clip 10mm	20p

THE BEST OF SERVICE

LED Covers



Attractive coloured covers for LED's which also serve to clip the LED on the front panel. Suitable for use with 3mm and 5mm dia LED's the covers increase the viewing angle up to 180° and give a finished appearance. The cover has a flat top marked with Fresnel rings and striated lines for maximum light dispersion. The 5mm covers simply clip into a 6.35mm (1/4in) panel cut-out while 3mm types need a 4.4mm (0.171in.) cut-out and the LED then clips in from the rear. Suits panels 1.6mm to 3.2mm thick for 5mm types and 0.8mm to 1.6mm for 3mm types. Overall diameter: 7mm for 5mm types, 5mm for 3mm types. Overall length: 11mm for 5mm types and 7.3mm for 3mm types. Available in four colours: Clear, Green, Red and Yellow.

Order Code	Type	Price each
UF91Y	Min Cliplite Clear	16p
UF92A	Min Cliplite Green	16p
UF93B	Min Cliplite Red	16p
YH54J	Cliplite Clear	20p
YH55K	Cliplite Green	20p
YH56L	Cliplite Red	20p
YH57M	Cliplite Yellow	20p

PANEL MOUNTING LEDs

LED Chrome Bezel

A smart, panel mounting chrome bezel for standard 5mm (0.2in) size round LED's. The bezel requires a single hole 7.5mm (5/16in) diameter, and is secured by a nut and lock-washer. The bezel has a removable PVC grommet at rear which has two holes to take the twin leads of the LED. The grommet is then pushed down onto the base of the LED before soldering, and the assembly pressed into the body of the bezel until the flange of the LED is hard against the internal step with the grommet flush. The bezel is 10mm diameter and 5mm deep. Total length 15.5mm.



Order Code	Type	Price each
FM38R	Chrome LED Holder	50p

Panel Mounting LEDs

A very attractive panel-mounting LED available in a large or small chromed bezel or a black bezel. All three types are available with red or green LED's. Forward voltage 2V at 20mA.



Dimensions	Small chrome	Large chrome	Black
Panel fixing hole	5mm	8mm	8mm
Bezel dia. front	5mm	8mm	9mm
rear	6mm	10mm	10mm
Bezel length	3mm	4mm	5mm
Overall length	18mm	24mm	25mm
Lead length	6mm	6mm	9mm
Cathode denoted by	Thicker wire	Short lead	Short lead

Order Code	Type	Price each
YY59P	Chrome LED Small	£1.20
QY46A	Chrome LED Small Gn	£1.20
YY60Q	Chrome LED Large Red	£1.40
QY47B	Chrome LED Large Gn	£1.40
QY48C	Black Bezel LED Red	£1.29
QY49D	Black Bezel LED Gn	£1.29

Miniature Round Panel Mounting LED



A miniature red or green LED in a red or green polycarbonate package with a flat round display. The front is engraved with Fresnel rings to give maximum dispersion. Cathode is denoted by the thicker wire. Dimensions 21mm long. Front face 6mm diameter. Mounting hole required 5mm diameter. Forward voltage 2.2V at 20mA for red and 2V at 20mA for green.

Order Code	Type	Price each
UF79L	Min Pan LED Red	86p
UF80B	Min Pan LED Green	99p

Miniature High-Top Panel Mounting LED



A miniature red or green LED in a red or green polycarbonate package with a high-top round display. The front is engraved with Fresnel rings and the sides are striated to give maximum dispersion. Cathode is denoted by the thicker wire. Dimensions 22mm long. Front diameter 5mm at front, 5.5mm at rear. Mounting hole required 5mm diameter. Forward voltage 2.2V at 20mA for red and 2V at 20mA for green.

Order Code	Type	Price each
UF81C	Hi-top Pan LED Red	99p
UF82D	Hi-top Pan LED Green	99p

Panel Mounting 12V LED with Plastic Bezel



A red or green LED in a red or green polycarbonate package with a round slightly domed front face. The package has an internal resistor so that it may be connected directly to 12V. The anode is denoted by a white spot. Dimensions 30.5mm long. Front face 8.5mm diameter. Mounting hole required 7mm diameter. Forward current approx. 15mA at 12V.

Order Code	Type	Price each
UF83E	12V Pan Plas Red LED	92p
UF84F	12V Pan Plas Gm LED	98p

Panel Mounting 12V LED with Chrome Bezel



This LED is identical to the one above, but has an attractive chromed bezel around the front face. Dimensions 31mm long. Front face 10mm diameter. Mounting hole required 7mm diameter.

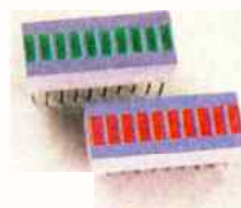
Order Code	Type	Price each
UF85G	12V Pan Chrm Red LED	£1.10
UF86T	12V Pan Chrm Gm LED	£1.20

BAR GRAPH ARRAYS

10 Segment Display

Kingbright

A 10-segment LED ladder encapsulated in a 20-pin DIL package. Designed for use as solid state level indicators, each LED is completely separate from the others in the package. The LED's may be driven from the LM3914, LM3915 or LM3916 bargraph driver IC's. The displays are available in red or green and may be stacked end to end.



	Red	Green
Max forward current per segment	30mA	30mA
per package	200mA	160mA
Light output at I _F = 20mA	4.0mcd	3.0mcd
Forward voltage at I _F = 20mA	2.0V	2.2V
Peak inverse voltage	5V	5V
Package size:	25 x 10 x 8mm high excluding pins.	
Pin length:	6mm	
Pin spacing:	0.3in x 0.1in (standard 20-pin DIL IC spacing).	

The anodes are denoted by product code marks printed on that side of the package.

Order Code	Type	Price each
BY65V	Red Bargraph Dslpy	£2.35
YG33L	Green Bargraph Dslpy	£2.35

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10-Segment LED Bar Array

Kingbright



An attractively finished 10-segment bar red display which is suitable for either front or rear panel mounting. The LED's are bright and evenly illuminated. The display is common anode connected to pins 1 and 12 and the board has a gold plated edge connector with 0.1in. centres.

Light output typical at $I_F = 10\text{mA}$	2mcd
Forward voltage at $I_F = 10\text{mA}$	2V
Forward current (max)	30mA
Reverse voltage (max)	5V
Power dissipation (max)	120mW
Peak wavelength	665nm

Dimensions

Overall size:	68 x 14 x 6.65mm deep
Bezel size:	66 x 6 x 2mm deep
Fixing holes in pcb:	60mm centres x 2.4mm dia.
Fixing holes in bezel:	62.4mm centres x 1.6mm dia
LED size:	5.1 x 1.6mm

Order Code	Type	Price each
YH76H	Red 10-Seg Bargraph	£1.99

Multi-LED Arrays

Kingbright



A unique range of 2-way and 3-way end-stackable LED arrays available in red, green and yellow, enabling multiple arrays of any number of segments with the same or various colours to be assembled. The housings are black and designed to push fit into a panel cut-out 4.76mm ($\frac{3}{16}$ in.) high and 7mm per LED long. The LED windows are diffused to give a wide viewing angle. Cathode denoted by short lead.

	Red	Green	Yellow
Light output typical at $I_F = 20\text{mA}$	1.2mcd	1.1mcd	1.5mcd
Forward voltage at $I_F = 20\text{mA}$	2V	2.2V	2.1V
Forward current (max)	30mA	30mA	30mA
Reverse voltage (max)	5V	5V	5V
Power dissipation (max)	120mW	105mW	105mW
Peak wavelength	665nm	565nm	585nm

Dimensions (mm)

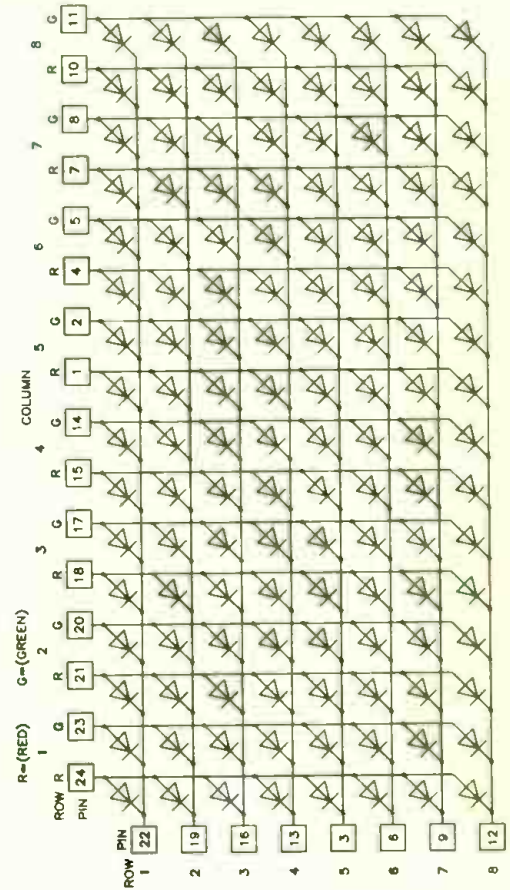
Type	2 segment	3 segment
Overall size (excl. leads)	14 x 6.13 x 8.6	21 x 6.13 x 8.6
Panel cut-cut	14 x 4.76	21 x 4.76
LED window size	5.4 x 1.95	5.4 x 1.95

Order

Order Code	Type	Price each
YH77J	Dual LED Array Red	45p
YH78K	Tri LED Array Red	60p
YH79L	Dual LED Array Green	45p
YH80B	Tri LED Array Green	60p
YH81C	Dual LED Array Yellw	56p
YH82D	Tri LED Array Yellow	70p

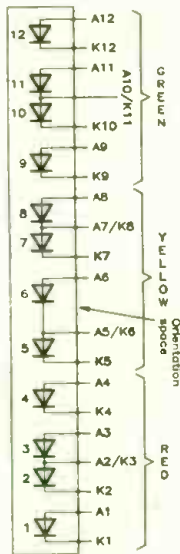
respectively. All cathodes are connected to the row pins. The display has a wide viewing angle and high, even brightness. The display is the right way up if pin 1 is at bottom left when viewed from the front.

	Red	Green
Luminous intensity:	3600 μcd	1800 μcd @ $I_F = 10\text{mA}$
Viewing angle:	150°	150°
Dimensions:	60.3 x 50.3 x 9.2mm deep not including pins	



Multicolour Array

Kingbright



An attractively finished 12-segment bargraph array with bright evenly illuminated LED's in three groups of four LED's green, yellow and red. Ideal for solid-state VU meters etc. Pins are on 0.1in. centres. Front is slightly raised and finished in matt black.

	Green	Yellow	Red
Light output typical at $I_F = 20\text{mA}$	2mcd	4mcd	4mcd
Forward voltage at $I_F = 20\text{mA}$	2.2V	2.1V	2V
Forward current (max)	30mA	30mA	30mA
Reverse voltage (max)	5V	5V	5V
Power dissipation (max)	105mW	105mW	120mW
Peak wavelength	565nm	635nm	665nm

Dimensions

Overall size: 57.5 x 7 x 8mm
Front face protrudes by 0.5mm and is 55.5 x 5mm across.

Order Code	Type	Price each
FE26D	Multicolour Bargraph	£1.99

ALPHANUMERIC DISPLAYS

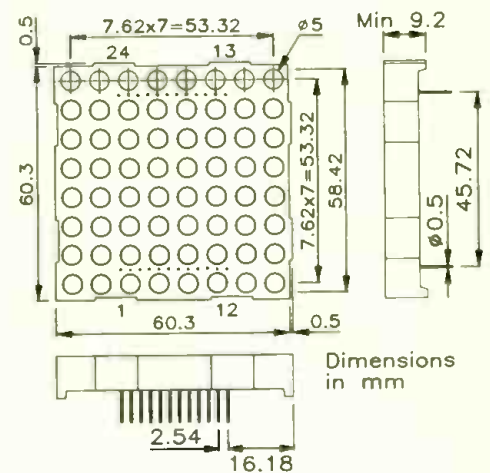
Bi-Colour Dot Matrix Display

Kingbright



A large 8 x 8 LED dot matrix display with an effective illuminated area of 58mm high x 53mm wide. The complete ASCII character set can be shown on it, and the package has slots and tongues in the sides so that rows of displays for moving messages, etc., can be precisely aligned. The display has 64 diffused, circular 5mm windows for the LEDs set into a neutral grey background. Each location actually contains a bi-colour LED and can show red or green or a combination of the two colours. The LEDs are high brightness types, and while the row connections are common to each colour, the column connections are duplicated so that each colour is individually accessible. any single location can be a specific colour. To achieve this the package has 24 PCB pins organised into two rows on a 0.1in. matrix; each row of 12 is spaced 1.8 inches apart.

It will be seen from the connection diagram that the column pins are arranged in adjacent pairs, where each pin in the pair provides for red and green



Order Code	Type	Price each
GW63T	Bi-Colour Dot Matrix	£12.99

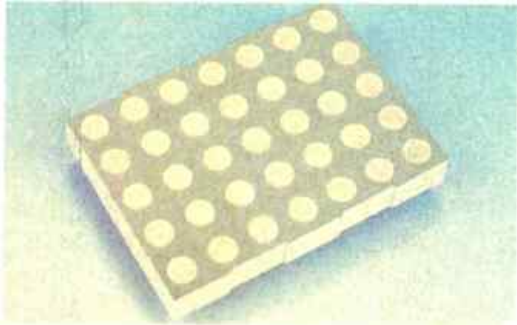
Large Dot Matrix Display

Kingbright

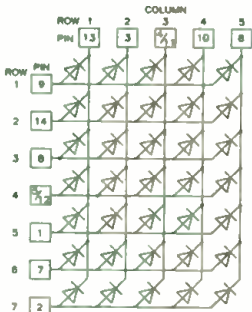
A 5 by 7 red dot matrix array on which the complete ASCII character set could be displayed. The package has slots and tongues in the sides so that rows of displays for moving messages etc., may be precisely aligned. The display has 35 diffused round 5mm circles flat with a grey plastic surround. The matrix is shown in the drawing; the cathodes are connected to the column pins. Pins 4/11 and 5/12 are commoned. For example, to light the centre LED connect pin 5 or 12 through a series resistor to +V and pin 4 or 11 to negative. The display has a wide viewing angle and high, even brightness. With the display

Continued on next page.

Continued from previous page.



vertical, pin 1 is at the lower left looking from the front. This is still true even if display is rotated through 180° top to bottom.



Light output typical at $I_F = 20\text{mA}$: 1.5mcd
 Forward voltage at $I_F = 20\text{mA}$: 2V
 Forward current (max): 30mA
 Forward current peak: 150mA at 10% duty cycle (100Hz to 1kHz)
 Reverse voltage (max): 5V
 Power dissipation (max): 100mW
 Peak wavelength: 635nm
 Dimensions: 53 x 38 x 8.5mm deep excluding pins.

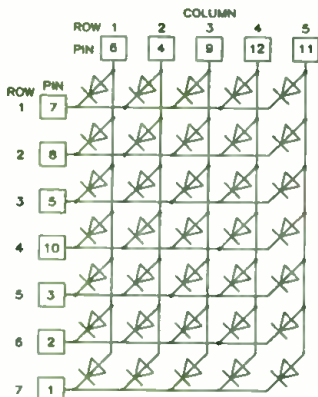
Order Code	Type	Price each
FT61R	5 x 7 LED Array	£3.99

Small Dot Matrix Display

Kingsbright

Similar to Large Display opposite, but pins are not symmetrical. LED's are 2mm diameter and the anodes are connected to the column pins.

Overall size: 17.8 x 12.7 x 6.3mm deep. All other specifications as FT61R.

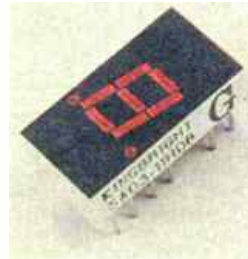


Order Code	Type	Price each
FE25C	Small 5 x 7 LED Array	£3.59

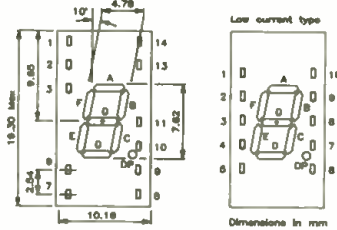
SEVEN-SEGMENT LED DISPLAYS

0.3in Display

High brightness 0.3in LED display featuring highly legible, bold, solid segments, fast switching, low power consumption, and compatibility with integrated circuits. Available in three types in Red only.



Type 1: Common anode, Right-hand decimal point.
 Type 4: Common cathode, Right-hand decimal point.



Luminous intensity: 1.3mcd at $I_F = 20\text{mA}$ (per segment).
 Forward voltage: 2V at $I_F = 20\text{mA}$ (per segment).
 A low current version of the Type 4 (common cathode) display is also available.
 Luminous intensity: 800µcd at $I_F = 5\text{mA}$ (per segment).
 Forward voltage: 1.7V at $I_F = 5\text{mA}$ (per segment).
 Pins will fit a standard 14-pin DIL IC socket.

Pin No.	Type 1	Type 4	Low Current
1	Cathode A	Anode F	Cathode
2	Cathode F	Anode G	Anode F
3	Anode*	No pin	Anode G
4	No pin	Cathode*	Anode E
5	No pin	No pin	Anode D
6	NC	Anode E	Cathode
7	Cathode E	Anode D	Anode DP
8	Cathode D	Anode C	Anode C
9	Cathode DP	Anode DP	Anode B
10	Cathode C	No pin	Anode A
11	Cathode G	No pin	
12	No pin	Cathode*	
13	Cathode B	Anode B	
14	Anode*	Anode A	

*Signifies that the connection designated is internally connected to all other connections so noted.

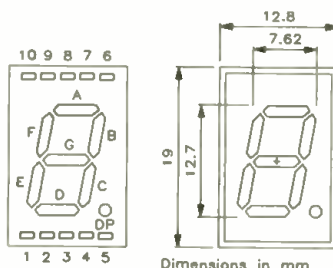
Order Code	Type	Price each
FR36P	7-Seg Red Type 1	£1.29
FR38R	7-Seg Red Type 4	£1.29
QY54J	Low Current Disp	£3.65

0.5in Display

Kingsbright

High brightness 0.5in display featuring highly legible, bold, solid segments, fast switching, low power consumption, and compatibility with integrated circuits.

Available in two types in Red only.



Type 1: Common anode: Right-hand decimal point.
 Type 4: Common cathode: Right-hand decimal point.

Characteristics:
 Luminous intensity: 1.3mcd at $I_F = 20\text{mA}$ (per segment).
 Forward voltage: 2V at $I_F = 20\text{mA}$ (per segment)

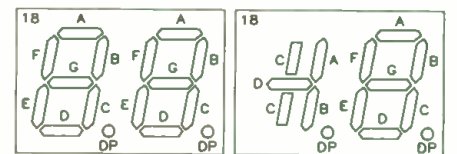
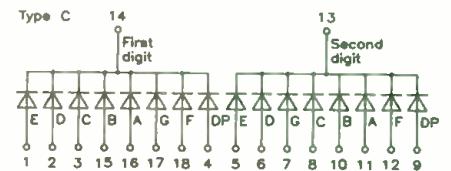
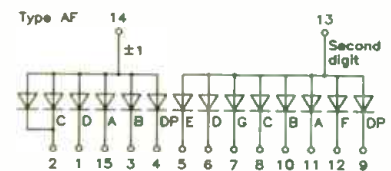
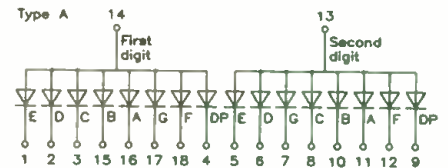
Electrical Connections

Pin No.	Type 1	Type 4
1	Segment E	Segment E
2	Segment D	Segment D
3	Common Anode	Common Cathode
4	Segment C	Segment C
5	DP	DP
6	Segment B	Segment B
7	Segment A	Segment A
8	Common Anode	Common Cathode
9	Segment F	Segment F
10	Segment G	Segment G

Order Code	Type	Price each
FR39N	1/2" Display Type 1	£1.15
FR41U	1/2" Display Type 4	£1.15

Double Digit Display

A 2-digit display available in red or green. Digits are 0.56in high with high contrast and wide viewing angles. All types have a right-hand decimal point.



Ratings per segment:

Luminous intensity: 1.3mcd at $I_F = 20\text{mA}$
 Forward voltage: 2V at $I_F = 20\text{mA}$
 Max forward current: 30mA

Type 'A': 2-digit (8.8.) Common anode. Type 'AF': 1 1/2-digit (±1.8.) Common anode. Type 'C': 2-digit (8.8.) Common cathode. Overall dimensions: 25 x 19 x 8mm. Pin spacing: 0.6 x 0.1in (18-pin).

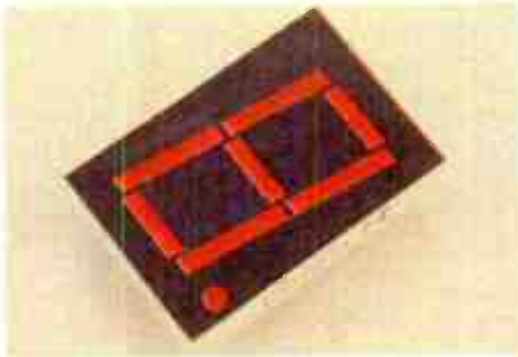
These displays may be used with direct drive or multiplexing type drivers.

Order Code	Type	Price each
BY66W	DD Display Type A	£2.09
FA01B	DD Display Typ A Grn	£2.49
BY67X	DD Display Type AF	£2.99
BY68Y	DD Display Type C	£2.09
FA02C	DD Display Typ C Grn	£2.49

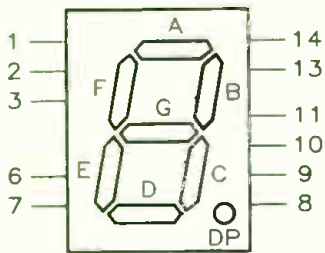
Stockist of Assessed Capability
YOUR GUARANTEE OF QUALITY & SERVICE

One Inch Display

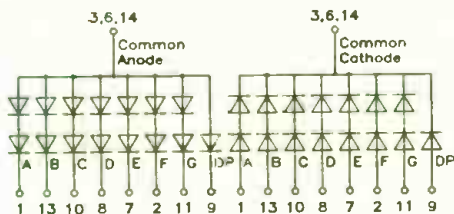
Kingbright



A very large display with an overall character height of 26mm (1in.). Available with common anode or common cathode in red.



Light output typical at $I_F = 20\text{mA}$: 2.4mcd
 Forward voltage: 2.2V per diode (i.e. 4.4V for all segments except DP)
 Max forward current: 30mA
 Overall dimensions: 32.9 x 22.4 x 8.5mm
 Pin length: 6mm
 Pin spacing: 0.6 x 0.1in (14-pin)



Order Code	Type	Price each
FA03D	1" Display Com: Anode	£2.29
FA04E	1" Display Com: Cathode	£2.29

1.8 inch. Bi-Colour Display

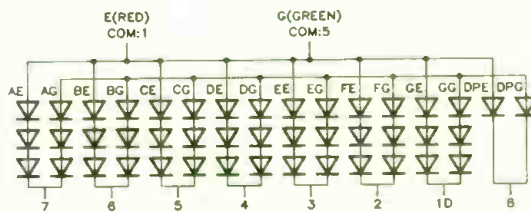
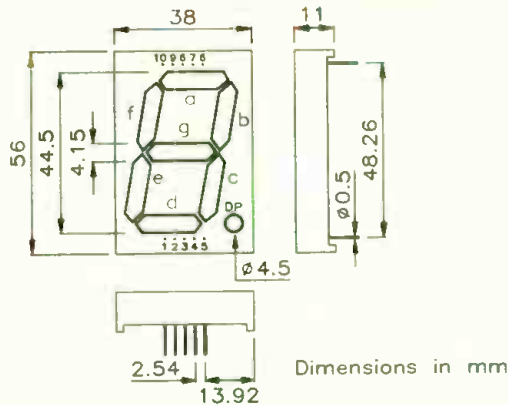
Kingbright

A high brightness, 1.8in. high 7-segment display with bold, legible and solid segments which can be lit in either red or green, or a combination of the two.

This is achieved through the use of two common anodes, one for red and the other for green. The individual segments can be activated by an open collector 7-segment driver in the normal way, and multiplexed displays are also possible, switching the relevant colour's anode pin. The package has 10 PCB pins, two of which are the anodes, and the remainder the segment and decimal point connections, organised into two rows of 5 pins on a 0.1in. matrix, with the rows spaced 1.9in. apart.



FOR TOP QUALITY & VALUE!



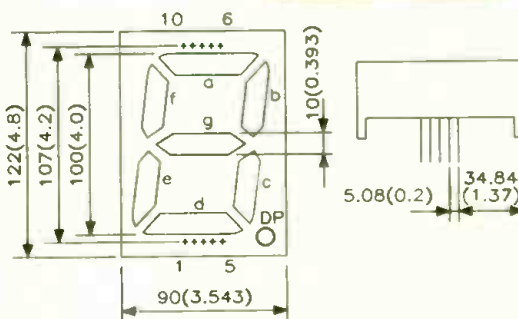
Luminous intensity: Red 30000 μcd Green 30000 μcd @ $I_F 10\text{mA}$
 Dimensions: 56 x 38 x 11mm deep not including pins

Order Code	Type	Price each
GW64U	1.8in. Bi-Colour	£4.99

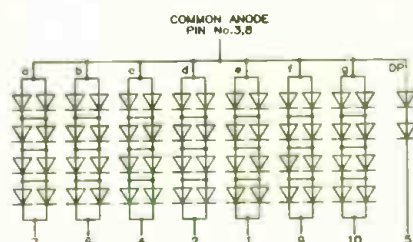
Four Inch Display

Kingbright

An extremely large display with an overall character height of 100mm (4in.) Display colour is red. Available with common anode.



Light output typical at $I_F = 20\text{mA}$ 21mcd
 Forward voltage at $I_F = 20\text{mA}$ 7.4V segment 3.7V decimal point
 Forward current (max) 60mA segment 30mA decimal point
 Overall dimensions 122mm x 90mm x 15mm
 Pin length approx 9mm
 Pin Spacing 5.08mm (0.2in.)



Order Code	Type	Price each
JX86T	4in Display	£19.99

Display Filters



Anti-reflection filters for data displays which greatly improve the contrast. Suitable for use with LED displays, incandescent filament displays, neon gas discharge displays and gas discharge displays. For optimum effectiveness use the filter whose colour is as close as possible to that of the display or the neutral density can be used with any colour. Sold only in pieces 105 x 35 x 0.76mm. Suits up to eight 1/3in. displays or up to six 1/2in. displays, but may be cut with scissors to size required.

Available in Green, Red and Neutral Density.

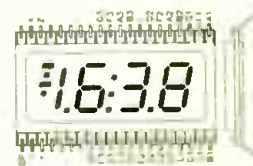
Order Code	Type	Price each
FR33L	Filter Green	£1.10
FR34M	Filter Red	£1.10
JE16S	Filter Neutral Dnsty	£1.10

LIQUID CRYSTAL DISPLAYS

3 1/2 -Digit



A 3 1/2 digit field effect liquid crystal display suitable for use in panel meters, digital multimeters and 12-hour clocks. With all segments on the current is typically 10 μA at 5V rms and the display is thus ideal for battery operation. The digits are 12.7mm (1/2in.) high and give a solid black appearance on a silvered, reflective background. The display has a centre colon for use in clocks, and decimal points, plus and minus signs and overflow indicator for use in panel meters. The device is supplied in a 40-pin DIL package 33 x 2.54mm (1.3 x 0.1in) spacing. The device is only guaranteed if it has not been soldered and the device will only be replaced for scratched front face if the protective coat has not been removed - (after checking that there is no damage the protective coat should be removed before use).



Specification (at 25°C and 5V rms)

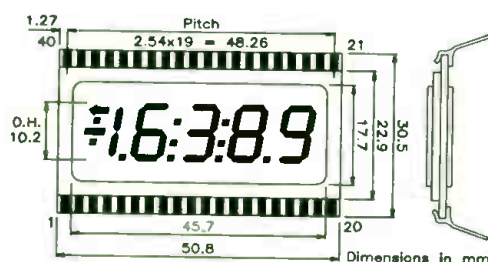
	Min	Typical	Max
Operating voltage (V_{rms})	3	5	9
Allowable DC drive component (mV)			50
Operating frequency (Hz)	30	32	100
Current all segments on (μA)		2.5	5
Capacitance all segments on (pF)		500	1000
DC resistance all segments on (M Ω)	32	100	
Response time to 90% on (msec)		75	150
Decay time to 10% on (msec)		150	300
Contrast ratio		20:1	
Operating temperature range (°C)	-15	25	55
Viewing angle at 4V rms		± 45	
5V rms		± 60	
6V rms		± 75	
Expected life (hours)		50,000	

Overall dimensions: 51 x 30.5 x 3.5mm
 Pin length: 6.4mm

Order Code	Type	Price each
FY89W	Lqd Crystal Display	£6.15

4 1/2-Digit

A 4 1/2-digit field effect liquid crystal display suitable for use in panel meters, digital multimeters and particularly with the ICM7224 IC. The digits are 10.2mm (0.4in.) high and give a solid black appearance on a silvered, reflective background.



Pin No.	Seg.	Pin No.	Seg.	Pin No.	Seg.	Pin No.	Seg.
1	COM	11	3C	21	1A	31	3F
2	-	12	3DP	22	1F	32	3G
3	BC	13	2E	23	1G	33	L1
4	5DP	14	2D	24	2B	34	4B
5	4E	15	2C	25	2A	35	4A
6	4D	16	2DP	26	2F	36	4F
7	4C	17	1E	27	2G	37	4G
8	4DP	18	1D	28	L2	38	←
9	3E	19	1C	29	3B	39	.
10	3D	20	1B	30	3A	40	COM

The display has colons between the first and second and between the second and third digits, decimal points, plus and minus signs and an overflow indicator. The device is supplied in a 40-pin DIL package 33 x 2.54mm (1.3 x 0.1in.) spacing. The device is only guaranteed if it has not been soldered and the device will only be replaced for scratched front face if the protective coat has not been removed - (after checking that there is no damage the protective coat should be removed before use). Specifications and size as 3 1/2-Digit.

Order Code	Type	Price each
FP61R	4 1/2 Dig LCD Disply	£7.45

LCD Character Display Modules

Hitachi



A range of dot matrix LCD modules that contain a HD44780 LSI controller for character display. The modules can be interfaced to 4-bit or 8-bit MPU directly, and can display 192 standard characters plus 8 user programmable symbols. Character generator RAM is also built-in (80 x 8 bits, 80 characters maximum), which can be read from the MPU. The modules feature low power consumption, and are powered from a single +5V supply.

Their light weight and compactness make them ideal for a wide range of applications including telephone, typewriters, portable computers, industrial equipment etc. The displays are either of the 'twisted neumatic' or 'supertwist' type. Type LM09XMLN features LED backlighting which is also 5V powered.

Optical specification	'Twisted Neumatic'	'Supertwist'
Viewing angle:	20°	40°
Contrast ratio:	2	3
Typical response time (rise):	250ms	400ms
Typical response time (fall):	250ms	450ms

LM020L 16 Character x 1 Line

Specification		
Type:	Twisted neumatic	
Module size:	80 x 36 x 12 mm	
Effective display area:	64.5 x 13.8mm	
Character size (5 x 7 dots):	3.07 x 5.73mm	
Character pitch:	3.77mm	
Dot size:	0.55 x 0.75mm	
Weight:	25g approx.	
Order		
Code	Type	Price each
DK65V	16x1 Char Disp Modul	£12.05

LM016L 16 Characters x 2 Lines

Specification		
Type:	Twisted neumatic	
Module size:	84 x 44 x 12mm	
Effective display area:	61 x 15.8mm	
Character size (5 x 7 dots):	2.96 x 4.86mm	
Character pitch:	3.55mm	
Dot size:	0.56 x 0.66mm	
Weight:	35g approx.	
Order		
Code	Type	Price each
DK63T	16x2 Char Disp Modul	£13.65

LM018L 40 Characters x 2 Lines

Specification		
Type:	Twisted neumatic	
Module size:	182 x 35.5 x 13mm	
Effective display area:	154 x 15.3mm	
Character size (5 x 7 dots):	3.2 x 4.85mm	
Character pitch:	3.7mm	
Dot size:	0.6 x 0.65mm	
Weight:	65g approx.	
Order		
Code	Type	Price each
DK64U	40x2 Char Disp Modul	£24.49

LM032XMBL 20 Characters x 2 Lines

Specification		
Type:	Supertwist	
Module size:	116 x 39 x 10.05mm	
Effective display area:	83 x 18.6mm	
Character size (5 x 7 dots):	3.2 x 4.85mm	
Character pitch:	3.7mm	
Dot size:	0.6 x 0.65mm	
Weight:	50g approx.	
Order		
Code	Type	Price each
DK66W	20x2 Char Disp Modul	£18.69

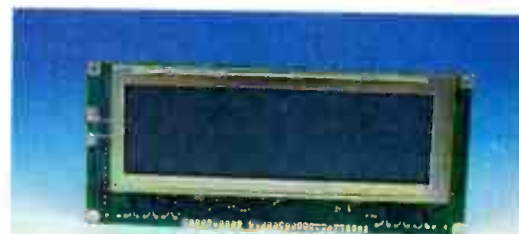
LM092XMLN 40 Characters x 2 Lines with LED Backlight

Specification		
Type:	Supertwist	
Module size:	192 x 35.5 x 15.3mm	
Effective display area:	154 x 15.3mm	
Character size (5 x 7 dots):	3.2 x 4.85mm	
Character pitch:	3.7mm	
Dot size:	0.6 x 0.65mm	
Dot pitch:	0.65 x 0.7mm	
LED supply current:	250mA maximum	
Order		
Code	Type	Price each
DK67X	40X2 Char Disp +LED	£49.99

FOR CASHTEL
Phone 01702 552941

LCD Graphic Display Modules

Hitachi



A range of high quality, very reliable, graphic display modules that have a wide visibility and a high contrast ratio. These thin, lightweight, modules have a low power consumption, and include an in-built controller. The modules are capable of displaying graphics, kanji, alphanumeric, kana etc., very clearly and legibly. The CMOS LSI controller stores display data from an 8-bit microcomputer in RAM to generate the dot matrix liquid crystal driving signals. The 7360-bit, internal character generator ROM, provides a total of 192 font types - 160 types of 5 x 7 dot, and 32 types of 5 x 11 dot fonts.

The modules are suitable for a wide range of applications including: portable data terminal equipment, laptop computers, word processors, etc. Two of the modules feature electroluminescent (EL) backlighting.

Specification	
Viewing angle:	40°
Contrast ratio:	3
Maximum response time rise:	400ms
Maximum response time fall:	450ms
EL contrast ratio:	47cd/m ²

LM213XB 256 x 64 dot display

Specification	
Display colour tone:	Yellow/green
Module size:	184 x 75 x 12mm
Effective display area:	149.6 x 43mm
Number of dots:	256 wide x 64 high
Dot pitch:	0.56 x 0.56mm
Typical logic supply:	5V
Typical LCD drive:	-10.5V
Logic supply current:	35mA
LCD supply current:	2mA

One power supply of 16V maximum is tapped accordingly to provide a 'GND'.

Order		
Code	Type	Price each
DK70M	256x64 Graph Display	£79.99

LMG6381QHGE 256 x 64 Dot Display with EL Backlight

Specification	
Display colour tone:	Blue on grey with backlight
Module size:	160 x 68 x 9.5mm
Weight:	115g approx.
Effective display area:	126.3 x 37mm
Viewing direction:	6 o'clock
Dot size:	0.44 x 0.44mm
Dot pitch:	0.47 x 0.47mm
Typical logic supply:	5V
Typical LCD drive:	-13V
Power consumption:	250mW

One power supply of 18V is tapped accordingly to provide a 'GND'. The EL backlight requires a separate driving voltage 100V rms 400Hz at 100mA. It is recommended that an inverter is used.

Order		
Code	Type	Price each
DK68Y	256x64+LED Graph Dis	£64.99

LMG6401PLGE 240 x 128 Dot Display with EL Backlight

Specification

Display colour tone:	Blue on grey with backlight
Module size:	159 x 101 x 9.5mm
Weight:	160g approx.
Effective display area:	126 x 71mm
Viewing direction:	6 o'clock
Dot size:	0.47 x 0.47mm
Dot pitch:	0.50 x 0.50mm
Typical logic supply:	5V
Typical LCD drive:	-15V
Logic supply current:	6mA
LCD supply current:	4mA

One power supply of 20V is tapped accordingly to provide a 'GND'. The EL backlight requires a separate driving voltage of 100V RMS, 400Hz at 160mA. It is recommended that an inverter is used.

Order		
Code	Type	Price each
DK69A	240x128 GraphDisplay	£86.99

Message Display System



A 16-character liquid crystal 5x7 dot-matrix display and microprocessor driven controller supplied complete, ready to connect up and be fully operational in minutes. A good quality 5V 250mA power supply is required. A set of 16 pre-programmed messages are instantly available from on-board ROM, each being displayed by simply connecting the appropriate input to ground via a mechanical or electronic switch or logic output. By using the on-board hexadecimal switches, users may write five of their own messages up to one line of 16 characters. A spare socket is provided into which a 2716 (not supplied) may be plugged to provide additional messages. Further expansion is possible thanks to all relevant signal lines being brought out to a 32-way 0.1in. double-sided edge connection. 190 standard characters are available for use in messages, which may be flashed.

The module is supplied as two boards, interconnection cable, display bezel and mounting hardware.

Size of control board: 138 x 84 x 20mm deep. display board: 80 x 37 x 21mm deep.

Interconnection cable: 280mm long.

Bezel size: 86 x 25mm.

Panel cut-out: 82 x 21mm.

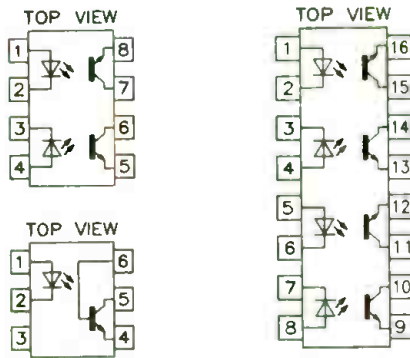
Order		
Code	Type	Price each
YJ49D	A1 Message Display System	£79.99

HOT TIP

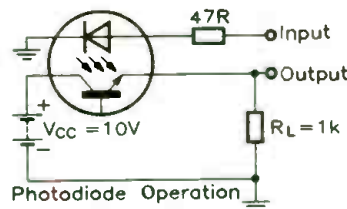
It is not possible to check whether an infra-red diode is working with the naked eye. One possibility is to use a camcorder, if one is available. The lens is set to the macro position and the diode is placed very close to the lens, and brought into sharp focus. Because camcorders are able to see the infra-red light and reproduce it, then you should be able to see the output on a TV screen. Try it initially with your TV or video remote control handset to see the effect.

OPTO-ISOLATORS Opto Transistor Isolator

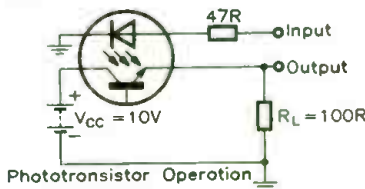
Siemens



Optically coupled infra-red emitting diodes and phototransistors in dual-in-line packages. Single type is in a 6-pin DIL package, dual type is in an 8-pin DIL package and quad type is in a 16-pin DIL package.



On the single type, a base lead is provided so that the device may be biased in the conventional manner.



Absolute maximum ratings

Input to output voltage:	1500V
Collector-base voltage (V_{CBO}):	70V
Collector-emitter voltage (V_{CEO}):	30V
	(dual and quad 20V)
Emitter-base voltage (V_{EBO}):	7V
Input diode reverse voltage:	3V
Input diode continuous forward current:	100mA
Continuous power dissipation:	

LED:	150mW
Phototransistor:	150mW
Total:	250mW (quad 450mW)

Electrical characteristics (typical)

Input diode static reverse current (at $V_R = 3V$):	<10 μ A
On state collector current ($V_{CE} = 0.4V, I_F = 16mA$):	
Phototransistor operation ($I_B = 0$):	7mA
Photodiode operation ($I_E = 0$):	20 μ A
Off-state collector current ($V_{CE} = 10V, I_F = 0$):	
Phototransistor operation ($I_B = 0$):	1nA
Photodiode operation ($I_E = 0$):	0.1nA
h_{FE} ($V_{CE} = 5V, I_C = 10mA, I_F = 0$):	300
Input diode forward voltage at $I_F = 16mA$:	1.2V
Collector-emitter saturation voltage ($I_C = 2mA, I_F = 16mA, I_B = 0$):	0.25V
Input to output resistance (diode leads shorted to transistor leads shorted at V_{in} to $V_{out} = 1.5kV$):	10 ¹¹ Ω
Input to output capacitance:	1pF
Max operating frequency	
Phototransistor operation:	>125kHz
Photodiode operation:	>250kHz
Min transfer ratio:	13%

Order		
Code	Type	Price each
WL35Q	Opto-Isolator	69p
YY62S	Dual Opto-Isolator	£1.29
YY63T	Quad Opto-Isolator	£1.99

High Sensitivity, High Voltage Opto Transistor Isolator

Q.T.C.

This opto-isolator is similar to WL35Q above, except that it has a min transfer ratio of 100% and a 7500V peak isolation voltage (5300V rms). Pin-out is the same as WL35Q.

Absolute maximum ratings:

Input to output voltage:	7500V peak, 5300V RMS
Collector-base voltage (V_{CBO}):	70V
Collector-emitter voltage (V_{CEO}):	70V
Emitter-base voltage (V_{EBO}):	7V
Input diode reverse voltage:	3V
Input diode continuous forward current:	90mA
Continuous power dissipation:	
LED:	135mW
Phototransistor:	200mW
Total:	260mW

Electrical characteristics (typical)

h_{FE} ($V_{CE} = 5V, I_C = 100\mu A$):	500
Input diode forward voltage at $I_F = 10mA$:	1.2V
Input to output capacitance:	0.5pF
Max operating frequency:	>100kHz
Min transfer ratio: 100% at $I_F = 10mA$	

Order		
Code	Type	Price each
RA57M	Hi-Sensitivity Opto	60p

Opto Darlington Isolator

An optically coupled gallium arsenide infra-red emitting LED and NPN silicon photo-darlington transistor in a 6-pin DIL package. A base lead is provided so that the device may be biased in the conventional manner if desired. Pin-out is the same as WL35Q.

Absolute maximum ratings:

Input to output voltage:	1500V
Collector-base voltage (V_{CBO}):	30V
Collector-emitter voltage (V_{CEO}):	30V
Emitter-base voltage (V_{EBO}):	7V
Input diode reverse voltage:	3V
Input diode continuous forward current:	100mA
Continuous power dissipation	
LED:	150mW
Photodarlington:	150mW
Total:	250mW

Electrical characteristics (typical)

On-state collector current ($V_{CE} = 1V, I_F = 10mA$):	100mA
Off-state collector current ($V_{CE} = 10V, I_F = 0$):	100nA
h_{FE} ($V_{CE} = 5V, I_C = 10mA, I_F = 0$):	15,000
Input diode forward voltage (V_F):	1.5V
Collector-emitter saturation voltage ($I_C = 125mA, I_F = 50mA, I_B = 0$):	1V
Input to output resistance (diode leads shorted to transistor leads shorted at V_{in} to $V_{out} = 1.5kV$):	10 ¹¹ Ω
Input to output capacitance:	1pF
Max operating frequency:	>10kHz
Min transfer ratio:	300%

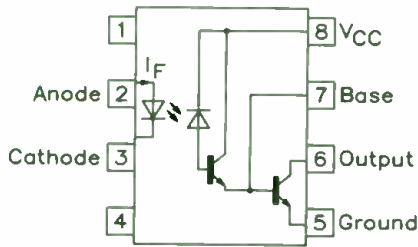
Order		
Code	Type	Price each
WQ70M	Darlington Isolator	88p

MAPLIN KEY CALL

Phone 01702 556751

High Gain Opto Isolator 6N139

Siemens



A high sensitivity, high speed split-darlington opto isolator. Speeds up to 300kbit/s are possible.

Supply voltage (V_{CC}): 5V (18V max)
LED input current: 0.5mA (20mA max)
Output current: 60mA max
LED forward voltage at $I_F = 0.5mA$: 1.37V
LED reverse voltage: 5V max
Isolation voltage: 3000V DC
Current transfer ratio: 800% at $I_F = 0.5mA$
900% at $I_F = 1.6mA$
($V_F = 1.42V$)

Order Code	Type	Price each
RA59P	Hi-Gain Opto 6N139	£2.35

High Voltage Opto-isolators

General Instruments

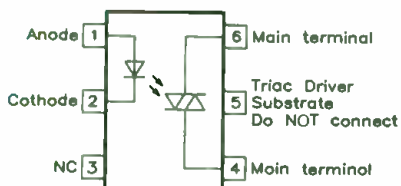
Two opto-isolator devices in a 6 pin DIL package comprising a gallium arsenide infra-red emitting diode optically coupled to a monolithic silicon phototransistor. The input to output isolation can be up to 7,500V peak guaranteed, and the device meets or exceeds all JEDEC registered specifications. Of the two versions available, the 4N25 has a faster switching time of 2.8 μ s and a higher current gain, whereas the 4N36 is 7.5 μ s.

	4N25	4N36	
LED forward voltage:	1.15V	1.15V	@ $I_F = 10mA$
Capacitance:	18pF	18pF	
Collector/emitter dark current:	50nA	50nA	@ $V_{CE} = 10V$
V_{CE} maximum:	30V	30V	
V_{CB} maximum:	70V	70V	
H_{FE} :	500	400	
Collector/base capacitance:	19pF	19pF	@ 1MHz
Collector/emitter saturation voltage:	0.15V	0.14V	
Turn-on time:	2.8 μ s	7.5 μ s	(LED $I_F = 10mA$)
Turn-off time:	4.5 μ s	5.7 μ s	
Isolation voltage:	7,500	7,500	VAC @ 60Hz
Isolation resistance:	$10^{11}\Omega$	$10^{11}\Omega$	@ 500V
Isolation capacitance:	0.2pF	0.2pF	

Order Code	Type	Price each
AY44X	4N25	45p
AY45Y	4N36	45p

Opto Triac Isolator

Motorola



An optically coupled gallium arsenide infra-red emitting LED and triac in a 6-pin DIL package. The triac has a 400V rating (suitable for 240V AC mains) and I_T rms of 100mA maximum.

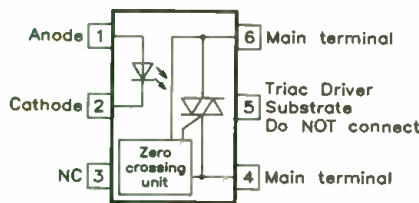
Characteristics

Forward voltage (V_F) at $I_F = 30mA$:	1.3V
Continuous forward current:	60mA max
LED current needed to latch output:	15mA
Holding current:	200 μ A
Reverse voltage:	3V max
PIV triac:	400V
I_T (rms) triac:	100mA
Isolation voltage:	7500V peak, 5300V rms

Order Code	Type	Price each
QQ10L	Triac Isolator	£1.19

Opto Zero-Crossing Triac Isolator

Motorola



An optically coupled gallium arsenide infra-red emitting LED and zero-voltage crossing triac in a 6-pin DIL package. The triac has a 400V rating (suitable for 240V AC mains) and I_T rms of 100mA maximum.

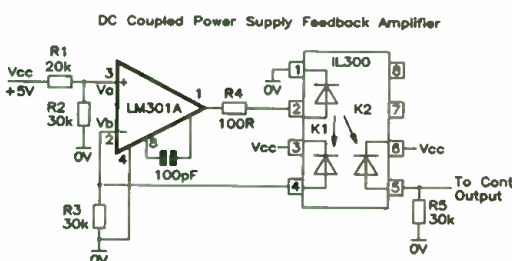
Forward voltage (V_F) at $I_F = 30mA$:	1.3V
LED current required to latch output:	7mA
Max forward current:	60mA
Reverse voltage (max):	6V
Isolation voltage:	7500V peak, 5300V RMS
PIV triac:	400V
I_T triac:	100mA

Order Code	Type	Price each
RA56L	Optotriac + Zero Crs	£1.49

IL300 Linear Optocoupler

Siemens

A linear optocoupler that consists of an AlGaAs infra-red LED, an isolated feedback photodiode and an output PIN photodiode, housed in a standard 8-pin DIL package. The feedback photodiode captures a percentage of the LED's flux and generates a control signal that can be used in a servo control system to provide the LED drive current. The technique compensates for the LED's nonlinear, time and temperature characteristics. The output PIN photodiode produces a signal that is linear related to the servo controlled, optical flux, generated by the LED. Time and temperature stability is insured by using matched PIN photodiodes that accurately track the output flux of the LED. Typical applications include power supply voltage/ current feedback loops, audio sensor interfacing, isolated process control transducers and digital telephone isolation.



Specification

LED Emitter

Forward voltage:	1.5V max	Forward current: 60mA
best linearity with drive	current between 5mA and 20mA	
Reverse current:	10 μ A max	
Power dissipation:	200mW max (ambient temp = 25°C)	

Detector

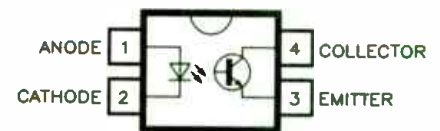
Power dissipation:	50mW max (ambient temp = 25°C)
Reverse voltage:	50V
Dark current:	25nA max ($V_F = 15V$)
Noise equivalent power:	4×10^{-14} W/Hz
Input/output capacitance:	1pF typical
Common mode rejection ratio:	130dB
Operating temperature range:	-55°C to 100°C

Order Code	Type	Price each
CY92A	IL300	£2.99

Low-Current Optocoupler SFH618-2

Siemens

NEW



A transistor optocoupler in a DIP-4 package with a low current input and a very high coupling transfer ratio (CTR), typically 120%. The device has good CTR linearity relative to forward current and a high V_{CEO} of 55V DC. The device can be 'end stacked' if necessary (2.54mm spacing).

Specification

Emitter - maximum ratings

Reverse voltage:	6V
DC forward current:	50mA
Surge forward current ($\leq 10\mu$ s):	2.5A
Total power dissipation:	70mW

Detector - maximum ratings

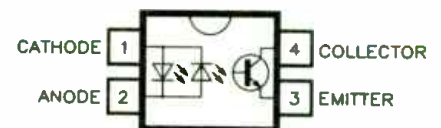
Voltage	
V_{CEO} :	55V
V_{ECO} :	7V
Collector current:	50mA
Surge collector current ($\leq 1ms$):	100mA
Total power dissipation:	150mW
Coupling capacitance:	0.25pF
Coupling transfer ratio	
$I_F = 1mA, V_{CE} = 0.5V$:	63% to 125%
$I_F = 0.5mA, V_{CE} = 1.5V$:	75% ($\pm 32\%$)

Order Code	Type	Price each
CY94C	SFH618-2	90p

Low-Current Optocoupler SFH628-2

Siemens

NEW



A transistor optocoupler housed in a DIP-4 package with a low current input, and a very high coupling transfer ratio (CTR), typically 160%. Two infra-red GaAs emitters are wired in parallel, but opposite polarity, to allow the device to operate with an AC input. The optocoupler has good CTR linearity relative to forward current and a high V_{CEO} of 55V DC. The device can be 'end stacked' if necessary (2.54mm spacing).

Specification

Emitter - maximum ratings

Forward voltage $I_F = \pm 5mA$:	$\pm 1.1V$ ($\leq 1.5V$)
DC forward current:	$\pm 50mA$
Surge forward current ($\leq 10\mu$ s):	$\pm 2.5A$
Total power dissipation:	70mW

Detector – maximum ratings

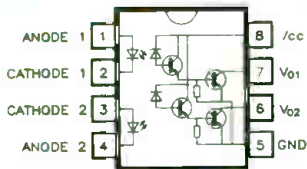
Voltage V_{CE0} :	55V
V_{ECO} :	7V
Collector current:	50mA
Surge collector current ($\leq 1\text{ms}$):	100mA
Total power dissipation:	150mW
Coupling capacitance:	0.25pF
Coupling transfer ratio	
$I_F = 1\text{mA}$, $V_{CE} = 0.5\text{V}$:	63% to 200%
$I_F = 0.5\text{mA}$, $V_{CE} = 1.5\text{V}$:	100% ($\pm 32\%$)

Order Code	Type	Price each
CY93B	SFH628-2	£1.10

HCPL-2731 Dual Input, High Gain Optocoupler

Hewlett-Packard

NEW



A dual low input current, high gain, optocoupler that provides an extremely high current transfer ratio (CTR) and excellent input-output common mode transient immunity. The device contains a separated pair of GaAsP LEDs optically coupled to a pair of integrated high gain photo detectors. Additional features include: a low input current requirement (0.5mA), low output saturation voltage (0.1V typical) and a minimum CTR of 400% with an input current of 0.5mA. This makes the device ideal for use in low input current applications such as MOS, CMOS and low power logic interfacing or RS232C data transmission systems.

Specification

Current transfer ratio	
$I_F = 0.5\text{mA}$, $V_O = 0.4\text{V}$, $V_{CC} = 4.5\text{V}$:	1800 typical
Supply and output voltage:	7V maximum
Average input current:	20mA each channel
Reverse input voltage:	5V maximum
Input power dissipation:	35mW max. per channel
Output current:	60mA max. per channel
Output power dissipation:	100mW per channel

Order Code	Type	Price each
CZ64U	HCPL-2731	£3.69

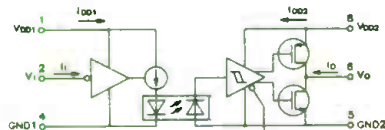
HCPL-7100 High-Speed CMOS Optocoupler

Hewlett-Packard

NEW



An optocoupler that combines CMOS IC technology, a high-speed high-efficiency AlGaAs LED and an optimised light coupling system to achieve low power requirements – just 10mA including the LED. The device requires just two bypass capacitors for complete CMOS/TTL compatibility. A CMOS or TTL logic signal controls the LED driver IC. The detector IC incorporates an integrated photodiode, a high-speed transimpedance amplifier and a voltage comparator with hysteresis. The 3-state output is controlled by the output enable pin V_{OE} .



TRUTH TABLE (POSITIVE LOGIC)

INPUT	ENABLE	OUTPUT
H	H	Z
L	H	Z
H	L	H
L	L	L

Specification

Supply voltage:	5.0V
Logic high input voltage:	2.0V minimum
Logic low input voltage:	0.8V maximum
Logic high output enable voltage:	2.0V to 5.0V
Logic low output enable voltage:	<0.8V
Input signal rise and fall time:	1ms
Average output current:	25mA
TTL fanout:	6

Order Code	Type	Price each
CZ66W	HCPL-7100	£3.10

INFRA RED TRANSCEIVERS

Miniature Infra-Red Source

A gallium arsenide infra-red LED. With a peak spectral wavelength of 940nm. Encapsulated in a 3mm water-clear resin package. Cathode denoted by flat on package/shorter lead. Similar to TIL32



Absolute maximum ratings

Power dissipation:	80mW
Forward current:	60mA
Reverse voltage:	5V

Electrical characteristics

Forward voltage:	1.6V ($I_F = 40\text{mA}$)
Light output:	3.5mW ($I_F = 40\text{mA}$)
Peak wavelength:	940nm

Order Code	Type	Price each
YY65V	Infra-Red Source	69p

Infra-Red Phototransistor

A low cost, high quality NPN silicon phototransistor, having high illumination sensitivity fast response time and low dark current. Encapsulated in a 3mm water clear resin package. The collector is denoted by a flat on the package and the shorter of the two leads; there is no access to the base terminal. Similar to TIL78.



Absolute maximum ratings

V_{CE} :	20V
P_{TOT} :	75mW

Electrical characteristics

Light current ($V_{CE} = 3\text{V}$, 880nm, 1000Lux)	
Min:	1.0mA
Max:	20mA
Dark current ($V_{CE} = 10\text{V}$)	
Max:	0.1µA
Peak spectral response	880nm

Order Code	Type	Price each
YY66W	Infra-Red Sensor	65p

High Power Infra-Red Emitting Diode

A high power infra-red emitter, intended primarily for remote control applications. Encapsulated in a 5mm water-clear resin package. Cathode denoted by flat on package/shorter lead. Similar to TIL38.



Absolute maximum ratings

Power dissipation:	100mW
Forward current:	100mA
Reverse voltage:	5V

Electrical characteristics

Forward voltage:	1.7V ($I_F = 100\text{mA}$)
Light output:	20mW ($I_F = 100\text{mA}$)
Peak wavelength:	940nm

Order Code	Type	Price each
YH70M	Infra-Red Emitter	69p

Photodiode

A high speed PIN photodiode designed to operate in the reverse bias mode. It offers low capacitance with high speed and high photosensitivity. The photodiode chip is moulded in a 5mm half round black infra-red transmissive plastic package. This device is intended for remote control applications. Cathode denoted by shorter lead. Similar to TIL100, in different package.



Absolute maximum ratings

Reverse voltage:	20V
Power dissipation:	150mW

Electrical characteristics

Dark current:	30nA (max) $V_R = 10\text{V}$
Light current:	60µA (950nm, 1000Lux)
Peak spectral response:	950nm

Order Code	Type	Price each
YH71N	Infra-Red Photodiode	99p

GaAs Infra-Red Photo Emitter

Telefunken

A photo emitting diode in the near infra-red range, suitable for remote control, light barrier and telecommunication. The device features a metal base with a clear plastic lens and extremely high radiation power, and is suitable for pulse operation to 10A. The anode is the leg adjacent to the tag.



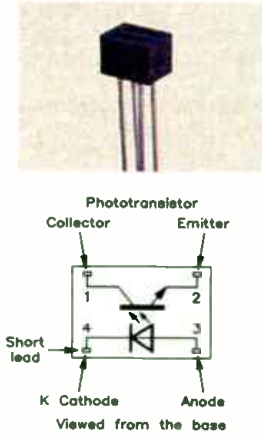
Characteristics (max. ratings)

Reverse voltage:	5V
Forward current:	250mA
Forward peak current:	10A
Power dissipation:	300mW
Junction temperature:	100°C
Forward voltage $I_F = 250\text{mA}$, $t_p \leq 100\text{ms}$:	1.2V
Forward voltage (pulse) $I_m = 10\text{A}$:	4.2V max.
Radiant power $I_F = 250\text{mA}$, $t_p \leq 100\text{ms}$:	20mW
Radiant power (pulse) $I_m = 10\text{A}$:	500mW
Radiant intensity $I_F = 250\text{mA}$, $t_p \leq 100\text{ms}$:	40mW/sr
Radiant intensity (pulse) $I_m = 10\text{A}$:	1W/sr
Peak wavelength emission $I_F = 100\text{mA}$:	950nm
Spectral half bandwidth $I_F = 100\text{mA}$:	50nm
Angle of half intensity:	$\pm 20^\circ$

Order Code	Type	Price each
KW66W	I/R Photo Emitter	£4.99

Photo Reflective Infra-Red Sensor

This device consists of an infra-red emitting diode and an NPN silicon phototransistor mounted side by side on parallel axes in a black plastic housing. Both emitting diode and phototransistor are moulded in infra-red transmissive plastic, which reduces ambient light noise. The phototransistor responds to radiation from the LED only when a reflective object passes within its field of view.



Absolute maximum ratings

IR LED ratings

Forward DC current: 50mA
Peak forward current: 3.0A (Pulse width 1µs, 300pps)
Reverse voltage: 2.0V
Power dissipation: 75mW

Phototransistor ratings

Collector-emitter voltage: 30V
Emitter-collector voltage: 5V
Collector current: 25mA
Power dissipation: 75mW

Electrical characteristics

IR LED ratings

Forward voltage: 1.7V, $I_F = 20\text{mA}$
Reverse current: 100µA, $V_F = 2\text{V}$

Phototransistor ratings

Dark current: 100nA, $V_{CE} = 5\text{V}$
On-state current: 350µA (min) 700µA (typ)
 $I_F = 20\text{mA}$, $V_{CE} = 5\text{V}$, $d^* = 1.27\text{mm}$
Saturation voltage: 0.4V
 $I_F = 20\text{mA}$, $I_C = 100\mu\text{A}$, $d^* = 1.27\text{mm}$

*Note: d = distance of reflective surface from sensor.

Order Code	Type	Price each
UK81C	Sensor OPB706B	£2.99

LIGHT RESPONSIVE DEVICES

Phototransistor BPX25

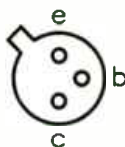
Zetex

A high sensitivity silicon planar NPN phototransistor for general purpose use. Top of package (TO 18) is lensed



Absolute maximum ratings

V_{CBO} : 32V
 V_{CEO} : 32V
 V_{EBO} : 5V
 I_C : 100mA
 P_{TOT} : 300mW



Electrical characteristics

(open-circuit base, except for h_{FE} typical)
Light current ($V_{CE} = 6\text{V}$ @ 1000 lux): 13mA
Dark current ($V_{CE} = 24\text{V}$): 100nA
 h_{FE} ($V_{CE} = 6\text{V}$, $I_C = 2\text{mA}$): 500
Peak spectral response: 800nm
Cut-off frequency (Note 1): 200kHz

Note 1: Improved switching times can be obtained by connecting the base lead to give a quiescent bias current.

Order Code	Type	Price each
QF30H	BPX25	£3.25

Photo-Darlington Transistor MEL12

A very high sensitivity silicon planar NPN photo-darlington transistor featuring a very high light current and low dark current.



Absolute maximum ratings

V_{CBO} : 60V
 V_{CEO} : 40V
 V_{EBO} : 10V
 I_C : 150mA
 P_{TOT} : 200mW

Electrical characteristics

(open-circuit base typical).
Light current ($V_{CE} = 5\text{V}$ @ $H = 2\text{mW/cm}^2$): 3mA
Dark current ($V_{CE} = 5\text{V}$): 100nA

Order Code	Type	Price each
HQ61R	MEL 12	£1.39

Photoconductive Cell

A cadmium sulphide photoconductive cell sensitive to visible light. It has a maximum sensitivity in the green, yellow, orange and red parts of the spectrum (wavelengths: 480-690nm). Resistances quoted are those measured when the cell is illuminated by a lamp of colour temperature 2854°K. For other light sources the cell resistance should be multiplied by the following approximate factors.



Source of illumination	Multiplication Factor
------------------------	-----------------------

Incandescent radiation at colour temperature of: 1500°K	x0.5
2000°K (oil-fired burner-yellow flame)	x0.66
Sunlight	x1.33
White fluorescent light	x2

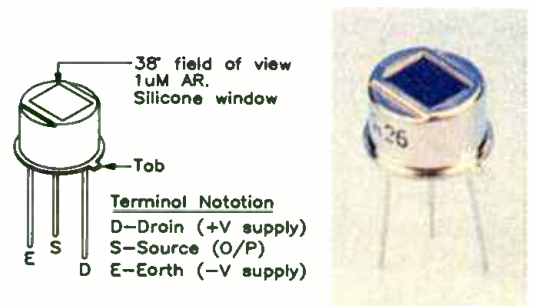
Where cell is operated from a 50Hz AC source the resistance values are between 1 and 1.3 times those for DC.

Type	Incidence of illumination	Cell resistance at 50 lux	Min. dark resistance
ORP12	End-on	6000Ω	1MΩ

Type	Min bright resistance	Max. power dissipation	Max. cell voltage
ORP12	80Ω*	250mW	320V

Order Code	Type	Price each
HB10L	LDR ORP12	£1.20

Infra-Red Detector E100SV1



This device is a sensitive, low noise, pyroelectric infra-red detector, which uses a ceramic ferroelectric dual sensing element, a silicon optical filter reduces the effect of RF interference.

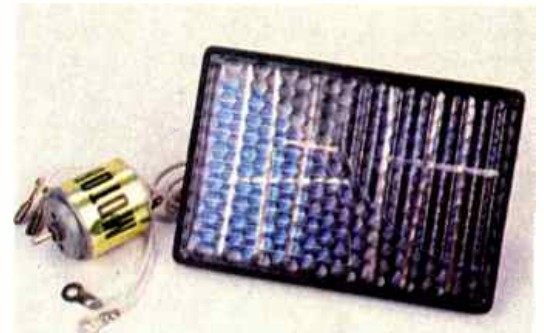
Characteristics at 25°C

Sensitivity (500°K, 1Hz, 1Hz): 1860V/W
Specific detectivity: $1.0 \times 10^8 \text{cmHz}^{1/2}/\text{W}$
Wavelength range: 1 to 20µm
Rise time: <25msec
Field of view: 38°
Supply voltage: +3 to +15V
Operating temperature range: -25 to +55°C

Order Code	Type	Price each
UR69A	I/R Detector E100SV1	£5.99

SOLAR POWER

Solar Cells



A range of solar cells that develop various voltages and currents and can be easily connected together to suit individual requirements. The output connections are threaded posts with nuts, and a metal strip is provided to connect the cells together. The cells are mounted in a rigid black plastic case. BZ47B includes a small electric motor that can be driven from the solar cell supplied.

Specification

All outputs are quoted for full sunlight.

Type	V DC	mA	Size mm
BZ43W	0.45	200	55 x 35 x 12
BZ44X	0.45	400	75 x 45 x 12
BZ45Y	0.45	700	95 x 65 x 12
BZ46A	0.9	400	95 x 65 x 12
BZ47B	0.9	400	95 x 65 x 12

Order Code	Type	Price each
BZ43W	Cell 200mA 0.45V	£1.60
BZ44X	Cell 400mA 0.45V	£2.10
BZ45Y	Cell 700mA 0.45V	£3.99
BZ46A	Cell 400mA 0.9V	£3.99
BZ47B	Cell with Motor	£4.99

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Phone 01702 556751

FOR
CASHTEL
Phone 01702 552941

Solar Cell Modules



Additional or replacement solar cell modules for the solar cells BZ43W to BZ47B. Can be added to make larger panels if desired. Each module can output 0-45V at 100mA and can be stacked in series or in parallel.

Order Code	Type	Price each
CJ36P	Solar Cell Module	£1.35

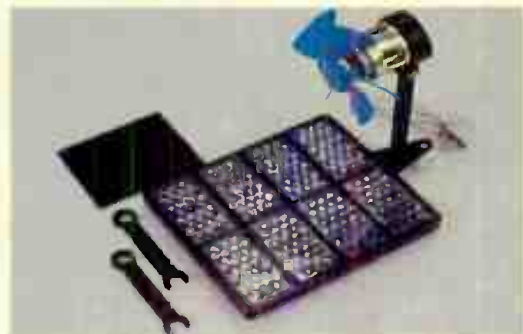
Solar Cell Educational Kits

Basic



An educational kit to help you explore solar energy power. The kit includes a solar panel (0-45V 400mA), a small DC motor, connecting wire, plastic fan spinner and tumblers, coloured spinner disks, coloured paper models, screws and nuts. An interesting kit for children to enjoy. A very informative booklet is included describing solar power in detail.

Advanced Kit



A more advanced kit that includes eight solar panels that produce 0.4V at 100mA each, and can be configured to produce 0.4V at 800mA or 3.2V at 100mA by connecting the cells in parallel or series, or a combination of both. It is possible to power small appliances, i.e. radios, personal cassettes, calculators, from sunlight. A detailed booklet is included in the kit that explains how to connect up the cells. A small electric fan along with connecting straps and wire are included in the kit to demonstrate the use of solar power.

Order Code	Type	Price each
BZ48C	Basic Solar Kit	£5.99
BZ52G	Advanced Solar Kit	£10.99

Solar Panels



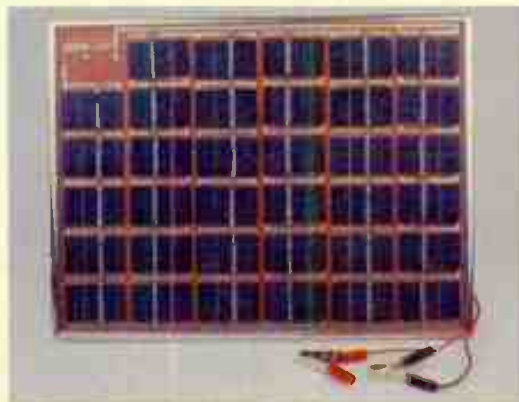
Each solar panel contains rectangular shaped silicon solar cells connected so as to supply 9V or 12V at 30mA

when the incident light is about 100mW/sq. cm. The cells are mounted in an attractive and sturdy black plastic case. The plastic faceplate comprises hundreds of bubble magnifiers which maximise cell performance as they enhance the light striking the solar cells. The cells are internally connected to a 2.5mm jack socket and a 2.5mm jack plug and approx 1m of twin flex is supplied with each panel.

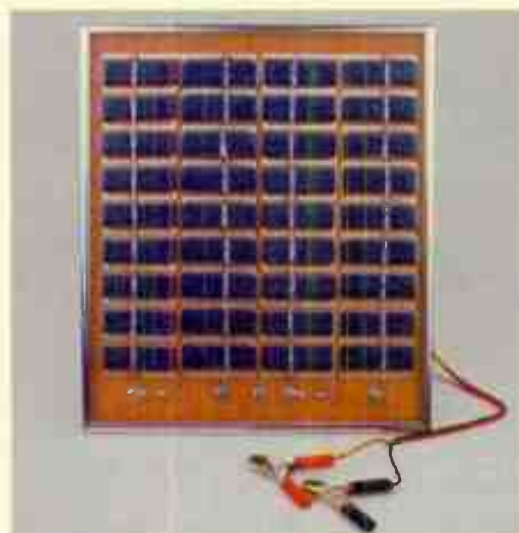
Dimensions: Panel size 98 x 128mm.
Case size 146 x 105 x 13mm.

Order Code	Type	Price each
RK23A	Solar Panel 9V	£11.99
RK24B	Solar Panel 12V	£14.99

Solar Panels



A choice of two solar panels configured to give a nominal 12V, that are laminated in special resin with an ultra violet inhibited poly-carbonate surface. The panels are epoxy sealed into an aluminium frame, to withstand the rigors of weather. A suggested use for the solar panels is for charging sealed lead acid batteries, a blocking diode is built into the circuit to prevent the reverse flow of current from the battery to the solar panel during poor lighting conditions. Four hooks are provided on the back of the panels for easy mounting, and 2m of connecting cable with medium size crocodile clips are included, for connecting to a device or circuit. It is recommended that the panels be mounted in a position where they will receive maximum sunlight. The panels can be connected together either in parallel or series to increase the current or voltage output. The smaller panel produces an output current of 200mA approx. and can be configured to produce two outputs of 6V at 250mA each, by removing a link on the back of the panel. The larger panel produces 12V at 500mA approx.



Specification (bright sun)	250mA	500mA
Voltage output:	12 to 16V DC max.	
Dimensions:	292 x 239 x 17mm	360 x 285 x 17mm
Weight:	500g	700g

Order Code	Type	Price each
BZ50E	A1 Solar Panel 250mA	£41.99
BZ51F	B3 Solar 12V 500mA	£71.99

Waterproof Solar Panels

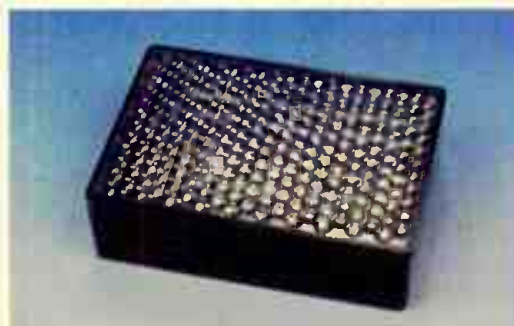


A range of waterproof and corrosion resistant solar panels for outdoor use. The panels are weatherproof and resistant to wind, rain, humidity, snow, ice, sand, sea air and deterioration by ultra-violet light. These panels are intended to be used as battery chargers and lead acid battery trickle chargers. A reverse blocking diode is built-in to prevent battery discharge and protect the panel cells. A tilt stand, made up from supplied parts, can be assembled and mounted on a vertical or horizontal surface, or can be free-standing, to catch the sun (screws supplied). Each panel is provided with red and black leads terminated in either insulated crocodile clips or car battery style clamps. The mechanical construction is extremely strong and able to withstand heavy weights. These panels have been especially designed for recreational activities involving boats, cars, tents, motorvans, portable TVs, radios, tape players, etc. Four different types are available.

Code	Nominal voltage	Max. voltage	Nominal current	Max. current	Dimensions mm
CJ43W	3V	4.5V	120mA	140mA	90 x 175 x 17
CJ42V	6V	8.5V	120mA	140mA	159 x 175 x 17
CJ41U	12V	16V	50mA	60mA	159 x 175 x 17
CJ40T	12V	16V	120mA	140mA	159 x 278 x 17

Order Code	Type	Price each
CJ43W	3V 120mA Panel	£9.99
CJ42V	A 6V 120mA Panel	£19.99
CJ41U	A 12V 50mA Panel	£19.99
CJ40T	A 12V 120mA Panel	£34.99

'AA' Solar Battery Charger



A small, neat solar powered battery charger which will accommodate up to four AA size Ni-Cd cells. Very simple to use; simply place your AA batteries into the battery compartment of the charger, and set the lid, which carries the solar panel, to face the sun rays. A single battery can be charged in 2 to 3 hours, 2 batteries, 4 to 6 hours; 3 batteries, 7 to 10 hours; 4 batteries, 10 to 14 hours. Times will vary depending on the strength of the sunlight and/or the depth of discharge of the batteries. For best results, batteries should be recharged at the first sign of 'weakness'. Batteries will last up to 4 times longer if charged after only 50% discharge. Dimensions of unit (closed): 95 x 65 x 28mm.

Order Code	Type	Price each
CJ35Q	4AA Solar Charger	£6.99

3V Solar Charger Panel



A solar battery charger panel which will output approximately 3V DC at up to 80mA. It has 2m of twin core cable attached to the panel terminated in both a 2.3mm DC power jack and insulated crocodile clips. The device can be used to directly power a personal stereo player which will normally operate from a 3V supply (2 x 1.5V batteries), via the power jack or by connecting the clips across the player's main battery terminals. The solar panel has a hinged stand and can be pointed in the direction of sunlight. Size of panel 95 x 65 x 8mm.

Order Code	Type	Price each
CJ37S	3V Charger Panel	£5.99

Variable Voltage Charger Panel



A solar battery charger panel which will output 3V, 6V and 9V DC according to the position of a selector slide switch. Output current is up to 100mA at 3V (this position can also be used as 4.5V), and 50mA for both 6 and 9V settings. It has 2m of detachable twin core cable which is terminated in both a 4-way power jack adaptor and a pair of insulated crocodile clips. The 4-way adaptor has 2.5 and 3.5mm jack plugs and 2.5 and 3.5 DC power plugs. The retractable and adjustable stand can also be used as a carry handle or for hanging the panel. It can be used to directly power a personal stereo player which will normally operate from a 3V or 4.5V supply via the power jack or by connecting the clips across the player's main battery terminals. Two AA size rechargeable Ni-Cd batteries can also be charged by fitting them into the battery compartment on the rear of the panel. Charging time will vary depending upon the strength of sunlight available. Two batteries may take 7 to 10 hours to recharge. Overall size of panel 165 x 98 x 20mm including battery compartment. Depth of handle 30mm.

Order Code	Type	Price each
CJ38R	Variable V Panel	£9.99

SOLAR POWERED PLANT TURNER

A practical application for solar power, this 'Plant Turner' will support up to 30lbs weight and slowly turn the plant during the day. This will help to promote healthier, well-developed plants, and no more lopsided plants! The small solar panel is attached to a 1m. long flying lead, so the cell can be positioned for maximum sunlight. The Turntable is 155mm in diameter and has a raised edge, and is finished in two-tone green plastic. Other possible uses include displays in shop windows or to create an eye-catching display inside cabinets. Bright incandescent light will also operate the 'Plant Turner'. Supplied with a multi-angle stand that can be attached to the solar panel to provide flexible mounting. Dimensions: 161 x 65mm.



GREAT VALUE!
£8.99
BZ49D

FIBRE OPTICS Light Guide



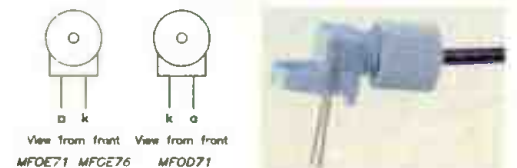
A rugged polymethyl methacrylate fibre with a polymer cladding and black protective sheath which may be bent and handled in the same way as insulated wires without damage. Ideal for use in equipment to provide several light sources possibly in confined spaces from a single lamp some distance away. The fibre as supplied has a roughly cut end and this should be cleanly sliced off using a razor blade or a very sharp knife. Light transmission can be increased by typically 33% by polishing the ends of the fibre after cutting.

Overall diameter:	2.2mm (0.1in.)
Fibre diameter:	1mm (0.04in.)
Refractive index:	1.49
Nominal aperture:	0.53
Acceptance angle:	±32° max
Transmission attenuation:	1.2dB/m (20 - 25% per metre)
Spectral response (3dB):	385 to 880nm
Temperature range:	-40°C to +80°C
Flammability:	Supports combustion 75mm per minute
Bending:	Min radius 20mm
Chemical resistance:	Attacked by organic solvents

Sold in continuous lengths in multiples of 1 metre. Max length in one piece 100m

Order Code	Type	Price each
XR56L	1mm Light Guide	99p

Fibre Optic Couplers



Low cost sender and receiver devices which mate directly with our fibre optic cable. Typical applications include high voltage isolation interconnections, data communication in noisy environments, light interrupt sensors etc. Level of performance is dependent on the finish of the prepared ends of plastic fibre, but in ideal conditions the maximum practical length of fibre may not exceed much more than 20 metres. Fibre is prepared by carefully removing 2.5 to 5mm of cladding from the end, which is then very finely polished, after having been cleanly cut at right-angles with a sharp knife. The fibre is inserted fully home into the device, and the locknut is tightened up only enough to secure the fibre. The detector is a fast PIN photodiode used in reversed biased mode and featuring a response time of <1ns. All devices can be mounted directly to a pcb and include a securing tag for an 8BA x 1/4in. bolt and nut.

Specifications

Sender MFOE71	Power output:	3.5mW @ 100mA
	Response time:	25ns
	Wavelength:	850nm
Sender MFOE76	Power output:	3.5mW @ 100mA
	Response time:	250ns
	Wavelength:	660nm
Detector MFOD71	Responsivity:	0.2µW
	Bandwidth:	70MHz
	Response time:	1ns
	Reverse voltage:	100V max

Order Code	Type	Price each
FD14Q	MFOE71 F/optc Emitt	£3.25
UL31J	MFOE76 F/optc Emitt	£3.25
FD12N	MFOD71 F/optc Detctr	£3.29

FOR CASHTEL
Phone 01702 552941

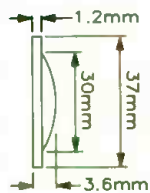


PHONE BEFORE 5PM FOR SAME DAY DESPATCH
01702 554161

LENSES

Plastic Lens

Optum

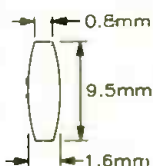


A cost effective, simple red plastic lens for opto-electronic applications. The lens proper is 30mm diameter but also has a flat rim for mounting purposes making the overall diameter 37mm. Overall thickness 3.5mm. The lens has a focal length of approx 80mm in the infra-red band.

Order Code	Type	Price each
FA95D	Plastic Lens	72p

Glass Lens

A 1in. focal length semi-precision glass lens. Size: 9.1mm diameter.



Order Code	Type	Price each
HQ63T	Lens	£4.49

Lensholder

Optum

A black anodised aluminium lensholder, drilled to accept our 9mm lens in one end and photodarlington MEL12 in the other end. Outside dia. 12.7mm.



Order Code	Type	Price each
HQ64U	Lensholder	£1.99

XENON TUBES

Optum

Linear



Two general purpose high quality flash tubes with straight sealed glass envelopes. One tube is designed to give high energy flashes at a low rate and the other to give low energy flashes at a fast rate. (On both types, faster flash rates are possible with lower energy and life will be considerably extended).

Specification

	High energy	Fast rate
Minimum anode voltage	220V	180V
Maximum anode voltage	350V	400V
Nominal anode voltage	320V	350V
Maximum energy input per flash	25Ws	0.3Ws
	(Ws = Watt seconds)	
Maximum flash rate at maximum input power	6/min	60/min
Life with max energy and max flash rate	5000 flashes	1 million flashes
Minimum trigger voltage	4kV	4kV
Dimensions	35mm long x 3.7mm dia.	

Order Code	Type	Price each
YQ62S	Xnn Tube High Energy	£1.39
FS77J	Xnn Tube Fast Flash	£1.59

Strobe

A U-shaped high quality flash tube designed for use in stroboscopic applications. Flash rates up to 100 flashes per second are possible at maximum energy. At lower energies the life of the tube will be considerably extended.



Specification

Minimum anode voltage	200V
Maximum anode voltage	400V
Nominal anode voltage	300V
Maximum energy input per flash	4 Watt seconds
Maximum flash rate at maximum input power	6000/min
Life with max energy and max flash rate	1 million flashes
Minimum trigger voltage	4kV
Diameter of tube	6mm
Width of whole unit	16mm
Length of unit (excl. glass seal)	32mm plus 15mm pins

Order Code	Type	Price each
FS78K	Xenon Tube Strobe	£1.99

Beacon

A U-shaped high quality flash tube designed for use in warning and alarm beacons. Flash rates up to 100 flashes per minute are possible at high energy. At lower energies the life of the tube will be considerably extended.



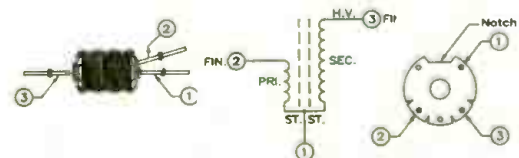
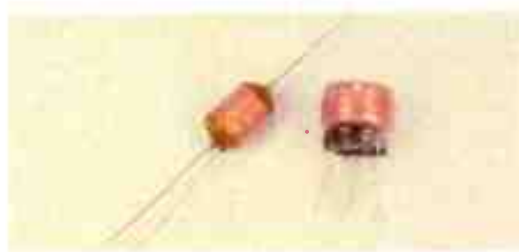
Specification

Minimum anode voltage	250V
Maximum anode voltage	500V
Nominal anode voltage	400V
Maximum energy input per flash	45W seconds
Maximum flash rate at maximum input power	100/min
Life with max energy and max flash rate	2 million flashes
Minimum trigger voltage	6kV
Diameter of tube	6mm
Width of whole unit	22mm
Length of unit (excl. glass seal)	53mm plus 40mm pins

Order Code	Type	Price each
FS79L	Xenon Tube Beacon	£2.29

Trigger Transformers

Trigger transformers for use with our xenon tubes. The 6kV type is for use with the Beacon tube.

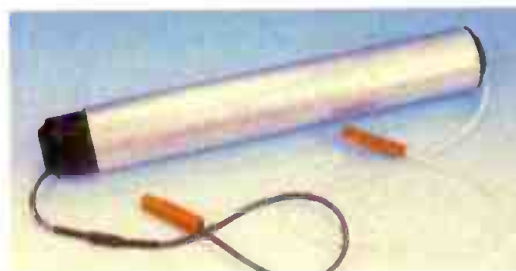


Specification

Secondary volts	4kV	6kV
Primary volts nominal	170V	190V
Trigger capacitor	0.033µF	0.047µF
Energy	0.6mj	0.9mj
Primary turns	10	15.5
Secondary turns	500	700
Primary inductance	2.5µH ±25%	4µH ±25%
Secondary inductance	3mH ±20%	6.5mH ±20%
Primary resistance	80mΩ	85mΩ
Secondary resistance	70Ω	90Ω
Dimensions	14.5 x 8.3mm dia.	11 x 13mm dia.

Order Code	Type	Price each
YQ63T	4kV Trigger Transfmr	69p
JE15R	6kV Trigger Transfmr	86p

LASER TUBE



A helium-neon laser tube having a typical output power of 2mW. A complete kit including this laser and power supply is also available (order code LM72P). The laser is capable of making small holograms and is ideal for use in school physics laboratories as the laser can be used to demonstrate many of the properties of light. The laser emits randomly polarised red light at 632.8nm wavelengths and at a power which makes it completely safe provided that you do not stare directly into the beam, when retinal damage may result. Therefore never use in the presence of children unless a diverging lens is fitted to the beam. The laser is incapable of burning, cutting or drilling and may be directed at the skin when no harm whatsoever will result.

Specification:

Typical power:	2mW
Overall size:	260 x 37mm dia.
Beam exit diameter:	0.75mm
Full angle divergence:	1.43mRad
Starting voltage:	8kV
Supply voltage:	1.5kV
Tube voltage drop:	1.15kV ±100V
Ballast resistor:	68kΩ 4W
Operating current:	5mA
Wavelength:	632.8nm (red light at 4.741 x 10 ¹⁴ Hz)
Operating mode:	TEM ₀₀ (Gaussian intensity distribution)

Order Code	Type	Price each
XL11M C1	Laser Tube	£69.99



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LASER DIODES



Two laser diodes of different outputs which feature built-in power stabilisation, built-in slow start and heatsink. The devices are complete with optics and electronics, yet each unit is only 22mm long and 12mm in diameter. Operating mode is continuous wave with small beam divergence and excellent far-field beam quality. Most popular commercial applications for these devices include laser pointers, bar-code readers and laboratory and educational uses. So simple to use, each unit only requires a 3V DC supply to operate.

Specification

Diode laser type:	Gain guided LD
Operating mode:	Continuous wave
Beam divergence:	<0.5mrad
Wavelength:	670 ±10nm (red)
Output power:	1mW or 3mW
Operating temperature range:	-10°C to +50°C
Power supply:	+3V DC
Dimensions:	22mm long x 12mm dia.
Weight:	12g

CAUTION

These devices generate a visible beam of red light that will not burn or cut. However, it is moderately hazardous and should not be viewed by the naked eye on the same axis as the beam. CJ51F conforms to Class II for laser products, while CJ52G conforms to Class IIIA. Suitable warning labels to this effect should be attached to any equipment using these devices.

Order Code	Type	Price each
CJ51F	1mW Diode Laser	£59.99
CJ52G	3mW Diode Laser	£79.99

Laser Diode



A class IIIa laser diode capable of delivering an output power of 5mW (nominal), at 670nm (red). The beam is index guided, which gives a clearer spot than gain guided devices, and can operate from a battery. These devices are suitable for general purpose laboratory and field applications.

Specification

Dimensions:	10.5mm(dia) x 29.5mm(L)
Wavelength:	670nm
Power supply:	3V DC
Operating current:	80mA
Output power:	<5mW
Angular divergence:	1 minute
Beam divergence:	1m rad

Order Code	Type	Price each
AQ27E	5mW Laser	£79.99

Alignment Laser



A powerful and convenient 3mW (nominal) laser, that has uses in surveying, machine alignment, and other similar applications. The laser is class IIIa and features a multi quantum well (MQW) laser structure, and can operate from a battery. The laser has built-in slow start, and is internally regulated, which means it can operate from a mains adaptor supplying 6-12V DC. Due to the 633nm wavelength, the output will look considerably brighter, when compared with 670nm types. An adjustable lens allows the beam to be accurately focused.

Specification

Dimensions:	10.5mm(dia) x 42.5mm(L)
Wavelength:	633nm (red)
Power supply:	6 to 12V DC
Current consumption:	100mA
Power consumption:	1200mW
Output power:	<3mW
Beam divergence:	1.5m rad

Order Code	Type	Price each
AQ28F	3mW Laser	£129.99

Sub-Miniature Monochrome CCD Video Camera

A tiny CCD video camera capable of producing a monochrome picture from both normal light and infra-red light with good resolution and detail. The infra-red capability makes the camera ideal for security applications. The lens is a universal fixed focus type so no special optics are required. The complete module includes the actual camera which only occupies some 4cm² of the PCB which measures just 95 x 60mm. It includes six IR LEDs which together act as an infra-red lamp for IR illumination in the dark with a range of 2 to 3 metres; illumination can be down to 0.2 lux (F18), and the camera includes automatic aperture control. The module can be converted to operate in a rectangular box with the lens looking out at one end by 'cracking' the PCB in half; this is provided for in the design and the two halves are already coupled together with ribbon cable.



Specification

Image sensor:	TSL type MID solid state
Effective pick-up area:	H384 x V291mm
Image pick-up area:	H434 x V329mm
Image output:	1V pk-to-pk into 75Ω, negative sync
Scanning system:	2:1 interlace
Scanning frequency, horizontal:	15.625kHz ±1%
vertical:	50Hz ±1%
Synchronisation system:	Internal
Horizontal resolution:	280 lines
Signal to noise ratio:	>42dB
Gamma characteristics:	γ=0.45
Aperture sensitivity:	= 1/60 to 1/10,000
Supply voltage range:	12V to 15V DC

Current consumption:	<170mA
Lens:	f = 4.48mm/F1.8
Lens angle:	74° horizontal, 55° vertical, OA = 92°

Operating temperature range: -10°C to +50°C
 Weight of module: 60g
 Connections are via a 4-way PCB plug for supply DC and ground, and a video signal and common earth. To prevent RF leakage a good quality screened cable of 75Ω impedance is preferred.

Order Code	Type	Price each
ZA35Q	H1 CCD Video Camera	£129.99

Security Camera Housing



Camera housing for the ZA35Q CCD Mono camera and suitable for internal and sheltered external applications. Designed to be mounted on any vertical wall, the unit is adjustable in both horizontal and vertical axes, giving a coverage of +10° to -30° (from 90° horizontal) and 160° left to right.

Order Code	Type	Price each
AG00A	A1 Security Camera Case	£18.99

Sub-miniature Colour CCD Video Camera



A tiny CCD camera capable of producing a full colour picture from normal and reduced light illumination conditions. The 8mm diameter fixed focus lens allows the CCD element to show a fair amount of detail without any special optics being required, because all focusing is controlled by an electronic iris. All the electronics, and the camera, are contained on both sides of a single printed circuit board measuring only 80mm by 115mm to form the complete module, of which the camera only occupies 6.4cm². The PCB is slotted to form three small sub-assemblies, inter-connected by ribbon cable, so that as an alternative, the module can be arranged to fit into a small enclosure with the camera looking out of one end. These sub-assemblies reduce the overall width to 60mm. The module requires a nominal 12V DC at 200mA and because it has an on-board regulator this voltage can vary from +11V to +15V DC. A short length (190mm) of 4-way ribbon cable is provided to carry the video signal, standardised at 1V peak-to-peak, and supplies. To prevent RF signal loss, good quality screened cable is advised.

Order Code	Type	Price each
CJ75S	H1 CCD Colour Camera	£229.99

PCB EQUIPMENT

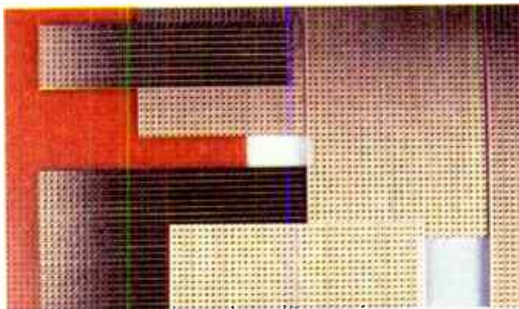
Adhesive Sprays	635
Cleaners	631
Coatings	631
Copper-clad Board	632
Dalo Pen	632
Developer	631
Drafting Aids	633
Drafting Film	631
Drawing Equipment	634
Easy PC	635
Etchant	632
Etching Systems	629

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Lacquer	631
Light Boxes	630
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PCB Frame	629
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Photoresist	631
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Tag Strips	626
Tapes	633
Terminals	624
Transfers	633
Ultra-violet Light Boxes	630
Wirewrapping	625

STRIPBOARD

SRBP Matrix Boards



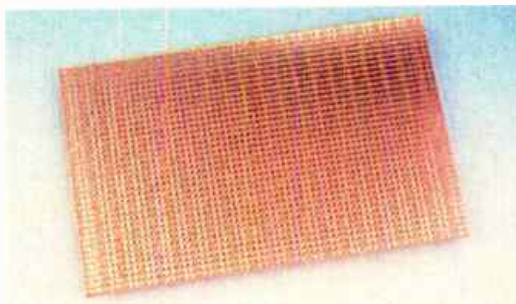
A range of SRBP boards punched with holes on a 2.54mm (0.1in) matrix. Plain board and boards with copper strips on one side are available in various sizes.

Type	Overall size (mm)	Number of copper strips	Number of holes in each strip
Plain 3962	160 x 100	none	39 x 62
Plain 3929	100 x 75	none	39 x 29
Plain 39117	300 x 100	none	39 x 117
Strip 1039	100 x 25	10	39
Strip 2939	100 x 74.1	29	39
Strip 2958	150 x 74.1	29	58
Strip 3939	100 x 100	39	39
Strip 3962	160 x 100	39	62
Strip 39117	300 x 100	39	117

All boards have 1mm dia. holes and are 1.6mm thick.

Order Code	Type	Price each
JP53H	Plain Board 3962	£1.29
JP54J	Plain Board 3929	69p
JU37S	Plain Board 39117	£2.35
JP46A	Strip Board 1039	49p
JP47B	Strip Board 2939	£1.45
JP48C	Strip Board 2958	£1.80
JP49D	Strip Board 3939	£1.56
JP50E	Strip Board 3962	£1.99
JP51F	Strip Board 39117	£3.85

Tripad Board



This board is specifically designed to mount dual-in-line integrated circuits and a great number of these and any other kind of component may be easily mounted. The board has 39 copper strips each with 62 holes and each strip is divided into 20 3-hole segments so that track cutting is virtually eliminated. The board is punched on a 0.1 x 0.1in matrix with a 1mm diameter hole. Overall size 160 x 100mm.

Order Code	Type	Price each
JP52G	Tripad Board 3962	£2.99

DIP Board



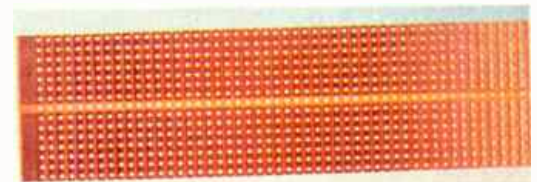
This board is specifically designed to mount dual-in-line integrated circuits and to assist in this two power rails run between the copper pad format to facilitate easy link-up of ground and voltage rail. Up to 20 14-pin or 28 8-pin DIL packages can be accommodated. A paper layout sheet is included. The board is punched on a 0.1 x 0.1in matrix with a 1mm dia. hole. Overall size 157 x 114mm.

Order Code	Type	Price each
FL19V	DIP Board	£9.99

Stripboard

Vero

Suitable for all applications where a conventional tag strip or group board might be used, with the advantage that small or large components are neatly accommodated. Components can be mounted across or along the strips. Copper strips run across the board with a break through the centre equal to the width of one hole (0.1in), over the full length of the board.



Overall size:	213 x 38mm
Number of strips:	81
Number of holes in coppered part of each strip:	14
Total number of holes in each strip:	15
Hole size:	1mm dia.

Order Code	Type	Price each
FL17T	Stripboard	£2.69

PC, PC-XT and PC-AT series Prototyping Boards



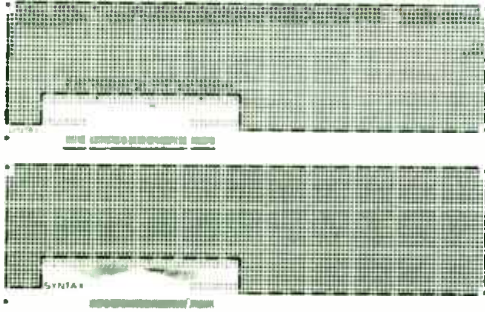
Prototyping boards for the IBM PC, PC-XT and PC-AT series of computers, which features a large prototyping area of independent 1mm dia plated-through holes on a 0.1in. matrix. The fibreglass boards incorporate a gold plated 0.1in edge connector and provision for fitting a 25-way D-type connector. Three versions are available: two are for use with PC and PC-XT machines, having 2 x 31-way edge connector and either half (JU12N) or full (JU13P) length card. The other is for use with PC-AT machines, having 2 x 31-way and 2 x 18-way edge connectors (JU14Q). Dimensions: 333 x 110 x 1.6mm (full length), 216 x 110 x 1.6mm (half length).

Order Code	Type	Price each
JU12N	A1 Protobd XT1/2	£18.99
JU13P	A1 Protobd XT1/1	£22.99
JU14Q	A1 Protobd AT1/1	£24.99

HOT TIP

To add extra strength to connecting wires which leave the veroboard, thread them through one (or more) holes before soldering. Remember to always thread the wires along the line of track you intend soldering the wires on.

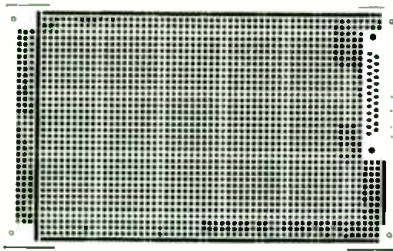
PS/2 Prototyping Boards



Prototyping boards for the IBM PS/2 series of computers, which features IBM microbus compatibility and a large prototyping area of independent 1mm diameter plated-through holes on a 0.1in. matrix. The fibreglass boards incorporate a top-surface groundplane and gold plated 0.05in. edge connector. The +5V contacts are shortened to ensure all other connections are made before power is introduced. Two versions are available, one with a video expansion connector having 45 x 2-way, 11 x 2-way and 10 x 2-way edge connectors (JU10L) and one without having 45 x 2-way and 11 x 2-way edge connectors (JU11M). Suitable for IBM PS/2 Models 50, 60, 70 and 80. (Note: Model 30 uses PC AT type boards.)
Dimensions: 292 x 88 x 1.6mm.

Order Code	Type	Price each
JU10L	A1 PS/2 Proto-Board+VC	£24.99
JU11M	A1 PS/2 Proto-Board	£24.99

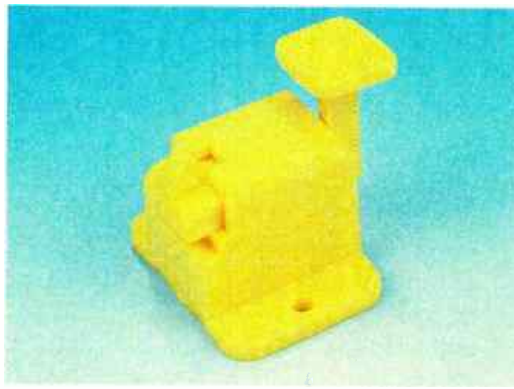
Single Eurocard Size VME-Bus Prototyping Card



A fibre-glass prototyping card for use with equipment based on the Eurocard VME-Bus standard. This prototyping board is suitable for use in racks that accept single Eurocard size boards, which includes our Modular Rack System (see Enclosures). The board is single sided and has independent 1mm holes on a 0.1in. matrix. The board will accept a 32, 64 or 96-way DIN 41612 PCB connectors and also a 25-way D-type connector (for suitable connectors see Connectors).
Dimensions: 100 x 160 x 1.6mm.

Order Code	Type	Price each
JU15R	VME-Bus Board	£7.99

Printed Circuit Board Clamps



A plastic moulded clamp for holding printed circuit boards of up to 3mm max. thickness. The clamp can also be screwed onto a board as part of a jig assembly for testing purposes. The clamp has been designed to be used with the various contact probes, so the PCB sitting on the probes with the clamps holding the board in place. A lever with a thumb platform allows the PCBs to be removed with ease, whilst a wide base enables the user to screw the clamp into the desired position.

Base measures: 34 x 25mm
Height to PCB level: 12mm
Total height: 30mm

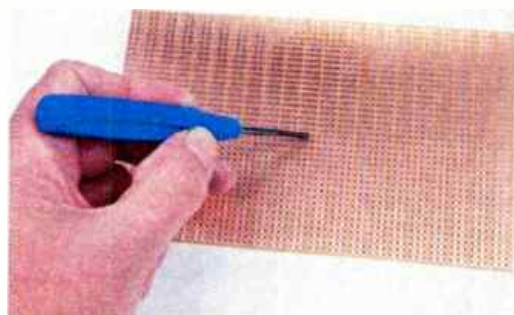
Order Code	Type	Price each
KU16S	PCB Clamps	99p

THE BEST OF SERVICE

TOOLS FOR MATRIX BOARDS

Spot Face Cutter

Vero



Designed for accurate and clean breaking of the copper strips on Stripboard. For best results use a light pressure.

Order Code	Type	Price each
FL25C	Tool 2022	£3.79

Pin Insertion Tool

Vero



A tool to help in the insertion of PCB pins into pcb's. The tool is suitable for 1mm dia. pins type 2144 and 2145, and has an orange handle to aid identification.

Order Code	Type	Price each
FL27E	Tool 2151	£4.99

PCB PINS

Type 2140

Double-ended pin 1.3mm (0.052in.) dia. Supplied in packs of 100.

Pins below are shown twice size.



Order Code	Type	Price each
FL20W	Pin 2140	£1.99

Type 2141

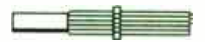
Single-ended pin 1.3mm (0.052in.) dia. Supplied in packs of 100.



Order Code	Type	Price each
FL21X	Pin 2141	£1.82

Type 2144

Double-ended pin 1mm (0.04in.) dia. Supplied in packs of 100.



Order Code	Type	Price each
FL23A	Pin 2144	£1.65

Type 2145

Single-ended pin 1mm (0.04in.) dia. Supplied in packs of 100.



Order Code	Type	Price each
FL24B	Pin 2145	£1.65

Gold Plated PCB Terminals (Eyelet)

Calvyn Industrial

Miniature gold plated PCB terminals designed to be fitted to circuit boards to provide test points for voltage and waveform measurement. The terminal consists of a gold plated wire eyelet and a coloured heatproof ceramic insulating spacer. The leadouts from the terminal are sprung and therefore the terminal will not dropout when the PCB is turned over for soldering. The terminal will stand 5mm above the PCB and the eyelet has an inside diameter of 2.6mm. The terminal requires a 1mm diameter hole in the PCB. Terminals are supplied in packs of ten, one each of the following colours; black, brown, red, orange, yellow, green, blue, purple, light-green and white.



Order Code	Type	Price each
JM02C	PCB Eyelet Terminal	99p

HOT TIP

By covering the top surface of stripboard with white plastic 'Fablon', or similar, not only do you hide all the unused holes, but it gives you a surface on which to write the names and values of components. It enhances the appearance of the board, and component wires can simply be pushed through the plastic covering when mounting.

Gold Plated PCB Terminals (Pin)

Calvyn Industrial



Miniature gold plated PCB terminals designed to be fitted to circuit boards to provide test points for voltage and waveform measurement. The terminal consists of a pin with protruding rings to position the terminal at the correct height and to prevent test clips from dropping off. The terminal is 9mm long overall and will stand 5.5mm above the PCB. The terminal requires a 0.8mm diameter hole in the PCB. Terminals are supplied in packs of ten.

Order Code	Type	Price each
JM03D	PCB Pin Terminal	99p

FOR TOP QUALITY & VALUE!

Gold Plated PCB Terminals (Solder Bucket)

Calvyn Industrial



Miniature gold plated PCB terminals designed to be fitted to circuit boards to provide an anchorage point for lead-out wires. The terminal consists of a pin with a protruding ring to position the terminal at the correct height and a solder bucket for attaching a lead-out wire. The terminal is 11mm long overall and will stand 8mm above the PCB. The terminal will accept wires up to 1.2mm in diameter and requires a 1.62mm diameter hole in the PCB. Terminals are supplied in packs of ten.

Order Code	Type	Price each
JM04E	PCB Solder Bucket	£1.89

Gold Plated PCB Terminals (Plain Pin)

Calvyn Industrial

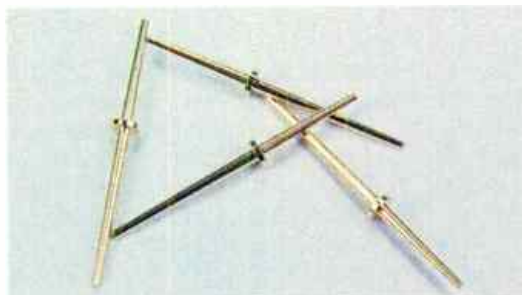


Miniature gold plated PCB terminals designed to be fitted to circuit boards to provide a test point, lead-out, etc. The terminal consists of a plain pin with a protruding ring to position the terminal at the correct height. The terminal is 10.5mm long overall and will stand 7.5mm above the PCB. The terminal requires a 0.65mm diameter hole in the PCB. Terminals are supplied in packs of ten.

Order Code	Type	Price each
JM05F	PCB Plain Terminal	99p

Gold Plated PCB Terminals (Long Tapered Pin)

Calvyn Industrial

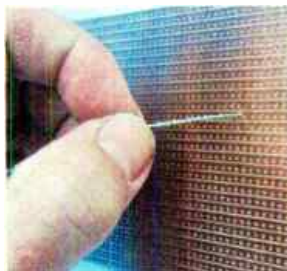
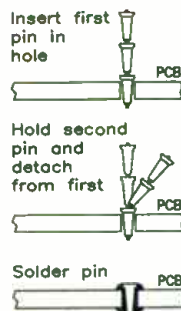


Miniature gold plated PCB terminals designed to be fitted to circuit boards to provide a test point, lead-out, etc. The terminal consists of a tapered pin with protruding ring to position the terminal at the correct height. The terminal is 22.5mm long overall and will stand 13.5mm above the PCB. The terminal requires a 1.1mm diameter hole in the PCB. Terminals are supplied in packs of ten.

Order Code	Type	Price each
JM06G	PCB Long Terminal	£1.36

Through-PCB Pins

Harwin



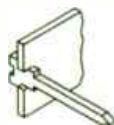
Pins to provide a connection between tracks on opposite sides of printed circuit boards without the need for through-hole plating. Pins are inserted by hand then soldered on both sides. Pins fit 0.04in (1mm) dia holes and are suitable for 1/16 in. (1.6mm) thick board. Pins are brass, tin/lead plated. Overall pin length: 0.137in (3.5mm). Supplied in packs of 50 approx.

Order Code	Type	Price each
FL82D	Track Pin	99p

Wirewrapping Pin

Vero

The pin is suitable for wire wrapping and fits holes of 1mm (0.04in.) dia. Single-sided Pin 0266 is sold in packs of 100.



Order Code	Type	Price each
FL80B	Pin 0266 Pk of 100	£4.45

WIRE WRAPPING SYSTEM

Vero

The wiring system enables fast construction of pcb's etc., requiring large numbers of wire links. It is very simple to use and the end result is neat, even when a large number of wires are packed into a small space. Simply wrap the wire around the terminal pin or component wire, set the tension on the Verowire pen and take the pen to the next component and wrap the wire there. The wire is insulated with a polyurethane coat, which is mechanically tough. Now simply solder the connections: under the extreme heat of the tip of the soldering iron, the polyurethane coat melts and the solder completes the joint.

Prototyping Pen



A plastic wiring tool supplied complete with one spool of wire as described below. Pen has an integral spring wire clamp for wire retention, advancement and retraction.

Order Code	Type	Price each
HY16S	Wiring Pen	£8.49

Replacement Spools for Pen

Vero

A spool of 30swg copper wire with an 0.005mm coating of self-fluxing polyurethane. Max. voltage 600V DC. Current rating 100mA. Resistance: 0.86Ω per metre at 20°C. Length of wire on spool: 40m. Available in Red.



Order Code	Type	Price each
HY17T	Spool Red	£1.89

Wiring Combs

Vero



Plug-in wiring combs can be fitted to any circuit board that has 0.04in (1mm) diameter holes on a 0.1in x 0.1in matrix. The combs are fitted to the wiring side of the board between the leads of the integrated circuits. They provide a guide and the pegs control and hold the wire ensuring a neat, stable layout. Sold individually and in packs of 100.

Order Code	Type	Price each
FY33L	Comb For Wiring Pen	20p
FP39N	Wiring Combs Pk 100	£15.49

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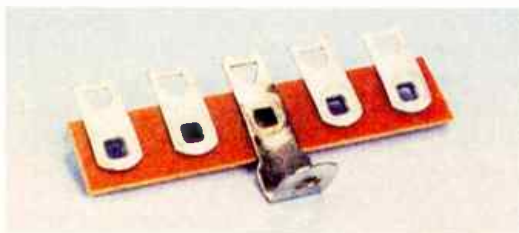


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TAG STRIPS

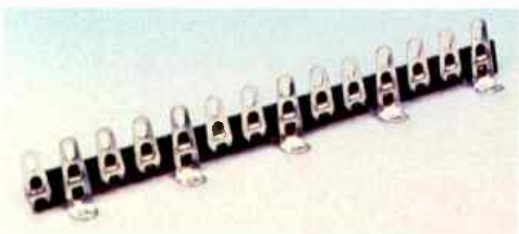
5-Way



Five tags mounted on a paxolin strip where the middle tag is for screw fixing.

Order Code	Type	Price each
FM34M	5-Way Tagstrip	29p

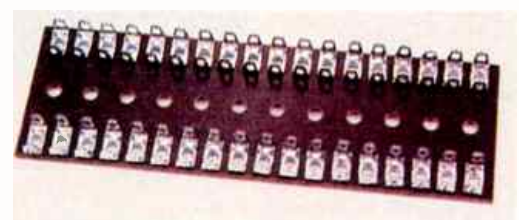
14-Way



Fourteen tags mounted on a paxolin strip. Five of the tags are right-angled for mounting.

Order Code	Type	Price each
FL29G	14-Way Tagstrip	45p

TAG BOARD



Miniature SRBP base with 36 solder tags in two rows. Overall size: 117 x 38 x 7.5mm.

Order Code	Type	Price each
FL11M	Tag Board	£1.23

PLUGBLOCK SOLDERLESS BREADBOARDS

A system for constructing circuits in such a way that the components can be used over and over again. Component wires are simply pushed into the boards where they are firmly held by double leaf spring contacts. To modify the circuit simply pull the components out and plug in again in the correct position.

Euro Breadboard



This plugblock has a total of 600 contacts arranged in four blocks of 25 rows of five interconnected sockets on a 0.1 x 0.1in. matrix and four other rows of 25 interconnected sockets arranged around the edges of

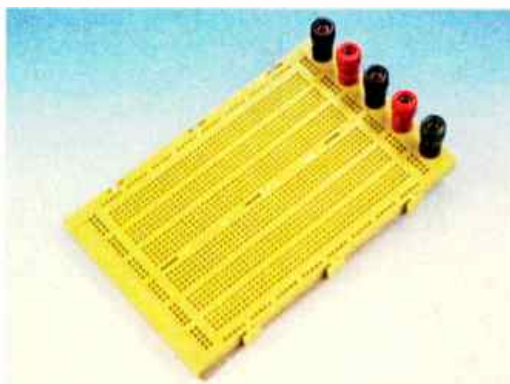
the main matrix for use as bus-bars. The distance between the two centre rows of sockets is 0.6in., the spacing between the leads on a 24, 28 or 40-pin IC and the distance between the centre rows of sockets of both end blocks of contacts is 0.3in., the spacing between leads on an 8, 14 or 16-pin IC package. Thus the block will hold up to six 14-pin and two 24-pin DIL packages for example. A non-slip rubber backing is fixed to the board and fixing is by four holes in the corners of the block into which will screw a No.4 self-tapper. The holes are 8BA clear. Horizontal rows are designated 1 to 25 whilst the four matrixed blocks are labelled A, B, C and D and the four bus-bar rows are labelled X1, X2, Y1 and Y2.

Specification

Contacts:	Nickel silver
Contact resistance:	<10mΩ
Contact rating:	1A
Contact life:	>5000 insertions
Accepts wire dia:	0.25 to 0.85mm
Dimensions:	92 x 82 x 10mm
Fixing holes:	78.5 x 68mm

Order Code	Type	Price each
YR83E	Eurobreadboard	£9.99

Breadboard For Microprocessors



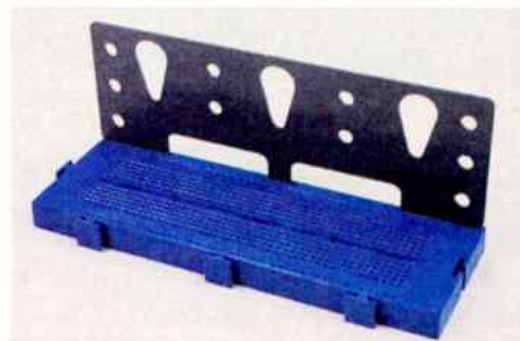
A large version of the Eurobreadboard. In addition this plugblock has 5 large screw terminals -5V, +5V, -12V, +12V and Earth and colour-coded black, red, black, red and green respectively for connection to power supply. The plugblock has a total of 1422 contacts arranged in four blocks of 47 rows of four interconnected sockets, and two blocks of 47 rows of five interconnected sockets on a 0.1 x 0.1in. matrix and six other rows, four of 30 and two of 40 interconnected sockets arranged around the edges of the main matrix for use as bus-bars. A non-slip rubber backing is fixed to the board. Boards may be clipped together horizontally to form larger arrays and they will clip to the Professional Plugblock (YR84F) and the Bus Strip (YR85G). All contact positions are clearly identified on an alpha-numeric grid.

Specification

Contacts:	Nickel silver
Contact resistance:	<10mΩ
Contact rating:	1A
Contact life:	>5000 insertions
Accepts wires dia:	0.25 to 0.85mm
Dimensions:	159 x 100 x 21mm

Order Code	Type	Price each
XX42V	MP Urobreadboard	£32.99

Professional Plugblock



This plugblock has a total of 550 contacts arranged in two blocks of 47 rows of five interconnected sockets on a 0.1 x 0.1in. matrix and two other rows of forty interconnected sockets on either side of the length of the main matrix for use as bus-bars. The distance between the two centre rows of sockets is 0.3in., the spacing between the leads on an 8, 14 or 16-pin DIL package. Thus the block will hold up to six 14-pin or nine 8-pin DIL packages for example. The rear plastic panel unclips to allow the contact arrangements to be seen and any contact strip to be changed should it ever be damaged. Boards may be clipped together horizontally or vertically to make larger arrays for more complex circuits. All contact positions are clearly identified on an alpha-numeric grid. A component support bracket is supplied with the block. It will fit onto any outside edge or down the centre with cut-outs in the bottom of the bracket allowing it to sit over IC's. The bracket has ten 5mm dia. holes and three tapered holes from 4mm to 12.7mm dia. punched into it, enabling mounting of potentiometers, rotary and toggle switches, lamp-holders, push-button switches and other components normally mounted on panels.

Specification

Body material:	Thermoplastic polyester
Temperature range:	-50 to +125°C
Contact resistance:	<10mΩ
Contact rating:	1A
Contact to contact capacity:	0.5pF
Contacts:	Nickel silver
Contact life:	>5000 insertions
Accepts wires dia:	0.25 to 0.85mm
Dimensions:	150 x 50 x 10mm

Order Code	Type	Price each
YR84F	Prof Plugblock	£11.49

Bus-Strip Plugblock

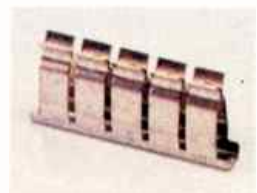


For use with our Professional Plugblock this block clips on to any side to provide additional bus-bars. The block has a total of 80 contacts arranged in two strips of forty interconnected sockets. The rear plastic panel unclips to allow the contact arrangement to be seen and any contact strip to be changed should it ever be damaged. Other details as Professional Plugblock.

Order Code	Type	Price each
YR85G	Bus-Strip Plugblock	£4.29

Contact Strip

A single strip of five interconnected contacts for replacement in our Professional Plugblock and Bus-Strip Plugblock.

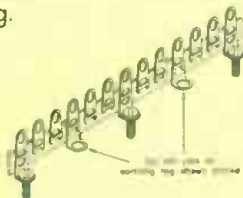


Order Code	Type	Price each
YR86T	Plugblock Contct Strp	32p

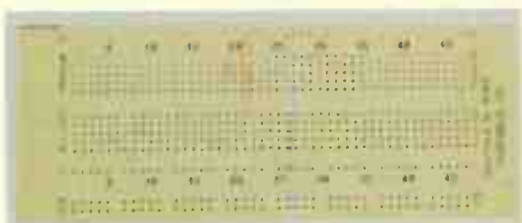
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HOT TIP

The number of 'non-earthed' connections on the 14-way tag strip (FL29G), can be increased by two or three if heavy-duty side-cutters are used to cut away the metal as shown in the drawing.



Professional Plugblock PCB



An SRBP circuit board printed and punched in the same layout as our Professional Plugblock with tinned copper strips. When a prototype circuit is working properly it may be transferred lead for lead from the plugblock to the pcb for permanence.

Order Code	Type	Price each
YR87U	Plugblock PCB	£2.49

Multi-Board



A novel plugblock having four separate strips which may be clipped together to form various configurations. For example the strips can be clipped together to form a 0.6in. or a 0.3in. centre channel for different size IC's. The pack consists of two strips each having 64 rows of 5 interconnected strips and two strips each having 4 rows of 25 interconnected strips. Further boards may be clipped on to make even larger arrays. Sockets are on a 0.1in. x 0.1in. matrix. The plugblock provides a total of 840 contacts making this board exceptional value for money. The bracket described below fits onto this board.

Specification	
Body material:	ABS polymer
resistance:	<10mΩ
Contact rating:	1A
Contacts:	Nickel-silver
Contact life:	>5000 insertions
Accepts wires:	0.3 to 0.8mm diameter
Dimensions	
Large block:	172 x 21.5mm
Small block:	172 x 12.7mm
All plugged together:	172 x 68.5mm
Thickness:	8.5mm

Order Code	Type	Price each
FD29G	Multiboard Plugblock	£8.99

Silver Plated Plugblock Type RH-10S



A high quality plugblock with silver-plated contacts for low contact resistance. The plugblock has a total of 640 contacts arranged in two blocks of 64 rows of 5 interconnected sockets on a 0.1in. x 0.1in. matrix. The distance between the two centre rows of sockets is 0.3in. and the block will hold up to nine 14-pin DIL packages for example. These boards will clip onto the Silver-Plated Bus Strips described below, and a clip-on component support bracket is also available separately. All contact positions are clearly marked on an alpha-numeric grid. Fixing is by self-adhesive foam insulating strip on the base of the block.

Specification	
Body material:	ABS polymer
Contact resistance:	<1mΩ
Contact rating:	1A
Contacts:	Silver-plated nickel-silver
Contact life:	>5000 insertions
Accepts wires:	0.3 to 0.8mm diameter
Dimensions:	172 x 38.5 x 8mm thick

Order Code	Type	Price each
FD31J	Plugblock RH10S	£4.99

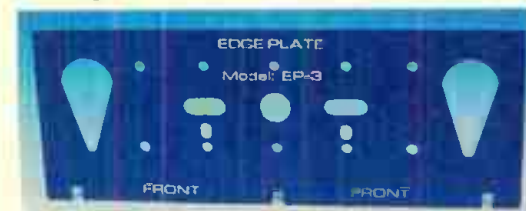
Silver Plated Bus Strip Type RH-5DS



For use as a bus strip with the RH-10S plugblock. This strip clips onto either side of RH-10S. Further blocks RH-10S can be clipped onto the far side of each RH-5DS. The block has a total of 100 contacts arranged in 4 interconnecting strips of 25 sockets. Specification as RH-10S. Dimensions: 172 x 12.5 x 8mm thick.

Order Code	Type	Price each
FD30H	Plugblock RH5DS	£1.79

Component Bracket EP-3



A clip-on component support bracket for use with the RH-10S plugblock. It clips onto either edge in place of the RH-5DS bus strip. The bracket has ten 4mm diameter holes, two 4mm x 6mm slots, two 6mm x 15mm slots, one 11mm diameter hole and two tapered holes 4mm to 19mm diameter. This enables potentiometers, rotary and toggle switches, lampholders and other components normally mounted on panels to be used with the plugblock. Dimensions 172 x 65 x 1.75mm.

Order Code	Type	Price each
FD33L	Bracket EP-3	75p

Silver Plated Plugblock Type RH-21B



A plugblock comprising one RH-10S and two RH-5DS plugblocks mounted on an attractive blue base with three terminal posts and a component bracket. This unit thus provides a total of 840 contacts. Specification as RH-10S above. Dimensions 190 x 118 x 19mm thick.

Order Code	Type	Price each
YU79L	Plugblock RH21B	£9.99

Silver Plated Plugblock Type RH-32S



A plugblock comprising two RH-10S and three RH-5DS plugblocks mounted on an attractive blue base with three terminal posts and a component bracket. This unit thus provides a total of 1580 contacts. Specification as RH-10S above. Dimensions 190 x 168 x 19mm thick.

Order Code	Type	Price each
FD32K	Plugblock RH32S	£16.99

Silver Plated Plugblock Type RH-53S



A plugblock comprising three RH-10S and five RH-5DS plugblocks mounted on an attractive blue base with four terminal posts and a component bracket. This unit thus provides a total of 2420 contacts. Specification as RH-10S above. Dimensions 190 x 250 x 19mm thick.

Order Code	Type	Price each
YU57M	Plugblock RH53S	£24.99

Silver Plated Plugblock Type RH-74S



A plugblock comprising four RH-10S and seven RH-5DS plugblocks mounted on an attractive blue base with four terminal posts and a component bracket. This unit thus provides a total of 3260 contacts. Specification as RH-10S above. Dimensions 245 x 270 x 19mm thick.

Order Code	Type	Price each
YU23A	A1 Plugblock RH74S	£29.99

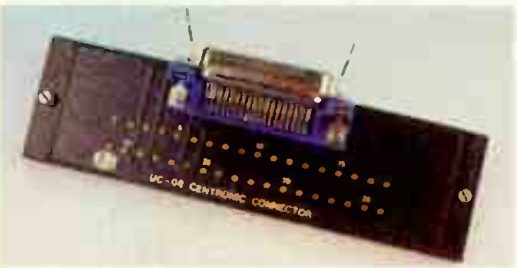
Silver Plated Interface Plugblock Type RH-34



A plugblock comprising three RH-10S and four RH-5DS plugblocks mounted on an attractive blue base with four terminal posts, a component bracket and two 25 way D-connectors one male, one female. The two 25 way D-connectors are mounted on a removable plate, in place of which a Centronics type connector plate (not supplied) may be fitted, see below. This unit provides a total of 2320 contacts. Specification as RH-10S above. Dimensions 230 x 255 x 19mm thick.

Order Code	Type	Price each
YU58N	A1 Interface Plugblock	£39.99

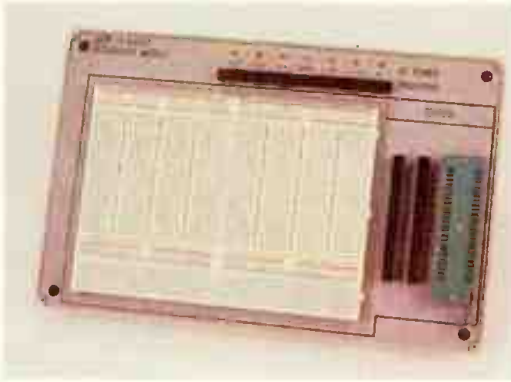
Centronics Connector Plate



A 36 way female Centronics type connector mounted on a fixing plate specifically intended for use with the above interface plugblock.

Order Code	Type	Price each
JM29G	Centronics Connector	£8.99

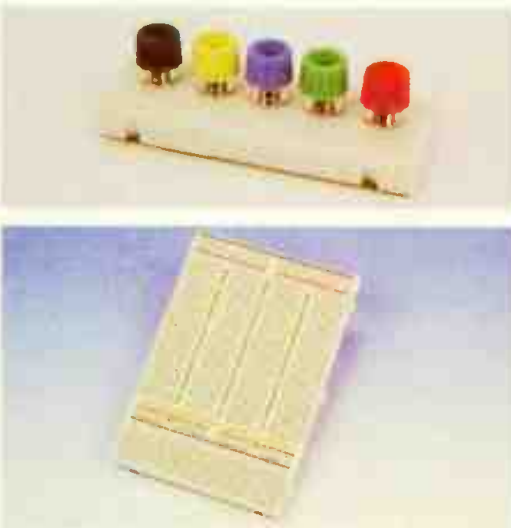
Breadboard Module



A universal breadboard module that has been designed for students and professionals who need to perform analogue and digital experiments, and development work. The unit consists of two AD-01 (BZ13P) breadboards which have silver-coated spring terminals, and are designed to accept solid wire of 0.3mm to 0.8mm diameter. A 40-pin ZIF type socket allows the breadboard to be used with large ICs such as RAM, ROM etc. Next to the ZIF socket there are two banks of 40 sockets, and every pin of the ZIF socket is connected to two of these sockets. These clearly marked banks of 40 sockets can be used to connect to the breadboards, or for taking measurements etc. The module has six independent 2mm power supply sockets (see Connectors Section for suitable plugs), marked $\pm 5V$, $\pm 12V$ and $\pm V$, and a matching 0V socket. The $\pm 5V$ and $\pm 12V$ rails have reverse protection diodes and decoupling and filtering capacitors fitted, and the $\pm V$ rails have reverse protection diodes. All the rails are connected to their own bank of ten sockets for connection to the breadboards or to the ZIF connecting sockets. Each breadboard has four power buses and provision for accepting MSI, LSI, and all DIP size chips in CPU bus connection. The module is housed in a durable, scratch-proof, plastic case with four rubber feet. Size 254 x 164 x 40mm.

Order Code	Type	Price each
CK50E	B1 Breadboard + Zif	£59.99

Advanced Solderless Breadboard System



A range of solderless breadboard modules that can interconnect to suit individual requirements. The basic board AD-01 consists of four blocks of six columns of 28 rows, the sockets in each row being interconnected. The blocks are a standard DIP size apart, although MSI and LSI type chips can be used. At both ends of the blocks, there are two power busses, the 'Red' bus is made up of two separate rows of 12 connecting sockets, and the 'Black' bus is one row of 24 connecting sockets. There is an additional matrix of 30 by 6 sockets for non-dip type components, the six sockets in the vertical plane are interconnected. Each socket will accept solid wire from 20 to 30 swg (0.3 to 0.8mm). The base has a 'sticky' covering to hold the board firm on a workbench or

surface. The AD-10 power block has 5 individual screw terminals that will accept 4.5mm Y-terminal, stripped wire or 4mm banana plug. Each terminal is connected to two sockets. The power block will snap lock onto the AD-01 base board to allow connections to the required power bus. The



power block has the same 'sticky' base. After use the modules can be unlocked and remade into a different configuration.

AD-10 is 80 x 30mm. AD-01 is 117 x 80mm. AD-11 is one AD-01 and one AD-10. Size: 147 x 80mm. AD-12 is two AD-01 and one AD-10 mounted on a blue base board. Size: 183 x 168mm.



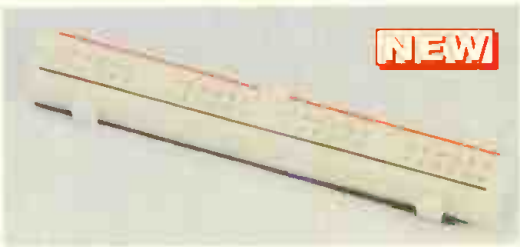
AD-13 is three AD-01 and one AD-10 mounted on a blue base board. Size: 265 x 168mm.

AD-14 is four AD-01 and one AD-10 mounted on a blue base board. Size: 335 x 168mm.

Order Code	Type	Price each
BZ13P	Breadboard AD-01	£5.75
BZ12N	Power Block AD-10	£3.65
BZ14Q	Breadboard AD-11	£8.95
BZ15R	Breadboard AD-12	£13.99
BZ16S	Breadboard AD-13	£18.99
BZ17T	A1 Breadboard AD-14	£23.99

Fax your orders to:
01702 553935

Silver Plated Bus Strip AD-4D



A high-quality silver plated Bus strip, type AD-4D. The contacts are arranged in two rows, 24 black and two sets of 12 red. Can be clipped to breadboards AD-01(BZ13P), AD-10(BZ12N), AD-100(AG08J), AD-101(AG09K) and AD-102(AH10L), or other blocks of AD-4D.

The blocks can be attached to a suitable clean flat surface with the self-adhesive pad on the base of the block.

Dimensions: 81 x 12 x 10mm.

Order Code	Type	Price each
AG07H	AD4D Plugblock	99p

AD-102 Breadboard



This breadboard is constructed from two of AD-4D(AG07H) and one of AD-100(AG08J) in between. A self-adhesive pad is attached to the rear of the breadboard. Can also be connected to AD-01(BZ13P), AD-4D(AG07H), AD-10(BZ12N), AD-100(AG08J), AD-101(AG09K), or other AD-102 blocks.

Dimensions: 62 x 83 x 10mm.

Order Code	Type	Price each
AG10L	AD102 Plugblock	£2.99

Jump Wire Kit

A kit containing 14 different length jumper wires for use with our plugblocks. Wires are stripped and formed at 90° at each end. There are 25 wires of each length:

0.1in.(2.54mm) uninsulated, 0.2in.(5.08mm), 0.3in.(7.62mm), 0.4in.(10.16mm), 0.5in.(12.7mm), 0.6in.(15.24mm) 0.7in.(17.78mm), 0.8in.(20.32mm), 0.9in.(22.86mm) 1in.(25.4mm), 2in.(50.8mm), 3in.(76.2mm), 4in.(101.6mm), 5in.(127mm).

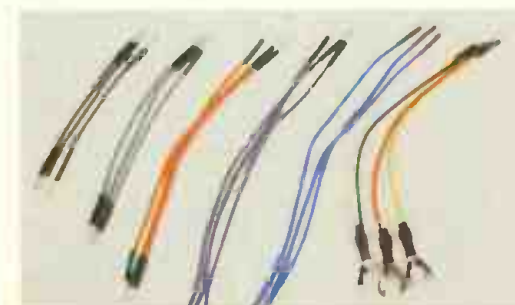
Wires are supplied in various colours and are 23swg solid tinned copper wire, and supplied in an attractive plastic case with a blue base and clear hinged lid with each length wire in a separate compartment. Overall size of box 270 x 124 x 30mm high.



Order Code	Type	Price each
FS65V	Jump Wire Kit	£9.99

Flexible Jumper Wires

Packs of flexible jumper wires for use with our plugblocks. Wires are terminated in hard pins at each end except Spade pack where each wire has a spade terminal on one end for use with terminal posts such as those on XX42V and FD32K. Wires are insulated 11 strands of 0.16mm copper conductor with a 7mm long, 0.6mm diameter pin.



Type	Colour	Flexible length	Overall length
50	Brown	50mm	75mm
70	Grey	70mm	95mm
100	Orange	100mm	125mm

150	Violet	150mm	175mm
200	Blue	200mm	225mm
Spade	*	100mm	128mm

*Spade pack contains 4 wires coloured red, yellow, green and black.

All packs except spade pack contain 10 wires.

Order Code	Type	Price each
FS66W	10pk Jump Lead 50	£2.49
FS67X	10pk Jump Lead 70	£2.49
FS68Y	10pk Jump Lead 100	£2.49
FS69A	10pk Jump Lead 150	£2.49
FS70M	10pk Jump Lead 200	£2.49
FS71N	4pk Spade Jump Lead	£1.80

PCB EQUIPMENT

PCB Component Mounting and Soldering Frame



An ingenious and flexible solution to component insertion and soldering problems. The extruded aluminium frame will hold a PCB with dimensions up to 185 x 235mm. The first stage of PCB assembly is to clamp the board in position using the adjustable clamp bars. The PCB is held firmly by 8 spring clips and the components can now be inserted. Once insertion is complete, the foam padded lid is fitted, which holds the components in position. The frame is then turned over and the underside of the board can be soldered and leads cropped without components falling out. Overall size 260 x 240 x 50mm. Supplied unassembled.

Order Code	Type	Price each
XM72P B2	PCB Assembly Frame	£39.99

Bubble Etching Tank



An ingenious and easy to use bubble etch tank. Ideal for development work in laboratories, schools, colleges and universities. The bubble etching tank consists of a smoked acrylic plastic tank, with integral air distribution

Continued on next page.

AD-100 Breadboard



This breadboard consists of two sections; one section of 30 blocks of six rows labelled 'A' to 'F', and an identical section labelled 'G' to 'L'.

Can be connected to AD-01(BZ13P), AD-4D(AG07H), AD-10(BZ12N), AD-101(AG09K) and AD-102(AG10L), or other blocks of AD-100(AG08J).

Dimensions: 42 x 83 x 10mm

Order Code	Type	Price each
AG08J	AD100 Plugblock	£1.99

AD-101 Breadboard



This breadboard is constructed from one of AD-4D(AG07H) and one of AD-100(AG08J) complete with a self-adhesive pad for attaching to a suitable surface. The breadboard can also be attached to AD-01(BZ13P), AD-4D(AG07H), AD-10(BZ12N), AD-100(AG08J) and AD-102(AG10L), or other blocks of AD-101.

Dimensions: 83 x 52 x 10mm.

Order Code	Type	Price each
AG09K	AD101 Plugblock	£2.49

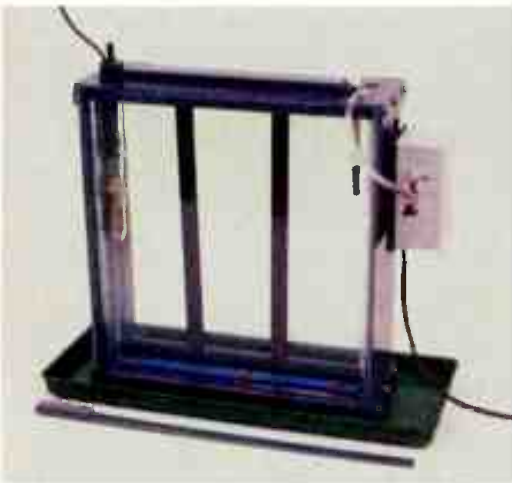
FOR CASHTEL
Phone 01702 552941

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channel, the PCB being etched may be clearly observed whilst in the tank. Supplied with the tank are two supporting feet which simply clip into place on the tank, a thermometer, air-tube, tank lid and lengths of titanium wire to support the PCB during etching (titanium wire will not be attacked by normal ferric chloride etching solution). Pump and heater are not supplied with the tank and must be purchased separately. Suitable pump and heater are (YZ69A) and (JU66W) are available.

Order Code	Type	Price each
YZ34M C1	Etch Tank	£34.99
YZ69A	Etch Tank Pump	£11.99
JU66W	Etch Tank Heater	£8.99

Bubble Etching System



An ingenious and easy to use bubble etch system that will greatly increase the throughput of small scale PCB production. Ideal for development work in laboratories, schools, colleges and universities. The bubble etching system consists of a durable rigid PVC frame to which the component parts are fitted. These are a glass etching tank, a thermostatic heater, a thermometer, an air distribution pipe and a diaphragm pump. A PCB holder, which can accommodate boards up to 180 x 260mm, allows easy insertion and removal of the board to be processed. A drip tray is provided to guard against spillages and a cleaning rod is also supplied to facilitate tank cleaning. The air flow circulates the etchant and this ensures that the temperature is maintained evenly and prevents coldspots. The etchant circulation results in fast and even etching over the surface of the board. The etching process can be continually monitored through the clear glass tank. The frame has provision for a second identical tank to be added and this could be used for photo-resist developing, washing or as another etching tank. Accessories and spare parts are available separately, see below. Overall dimensions (excluding drip tray) 100 x 340 x 340mm. Power requirements 240V AC 50Hz mains, pump 5W, heater 100W.

Order Code	Type	Price each
XM67X E10	Bubble Etch Unit	£119.99

Bubble Etch Spare Parts and Accessories

The following items are available as spare parts and also for adding a second tank to the main unit. A PCB holder; a glass tank; a 100W thermostatic heater; a diaphragm pump and an air distribution pipe.

Order Code	Type	Price each
YZ05F	Bble Etch PCB Holder	£10.99
YZ06G D6	Bble Etch Glass Tank	£39.99
YZ07H	Bble Etch Heater	£24.99
YZ08J	Bble Etch Pump	£18.99
YZ09K	Bble Etch Air Dist	£9.99

UV Photo-Etch System

The UV photo-etch system of making pcbs has many advantages over any other system for prototypes or production in very small quantities.

1. The original artwork can be produced using a professional method, because it does not have to be made on the pcb.
2. The production run can be made from the same artwork as the prototype is not destroyed during the etching process.
3. Alterations can be made without having to remake the whole artwork.
4. The artwork may be filed and additional copies of the original pcb made at any time.
5. Magazine artworks could be turned into a positive transparency by a professional photographer at very little cost, saving hours of time making new artworks.
6. The system is very simple to use and does not require a darkroom. Full instructions are supplied with the ultra-violet light exposure unit.

Ultra-Violet Light Exposure Unit



An attractive metal case finished in brown and containing two 8W ultra-violet tubes. Case size 406 x 177 x 102mm. The lamps are covered by a 4mm glass sheet masked to give a maximum exposure area of 254 x 157mm. The metal lid is hinged and clips down firmly at the front. A pressure pad fixed to the lid ensures an even and firm pressure on the pcb to keep it in good contact with the glass over the whole exposure area. The box incorporates a mains switch and indicator and is connected to the mains (240V AC) via mains lead supplied. The unit must be used with our Photo-etch board and after exposure the board must be developed using sodium hydroxide solution (caustic soda) available from most chemists (e.g. Boots) before etching in ferric chloride in the normal way. Full instructions for use are supplied with the exposure unit.

Order Code	Type	Price each
XY10L F13	UV Exposure Box	£74.99

Replacement UV Tubes

Spare tubes are available should replacements be required, for UV Exposure Box (XY10L).

Order Code	Type	Price each
FJ55K	Spare UV Tube Exp Bx	£9.99

Ultra-Violet Light Exposure Box



A large ultra-violet light exposure box for PCB production work. The exposure box is constructed from anodised aluminium and has a hinged laminated wood lid with side locks. The inside of the lid has a foam pressure pad to ensure the artwork and PCB are held firmly. The exposure box is equipped with four 15W 17inch ultra violet tubes which are controlled by an electronic exposure timer (adjustable via a front panel slot). The tubes are covered by 4mm glass which provides an exposure area of 369 x 241mm. Overall size: 495 x 95 x 320mm. Power requirements 240V AC 50Hz mains.

Replacement UV tubes are available

Order Code	Type	Price each
XM66W H16	Lge UV Exposure Box	£199.99
YZ04E B1	UV Tube 15W/17inch	£22.99

Pre-Sensitised Copper-Clad Boards

Single and double-sided copper-clad SRBP and glass fibre boards coated with a positive photo-resist suitable for use with our UV exposure box. The boards are covered with light-proof protective film; this should not be removed until the board is used. The PCB should be exposed using our UV exposure box and a circuit overlay transparency. Exposure time will be 8 to 15 minutes. Mix together 1 pint of cold water and 1 teaspoonful of sodium hydroxide (available from most chemists) and pour into a tray. Gently rock the exposed PCB in the tray until the unwanted photo-resist is dissolved away. Etch the PCB in a bath of ferric chloride. Expose the PCB in the UV box for a further 10 mins. then wash off all remaining etch resist in the tray of sodium hydroxide solution. Three sizes are available in SRBP: Small 100 x 75; Medium 160 x 100 and Large 300 x 210. Six sizes are available in single or double-sided fibreglass: 75 x 100mm (Size 1); 100 x 160mm (Size 2); 100 x 220mm (Size 3); 233.4 x 160mm (Size 4); 233.4 x 220mm (Size 5); and 210 x 300mm (Size 6).

Order Code	Type	Price each
JP55K	SRBP P/Etch Sml Sngl	95p
JP58N	SRBP P/Etch Sml Dbl	99p
JP56L	SRBP P/Etch Med Sngl	£1.79
JP59P	SRBP P/Etch Med Dbl	£1.99
JP57M	SRBP P/Etch Lrg Sngl	£6.49
JP60Q	SRBP P/Etch Lrg Dbl	£7.99
FA60Q	F/Glass Size1 Single	£1.14
FA61R	F/Glass Size1 Double	£1.35
BW19V	F/Glass Size2 Single	£2.55
FA62S	F/Glass Size2 Double	£2.85
KU13P	F/Glass Size3 Single	£3.39
KU10L	F/Glass Size3 Double	£3.79
KU14Q	F/Glass Size4 Single	£4.99
KU11M	F/Glass Size4 Double	£5.69
KU15R	F/Glass Size5 Single	£7.49
FA63T	F/Glass Size6 Single	£8.69
FA64U	F/Glass Size6 Double	£9.79

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FOR SAME DAY DESPATCH
01702 554161
Access, Visa, American Express**

Drafting Film Pack



A pack containing 5 sheets of polyester drafting film and one sheet of 0.1 x 0.1in (2.54mm) grid. Lay one sheet of film on the grid which then assists in exact placing of the tracks and pads that make up the artwork. The piece of film with artwork on it is then placed on the UV exposure unit with the coppered photoresist board on top of it and the lid closed. The artwork may be altered or re-used whenever required. Sheet size: 248 x 150mm.

Order Code	Type	Price each
BW20W	Phot-Etch Drftg Pk	£3.49

Positive Photoresist Aerosol Spray

Electrolube

An aerosol can of positive photoresist for coating copper-clad board. To use, first use a fine grade emery cloth or polishing block to remove dust, dirt, grease, fingernails and oxide from the copper surface. Rinse well and dry thoroughly. The coating must be applied in subdued light. Shake the can, place the board horizontally in a dust-free area, then holding the can at a 30° to 45° angle, from a distance of 20 to 30cm spray with smooth strokes in a zig-zag pattern. Leave in low light for 5 minutes until touch-dry. Move to a dark well-ventilated area and leave for 24 hours (or heat to 80°C for 15 minutes, but do NOT use an open flame or incandescent element). The board may now be used in the normal way, with our UV Light Box. Available in 200g cans.

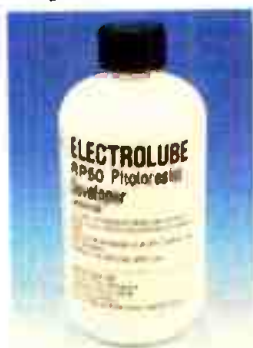


Order Code	Type	Price each
YM62S	Pos Photores 200g	£7.55

Photoresist Developer

Electrolube

For use with positive photoresist pcb's, the developer must be diluted 4:1 with water before use. Place the prepared board in the solution for 30 to 90 seconds at 20°C. Development is complete when the shiny copper shows through on the non-image areas. Rinse the board thoroughly with water to halt the development process. When the board is dry it is ready for etching. Supplied in 250ml bottle.



Order Code	Type	Price each
YJ38R	Photoresist Develop	£3.49

Universal PCB Developer

A sodium-hydroxide free PCB developer that is supplied in free flowing odourless granules and is ready for dilution with water. Suitable for single or double sided PCBs, and all applications such as prototype work is 10g of granules with 100ml of water, or the full 250g would make up to 2.5l of developer. The ideal temperature for dilution and developing is room temperature i.e. approximately 20°C. Development time will depend on the complexity of the board design, dilution ratio of the solution and the temperature. After development, the board should be rinsed thoroughly and dried either in air or an oven. Always wear protective gloves and goggles and avoid contact with the eyes and skin., but in case of contact, flush liberally with water. Ensure all containers and utensils used with this product are made from strong chemical resistant plastics or glass. Do not use any equipment made from metal.



Order Code	Type	Price each
AP01B	PCB Developer	£5.99

Clear Protective Lacquer

Electrolube

A transparent plastic coating which can be used to protect printed circuit boards and sensitive electronic circuitry from the effects of humidity and corrosion. Ideal for sealing EHT and high voltage conductors, and can be used for additionally insulating automotive HT circuits against the weather, for example. Does not crack or discolour, conforms to international specifications. Disappears quickly and easily on the application of a soldering iron, hence the circuit is not difficult to service or modify afterwards. Supplied in a 400ml aerosol can.



Order Code	Type	Price each
DM82D	Acrylic Conf Coating	£5.75

PCB Cleaner

Electrolube

An aerosol solvent especially for removing contaminants and oxidation from printed circuit board conductors, and removing flux residues that result from soldering operations. Before using on plastics, test a small area first. Supplied in 300g aerosol can.



Order Code	Type	Price each
DM83E	Fluxclene	£3.79

Acrylic Conformal Coating

Electrolube

A flexible transparent acrylic coating specially formulated for the protection of electronic circuitry to meet the highest defence and aerospace industry requirements. Possesses excellent adhesion under all climatic conditions. It is resistant to mould growth and has a temperature range of -60 to +130°C. It has excellent dielectric properties and is fluorescent under ultra-violet light as an aid to inspection. Can be soldered through without fear of highly toxic gases being produced e.g. isocyanates. It is non-corrosive to cadmium and zinc plate (contains no phenols). It can be totally removed with 1.1.1 trichloroethane. Supplied in 200ml aerosol can.

100%
ENVIRONMENTALLY
SAFE



Order Code	Type	Price each
YT50E	HPA Conformal Coat	£6.29

Very High Temperature Conformal Coating

Electrolube

A flexible, transparent modified silicone resin conformal coating specially formulated for the protection of electronic circuitry to meet the highest defence and aerospace industry requirements. Possesses excellent adhesion under all climatic conditions and is resistant to a wide range of solvents. Excellent resistance to mould growth and ultra violet light. Wide temperature range from -70 to +200°C. The coating produces a high gloss finish, exceptionally low oxygen permeativity and high surface resistivity. It has good dielectric properties at all frequencies, and is fluorescent under ultra-violet light as an aid to subsequent inspection. Can be soldered through without fear of highly toxic gases being produced, e.g. isocyanates. Non-corrosive to cadmium and zinc plate (contains no phenol). Supplied in 250gm aerosol can.

100%
ENVIRONMENTALLY
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Order Code	Type	Price each
YP74R	-70/+200 Conformal	£6.99



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Peelable Coating Mask

Electrolube

A flexible, solvent resistant latex for masking components, connectors and other items prior to applying a conformal coating, to ensure that sensitive items, and areas requiring further processing are not coated. The mask can be applied to adjustable pots, IC sockets etc. to prevent ingress of coating. The high film strength of the mask means that it can be peeled away by hand without breaking or leaving residues. Note that this product contains ammonia and therefore must be applied and allowed to dry in a well-ventilated area. Supplied in 250ml bottles.



Order Code	Type	Price each
YT48C	Peelable Coat 250ml	£4.99

ETCHING AIDS

Ferric Chloride Crystals



A pack of Ferric Chloride (FeCl₃) crystals for etching copper clad boards. Packet contains sufficient crystals to make one pint of solution. Dissolve in 250ml of warm water. Store and etch in plastic or glass vessels. With regular stirring, etching will take about 20 minutes or longer depending on how many times solution has been used before. One pint will etch about 350 square inches (0.226 square metres).

Order Code	Type	Price each
XX12N	Etch Crystals	£4.49

Etching Fluid

A plastic bottle containing 250cc of high concentration ferric chloride etching fluid. The fluid should be diluted with 250cc of water before use (i.e. one part etchant, one part water).



Order Code	Type	Price each
WF10L	Etcher Fluid	£4.99

Printed Circuit Board Etch Resist Marker Pen



A nylon tipped pen for fast fabrication of perfect printed circuit boards. The ink adheres perfectly to copper and is completely resistant to ferric chloride and other usual etchant solutions. Draw the planned circuit onto a thoroughly cleaned copper laminated board and allow to dry. Then immerse the board in etching fluid until the copper is dissolved. The ink can then be removed with Degreasing Solvent or PCB Cleaner, and the circuit board is then ready to be drilled and assembled. This pen is capable of producing thin, delicate lines allowing for quite a condensed track layout if required. It can also be used as an indelible marker felt tip pen for an enormous range of materials especially metals.

Order Code	Type	Price each
HX02C	PCB Pen	£1.49

Dalo Etch Resist Marker Pen



An etch-resist marker pen similar to the one above, but having better adhesion to the board if it is not perfectly clean of grease and oxides.

Order Code	Type	Price each
FP40T	Dalo Pen	£2.75



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

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Polishing Block



Block is ultrafine non-metallic polishing compound bonded in an elastic material which wears evenly. It cleans, degreases and polishes in one clean simple procedure, totally eliminating the need for abrasive pastes, water washes and solvent washes. It has been designed primarily for cleaning copper-clad boards prior to application of resist inks, or finished circuits prior to tin/silver/gold plating. It is equally useful for cleaning contacts, switch gears, potentiometers, connectors, adjustable transformers etc. Supplied individually.

Order Code	Type	Price each
HX04E	Polish Block	£2.19

Etch Resist Remover

A cloth made damp with this isopropanol remover will dissolve Etch Pen ink after etching and leave copper tracks clean. Bottle contains 100ml.



Order Code	Type	Price each
HX03D	Resist Remover	£3.79

Copper-Clad Boards



A range of copper-clad boards suitable for making your own printed-circuit boards.

The following types and sizes are available:

Single-sided SRBP:

- 203 x 102mm (8 x 4in) (Small single)
- 254 x 152mm (10 x 6in) (Medium single)
- 305 x 203mm (12 x 8in) (Large single)

Double-sided SRBP:

- 203 x 102mm (8 x 4in) (Small double)
- 254 x 152mm (10 x 6in) (Medium double)
- 305 x 203mm (12 x 8in) (Large double)

Single-sided Fibreglass:

- 203 x 102mm (8 x 4in) (Small single)
- 254 x 152mm (10 x 6in) (Medium single)
- 305 x 203mm (12 x 8in) (Large single)

Double-sided Fibreglass:

- 203 x 102mm (8 x 4in) (Small double)
- 254 x 152mm (10 x 6in) (Medium double)
- 305 x 203mm (12 x 8in) (Large double)

Order Code	Type	Price each
HX00A	PCB SRBP Smll Single	84p
WF38R	PCB SRBP Med Single	£1.25
WF39N	PCB SRBP Lrg Single	£1.99
FA55K	PCB SRBP Small Doubl	99p
FA56L	PCB SRBP Med Doubl	£1.49
FA57M	PCB SRBP Lrg Doubl	£2.45
HX01B	PCB F.Glass Sm Sngl	£1.35
WF40T	PCB F.Glass Med Sngl	£1.99
WF41U	PCB F.Glass Lrg Sngl	£2.99
FA58N	PCB F.Glass Smll Dbl	£1.39
WF42V	PCB F.Glass Med Dbl	£1.99
FA59P	PCB F.Glass Lrg Dbl	£3.29

HOT TIP

Used PCB marker pens can be given a second life as test prod holders, light guides on optical projects, or sawn into smaller pieces and used as PCB spacers.










ETCH RESIST DRAFTING AIDS

A range of professional etch resist drafting aids for use directly on the pcb or in making 1:1 artwork for use with photo resist pcbs or 2:1 artwork for masters for professional pcb manufacturers.

Black Tapes

A black crepe tape with a matt finish for high quality photographic reproduction. The crepe tape can be made into tight curves without distortion at the edges. A good adhesion is obtained even on irregular surfaces. Tapes are on 16-46m rolls.

The following types are available.

0.031 in		0.100 in.	
0.040 in		0.125 in	
0.050 in		0.150 in	
0.062 in		0.200 in.	
0.080 in.			

Order Code	Type	Price each
BW21X	Track Tape 31	£1.56
BW22Y	Track Tape 40	£1.56
BW23A	Track Tape 50	£1.56
BW24B	Track Tape 62	£1.98
BW25C	Track Tape 80	£1.98
BW26D	Track Tape 100	£1.98
BW27E	Track Tape 125	£2.15
BW28F	Track Tape 150	£2.65
BW29G	Track Tape 200	£2.65

Black Circles

Die-cut circles manufactured in black crepe and supplied in the form of a roll with half of each symbol stuck to a clear carrier tape. To apply, separate the circles from the carrier, release the film from its protective backing paper and position carrier with circle on the artwork or pcb. Then having applied pressure to the circle, gently pull away the carrier film at an angle leaving the circle securely in position. This method is undoubtedly the most simple, accurate and speedy way to make pcb artwork.

Circles are supplied in rolls of 250 circles. The following sizes are available.

Outside dia. (in)	Inside dia. (in)	Outside dia. (in)	Inside dia. (in)
0.075	0.02	0.15	0.04
0.100	0.03	0.2	0.04
0.125	0.03		

Order Code	Type	Price each
BW30H	Pad 075	£2.75
BW31J	Pad 100	£2.75
BW32K	Pad 125	£2.75
BW33L	Pad 150	£2.75
BW34M	Pad 200	£2.75

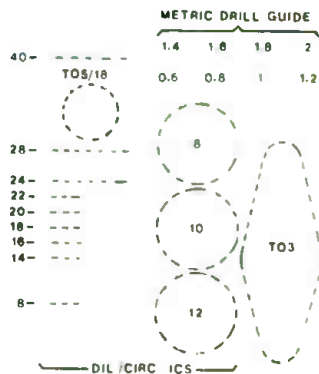
Dual-In-Line IC Clusters

Sixteen circles arranged in a 0.1 x 0.3in pitch (1:1) or a 0.2 by 0.6in pitch (2:1), to suit IC's up to 16-pin DIL. Symbols can be laid end to end and/or split to make them wider to suit any size IC package. These pads offer a considerable time saving over using individual pads. Supplied in rolls of 100 16-pin DIL grouped symbols. These pads are not suitable for use directly on pcb's, only for artwork

Order Code	Type	Price each
BW39N	IC Pads 100	£6.99
BW40T	IC Pads 200	£8.99

Drafting Template

Calvyn Industrial



A clear plastic template to speed the job of placing pads for pcb artworks. Holes are laid out over the template in various patterns and pitches; simply lay the template over the artwork or pcb, put a pin through the appropriate holes to lightly mark the position, remove the template and put the pads down centred on the marks. The following patterns are marked on the template. DIL packages up to 40-pin at 0.3in and 0.6in pitch as applicable, TO5, TO18 and TO3 transistor packages including fixing holes for TO3, 8-pin, 10-pin and 12-pin round IC packages. In addition there are a series of precision holes to check drill sizes between 0.6mm and 2mm where drills are often too small to be marked on the shank. Manufactured in clear plastic. Overall size: 64 x 51mm.

Order Code	Type	Price each
BW41U	Drafting Template	£1.99

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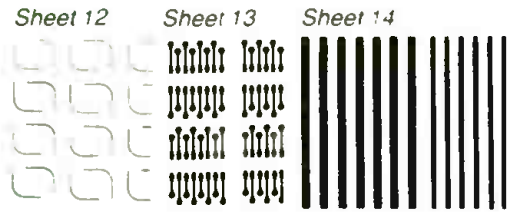
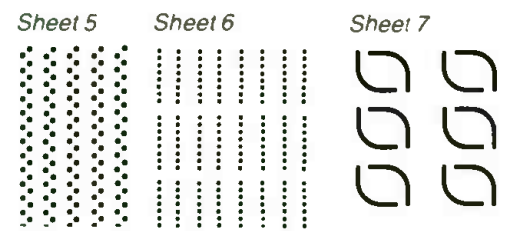
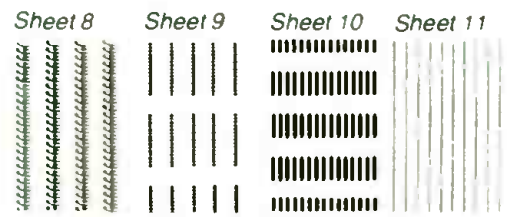
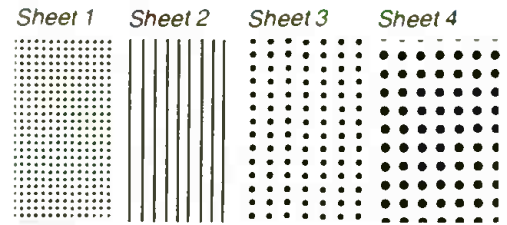
Phone 01702 556751

PCB Transfers

A range of high quality rub-down black symbols suitable for making printed circuit boards. Available as individual sheets or one of each in a starter kit of fourteen sheets. All symbols are acid resistant, have a clear sharp outline and are fully lightproof. The specially designed transparent symbol carrier prevents stresses being imparted to the symbol during application and eliminating symbol edge tearing. The carrier retains its shape even during heavy handed application or the use of unsuitable rub-down tools. The customised symbol adhesive prevents unwanted side-effects and guarantees optimum symbol adhesion. Sheet size 210 x 94mm.

How to use

Rub down the printed circuit board with Polish Block or fine abrasive paper to give a good finish to the copper surface. Do not use liquid cleaners or water and keep the board dry and clean whilst you are working. Mask the unwanted symbols on the transfer card being used, with the release paper backing, or cut out the required symbol place in position on the printed circuit board (tacky side down), then rub the reverse side of the symbol with a ball pen or soft pencil lead. Lift off the clear film and smooth over by rubbing the release paper over the symbol to make sure there is no lift at the edges. The printed circuit board may now be etched to remove the unwanted copper. When complete, wash under water and rub the transfer away with Polish Block, fine wire wool or scouring powder. You will then have a professional looking printed circuit board, ready to drill and assemble.



Sheet details

- Sheet 1 2176 circle pads 1.6 x 0.38mm.
- Sheet 2 20 straight lines 170 x 1.61mm.
- Sheet 3 480 circle pads 2.54 x 0.45mm.
- Sheet 4 351 circle pads 3.6 x 0.79mm.
- Sheet 5 210 transistor pad sets, each circular pad is 2.4 x 0.32mm.
- Sheet 6 45 16 pad DIL IC's spaced at 0.3 x 0.1 inch, each circular pad is 2.16 x 0.38mm.
- Sheet 7 90° bend lines, fifteen bends 2.25mm wide, twelve bends 3.0mm wide.
- Sheet 8 8 rows of 68 pairs of pads with 'between-pad' tracks, pads are 2.54mm diameter.
- Sheet 9 77 sets of 8 pads 1.6 x 0.34mm with through tracks for DIL IC's.
- Sheet 10 0.1 inch spaced edge connector fingers, 12 rows of 32 fingers.
- Sheet 11 21 straight lines 170 x 0.65mm.
- Sheet 12 90° bend lines, 24 bends 0.65mm thick, 24 bends 1.61mm thick.
- Sheet 13 33 sets of DIL IC pads with leads and offset holes.
- Sheet 14 7 straight lines 170 x 3.0mm, 8 straight lines 170 x 2.25mm.

The kit contains one each of all of the 14 sheets listed.

Order Code	Type	Price each
XH66W	Transfer Sheet 1	60p
HX46A	Transfer Sheet 2	60p
HX47B	Transfer Sheet 3	60p
XH67X	Transfer Sheet 4	60p
HX49D	Transfer Sheet 5	60p
HX63T	Transfer Sheet 6	60p
HX64U	Transfer Sheet 7	60p
XH68Y	Transfer Sheet 8	60p
XH69A	Transfer Sheet 9	60p
HX67X	Transfer Sheet 10	60p
HX68Y	Transfer Sheet 11	60p
HX83E	Transfer Sheet 12	60p
HX84F	Transfer Sheet 13	60p
XH70M	Transfer Sheet 14	60p
HX44X	Transfer Kit	£6.79

DRAWING EQUIPMENT

Templates



Type 116: A template for circles from 1 to 5mm in 0.5mm steps and circles from 5 to 35mm in 1mm steps. The template is made from transparent tinted plastic and is marked with metric and imperial units, and centre guide lines. Size 240 x 120 x 1.2mm.

Type 175: Flowcharting template incorporates 32 of the most commonly used computing/data preparation symbols and is made from transparent tinted plastic. Size: 190 x 100 x 1.2mm.

A range of green-transparent, 1mm thick butyrate, templates with raised bosses on the underside, to prevent ink spread.

Type 1139S: Electronic: Containing logic and electronic symbols in two sizes to suit 0.1 or 0.2in. grids. Size 165 x 95mm.

Type 1173S: Square: With 34 squares from side length 2 to 35mm, with centre lines. Size 242 x 125mm.

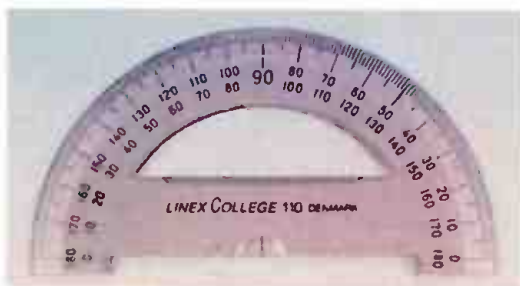
Type 7857: Lettering: Upper case, numbers and arrow heads in 3.5, 5 and 7mm heights. Size: 250 x 60mm.

Type 1170S: Combination: A useful collection of circles, hexagons, squares, and triangles for layouts. Size: 130 x 87mm.

Order Code	Type	Price each
RC22Y	116 Circle	£3.65
RC23A	175 Flowchart	£2.99
RC36P	1139S Electron	£10.95
RC37S	1173S Square	£10.45
RC38R	7857 Letter	£10.49
RC39N	1170S Combi	£6.95

Protractor

Linex



A 180° protractor, made of transparent tinted plastic, with clockwise and anti-clockwise markings and accessible centre point. 100mm diameter.

Order Code	Type	Price each
RC24B	Protractor	89p

Set Squares



A range of high quality squares made from transparent tinted plastic

Type	Angle	Rule length (cm)	Thickness (mm)
625	60°	23.5	2.5
628	60°	26.5	2.752
632	60°	30.5	2.75
425	45°	16.5	2.5
428	45°	18.5	2.75
432	45°	21.5	2.75

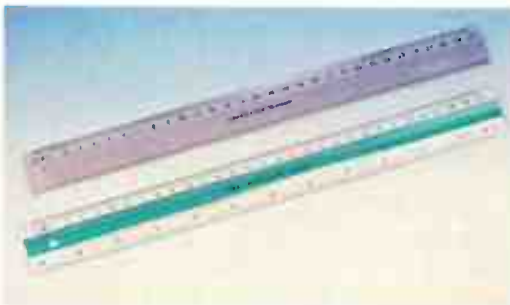
Type 216: A 45° set square with a 7-0-7cm rule and 180° protractor, the central zero position of the rule is coincident with the centre of the protractor. Dimensions: longest side: 160mm, thickness: 1.6mm.

Type 1120/10B: An adjustable set square, made from glass-clear Dunilon, with a bevel edge and adjustable from 0 to 45°. The angle can be read from the graduated arch which is precision divided into half-degrees, tangent and secant.

Order Code	Type	Price each
RC26D	Square 625	£1.69
RC27E	Square 628	£1.85
RC28F	Square 632	£1.99
RC29G	Square 425	£1.69
RC30H	Square 428	£1.85
RC31J	Square 432	£1.99
RC25C	Square 216	£1.05
RC40T	1120/10B	£9.99

Rulers

Linex



Type 130 and 140: Transparent tinted plastic rulers with metric scale and hanging hole. Type 130 has a 30cm scale and type 140 has a 40cm scale.

Type S30M1: A 30cm ruler made from crystal-clear acrylic, with metric and imperial scales and a built in non-slip rubber strip.

Order Code	Type	Price each
RC32K	Ruler 130	85p
RC33L	Ruler 140	£1.45
RC41U	Rule S30M1	£4.79

Multipurpose Ruler



A versatile multipurpose ruler with a host of useful features. Convenient for use at school, in the office or the home, for applications that involve the accurate measurement of distances or angles. This ruler is not only for measuring it enables you to draw perfect straight lines due to its unique roller action. The ruler may be moved up or down a fixed distance which, together with its rectifying lines, allows you to draw perfectly parallel lines of any length and distance apart. The ruler section is marked with both metric and imperial graduations. The fixed circle template allows circles of between 1 and 10mm to be easily and quickly drawn. Larger circles are also possible by use of the compass feature. The many features of this compact ruler include ruler, compass, set-square, fixed circle template, protractor and rectifying lines. Various spirograph functions are also possible, which are described in the manual supplied. Overall dimensions of ruler: 150 x 65 x 15mm.

Order Code	Type	Price each
RJ74R	Multipurpose Ruler	£4.99

Pencil Compasses

Linex



Type 76C: For circles up to 390mm, fast acting adjustment screw, supply of leads.

Type 72: Strong, good quality, 140mm compass with knee joint and supply of leads. Suitable for 3.5mm diameter inserts.

Order Code	Type	Price each
RC34M	76C Compasses	£7.75
RC35Q	72 Compasses	£4.99

Stockist of
Assessed Capability

**YOUR GUARANTEE OF
QUALITY & SERVICE**

SPRAY ADHESIVES

Permaglu

A permanent spray adhesive for paper, cardboard, film, wood, metal, glass, rubber, polystyrene and polyurethane. Ideal for exhibition material and layout presentation as it does not age, yellow, stain or soak through documents. Ozone friendly: contains no CFCs. 400ml.



Order Code	Type	Price each
RC42V	Permaglu	£9.89

Softglu

A repositionable spray adhesive for mounting all types of artwork. Does not stain or age. Ideal for most supports: film, paper, bromides, textiles etc. Ozone friendly: contains no CFCs. 400ml.



Order Code	Type	Price each
RC43W	Softglu	£9.89

This process will also allow image transfer directly to film, the result being artwork that can be used with the standard UV photo-etch process. Multiple copies could be produced so that the simultaneous processing of several boards could be achieved if small batch manufacture is intended. The circuit diagram program is similarly easy to use, and offers superb results of publishable standard, although as with the PCB design software the overall quality would depend on the printing device used.

System Requirements

The hardware required to run this software is an IBM PC/XT/AT/386, or a true compatible, running DOS 2.0 (or later), with a minimum of 512k memory and having at least CGA graphics capability.

A maths co-processor is not required. A mouse (Microsoft or equivalent) is not essential but is highly recommended. If a printer is to be used, this should have a 9 or 24-pin print head and compatibility with IBM graphics systems.

The Easy-PC package includes comprehensive instruction manual/tutorial, 5 1/4 in. and 3 1/2 in. program disks, a large symbol library, unlimited free telephone support and any software updates issued within 6 months of the date of purchase.

Order Code	Type	Price each
GL01B B2	Easy PC CAD	£115.99

Seetrex Ranger 1

Features

- ★ Schematic (Circuit Diagram) Entry
- ★ Automatic Net List Generation
- ★ Optional Manual Net List Entry
- ★ Multi-Layer PCB Component and Track Layout
- ★ High Resolution Component Placement
- ★ 16 Track Widths and Pad Sizes
- ★ Expandable Component Outline Library

Ranger 1 is a powerful software package aimed at designing complex printed circuit boards with the greatest of ease. The package consists of two modules: Schematic Capture, including simulation; and PCB Layout. These two packages are designed to use a consistent database structure, ensuring 100% compatibility for data transfer between both modules.



The sophistication of this software does demand somewhat more than basic hardware to operate. You will need an IBM XT/AT, PS2 or equivalent, with 640K-bytes of continuous RAM (not separate 512K blocks); and a fixed or hard drive is essential. The software is supplied on 4x5 1/4 in disks and 2x3 1/2 in disks. The computer also requires the minimum of an EGA graphics card and compatible monitor. A mouse or graphics tablet is also required.

The software is designed to operate in an MS/DOS or OS/2 environment. The output device can be a penplotter emulating HP-GL (Hewlett Packard Graphics Language), a disk file, dot-matrix printer or Gerber file.

Ranger 1 offers the user the means to design printed

circuit boards in a way that is both easy to learn and fast to use. Extensive use is made of menus to lead the operator through the design cycle, menu selection being acted on through either the mouse or a graphics tablet.

A complete spectrum of designs can be produced, from simple, single-sided boards using leaded components, through to multi-layer designs going as far as 13 copper layers and surface mounted devices on both sides.

Specification

Schematic Capture Software

1. Macro generation for commonly used circuits.
2. 2,300 symbols per drawing.
3. Five standard drawing sheet sizes from A5 to A1.
4. Up to 8 drawing sheets per whole drawing.
5. More than 750 symbols per library volume.
6. Up to 100 library volumes.
7. 256 pins per symbol.
8. 3,500 signals per drawing sheet.
9. Signal connectivity retained through all drawing sheets.
10. Automatic generation of net list.
11. Part codes and pin numbers automatically allocated.

PCB Design Software

1. Macro generation for commonly used circuits.
2. 1,400 components per board.
3. Multilayer design up to 16 layers.
4. Extensive component outline library.
5. Complex true component shapes.
6. True track width representation.
7. Component flip for placement on other side of double sided board.
8. Input from ASCII or Futurenet not possible.
9. Imperial or metric scales with a resolution to one thousandth of an inch or 0.01mm.
10. Board can be up to 32 x 32 inches in size.
11. Automatic clearance checking of space between tracks to one thousandth of an inch resolution.
12. Up to 256 pins per component.
13. Interactive component renaming, back annotated to circuit schematic.
14. Automatic security data dump.
15. Silkscreen legends for both sides of board with part code flip-over can be made.
16. Automatic check of artwork against net list.
17. Automatic net reconnection for minimum connection length.
18. Powerful window function for mass editing.
19. 8,000 connections per board.

Order Code	Type	Price each
GL02C B	Ranger 1 PCB CAD	£115.99

THE BEST OF SERVICE

PCB COMPUTER AIDED DESIGN SOFTWARE

Easy-PC

Number One Systems

An extensive Computer-Aided Design (CAD) software package that will produce superb PCB artworks and circuit diagrams. Easy-PC provides very comprehensive features, is very fast and yet using its main features can be learnt within an hour. It is aimed at those who already own an IBM PC/XT/AT or equivalent, still use manual design methods or have been put off changing to a CAD system by the cost of existing software.

Easy-PC permits the design of PCBs of up to 17in. square, with up to 8 track layers and 2 silk screen layers. Drill templates and solder-resist artwork can also be produced with precision and accuracy. Many major component types (including surface mount) are stored in a 'library' and new symbols can be defined if required. Interconnecting tracks of eight different widths and pads of many different shapes and sizes are stored in the library, and can be extracted at any time. Suitable tracks and pads can be found for all major applications, which include signal, logic and power circuits. Components, pads and edge connectors are 'placed' onto a grid (with a resolution of 0.05mm), and interconnecting tracks are 'laid' between them. Track angles can be fixed at 45°, 90° or any user-defined value. The software is menu-driven and can be used with the cursor keys or a mouse. The final design can be output to a penplotter or a dot-matrix printer, and may be reduced or enlarged in scale. If enlarged, then the artwork can be 'photo-reduced' to the correct size with a great improvement in quality, particularly if a dot-matrix printer is used.



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2 ISSUES FREE

RESISTORS

Cermet Presets	640	Potentiometers	640	Resistors	636
Colour Code Calculator	637	Presets	639	Slide Potentiometers	641
Loudspeaker Volume Controls	641	Resistance Wire	639	Thermistors	642
Multi-turn Presets	640	Resistor Networks	639	Wirewound Resistors	638

RESISTORS Colour code chart on page 639

How To Order Resistors

To each range of resistors that we stock, we have allocated a code letter and in addition for use with the Maplin key call system a special five digit code for any type or value of fixed resistor is determined from the following tables. Table 1 gives the two digit code that determines the type of resistor being ordered. Table 2 selects the three digit number that indicates the value of the resistor in ohms.

NOTE: All Starter Packs are ordered by standard order codes.

Table 1

Type	Description	Code Letter	Digit Code
Carbon Film 1/8 Watt	Micro Res	U	80
Carbon Film 1/3 Watt	Econ Res	B	81
Metal Film 0.6 Watt	Min Res	M	82
Metal Film 0.6 Watt in packs of 10	Min Res in 10's	A	83
Metal Film 2 Watt	2W Res	D	91
Carbon Film 1 Watt	W Res	C	84
Wirewound 2.5 Watt	2.5W W/W	S	92
Wirewound 3 Watt	W/W Min	W	85
Wirewound 7 Watt	7W W/W	L	86
Wirewound 10 Watt	10W W/W	H	87
Wirewound 25 Watt	25W W/W	P	88
High Voltage Resistor	HV Res	V	89
Econ Res 1/4 Watt in packs of 10	Econ Res in 10's	F	93
Econ Res 1/4 Watt in packs of 100	Econ Res in 100's	E	90

NOTE: All resistor Starter Packs are coded as standard order codes.

Table 2

Value	Code	Value	Code	Value	Code	Value	Code
0.1Ω	100	11Ω	125	120Ω	150	1.3kΩ	175
0.12Ω	101	12Ω	126	130Ω	151	1.5kΩ	176
0.15Ω	102	13Ω	127	150Ω	152	1.6kΩ	177
0.18Ω	103	15Ω	128	160Ω	153	1.8kΩ	178
0.22Ω	104	16Ω	129	180Ω	154	2kΩ	179
0.27Ω	105	18Ω	130	200Ω	155	2.2kΩ	180
0.33Ω	106	20Ω	131	220Ω	156	2.4kΩ	181
0.39Ω	107	22Ω	132	240Ω	157	2.7kΩ	182
0.47Ω	108	24Ω	133	270Ω	158	3kΩ	183
0.56Ω	109	27Ω	134	300Ω	159	3.3kΩ	184
0.68Ω	110	30Ω	135	330Ω	160	3.6kΩ	185
0.82Ω	111	33Ω	136	360Ω	161	3.9kΩ	186
1Ω	112	36Ω	137	390Ω	162	4.3kΩ	187
1.2Ω	113	39Ω	138	430Ω	163	4.7kΩ	188
1.5Ω	114	43Ω	139	470Ω	164	5.1kΩ	189
1.8Ω	115	47Ω	140	510Ω	165	5.6kΩ	190
2.2Ω	116	51Ω	141	560Ω	166	6.2kΩ	191
2.7Ω	117	56Ω	142	620Ω	167	6.8kΩ	192
3.3Ω	118	62Ω	143	680Ω	168	7.5kΩ	193
3.9Ω	119	68Ω	144	750Ω	169	8.2kΩ	194
4.7Ω	120	75Ω	145	820Ω	170	9.1kΩ	195
5.6Ω	121	82Ω	146	910Ω	171	10kΩ	196
6.8Ω	122	91Ω	147	1kΩ	172	11kΩ	197
8.2Ω	123	100Ω	148	1.1kΩ	173	12kΩ	198
10Ω	124	110Ω	149	1.2kΩ	174	13kΩ	199

Value	Code	Value	Code	Value	Code	Value	Code
15kΩ	200	62kΩ	215	270kΩ	230	1.2MΩ	245
16kΩ	201	68kΩ	216	300kΩ	231	1.5MΩ	246
18kΩ	202	75kΩ	217	330kΩ	232	1.8MΩ	247
20kΩ	203	82kΩ	218	360kΩ	233	2.2MΩ	248
22kΩ	204	91kΩ	219	390kΩ	234	2.7MΩ	249
24kΩ	205	100kΩ	220	430kΩ	235	3.3MΩ	250
27kΩ	206	110kΩ	221	470kΩ	236	3.9MΩ	251
30kΩ	207	120kΩ	222	510kΩ	237	4.7MΩ	252
33kΩ	208	130kΩ	223	560kΩ	238	5.6MΩ	253
36kΩ	209	150kΩ	224	620kΩ	239	6.8MΩ	254
39kΩ	210	160kΩ	225	680kΩ	240	8.2MΩ	255
43kΩ	211	180kΩ	226	750kΩ	241	10MΩ	256
47kΩ	212	200kΩ	227	820kΩ	242		
51kΩ	213	220kΩ	228	910kΩ	243		
56kΩ	214	240kΩ	229	1MΩ	244		

To order a particular resistor simply write the code letter followed by the value, or if using the Maplin key call system use the digit codes.

Examples:

Type	Value	Order Code	Digit Code
Min Res	4.7Ω	M4R7	82 120
Min Res	47kΩ	M47K	82 212
Min Res	4.7MΩ	M4M7	82 252
1 Pack of 10 Min Res	470Ω	A470R	83 164
Wirewound 7W	0.47Ω	L0.47	86 108
100 Econ Res	470kΩ	E470K	90 236

Carbon Film 1/8W



High Stability, Low Noise

Working Voltage (max): 150V
 Tolerance: ±5%
 Power Rating: 1/8W at 70°C
 Temperature coefficient: -300ppm/°C up to 100kΩ rising to -500ppm/°C at 1MΩ

Noise Level: <0.5µV/V
 Dimensions of body: 4.1mm long, 1.8mm dia.

The following values (Ω) only are available:

Value	Code	Value	Code	Value	Code	Value	Code
10Ω	100	100Ω	1k	10k	100k	1M	
15Ω	150	150Ω	1k5	15k	150k		
2.2Ω	220	220Ω	2k2	22k	220k		
3.3Ω	330	330Ω	3k3	33k	330k		
4.7Ω	470	470Ω	4k7	47k	470k		
6.8Ω	680	680Ω	6k8	68k	680k		

To order write 'U' and then the value.

E.g. U4R7, U15R, U330R, U1K, U22K, U680K etc.

Order Code	Type	Price each
U+ Value	Micro Res	3p

Low Cost Metal Film 0.25W Packs of 10/100 Resistors



High stability, low noise. This range of resistors is ideal for use in manufacturing of electronic products where ±5% tolerance is sufficient. Available in packs of 10 or 100 of any 1 value, at a very low price.

Specification

Working Voltage (max.): 250V
 Tolerance: ±5%
 Power Rating: 0.25W @ 70°C
 Temperature Coefficient: ±200ppm/°C
 Dimensions of body: 6.8mm long x 2.5mm dia.

The following values (Ω) only are available:

Value	Code	Value	Code	Value	Code	Value	Code
1Ω	100	100Ω	1k0	10k	100k	1M	
		11Ω	110Ω	1k1	11k	110k	
1.2Ω	120	120Ω	1k2	12k	120k		
		13Ω	130Ω	1k3	13k	130k	
1.5Ω	150	150Ω	1k5	15k	150k		
		16Ω	160Ω	1k6	16k	160k	
1.8Ω	180	180Ω	1k8	18k	180k		
		20Ω	200Ω	2k0	20k	200k	
2.2Ω	220	220Ω	2k2	22k	220k		
		24Ω	240Ω	2k4	24k	240k	
2.7Ω	270	270Ω	2k7	27k	270k		
		30Ω	300Ω	3k0	30k	300k	
3.3Ω	330	330Ω	3k3	33k	330k		
		36Ω	360Ω	3k6	36k	360k	
3.9Ω	390	390Ω	3k9	39k	390k		
		43Ω	430Ω	4k3	43k	430k	
4.7Ω	470	470Ω	4k7	47k	470k		
		51Ω	510Ω	5k1	51k	510k	
5.6Ω	560	560Ω	5k6	56k	560k		
		62Ω	620Ω	6k2	62k	620k	
6.8Ω	680	680Ω	6k8	68k	680k		
		75Ω	750Ω	7k5	75k	750k	
8.2Ω	820	820Ω	8k2	82k	820k		
		91Ω	910Ω	9k1	91k	910k	

To order write 'F' and then the value for a pack of 10, or 'E' and then the value for a pack of 100. E.g. E1R2, E12R, E1K2, E12K, E120K, E1M, etc.

Order Code	Type	Price per pack
F+Value	MF 10 Res Pk	18p
E+Value	MF 100 Res Pk	£1.69

THE BEST OF SERVICE

▶ IT'S A FACT! ◀

For resistors combined in series i.e. R_1 , R_2 , R_3 , etc., the resultant value R is the sum of the value of each resistor i.e.

$$R = R_1 + R_2 + R_3 \text{ etc.}$$

For resistors combined in parallel, the resultant value R is given by the formula:

$$R = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots}$$

For two resistors in parallel:

$$R = \frac{R_1 \times R_2}{R_1 + R_2}$$

Carbon Film $\frac{1}{3}W$



High stability, low noise. This much reduced range is maintained to make available a low-cost miniature resistor. For all other values, use our Metal Film 0.6W range for a superior product.

Working voltage (max): 250V
 Tolerance: $\pm 5\%$
 Power rating: $\frac{1}{3}W$ at 70°C
 Noise level: Typical 0.5 $\mu V/V$
 Dimensions of body: 8mm long, 2.8mm dia.
 Only available in 10M Ω .

Order Code	Type	Price each
B10M	Econ Res 10M	3p

Metal Film 0.6W



A 'Universal Resistor' with a superb specification. It may be used as a superior replacement wherever carbon film $\frac{1}{4}W$, $\frac{1}{3}W$ or $\frac{1}{2}W$ are specified since its size is the same as $\frac{1}{3}W$ types, yet it can be run continuously at 0.6W with ambient temperatures up to 70°C, thanks to the highly even thermal characteristics of the ceramic substrate. It is also a superior replacement to most metal oxide and thick film resistors due to its very tight tolerance, $\pm 1\%$, and its low temperature coefficient, only 50ppm. These resistors are also available in packs of ten of any one value at a considerable cost saving.

Working voltage max: 250V
 Tolerance: $\pm 1\%$
 Power rating: 0.6W at 70°C
 Temperature coefficient: 50ppm/°C
 Noise level: Typically 0.01 $\mu V/V$
 Dimensions of body: 6.5mm long, 2.5mm diameter

Note that to make up 'odd' values not stocked, resistor networks may be built and if all the resistors in the network have a 1% tolerance, then the tolerance of the whole network will still be 1% tolerance.

The following values (Ω) only are available:

1 Ω	10 Ω	100 Ω	1k0	10k	100k	1M
	11 Ω	110 Ω	1k1	11k	110k	
1.2 Ω	12 Ω	120 Ω	1k2	12k	120k	1M2
	13 Ω	130 Ω	1k3	13k	130k	
1.5 Ω	15 Ω	150 Ω	1k5	15k	150k	1M5
	16 Ω	160 Ω	1k6	16k	160k	
1.8 Ω	18 Ω	180 Ω	1k8	18k	180k	1M3
	20 Ω	200 Ω	2k0	20k	200k	
2.2 Ω	22 Ω	220 Ω	2k2	22k	220k	2M2
	24 Ω	240 Ω	2k4	24k	240k	
2.7 Ω	27 Ω	270 Ω	2k7	27k	270k	2M7
	30 Ω	300 Ω	3k0	30k	300k	
3.3 Ω	33 Ω	330 Ω	3k3	33k	330k	3M3

Colour code chart on page 639

3.9 Ω	36 Ω	360 Ω	3k6	36k	360k	
	39 Ω	390 Ω	3k9	39k	390k	3M9
	43 Ω	430 Ω	4k3	43k	430k	
4.7 Ω	47 Ω	470 Ω	4k7	47k	470k	4M7
	51 Ω	510 Ω	5k1	51k	510k	
5.6 Ω	56 Ω	560 Ω	5k6	56k	560k	5M6
	62 Ω	620 Ω	6k2	62k	620k	
6.8 Ω	68 Ω	680 Ω	6k8	68k	680k	6M8
	75 Ω	750 Ω	7k5	75k	750k	
8.2 Ω	82 Ω	820 Ω	8k2	82k	820k	8M2
	91 Ω	910 Ω	9k1	91k	910k	10M

To order write 'M' and then the value.

E.g. M1R2, M15R, M180R, M2K2, M27K, M330K, M3M9 etc.

To order a pack of ten of any one value write 'A' and then the value.

E.g. A1R2, A15R etc. Note that if you order one A1.2R you will receive ten M1.2R and so on.

Order Code	Type	Price each
M+Value M1RtoM8R2		4p
M+Value M10RtoM1M		3p
M+Value M1M2toM2M7		4p
M+Value M3M3toM6M8		12p
M+Value M8M2toM10M		20p
A+Value A1RtoA8R2		32p
A+Value A10RtoA1M		24p
A+Value A1M2toA2M7		32p
A+Value A3M3toA6M8		95p
A+Value A8M2toA10M		£1.75

Starter Pack E12

A development pack of Min Resistors containing ten of each of the following values, 10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68 and 82 Ω , plus all the decades up to 1M Ω . 610 resistors in all.

Order Code	Type	Price each
FA08J	E12 Resistor Pack	£12.99

Starter Pack E24

A development pack of Min Resistors containing ten of each of the values, 1 Ω to 1M Ω as shown in the 'Min Res' table left. 1330 resistors in all.

Order Code	Type	Price each
FA09K	E24 Resistor Pack	£24.99

Starter Pack M Ω Values

A pack of Min Resistors containing ten of each of the following values 1.2M, 1.5M, 1.8M, 2.2M, 2.7M, 3.3M, 3.9M, 4.7M, 5.6M, 6.8M, 8.2M and 10M Ω . 120 resistors in all.

Order Code	Type	Price each
FA10L	Mega Resistor Pack	£6.99

Metal Film 2W



A very high quality metal film resistor that is physically the same size as the 1W resistor, yet has a superior specification.

Specification

Working voltage: 500V
 Tolerance: $\pm 1\%$
 Power rating: 2W at 70°C
 Temperature coefficient: $\pm 50\text{ppm}/^\circ\text{C}$
 Noise level: Typically 0.01 $\mu V/V$
 Dimensions of body: 16mm long, 5.5mm dia.

The following values (Ω) only are available:

100 Ω	1k	10k	100k	1M
120 Ω		12k		
150 Ω	1k5			
180 Ω				
220 Ω	2k2	22k	220k	
270 Ω				
330 Ω				
390 Ω		39k		
470 Ω	4k7	47k	470k	
	5k6			
68 Ω	680 Ω			
82 Ω				

To order write 'D' and then the value.

E.g. D68R, D120R, D1K5, D12K, D470K, D1M, etc.

Order Code	Type	Price each
D+Value	2W Res	10p

Carbon Film 1W



High stability, low noise

Specification

Working voltage: 500V maximum
 Tolerance: $\pm 5\%$
 Power rating: 1W at 70°C
 Temperature coefficient: -180 to -300ppm/°C
 Noise level: <0.3 $\mu V/V$
 Dimensions of body: 16mm long x 5.5mm dia.

The following values (Ω) only are available: 10, 22, 27, 33, 47.

To order write 'C' and then the value.

E.g. C22R, C47R, etc.

Order Code	Type	Price each
C+Value	1W Res	7p

Resistor Colour-Code Calculator



Simply set the three colours on the calculator in the same order as on the resistor and read the value directly. The calculator can be used with any colour-coded resistor and full instructions for use are printed on the reverse of the calculator.

Order Code	Type	Price each
XL05F	Colour Calculator	99p



BS 5750
 Part 2 1987
 Level B:
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 RS12750



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High Voltage Resistor



High stability, low noise metal film resistors.
 Working voltage 1M to 33M: 2500V AC, 3500V DC
 47M: 7000V AC, 10,000V DC
 Tolerance: $\pm 5\%$
 Power rating 1M to 33M: $\frac{1}{2}$ W at 70°C
 47M: 1W at 70°C
 Temperature coefficient: ± 200 ppm/°C
 Noise level: < 0.5 μ V/V
 Dimensions of body,
 1M to 33M: 10mm long
 x 3.7mm dia.
 47M: 18mm long
 x 6.8mm dia.

The following values (Ω) only are available:

1M 2M2 4M7
 10M 15M 22M 33M 47M

To order write 'V' and then the value.

E.g. V1M, V4M7, V22M, V47M etc.

Order Code	Type	Price each
V+Value	V1Mto V33M	20p
V+Value	V47M	49p

HIGH POWER RESISTORS

2.5 Watt Silicone Coated



A very rugged and high quality wire wound resistor with ceramic former and non-inflammable silicone cement coating. Ruggedised welded cap and lead method of construction ensure a high resistance to damage.

Specification
 Power rating at 70°C: 2.5W (3W at 20°C)
 Resistance tolerance: $\pm 5\%$
 Temperature coefficient: 200ppm/°C (max.)
 Maximum element voltage: 100V
 Ambient temperature range: -55°C to +200°C

The following values (Ω) are only available:
 0.03 Ω 0.05 Ω 0.1 Ω 0.22 Ω 0.27 Ω 0.33 Ω 0.47 Ω

To order write 'S' and then the value.

E.g. S0R03, S0R1, S0R47, etc.

Order Code	Type	Price each
S+Value	2.5W W/W Silicone	46p

3 Watt

A range of high quality wirewound resistors sealed in a high insulation cement box. The box is heat and moisture resistant and non-flammable. The resistors are low noise, very stable and have an overload capability of ten times the rated power for 5 seconds. Values over 500 Ω are metal oxide film and these have an overload capability of five times the rated power for 5 seconds.



Power rating: 3W @ 70°C
 Tolerance: $\pm 5\%$
 Temperature coefficient: ± 300 ppm/°C
 Working voltage: 200V (400V peak)
 Dimensions of body: 22 x 8 x 8mm

The following values (Ω) only are available:

0.1 Ω 1 Ω 10 Ω 100 Ω 1k 10k
 15 Ω 150 Ω 1k5 15k
 18 Ω 180 Ω
 0.22 Ω 2.2 Ω 22 Ω 220 Ω 2k2 22k
 0.27 Ω 2.7 Ω 27 Ω
 0.33 Ω 3.3 Ω 33 Ω 330 Ω 3k3
 3.9 Ω
 0.47 Ω 4.7 Ω 47 Ω 470 Ω 4k7
 0.68 Ω 6.8 Ω 68 Ω
 8.2 Ω

To order write 'W' and then the value.

E.g. W0.47, W8.2R, W10R, W100R, etc.

Order Code	Type	Price each
W+Value	W/W Min	23p

7 Watt



A range of high quality wirewound resistors sealed in a high insulation cement box. The box is heat and moisture resistant and non-flammable. The resistors are low noise, very stable and have an overload capability of ten times the rated power for 5 seconds.

Power rating: 7W @ 70°C
 Tolerance: $\pm 5\%$
 Temperature coefficient: ± 300 ppm/°C
 Working voltage: 350V (700V peak)
 Dimensions of body: 35 x 10 x 9mm

The following values (Ω) only are available:

0.1 Ω 1 Ω 10 Ω 100 Ω 1k
 15 Ω
 0.22 Ω 2.2 Ω 22 Ω 220 Ω
 0.27 Ω
 0.33 Ω
 3.9 Ω
 0.47 Ω 4.7 Ω 47 Ω 470 Ω
 5.6 Ω
 0.68 Ω 6.8 Ω
 8.2 Ω

To order write 'L' and then the value.

E.g. L0.47, L8R2, L10R, L100R, etc.

Order Code	Type	Price each
L+Value	7W W/W	30p

10 Watt

A range of high quality wirewound resistors sealed in a high insulation ceramic block. The block is heat and moisture resistant and non-flammable. The resistors are low noise, very stable and have an overload capability of ten times the rated power for 5 seconds. Value 4k7 is metal oxide film and has an overload capability of five times the rated power for 5 seconds.



Power rating: 10W @ 70°C
 Tolerance: $\pm 5\%$
 Temperature coefficient: ± 300 ppm/°C
 Working voltage: 500V (1kV peak)
 Dimensions of body: 48 x 10 x 9mm

The following values (Ω) only are available:

0.1 Ω 1 Ω 10 Ω 100 Ω 1k
 15 Ω
 0.22 Ω 2.2 Ω 22 Ω
 3.3 Ω 33 Ω
 3.9 Ω
 0.47 Ω 4.7 Ω 47 Ω 470 Ω 4k7
 0.56 Ω 5.6 Ω
 6.8 Ω 68 Ω
 8.2 Ω

To order write 'H' and then the value.

E.g. H0.47, H8.2R, H10R, H100R, etc.

Order Code	Type	Price each
H+Value	10W W/W	37p

25 Watt Wirewound

A high quality, high power, wirewound resistor in an aluminium case to aid dissipation, and can be screwed to a chassis or heatsink.



Tolerance: $\pm 5\%$
 Power rating at 70°C: 25W
 Power rating without heatsink: 12.5W
 Minimum heatsink for 25W at 25°C: 4.5°C/W
 Working voltage (max): 550V AC/DC
 Temperature coefficient
 0.47 Ω : 90ppm/°C
 1 Ω to 47 Ω : 50ppm/°C
 100 Ω : 25ppm/°C
 Dimensions: Length: 28mm
 Width: 28mm
 Height: 14.5mm
 Fixing centres: 18.3 x 19.8mm
 x 6BA (M3)
 (2 holes)

The following values (Ω) only are available:

1 Ω 10 Ω 100 Ω
 2.2 Ω
 3.9 Ω
 0.47 Ω 4.7 Ω 47 Ω
 8.2 Ω

(3.9 Ω and 8.2 Ω are stocked for use as dummy load resistors to replace supplement loudspeakers in 4 Ω and 8 Ω systems. They may be built up in series/parallel networks to suit any power system.)

To order write 'P' and then the value.

E.g. P0.47, P8.2R, P10R, P100R etc.

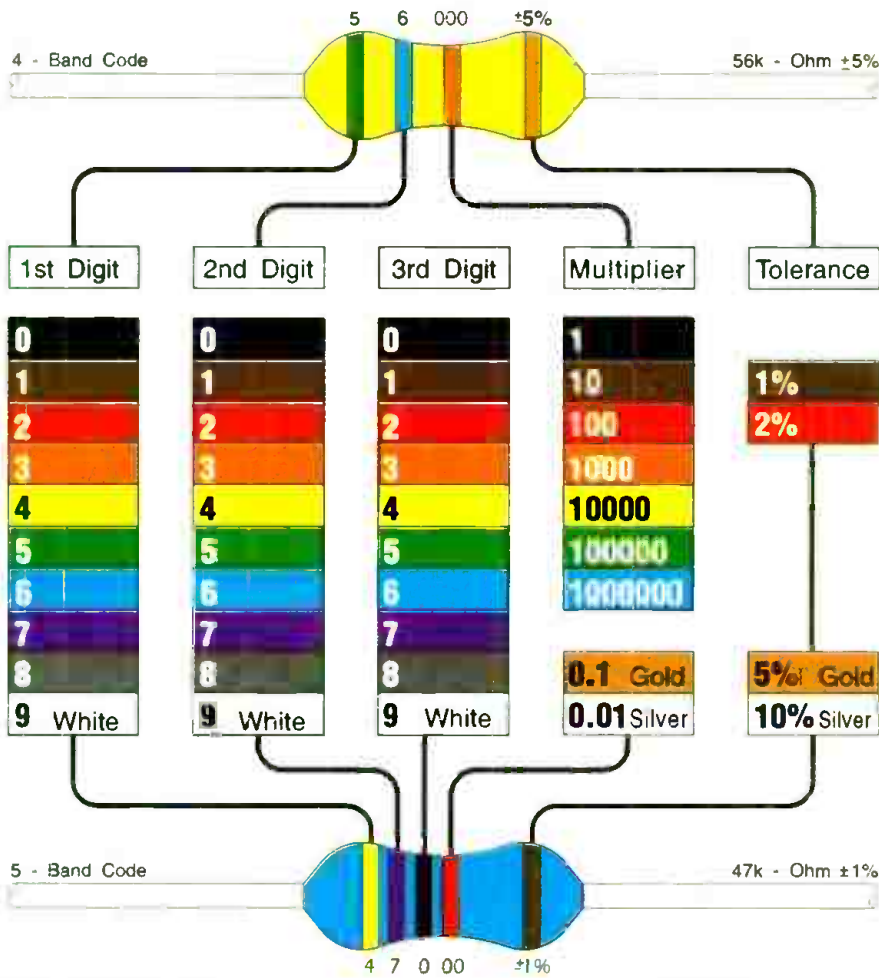
Order Code	Type	Price each
P+Value	25W W/W	£1.65

MAPLIN KEY CALL

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RESISTOR COLOUR CODE



Note: On all of the colour-coded resistors, the band at one end will be spaced further apart than the others; the resistor should be viewed with this band to the right to correspond with the chart and examples.

4-band codes

Reading from the left, bands 1 & 2 are the significant digits [1st green = 5, 2nd blue = 6].

Band 3 is the multiplier [orange = x1000].

Therefore the value of our example is 56 x 1000 ohms or 56k.

The 4th band indicates the Tolerance [gold = ±5%].

5-band codes

Reading from the left, bands 1, 2 & 3 are the significant digits [1st yellow = 4, 2nd violet = 7, 3rd black = 0].

Band 4 is the multiplier [red = x100].

Therefore the value of our example is 470 x 100 ohms or 47k.

The 5th band indicates the Tolerance [brown = ±1%].

Please note that our Min Res resistors are usually supplied with the 4-Band Code, but with an additional red band to indicate the 50ppm temperature coefficient after the brown 1% tolerance band. This additional band prevents the code being read backwards accidentally, since no value begins red, brown (21--), in the event that the extra large space between the third and fourth bands is hard to identify.

RESISTOR NETWORKS

SIL Arrays



Eight equal value, discrete thick film resistors in a narrow Single In-Line package, with 9 pins spaced at 0.1in. Ideal for use as pull-up/pull-down arrays for a parallel 8-way data bus etc, or anywhere where several commoned resistors are required, but must fit in a very confined PCB layout.

Dimensions of package: 23mm long x 2.5mm thick

Height from PCB: 5.1mm

Working voltage: 100V max

Tolerance: ±2%

Temperature coefficient: ±200ppm/°C

Power rating

(one resistor): 125mW @ 70°C

(whole package): 1W

The following values are available:-

220Ω, 330Ω, 470Ω, 1k, 2k2, 4k7, 10k, 47k, 100k.

Order Code	Type	Price each
RA24B	SIL Resistor 220F	20p
RA25C	SIL Resistor 330R	20p
RA26D	SIL Resistor 470F	20p
RA27E	SIL Resistor 1k	20p
RA28F	SIL Resistor 2k2	20p
RA29G	SIL Resistor 4k7	20p
RA30H	SIL Resistor 10k	20p
RA31J	SIL Resistor 47k	20p
RA32K	SIL Resistor 100k	20p

RESISTANCE WIRE

A 1oz reel of 28swg Constantan (55-60% copper, 45-40% nickel) wire suitable for making rheostats etc. Can be used as a thermocouple when twisted with copper wire.

A temperature difference between the wires of approx 25°C gives around 1mV with temperatures in the range 0°C to 50°C. Resistance: 4-2Ω per metre.

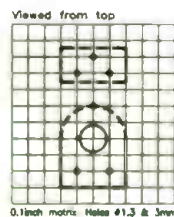


Order Code	Type	Price each
BL64U	Constantan 28 swg	£2.99

PRESETS

Sub-Miniature Fully Enclosed Carbon Presets

Citec



A new range of sub-miniature horizontal and vertical mounting linear track presets fully enclosed in a flame retardant plastic housing. The insulated slider can be adjusted from either side by tool with blade 1 to 2.3mm wide. Power rating 0.15W at 40°C. Tolerance ±20% (±30% 2.2MΩ and 4.7MΩ). Enclosure is dust and splash proof. Dimensions 10 x 10.3 x 4.5mm. Vertical type fits flush to pcb (12.1mm overall height from pcb), horizontal type sits 1.5mm proud of pcb (6mm overall height from pcb). Pins require 1.3mm dia. pcb holes. Pin length 4.5mm.

The following values are available in horizontal types: 100Ω, 220Ω, 470Ω, 1k, 2k2, 4k7, 10k, 22k, 47k, 100k, 220k, 470k, 1M, 2M2, 4M7.

Order Code	Type	Price each
UF97F	Hor Encl Preset 100R	19p
UF98G	Hor Encl Preset 220R	19p
UF99H	Hor Encl Preset 470R	19p
UH00A	Hor Encl Preset 1k	19p
UH01B	Hor Encl Preset 2k2	19p
UH02C	Hor Encl Preset 4k7	19p
UH03D	Hor Encl Preset 10k	19p
UH04E	Hor Encl Preset 22k	19p
UH05F	Hor Encl Preset 47k	19p
UH06G	Hor Encl Preset 100k	19p
UH07H	Hor Encl Preset 220k	19p
UH08J	Hor Encl Preset 470k	19p
UH09K	Hor Encl Preset 1M	19p
UH10L	Hor Encl Preset 2M2	19p
UH11M	Hor Encl Preset 4M7	19p

The following values are available in vertical types: 470Ω, 1k, 2k2, 4k7, 10k, 22k, 47k, 100k, 220k, 470k, and 1M.

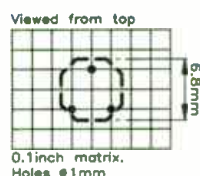
Order Code	Type	Price each
UH12N	Vrt Encl Preset 470R	19p
UH13P	Vrt Encl Preset 1k	19p
UH14Q	Vrt Encl Preset 2k2	19p
UH15R	Vrt Encl Preset 4k7	19p
UH16S	Vrt Encl Preset 10k	19p
UH17T	Vrt Encl Preset 22k	19p
UH18U	Vrt Encl Preset 47k	19p
UH19V	Vrt Encl Preset 100k	19p
UH20W	Vrt Encl Preset 220k	19p
UH21X	Vrt Encl Preset 470k	19p
UH22Y	Vrt Encl Preset 1M	19p

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Cermet Preset

Citec



A miniature horizontal mounting cermet preset featuring high stability and excellent resolution. It has an integral dust cover, fits 0.1in matrix directly, and may be adjusted by a screwdriver from either side. Linear track only.

Tolerance: $\pm 20\%$. Power rating: 0.3W at 70°C. Max volt: 100V DC or AC. Temperature coefficient: $\pm 200\text{ppm}/^\circ\text{C}$. Dimensions 7.8mm diameter, stands 7.4mm high from pcb. Value is marked on case as shown in brackets.

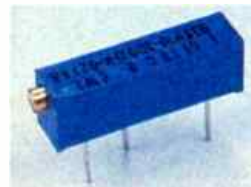
The following values are available:

100 Ω (101), 500 Ω (501), 1k (102), 5k (502), 10k (103), 50k (503), 100k (104), 1M (105).

Order Code	Type	Price each
WR38R	Cermet 100R	45p
WR39N	Cermet 500R	45p
WR40T	Cermet 1k	45p
WR41U	Cermet 5k	45p
WR42V	Cermet 10k	45p
WR43W	Cermet 50k	45p
WR44X	Cermet 100k	45p
WR45Y	Cermet 1M	45p

18-Turn Cermet Preset

Citec



An 18-turn Cermet preset with slipping clutch (23 mechanical turns), end stops and infinite electrical resolution. Power rating 0.75W at 70°C. Max working voltage 315V. Tolerance: $\pm 10\%$. Temperature coefficient: $\pm 100\text{ppm}/^\circ\text{C}$ max.

Values available:

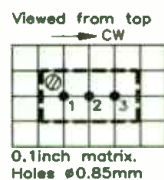
500 Ω , 1k, 5k, 10k, 50k, 100k, 1M

The dust proof and immersion proof case measures 19.3mm x 5mm x 6.6mm high and the terminal pins are at 7.62mm (0.3in) and 5.08mm (0.2in) spacing, the centre pin being offset by 2.54mm (0.1in).

Order Code	Type	Price each
WR46A	18-Turn Cermet 500R	80p
WR47B	18-Turn Cermet 1k	80p
WR48C	18-Turn Cermet 5k	80p
WR49D	18-Turn Cermet 10k	80p
WR50E	18-Turn Cermet 50k	80p
WR51F	18-Turn Cermet 100k	80p
UH29G	18-Turn Cermet 1M	80p

3/8 in. Square 22-Turn Cermet Preset

Citec



A 22-turn cermet preset with slipping clutch (25 mechanical turns) and an audible click at each end of travel to define the ends. This professional quality trimmer is designed for applications where reliability and small size are major considerations. Infinite electrical resolution. Power rating 0.5W at 70°C. Tolerance $\pm 10\%$. Max working voltage 300V. Temperature coefficient: $\pm 100\text{ppm}/^\circ\text{C}$ max

Values available:

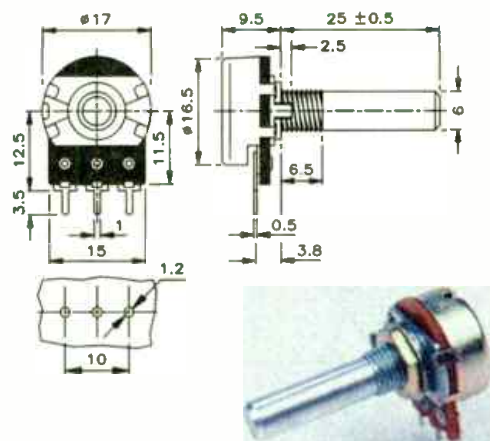
1k, 5k, 10k, 50k, 100k, 1M.

The dust proof and immersion proof case measures 9.6 x 4.8 x 10mm high. Drive head stands a further 1.5mm high. Lead length 6.2mm. Pins are in-line on 0.1in. centres.

Order Code	Type	Price each
UH23A	22-Turn Cermet 1k	£1.28
UH24B	22-Turn Cermet 5k	£1.28
UH25C	22-Turn Cermet 10k	£1.28
UH26D	22-Turn Cermet 50k	£1.28
UH27E	22-Turn Cermet 100k	£1.28
UH28F	22-Turn Cermet 1M	£1.28

ROTARY POTENTIOMETERS

Miniature Type



A range of miniature rotary carbon track potentiometers with printed circuit board mounting terminals. Fixing hole required: 7mm. Power rating: 0.2W linear, 0.1W log. Max voltage: 200V linear, 150V log. Overall shaft length 25mm. Linear types are marked 'B' and log types are marked 'A'.

The following values are available with a linear track:

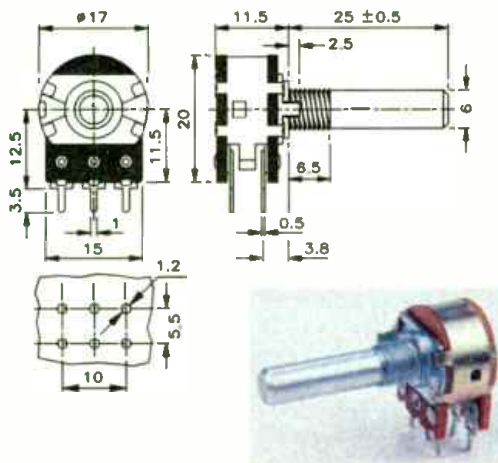
1k, 4k7, 10k, 22k, 47k, 100k, 470k, 1M

The following values are available with logarithmic track:

10k, 47k, 100k, 1M

Order Code	Type	Price each
JM69A	Min Pot Lin 1k	58p
JM70M	Min Pot Lin 4k7	58p
JM71N	Min Pot Lin 10k	58p
JM72P	Min Pot Lin 22k	58p
JM73Q	Min Pot Lin 47k	58p
JM74R	Min Pot Lin 100k	58p
JM75S	Min Pot Lin 470k	58p
JM76H	Min Pot Lin 1M	58p
JM77J	Min Pot Log 10k	58p
JM78K	Min Pot Log 47k	58p
JM79L	Min Pot Log 100k	58p
JM80B	Min Pot Log 1M	58p

Dual Miniature Type



A range of dual miniature rotary carbon track potentiometers with printed circuit board mounting terminals. Fixing hole required: 7mm. Power rating: 0.125W linear, 0.06W log. Max voltage: 200V linear, 150V log. Overall shaft length 20mm. Linear types are marked 'B' and log types are marked 'A'.

The following values are available with a linear track:

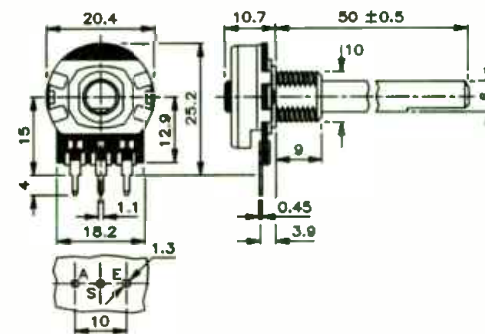
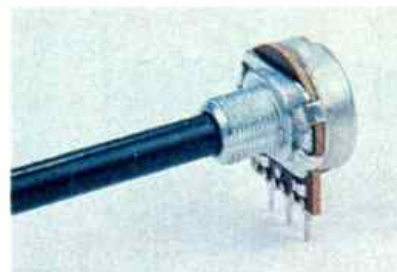
10k, 100k

The following values are available with logarithmic track:

10k, 100k

Order Code	Type	Price each
JM81C	Min Dual Pot Lin 10k	99p
JM82D	Min Dual Pot Lin 100k	99p
JM83E	Min Dual Pot Log 10k	99p
JM84F	Min Dual Pot Log 100k	99p

Standard Type



A range of carbon track potentiometers with printed circuit board mounting terminals. Fixing hole required: 10.5mm ($13/32$ in.). Power rating: 0.4W linear, 0.2W log. Max. volt: 500V DC. Tolerance: $\pm 20\%$. Overall shaft length 50mm.

The following values are available with a linear track:

1k, 4k7, 10k, 22k, 47k, 100k, 220k, 470k, 1M, 2M2

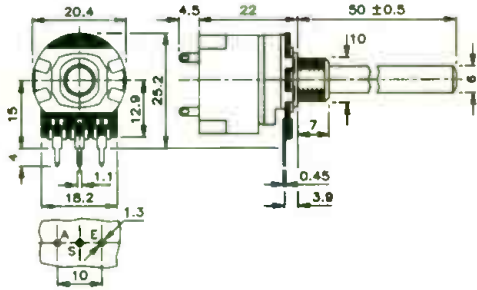
Order Code	Type	Price each
FW00A	Pot Lin 1k	69p
FW01B	Pot Lin 4k7	69p
FW02C	Pot Lin 10k	69p
FW03D	Pot Lin 22k	69p
FW04E	Pot Lin 47k	69p
FW05F	Pot Lin 100k	69p
FW06G	Pot Lin 220k	69p
FW07H	Pot Lin 470k	69p
FW08J	Pot Lin 1M	69p
FW09K	Pot Lin 2M2	69p

The following values are available with a logarithmic track:

4k7, 10k, 22k, 47k, 100k, 220k, 470k, 1M, 2M2

Order Code	Type	Price each
FW21X	Pot Log 4k7	72p
FW22Y	Pot Log 10k	72p
FW23A	Pot Log 22k	72p
FW24B	Pot Log 47k	72p
FW25C	Pot Log 100k	72p
FW26D	Pot Log 220k	72p
FW27E	Pot Log 470k	72p
FW28F	Pot Log 1M	72p
FW29G	Pot Log 2M2	72p

Standard Type with Switch



A range of rotary carbon track potentiometers with DPST switch. The potentiometer has printed circuit mounting terminals. Fixing hole required: 10.5mm (13/32 in.). Power rating: 0.4W linear, 0.2W log. Max. voltage: 500V DC. Tolerance: ±20%. Switch rating 4A at 250V AC. Overall shaft length 50mm.

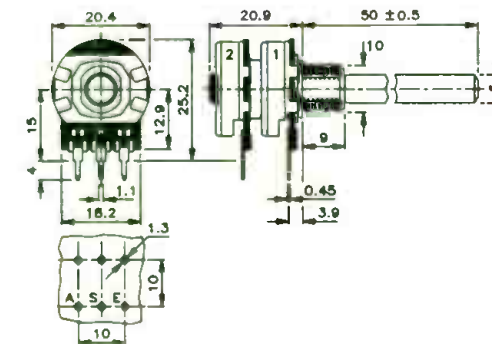
The following values are available with a linear track: 4k7, 1k, 10k, 22k, 47k, 100k, 220k, 470k, 1M

Order Code	Type	Price each
FW41U	Sw Pot Lin 4k7	£1.85
KU91Y	Sw Pot Lin 1k	£1.85
FW42V	Sw Pot Lin 10k	£1.85
FW43W	Sw Pot Lin 22k	£1.85
FW44X	Sw Pot Lin 47k	£1.85
FW45Y	Sw Pot Lin 100k	£1.85
FW46A	Sw Pot Lin 220k	£1.85
FW47B	Sw Pot Lin 470k	£1.85
FW48C	Sw Pot Lin 1M	£1.85

The following values are available with a logarithmic track: 4k7, 10k, 47k

Order Code	Type	Price each
FW62S	Sw Pot Log 4k7	£2.05
FW63T	Sw Pot Log 10k	£2.05
FW65V	Sw Pot Log 47k	£2.05

Standard Dual-Gang Type



A range of rotary dual-gang carbon track potentiometers with printed circuit mounting terminals. Fixing hole required: 10.5mm (13/32 in.). Power rating: 0.4W linear, 0.2W log. Max. voltage: 500V DC. Tolerance: ±20%. Overall shaft length 50mm.

The following values are available with a linear track: 4k7, 10k, 22k, 47k, 100k, 220k, 470k, 1M, 2M2

Order Code	Type	Price each
FW84F	Dual Pot Lin 4k7	£1.79
FW85G	Dual Pot Lin 10k	£1.79
FW86T	Dual Pot Lin 22k	£1.79
FW87U	Dual Pot Lin 47k	£1.79
FW88V	Dual Pot Lin 100k	£1.79
FW89W	Dual Pot Lin 220k	£1.79
FW90X	Dual Pot Lin 470k	£1.79
FW91Y	Dual Pot Lin 1M	£1.79
FW92A	Dual Pot Lin 2M2	£1.79

The following values are available with a logarithmic track: 4k7, 10k, 22k, 47k, 100k, 220k, 470k

Order Code	Type	Price each
FX08J	Dual Pot Log 4k7	£1.85
FX09K	Dual Pot Log 10k	£1.85
FX10L	Dual Pot Log 22k	£1.85
FX11M	Dual Pot Log 47k	£1.85
FX12N	Dual Pot Log 100k	£1.85
FX13P	Dual Pot Log 220k	£1.85
FX14Q	Dual Pot Log 470k	£1.85

Spare Nuts and Washers

Spare nuts and washers to suit the above rotary potentiometers. Available in packs of 10. Size M10.

Order Code	Type	Price each
FP06G	M10 Pot Nut 10 Pk	56p
FP07H	M10 Pot Washer 10 Pk	56p

HIGH POWER POTENTIOMETERS

Cermet Type

Citec



A high quality cermet element rotary potentiometer for panel mounting. The cermet element gives excellent electrical and thermal stability, reliability, low noise and long life. Linear track.

Power rating: 2W at 70°C
Tolerance: ±10%
Working voltage: 315V max

Dimensions: Body diameter 19mm, height 12.7mm max. Bush 3/8 in. (9.5mm) diameter, flattened on opposing sides to 8.6mm, 10mm long. Requires 3/8 in. (9.5mm) diameter panel cut-out. Spindle: standard 1/4 in. (6.35mm), 15mm long. Pins 4mm long. Centre pin is wiper.

The following values are available: 47Ω, 100Ω, 470Ω, 1k, 4k7, 10k, 47k, 100k, 1M.

Order Code	Type	Price each
YP02C	High Power Pot 47R	£3.89
YP03D	High Power Pot 100R	£3.89
YP04E	High Power Pot 470R	£3.89
YP05F	High Power Pot 1k	£3.89
YP06G	High Power Pot 4k7	£3.89
YP07H	High Power Pot 10k	£3.89
YP08J	High Power Pot 47k	£3.89
YP09K	High Power Pot 100k	£3.89
YP10L	High Power Pot 1M	£3.89

Loudspeaker Volume Controls

Wirewound controls with 6.3mm (1/4 in.) dia. shaft, 9.5mm long. Standard 3/8 in. hole mounting. Ideal for use as a loudspeaker volume control. Available in four values: 20Ω, 50Ω, 100Ω, and 200Ω. Power rating: 3.5W.



Order Code	Type	Price each
FX40T	L/S Control 20R	£1.50
FX97F	L/S Control 50R	£1.50
FX98G	L/S Control 100R	£1.50
FX99H	L/S Control 200R	£1.50

SLIDE POTENTIOMETERS

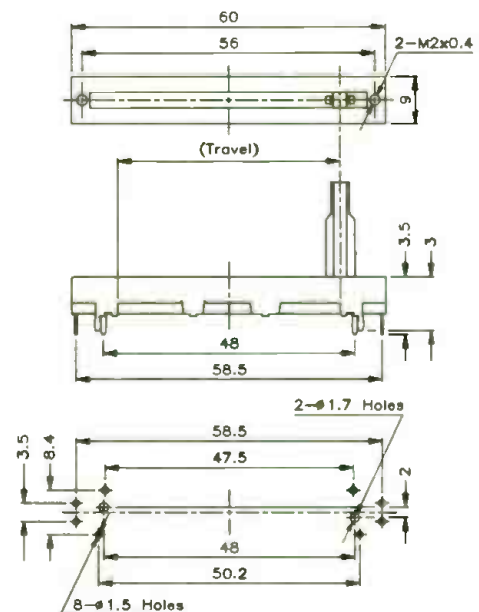
Miniature Dual Gang



A range of dual miniature slide track carbon potentiometers with printed circuit board mounting terminals. Potentiometer measures 60mm long x 9mm wide with a 45mm track length. Height above PCB (excluding slide tang) 6.5mm. The pin spacing is not compatible with 0.1 inch matrix board. The potentiometer may be attached to a front panel using two M2 bolts, fixing centres 56mm. Slide tang is 15mm long. Slide Knob B (YG09K) fits the tang on these sliders. Linear types are marked 'B' and log types are marked 'A'.

The following values are available with a linear track: 10k, 100k

The following values are available with logarithmic track: 10k, 100k



Order Code	Type	Price each
JM85G	Min Slide Lin 10k	99p
JM86T	Min Slide Lin 100k	99p
JM87U	Min Slide Log 10k	99p
JM88V	Min Slide Log 100k	99p

THERMISTORS

A range of negative temperature coefficient thermistors. The resistance R_{T_1} of a thermistor at a temperature T_1 °K can be found by inserting the resistance R_{T_2} at a given temperature T_2 °K in the following equation:

$$R_{T_1} = R_{T_2} \exp\left(B \left(\frac{1}{T_1} - \frac{1}{T_2} \right)\right)$$

where B is the characteristic temperature for any given thermistor in °K and e is the exponential factor (= 2.7183). °K = °C + 273.

Disc Thermistor

Philips



Disc type lacquer coated thermistor suitable for use in temperature measurement, control and compensation applications.

Diameter: 5.0mm (±0.3mm)
 Power (max): 0.5W $T_{amb} = 25^\circ\text{C}$
 Dissipation factor: 8.5mW/°C
 Temperature range: -25°C to +125°C reducing to 0°C to +55°C at max. power

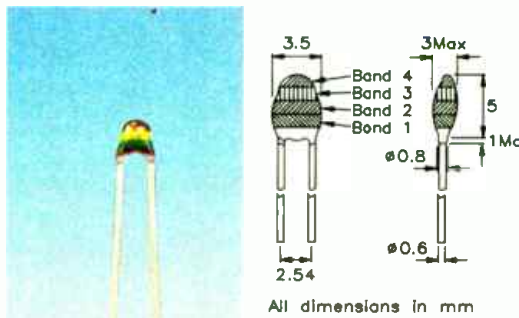
Tolerance: 10%

R at 25°C (±20%)	B(°K)	R at 125°C (approx)	Equivalent
1500Ω	3975	52.5Ω	VA1098

Order Code	Type	Price each
UL82D	Thermistor 1500R	60p

Bead Thermistors

Philips



Bead type thermistors for general applications including temperature measurement and compensation.

Tolerance: ±5%
 Power (max): 250mW
 Dissipation factor: 7mW/°C
 Response time: 1.2 secs
 Thermal time constant: 11 secs
 Temperature range: -40°C to +125°C reducing to 0° to 55°C at max power

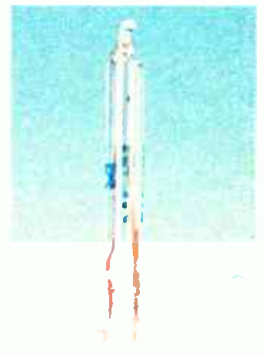
R at 25°C	B(°K)	R at 100°C (approx)	R at 0°C (approx)
4k7	3977	318.4Ω	15.28kΩ
15k	3740	1.19kΩ	45.13kΩ
47k	4090	2.94kΩ	155.6kΩ
150k	4370	7.73kΩ	534.9kΩ

R at 25°C	Band 1	Band 2	Band 3	Band 4
4k7	Yellow	Violet	Red	Gold
15k	Brown	Green	Orange	Gold
47k	Yellow	Violet	Orange	Gold
150k	Brown	Green	Yellow	Gold

Order Code	Type	Price each
FX21X	Thermistor 4k7	69p
FX22Y	Thermistor 15k	69p
FX42V	Thermistor 47k	69p
FX43W	Thermistor 150k	69p

Bead Thermistor Type R53

Directly heated bead type thermistor housed in evacuated glass bulb, designed for operation at very low power levels owing to its exceptionally high sensitivity and is thus particularly suitable for use in transistor circuits.



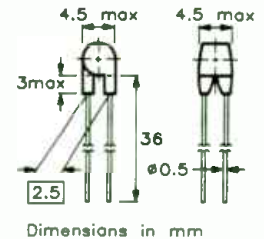
Length: 25.4mm (max)
 Diameter: 4mm (approx)
 Power at 20°C max: 3mW
 Power sensitivity: 62.5°C/mW
 Dissipation factor: 0.016mW/°C
 Max. operating temperature: 175°C (ambient), 220°C (bead)
 R at 20°C (±20%): 5000Ω
 R at 25°C (±20%): 4200Ω
 B (°K): 3100

Typical resistance at 3mW dissipation in free air at 20°C: 63Ω.

Order Code	Type	Price each
FX62S	Thermistor R53	£12.99

100k Bead Thermistor

Siemens



A 100k bead thermistor for general applications, in particular, accurate temperature measurement. The case has a black epoxy resin coating and tinned leads.

Specification

Tolerance: ±2%
 Power (max.): 350mW at 25°C 220mW at 60°C
 Dissipation factor: 3.5mW/K
 Heat capacity: 40mJ/K approx.
 Thermal time constant (air): 12secs approx.
 Temperature range: -55°C to +155°C
 B value: 4450°K
 Approx. resistance at 25°C: 100kΩ
 100°C: 4.77kΩ
 0°C: 352.4kΩ

Order Code	Type	Price each
CR05F	Thermistor 100k	75p



BS 5750 Part 2 1987
 Level B: Quality Assurance
 RS12750



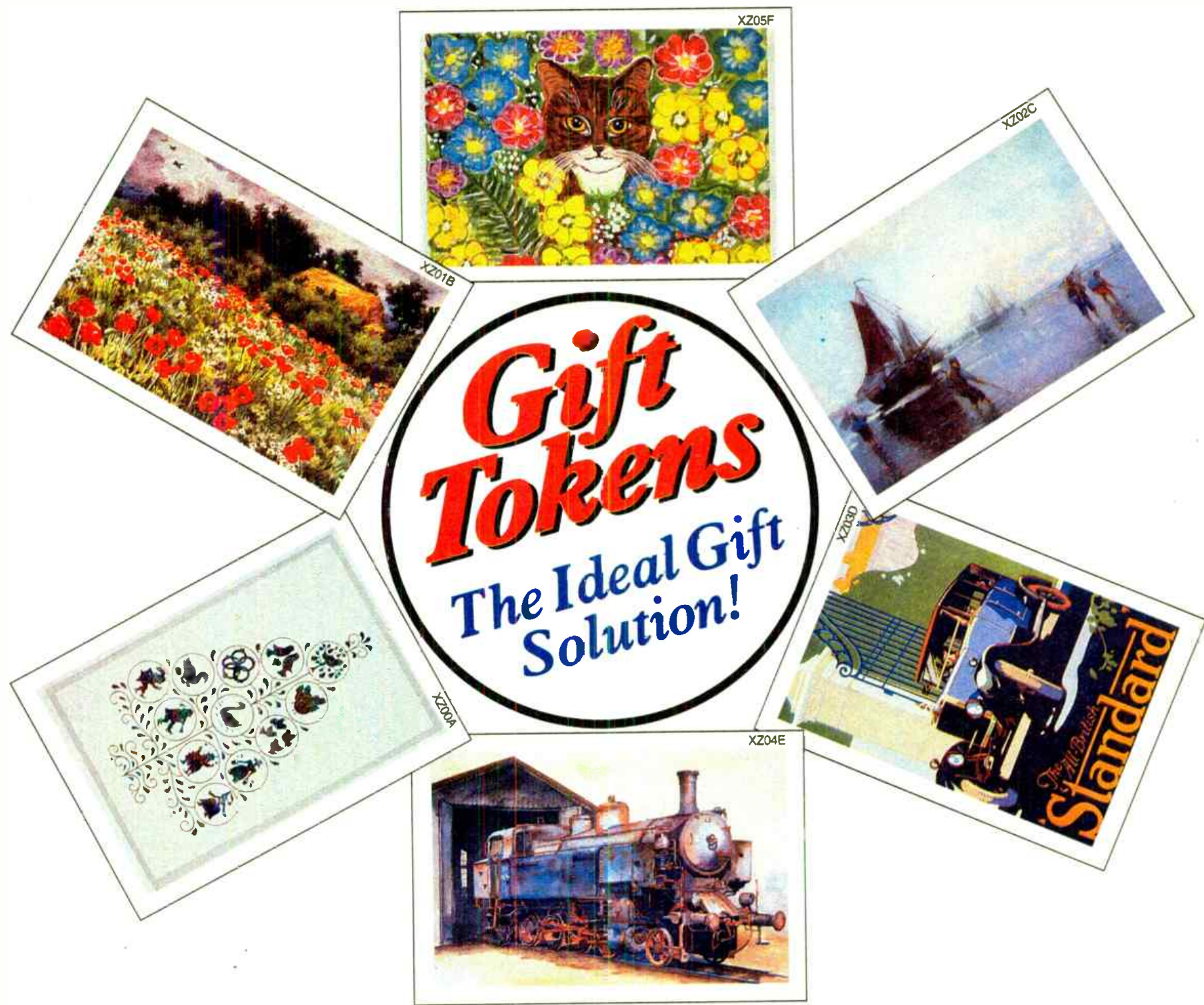
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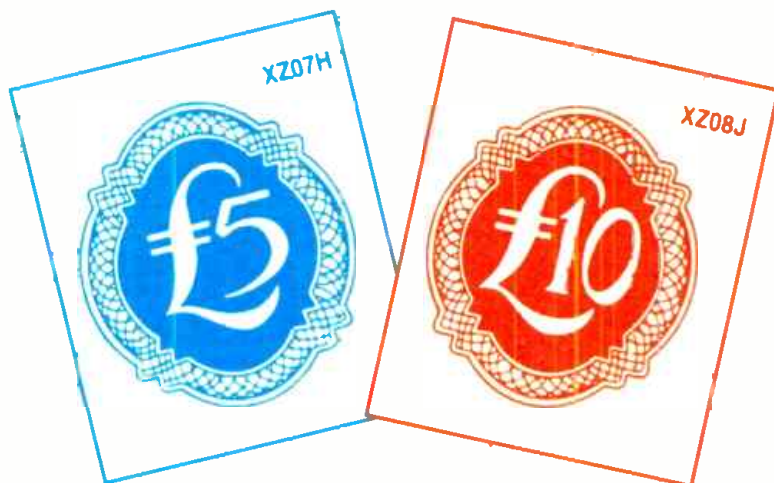
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Order Code	Device	Type	Page
QR59P	2SC1162	NPN Power Transistor	652
QF03D	BD131	NPN Power Transistor	652
QF05F	BD132	PNP Power Transistor	652
QF06G	BD135	NPN Power Transistor	652
QF75S	BD136	PNP Power Transistor	652
QF07H	BD139	NPN Power Transistor	652
QF08J	BD140	PNP Power Transistor	652
UM78K	BD539C	NPN Power Transistor	652
UM79L	BD540C	PNP Power Transistor	652
WH15R	BD711	NPN Power Transistor	652
WH16S	BD712	PNP Power Transistor	652
UJ15R	BD911	NPN Power Transistor	652
UJ16S	BD912	PNP Power Transistor	652
UM80B	BDX53C	NPN Power Darlington Transistor	652
UM81C	BDX54C	PNP Power Darlington Transistor	652
QF39N	BU208	NPN Power Transistor	652
UJ17T	BU208A	NPN Power Transistor	652
UJ18U	BU806	NPN Darlington Power Transistor	652
UJ21X	BUV47A	NPN Power Transistor	652
UJ24B	MJ11015	PNP Darlington Power Transistor	652
UJ25C	MJ11015	NPN Darlington Power Transistor	652
QH57M	MJ2501	PNP Darlington Power Transistor	652
BL38R	MJ2955	PNP Power Transistor	652
QH58N	MJ3001	NPN Darlington Power Transistor	652
UJ26D	MJE13005	NPN Power Transistor	652
UJ27E	MJE13007	NPN Power Transistor	652
QH54J	MJE340	NPN Power Transistor	652
WO51F	MJE350	PNP Power Transistor	652
WO73Q	TIP122	NPN Power Darlington Transistor	652
WO74R	TIP127	PNP Power Darlington Transistor	652
UJ30H	TIP142	NPN Darlington Power Transistor	652
UJ31J	TIP147	PNP Darlington Power Transistor	652
QH55K	TIP2955	PNP Power Transistor	652
QH56L	TIP3055	NPN Power Transistor	652
QL15R	TIP31A	NPN Power Transistor	652
UM82D	TIP31C	NPN Power Transistor	652
QL16S	TIP32A	PNP Power Transistor	652
UM83E	TIP32C	PNP Power Transistor	652
WO71N	TIP33A	NPN Power Transistor	652
WO72P	TIP34A	PNP Power Transistor	652
UJ28F	TIP35C	NPN Power Transistor	652
UJ29G	TIP36C	PNP Power Transistor	652
QL17T	TIP41A	NPN Power Transistor	652
QL18U	TIP42A	PNP Power Transistor	652
UM84F	TIPL770	NPN Power Transistor	652

Table 4. Small Signal HF Silicon Transistors

Order Code	Device	Type	Page
UH54J	2N2222A	High Frequency Transistor	652
QR12N	2N2369A	High Frequency Transistor	652
QF09K	BF115	High Frequency Transistor	652
OY53H	BF173	High Frequency Transistor	652
QQ19V	BF494	High Frequency Transistor	652
UH34M	BFR90A	High Frequency Transistor	652
QQ64U	BFY90	High Frequency Transistor	652
QF32K	BSX20	High Frequency Transistor	652
CR01B	MPSH10	High Frequency Transistor	652

Table 5. Medium Power HF Silicon Transistors

Order Code	Device	Type	Page
QR38R	2N3866	High Frequency Power Transistor	653
UK78K	2N4427	High Frequency Transistor	653
QF18U	BF259	High Frequency Transistor	653
QF19V	BF337	High Frequency Transistor	653

Table 6. N Channel Field Effect Transistors

Order Code	Device	Type	Page
QR36P	2N3819	Field Effect Transistor	653
QR50E	2N5459	Field Effect Transist	653
UF89W	2N7030	Fetlington	653
QF16S	BF244A	Field Effect Transistor	653
DB32K	J109	N Channel FET	653
DB33L	J112	N Channel FET	653
QH59P	MPF102	Field Effect Transistor	653
	NE08837	see 3SK88	653

Table 7. P Channel Field Effect Transistors

Order Code	Device	Type	Page
UL38R	2N5460	Field Effect Transistor	653

Table 8. Power MOSFETS

Order Code	Device	Type	Page
AY49D	2SJ114	Power Mosfet	653
AY46A	2SJ160	Power Mosfet	653
AY47B	2SJ161	Power Mosfet	653
UR41U	2SJ162	Power MOSFET	653
QQ34M	2SJ48	Power MOSFET	653
QQ35Q	2SJ49	Power MOSFET	653

Order Code	Device	Type	Page
QW09K	2SJ50	Power MOSFET	653
AY50E	2SK1056	Power Mosfet	653
AY51F	2SK1057	Power Mosfet	653
UR40T	2SK1058	Power MOSFET	653
QQ36P	2SK133	Power MOSFET	653
QQ37S	2SK134	Power MOSFET	653
AY53H	2SK400	Power Mosfet	653
UJ32K	BUZ10	Power MOSFET	653
UJ33L	BUZ11	Power MOSFET	653
UL41U	BUZ31	Power MOSFET	653
UR43W	IRF540	Power MOSFET	653
UR44X	IRF630	Power MOSFET	653
UR45Y	IRF640	Power MOSFET	653
UR46A	IRF740	Power MOSFET	653
UR47B	IRF830	Power MOSFET	653
UR48C	IRF840	Power MOSFET	653
UR50E	IRFP250	Power MOSFET	653
UR49D	IRFP450	Power MOSFET	653
QQ27E	VN10KM	VMOS POWER FET	653
UL35Q	VN1210M	VMOS POWER FET	653
WQ97F	VN66AF	VMOS POWER FET	653

Table 9. N and P Channel Lateral Power MOSFETS

Order Code	Device	Type	Page
AY56L	ECF10N16	Power Mosfet	653
AY57M	ECF10N20	Power Mosfet	653
AY54J	ECF10P16	Power Mosfet	653
AY55K	ECF10P20	Power Mosfet	653

Table 10. Unijunction Transistors

Order Code	Device	Type	Page
QR14Q	2N2646	Unijunction Transistors	654

Table 11. Programmable Unijunction Trans.

Order Code	Device	Type	Page
F31J	BRY39	Programmable Unijunction Trans.	654

Table 12. Signal Diodes

Order Code	Device	Type	Page
QL80B	1N4148	Signal Diode	654
QL71N	1N914	Signal Diode	654
QL72P	1N916	Signal Diode	654
QQ13P	BAR28	Schottky Diode	654
QB28F	BAX13	Signal Diode	654
QB29G	BAX16	Signal Diode	654
QF44X	BY206	Signal Diode	654
QH70M	OA47	Germanium Signal Diode	654
QH71N	DA90	Germanium Signal Diode	654
QH72P	OA91	Germanium Signal Diode	654
QH73Q	OA95	Germanium Signal Diode	654

Table 13. Low Leakage Diodes

Order Code	Device	Type	Page
DB35Q	J-PAD5	Low Leakage Diode	654

Table 14. Varicaps

Order Code	Device	Type	Page
YH83E	BB212	Varicap Diode	654
QY81C	MV2108	Varicap Diode	654

Table 15. Rectifier Diodes

Order Code	Device	Type	Page
QF42V	BY127	1A Rectifier Diode 1250V	654
QL73Q	1N4001	Rectifier Diode 1A 50V	654
QL74R	1N4002	Rectifier Diode 1A 100V	654
QL75S	1N4003	Rectifier Diode 1A 200V	654
QL76H	1N4004	Rectifier Diode 1A 400V	654
QL77J	1N4005	Rectifier Diode 1A 600V	654
QL78K	1N4006	Rectifier Diode 1A 800V	654
QL79L	1N4007	Rectifier Diode 1A 1000V	654
QL81C	1N5400	Rectifier Diode 3A 50V	654
QL82D	1N5401	Rectifier Diode 3A 100V	654
QL83E	1N5402	Rectifier Diode 3A 200V	655
QL84F	1N5404	Rectifier Diode 3A 400V	655
QL85G	1N5406	Rectifier Diode 3A 600V	655
QL86T	1N5407	Rectifier Diode 3A 800V	655
QL87U	1N5408	Rectifier Diode 3A 1000V	655
YH96E	MR751	Rectifier Diode 6A 100V	655
YH97F	MR754	Rectifier Diode 6A 400V	655
UK59P	P600A	6A Rectifier Diode 50V	655
UK60Q	P600D	6A Rectifier Diode 200V	655
UK61R	P600J	6A Rectifier Diode 600V	655
AY26D	R250S	6A/800V Diode	655

Table 16. Fast Rec. Rectifier Diodes

Order Code	Device	Type	Page
UL34M	BYW51-200	2 x 8A Fast Rectifier 200V	655
UK63T	BYW80-150	8A Fast Rectifier 150V	655
AH56L	BYW80-100	Diode	655
AH57M	BYW80-200	Diode	655
AH56L	BYW80-100	Diode	655
UK65V	BYW98-150	3A Fast Rectifier 150V	655

Table 17. Schottky Rectifier Diodes

Order Code	Device	Type	Page
GX29G	1N5820	Schottky Rectifier Diode	655
GX30H	1N5822	Schottky Rectifier Diode	655
GX32K	MBR1045	Schottky Rectifier Diode	655
GX33L	MBR1090	Schottky Rectifier Diode	655
GX34M	MBR1535CT	Schottky Rectifier Diode	655
GX35Q	MBR2045CT	Schottky Rectifier Diode	655
GX36P	MBR2080CT	Schottky Rectifier Diode	655
GX38R	MBR3045PT	Schottky Rectifier Diode	655
GX39N	MBR3045WT	Schottky Rectifier Diode	655
GX31J	MBR745	Schottky Rectifier Diode	655

Table 18. Fast Recovery Rectifiers

Order Code	Device	Type	Page
GX40T	MUR120	Fast Recovery Rectifier	655
GX43W	MUR1615CT	Fast Recovery Rectifier	655
GX41U	MUR420	Fast Recovery Rectifier	655
GX42V	MUR820	Fast Recovery Rectifier	655

Table 19. Bridge Rectifiers

Order Code	Device	Type	Page
BH45Y	J005	Bridge Rectifier 10A 50V	655
BL36P	J02	Bridge Rectifier 10A 200V	655
BH46A	J04	Bridge Rectifier 10A 400V	655
BH47B	K01	Bridge Rectifier 25A 130V	655
BH48C	K04	Bridge Rectifier 25A 400V	655
WQ57M	PW01	Bridge Rectifier 6A 100V	655
WQ58N	PW06	Bridge Rectifier 6A 600V	655
QL09K	S005	Bridge Rectifier 2A 50V	655
QL10L	S04	Bridge Rectifier 2A 400V	655
QL37S	W005	Bridge Rectifier 1.5A 50V	655
QL38R	W01	Bridge Rectifier 1.5A 100V	655
QL39N	W02	Bridge Rectifier 1.5A 200V	655
QL40T	W04	Bridge Rectifier 1.5A 400V	655

Table 20. Zener Diodes

Order Code	Device	Type	Page
AY65V	1N5338BRL	5.0W Zener Diode 5.1V	656
QX35Q	1N5339B	5.0W Zener Diode 5.6V	656
AY66W	1N5341BRL	5.0W Zener Diode 6.2V	656
AY67X	1N5342BRL	5.0W Zener Diode 6.8V	656
QX36P	1N5344B	5.0W Zener Diode 8.2V	656
AY68Y	1N5346BRL	5.0W Zener Diode 9.1V	656
AY69A	1N5347BRL	5.0W Zener Diode 10V	656
AY70M	1N5348BRL	5.0W Zener Diode 11V	656
AY71N	1N5349BRL	5.0W Zener Diode 12V	656
AY72P	1N5352BRL	5.0W Zener Diode 15V	656
AY78K	1N5353BRL	5.0W Zener Diode 16V	656
AY73Q	1N5355BRL	5.0W Zener Diode 20V	656
AY74R	1N5357BRL	5.0W Zener Diode 22V	656
AY75S	1N5358BRL	5.0W Zener Diode 24V	656
AY76H	1N5359BRL	5.0W Zener Diode 27V	656
AY77J	1N5361BRL	5.0W Zener Diode 30V	656
AY79L	1N5364BRL	5.0W Zener Diode 33V	656
AY80B	1N5365BRL	5.0W Zener Diode 36V	656
AY81C	1N5366BRL	5.0W Zener Diode 39V	656
AY82D	1N5367BRL	5.0W Zener Diode 43V	656
AY83E	1N5368BRL	5.0W Zener Diode 47V	656
AY84F	1N5373BRL	5.0W Zener Diode 68V	656
AY85G	1N5378BRL	5.0W Zener Diode 100V	656
AY86T	1N5380BRL	5.0W Zener Diode 120V	656
AY87U	1N5386BRL	5.0W Zener Diode 180V	656
AY88V	1N5388BRL	5.0W Zener Diode 200V	656
QF45A	BZX61C4V7	1.3W Zener Diode 4.7V	656
QF46A	BZX61C5V1	1.3W Zener Diode 5.1V	656
QF47B	BZX61C5V6	1.3W Zener Diode 5.6V	656
QF48C	BZX61C6V2	1.3W Zener Diode 6.2V	656
QF49D	BZX61C6V8	1.3W Zener Diode 6.8V	656
QF50E	BZX61C7V5	1.3W Zener Diode 7.5V	656
QF51F	BZX61C8V2	1.3W Zener Diode 8.2V	656
QF52G	BZX61C9V1	1.3W Zener Diode 9.1V	656
QF53H	BZX61C10	1.3W Zener Diode 10V	656
QF54J	BZX61C11	1.3W Zener Diode 11V	656
QF55K	BZX61C12	1.3W Zener Diode 12V	656
QF56L	BZX61C13	1.3W Zener Diode 13V	656
QF57M	BZX61C15	1.3W Zener Diode 15V	656
QF58N	BZX61C16	1.3W Zener Diode 16V	656
QF59P	BZX61C18	1.3W Zener Diode 18V	656

Order Code	Device	Type	Page
QF60Q	BZX61C20	1.3W Zener Diode 20V	656
QF61R	BZX61C22	1.3W Zener Diode 22V	656
QF62S	BZX61C24	1.3W Zener Diode 24V	656
QF63T	BZX61C27	1.3W Zener Diode 27V	656
QF64U	BZX61C30	1.3W Zener Diode 30V	656
QF65V	BZX61C33	1.3W Zener Diode 33V	656
QF66W	BZX61C36	1.3W Zener Diode 36V	656
QF67X	BZX61C39	1.3W Zener Diode 39V	656
QF68Y	BZX61C43	1.3W Zener Diode 43V	656
QF69A	BZX61C47	1.3W Zener Diode 47V	656
QF70M	BZX61C51	1.3W Zener Diode 51V	656
QF71N	BZX61C56	1.3W Zener Diode 56V	656
QF72P	BZX61C62	1.3W Zener Diode 62V	656
QF73Q	BZX61C68	1.3W Zener Diode 68V	656
QF74R	BZX61C75	1.3W Zener Diode 75V	656
UH89W	ZPY100	1.3W Zener Diode 100V	656
QH00A	BZY88C2V7	500mW Zener Diode 2.7V	655
QH01B	BZY88C3V0	500mW Zener Diode 3V	655
QH02C	BZY88C3V3	500mW Zener Diode 3.3V	655
QH03D	BZY88C3V6	500mW Zener Diode 3.6V	656
QH04E	BZY88C3V9	500mW Zener Diode 3.9V	656
QH05F	BZY88C4V3	500mW Zener Diode 4.3V	656
QH06G	BZY88C4V7	500mW Zener Diode 4.7V	656
QH07H	BZY88C5V1	500mW Zener Diode 5.1V	656
QH08J	BZY88C5V6	500mW Zener Diode 5.6V	656
QH09K	BZY88C6V2	500mW Zener Diode 6.2V	656
QH10L	BZY88C6V8	500mW Zener Diode 6.8V	656
QH11M	BZY88C7V5	500mW Zener Diode 7.5V	656
QH12N	BZY88C8V2	500mW Zener Diode 8.2V	656
QH13P	BZY88C9V1	500mW Zener Diode 9.1V	656
QH14Q	BZY88C10	500mW Zener Diode 10V	656
QH15R	BZY88C11	500mW Zener Diode 11V	656
QH16S	BZY88C12	500mW Zener Diode 12V	656
QH17T	BZY88C13	500mW Zener Diode 13V	656
QH18U	BZY88C15	500mW Zener Diode 15V	656
QH19V	BZY88C16	500mW Zener Diode 16V	656
QH20W	BZY88C18	500mW Zener Diode 18V	656
QH21X	BZY88C20	500mW Zener Diode 20V	656
QH22Y	BZY88C22	500mW Zener Diode 22V	656
QH23A	BZY88C24	500mW Zener Diode 24V	656
QH24B	BZY88C27	500mW Zener Diode 27V	656
QH25C	BZY88C30	500mW Zener Diode 30V	656

Table 21. Voltage Suppressors

Order Code	Device	Type	Page
CP80B	1.5KE16	Voltage Suppressor	656
CP81C	1.5KE18	Voltage Suppressor	656
CP79L	1.5KE6.8	Voltage Suppressor	656
CP77J	P6KE6.8	Voltage Suppressor	656
CP78K	P6KE15	Voltage Suppressor	656
QY71N	P6KE47A	Voltage Suppressor	656

Table 22. Thyristors

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UR42V	2N6399	Thyristor 800V 12A	656
QH30H	C106D	Thyristor 400V 5A	656
UM76H	C106M	Thyristor 600V 5A	656
WQ22Y	C116D	Thyristor 400V 8A	656
WQ23A	C126D	Thyristor 400V 12A	656
UM77J	C126M	Thyristor 600V 12A	656
UR23A	CF106D	Thyristor 400V 5A	656
UR24B	CF106M	Thyristor 600V 5A	656
UM74R	CP106D	Thyristor 400V 2A	656
UM75S	CP106M	Thyristor 600V 2A	656
AH00A	X0203NA	Thyristor 800V 1.25A	656
AH01B	X0405ME	Thyristor 600V 4A	656
AH02C	X0405MF	Thyristor 600V 4A	656
AH03D	S0602MH	Thyristor 600V 6A	656
AH04E	S2156MH	Thyristor 600V 25A	656
AH05F	T0606ME	Thyristor 600V 6A	656
AH06G	T1006MH	Thyristor 600V 10A	656
AH07H	T1616MH	Thyristor 600V 16A	656
AH08J	T2516MH	Thyristor 600V 25A	656
AH09K	T0606MJ	Thyristor 600V 6A	656
AH10L	T0606MJ	Thyristor 600V 10A	656

Table 23. Triacs

Order Code	Device	Type	Page
UK54J	BTA08-600B	Triac 600V 8A	657
AY29G	BTA08-800	Triac 800V 8A	657
UK55K	BTA16-600B	Triac 600V 16A	657
UK56L	BTA26-600B	Triac 600V 26A	657
AY30H	BTA26-800	Triac 800V 26A	657
WQ24B	C206D	Triac 400V 4A	657
UR27E	C206M	Triac 600V 4A	657
UR28F	C225D	Triac 400V 8A	657

Order Code	Device	Type	Page
UR29G	C225M	Triac 600V 8A	657
WQ25C	C226D	Triac 400V 8A	657
UR30H	C226M	Triac 600V 8A	657
QL14Q	C246D	Triac 400V 16A	657
UR31J	C246M	Triac 600V 16A	657
UR33L	C263M	Triac 600V 25A	657
UR34M	CF206D	Triac 400V 4A	657
UR35Q	CF206M	Triac 600V 4A	657
UR36P	CF225D	Triac 400V 8A	657
UR37S	CF225M	Triac 600V 8A	657
UR38R	CF246D	Triac 400V 16A	657
UR39N	CF246M	Triac 600V 16A	657
UR25C	CP206D	Triac 400V 1.5A	657
UR26D	CP206M	Triac 600V 1.5A	657
AH63T	T405-600D	Triac 600V 4A	657
AH64U	T405-600T	Triac 600V 4A	657
AH65V	T410-600D	Triac 600V 4A	657
AH66W	T410-600T	Triac 600V 4A	657
AH67X	T410-800D	Triac 800V 4A	657
AH68Y	T410-800T	Triac 800V 4A	657
AH11M	20105MA	Triac 600V 0.8A	657
AH12N	20405MF	Triac 600V 4A	657

Table 24. Diac

Order Code	Device	Type	Page
QL08J	ST2	Diac	658

Subsection 66. Power Cont. & Ref. IC's

Order Code	Device	Type	Page
DB34M	J511	Current Regulator Diode	756
UF29G	MVS460-2	Varicap Voltage Stabiliser	756
	ZTK33B	see MVS460-2	

Subsection 71. Valves

Order Code	Device	Type	Page
CR25C	ECC81	Valve Twin Triode	780
CR26D	ECC82	Valve Twin Triode	780
CR27E	ECC83	Valve Twin Triode	780
DM56L	EF86	Valve 9A Pentode	780
CR28F	EL34	Valve Dctal Pentode	780
CR29G	EL84	Valve 9A Pentode	781

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AD06G	DRAM1MX1	1M DRAM (ZIP)	50	696
AD07H	DRAM1MX1	1M DRAM (SDJ)	50	696
UL08J	REF01CP	10V Precision Reference	66	755
AR19V	SIMM1MX32	1M SIMM module	50	697
AD98G	DRAM1MX36	1M DRAM (SIMM)	50	697
AD10L	DRAM1MX4	1M DRAM (SDJ)	50	697
AD08J	DRAM1MX4	1M DRAM (DIP)	50	697
AD09K	DRAM1MX4	1M DRAM (ZIP)	50	697
UR63T	SIMM1Mx8-80	Memory Module	50	697
UR64U	SIP1Mx8-80	Memory Module	50	697
ZG53H	SIMM1Mx9-60	Memory Module	50	697
UR58N	SIMM1Mx9-70	Memory Module	50	697
UR60Q	SIP1Mx9-70	Memory Module	50	697
UR57M	SIMM1Mx9-80	Memory Module	50	401
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AE19V	HT12F	Decoder 12-Bit Addr	63	672
UL32K	LM12CLK	Power Op-Amp	53	712
DB57M	REF12Z	Precision Reference IC	67	758
AD18U	DV163002	PIC hardware	49	691
AR02C	PAL16R4ACN	Programmable Logic	51	704
AR01B	PAL16R4BCN	Programmable Logic	51	704
AR04E	PALCE16V8H-15PC	Programmable Logic	51	705
AD21X	AC165001	PIC hardware	49	691
AD19V	AC165002	PIC hardware	49	691
AD32K	PIC16C54JW/P	OTP Microcontroller	49	687
AD33L	PIC16C54LP/P	OTP Microcontroller	49	687
AD34M	PIC16C54RC/SO	OTP Microcontroller	49	687
CR17T	PIC16C54RC/P	OTP Microcontroller	49	687
CR17T	PIC16C54RC/P	OTP Microcontroller	49	687

Order Code	Device	Type	Sub-Section	Page
AD36P	PIC16C54XT/SD	DTP Microcontroller	49	687
AD35Q	PIC16C54XT/P	DTP Microcontroller	49	687
AD37S	PIC16C55JW/P	DTP Microcontroller	49	687
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CR18U	PIC16C55RC/P	DTP Microcontroller	49	687
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AD43W	PIC16C57XT/SD	DTP Microcontroller	49	687
AD55K	PIC16C64/JW-SI	DTP Microcontroller	49	688
AD17T	PIC16C64-04/P	OTP Microcontroller	49	688
AD20W	EM167011	PIC hardware	49	691
AY32K	EM167014	PICMASTER 16	49	690
AD44X	PIC16C71-JW/P	DTP Microcontroller	49	687
DC19V	PIC16C71-04	8 Bit CMDS Micro with DA	49	689
AD45Y	PIC16C71-04/SO	OTP Microcontroller	49	687
AD49D	PIC16C71-04/SD	DTP Microcontroller	49	687
AD48C	PIC16C71-04/P	OTP Microcontroller	49	687
AD47B	PIC16C71-16/SD	DTP Microcontroller	49	687
AD46A	PIC16C71-16/P	DTP Microcontroller	49	687
AR00A	PAL16L8ACN	Programmable Logic	51	704
AR05F	PALCE16V8H-25	Programmable Logic	51	705
AD51F	PIC16C84-04/SO	OTP Microcontroller	49	688
AY31J	PIC16C84-04/P	8-Bit CMOS EEPROM Micro	49	688
AD54J	PIC16C84-04/SD	OTP Microcontroller	49	688
AD53H	PIC16C84-04/P	DTP Microcontroller	49	688
AD50E	PIC16C84-10/P	OTP Microcontroller	49	688
AD52G	PIC16C84-10/SD	DTP Microcontroller	49	688
AD22Y	DV173002	PIC hardware	49	691
DC20W	PIC17C42	Risc 8-Bit Micro	49	689
GX44X	18CV8 P-15	PEEL	51	702

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AD61R	INA105KP	Pre Amplifier	59	723
AD75S	INA106KP	Instrumentation Amp	55	715
AR09K	MACH110-15JC	High Density PLA	51	705
AR10L	MACH110-20JC	High Density PLA	51	705
AD73Q	INA114AP	Instrumentation Amp	55	714
AD74R	INA118P	Instrumentation Amp	55	714
AD76H	INA117KP	Instrumentation Amp	55	715
AD81C	ISD122P	Isolation Amp	55	716
AD80B	ISD122JP	Isolation Amp	55	716
AD59P	DPA124P	FET Dp-amp	54	713
UK66W	L165V	Power Dp-Amp	53	711
AD56L	DPA177GP	Dp-amp	52	710
KU64U	ISD1016AG	Speech Rec/Play	60	728
KU63T	ISD1016AP	Speech Rec/Play	60	728
KU68Y	ISD1020AG	Speech Rec/Play	60	728
KU66W	ISD1020AP	Speech Rec/Play	60	728
QY76H	SAA1027	Stepper Motor Dnver	63	745
UL23A	LT1028CN	Low Noise Dp-Amp	52	708
UF32K	ZN1034E	Precision Counter Timer	48	682
QY19V	LM1035N	Dual Tone/Vol./Bal. Control	59	725
QY33L	LM1037N	Dual 4-Channel Switch	59	726
UK85G	SAA1043P	Sync Generator	61	736
UM56L	LM1044N	Video Analogue Switch	61	737
AH45Y	TDA1072A	AM receiver chip	61	740
KU92A	ISD1110P	Speech Rec/Play	60	728
AY27E	MSC1191	Bi-CMDS Amplifier	58	717
KU62S	ISD1212G	Speech Rec/Play	60	728
KU59P	ISD1212P	Speech Rec/Play	60	728
AD97F	MAX1232CPA	L/P CMDS Micro-Monitor	49	684
QH46A	MC1458CN	Dual Op-Amp	52	711
YH89W	MC1488P	RS232 Driver	68	770
YH90X	MC1489P	RS232 receiver	68	770
QH47B	MC1496P	Double Balanced Modulator	61	739
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AD64U	PCM1700P	Music/Sound Generator	60	727
AD63T	DF1700P	Digital filter	70	727
QL20W	LM1709CN	Op-Amp	52	710
AY35Q	MAX1743	DC-DC Converter	66	756
DB28F	SDA1812D	12-Bit A/D Converter	70	777
YY99H	LM1830N	Fluid Level Detector	64	749
YY72P	LM1872N	Radio Control Receiver	63	741
UH78K	LM1875N	20W Power Amp	59	722
QH38R	LM1877N-9	2W Stereo Power Amp	58	720
DC09K	AD1879N	18-Bit Oversample A/D Converter	70	778
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UF50E	LM1893N	Mains Data Transceiver	63	747
GX48C	LMC1983	Stereo Chip	60	729

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YH64U	LM13700N	Dual Transconductance Op-Amp	56	716
QL03D	MC14001UBCP	Quad 2-VP NOR Gate Unbuffered	27	662
UM63T	MSM16811RS	1024-Bit EEPROM	50	699

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UJ50E	M145027B-1	Remote Control Receiver	63	742
UJ51F	M145028B-1	Remote Control Receiver	63	742
QQ51F	MC145100CP	4x4 Crosspoint Switch	42	677

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AR20W	SIMM2MX32	2M SIMM module	50	697
AR17T	SIMM2MX36	2M SIMM module	50	697

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GX46A	20GG10P-25	PEEL	50	702
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GX45Y	22CV10P-15	PEEL	50	703
AR03D	PAL22V10-15PC PAL device		51	704
AR07H	PALCE22V10H-15PAL device		51	705
AR08J	PALCE22V10H-25PAL device		51	705
AD23A	24LC16B/P	PIC EEPROM	49	689
AH60Q	ST24C02AB1	EEPROM 2K	50	698
AD24B	24C32/P	PIC EEPROM	49	689
AD26D	24AA65/P	PIC EEPROM	49	690
AD25C	24LC65/P	PIC EEPROM	49	690
AH62S	ST24C08B1	EEPROM 8K	50	698
OB58N	REF25Z	Precision Reference IC	67	758
RA74R	OP-27GNB	Precision Op-Amp	52	709
UM58N	M27C1001-15XF11M CMOS EPROM		50	702
YH88V	M27128AF1	128K EPROM	50	701
UH95O	TMS27C128-25JL 128K CMOS EPROM		50	701
QQ07H	M2716-1F1	16K EPROM	50	700
UM59P	M27C2001-15XF12M CMOS EPROM		50	702
QY75S	M27256F1	256K EPROM	50	701
UH44X	M27C256B-12XF1 256K CMOS EPROM		50	701
UH88V	M2732A-2F1	32K EPROM	50	700
UM60Q	M27C4001-15XF14M CMOS EPROM		50	802
UH42V	M27512F1	512K EPROM	50	701
UM57M	M27C512-15XF1 512K CMOS EPROM		50	701
QQ09K	M2764AF1	64K EPROM	50	700
UH43W	M27C6464A-25F1 64K CMOS EPROM		50	700
KU72P	M28F101-150K1	Flash EPROM	50	701
KU73Q	M28F101-150P1	Flash EPROM	50	701
DC06G	XLS28C256AP	32k 8 Bit EEPROM	50	700
UM62S	28C64	64K EEPROM	50	700
QW12N	2114	4K Static RAM	50	695

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AD77J	PGA204AP	Instrumentation Amp	55	715
AD78K	PGA205AP	Instrumentation Amp	55	715
UH59P	CS209A	Proximity Detector	64	748
AR11M	MACH210-15JC	High density PLA	51	706
AR12N	MACH210-20JC	High density PLA	51	706
UH57M	DG211CJ	Analogue Switch	59	726
UH60Q	CS212	Security IC	63	746
AH39N	U217B	Temperature Controller	64	748
CP93B	TSL220	Light to Frequency Converter	64	749
FD92A	MAX232CPE	RS232C From 5V	68	770
UL96E	NM232DD	Dual RS232D Transceiver	68	771

Order Code	Device	Type	Sub-Section	Page
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CR21X	MAX238CNG	Quad RS232C From 5V	68	770
AD01B	DRAM256KX1	256K DRAM (SOJ)	50	696
AD00A	DRAM256KX1	256K DRAM (ZIP)	50	696
AD02C	DRAM256KX4	256K DRAM (ZIP)	50	696
AD04E	DRAM256KX4	256K DRAM (DIP)	50	696
AD03D	DRAM256KX4	256K DRAM (SOJ)	50	696
UR61R	SIMM256Kx9-70	Memory Module	50	697
UR62S	SIP256Kx9-70	Memory Module	50	697
UJ36P	L272M	Dual Power Op-Amp	53	712
CR07H	287XLT	Numeric Co-Processor	49	694
AH80B	L293D	Stepper Motor Driver	66	752
AH81C	L293E	Stepper Motor Driver	66	752
AY41U	MAX293	LP Filter	60	730
UK62S	L296P	4A Switching Regulator	67	765
AY42V	MAX297	LP Filter	60	730
UK72P	L298N	Stepper Motor Driver	63	746

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UH66W	TEA2000-V1	PAL Colour Encoder	61	737
UR07H	EL2001CN	Video Op-Amp	52	707
AD91Y	ULN2001N	Darlington buffer	68	771
AD92A	ULN2002N	Darlington buffer	68	771
AH53H	TDA2003H	Audio IC	58	719
AH52G	TDA2003V	Audio IC	58	719
AD93B	ULN2003N	Darlington buffer	68	771
AD94C	ULN2004N	Darlington buffer	68	771
YY70M	TDA2005M	20W Power Amp	58	721
WQ66W	TDA2006V	12W Power Amp	58	721
UR12N	EP2015CN	Quad PNP Transistor	62	741
UL16S	SSM2015P	Microphone Pre-Amp	59	723
UR13P	EN2016CN	Quad NPN Transistor	62	741
UL17T	SSM2016P	Audio Pre-Amp	59	724
CP89W	SSM2017P	Audio Pre-Amp	59	724
UR06G	EL2020CN	Video Op-Amp	52	707
UL18U	SSM2024P	Current Controlled Amp	60	730
CP86T	TLE2027CP	Low Noise Op-Amp	52	710
WQ67X	TDA2030AV	18W Power Amp	58	721
CP87U	TLE2037CP	Low Noise Op-Amp	52	710
AH54J	TDA2040V	Audio IC	58	719
AJ55K	EL2044CN	Low Cost Video Op-Amp	52	707
UL19V	SSM2044P	Voltage Controlled Filter	60	730
AJ57M	EL2045CN	Video Op-Amp	52	707
UL77J	OM2045	Wideband RF Ampr	61	735
CP88V	TDA2050V	25W Power Amp	58	722
AY89W	EL2099CT	Video Distribution Amp	61	736
UL78K	SSM2120P	Dynamic Range Processor	59	725
UM54J	SSM2142P	Balanced Line Driver	59	724
CP90X	SSM2143P	Balanced Line Receiver	59	724
UL79L	SSM2210P	Dual NPN Transistor	62	740
QY43W	RC2211N	FSK Demod./Modem Receiver	70	773
UL80B	SSM2220P	Dual PNP Transistor	62	740
UR10L	EL2232CN	Dual Video Op-Amp	52	707
CP99H	uA2240CN	Programmable Timer Counter	49	682
AJ56L	EL2244CN	Dual Op-Amp	52	707
AJ58N	EL2245CN	Dual Op-Amp	52	707
AH40T	U2400B	NiCd Battery Charger	66	757
AH41U	U2401B	NiCd Battery Charger	66	758
CR13P	HV3-2405-5	Single Chip Power Supply	67	765
UL81C	SSM2412P	Analogue Switch	59	726
CR12N	TLE2425CLP	Precision Virtual Ground	66	756
GX10L	ULQ2436M	Countdown Power Timer	66	758
GX11M	ULN2453M	Auto Lamp Monitor	66	755
GX53H	ULN2455M	Auto Lamp Monitor	66	755
UL28F	TDA2555-V2	TV Sound Demodulator	61	738
AD82D	LM2574T5-0	Voltage Regulator	67	761
AD86T	LM2575T-ADJ	Voltage Regulator	67	761
AD83E	LM2575T-5	Voltage Regulator	67	761
AD84F	LM2575T-12	Voltage Regulator	67	761
AD85G	LM2575T-15	Voltage Regulator	67	761
AD89W	LM2576T-ADJ	Voltage Regulator	67	761
AD87U	LM2576T-5	Voltage Regulator	67	761
AD88V	LM2576T-12	Voltage Regulator	67	761
AD90X	LM2577T-ADJ	Voltage Regulator	67	761
GX47B	LM2577T-12	Step-Up Switcher	67	761
AD58N	OPA2604AP	Voltage Regulator	54	713
JU36P	TBA2800	IR Receiver	63	744
QY78K	ULN2801A	Octal Darl'n Dvr Bipolar/CMOS	68	772
QY79L	ULN2803A	Octal Darlington Driver TTL	68	772
UJ38R	TQA2822M	1W Stereo Power Amp	58	718
AE15R	HT2860B	Alarm Sounds	60	731
WQ38R	LM2917N	Frequency to Voltage Converter	70	778
AH87U	LM2930A	Voltage Regulator	67	760

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UF52G	LM35DZ	Temperature Sensor	64	748
UL04E	DP37GP	Precision Op-Amp	52	709

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QH37S	LM308N	Precision Op-Amp	52	707
QY09K	LM311N	Voltage Comparator	57	716
RA87U	LM317L	Adjustable Voltage Reg. 100mA	67	767
RA86T	LM317M	Adjustable Voltage Reg. 500mA	67	767
UF27E	LM317T	Adjustable Voltage Reg. 1.5A	67	767
UH33L	LM319N	Voltage Comparator	57	717
UF26D	LM324N	Quad Op-Amp	52	707
UL47B	LM331N	V to F Converter	70	778
WQ32K	LM334N	Adjustable Current Source	66	756
YY73Q	LM335Z	Temperature Sensor	64	748
RA88V	LM338K	Adjustable Voltage Regulator	5A	767
UH31J	LM339N	Voltage Comparator	57	717
WQ29G	LF347	Quad J-FET Op-Amp	54	712
WQ30H	LF351	J-FET Op-Amp	54	712
WQ31J	LF353	Dual J-FET Op-Amp	54	712
UJ34M	LM358N	Dual Op-Amp	52	708
QH40T	LM380N	5W Power-Amp	58	720
WQ33L	LM383T	7W Power-Amp	58	720
UJ37S	LM386N-1	325mW Power Amp	58	717
CR09K	387DX	Numeric Co-Processor	49	694
CR10L	387DX+	Numeric Co-Processor	49	694
CR08J	387SX	Numeric Co-Processor	49	694
AH85G	L387A	Voltage Regulators	67	760
WQ35Q	LM387N	Stereo Pre-Amp	59	723
UH32K	LM392N	Voltage Comparator	57	717
UH30H	LM393N	Voltage Comparator	57	717

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UM65V	MN3011	BBD 3328-Stage	60	732
QH26D	CA3046	Transistor Array	62	741
UL25C	TDA3047/N4	IR Receiver	63	745
YH58N	CA3080E	Transconductance Op-Amp	56	716
UM66W	MN3101	BBD Clock Generator	60	733
UR68Y	MN3102	BBD Clock Generator	60	733
QH28F	CA3130E	MOSFET VP, CMOS OP Op-Amp	54	712
GX07H	UGN3132LL	Ultra Sens Bi-Prn Hll Eff	64	747
GX50E	UGN3133U	Ultra Sens Bi-Prn Hll Eff	64	747
QH29G	CA3140E	MOSFET VP, Bipolar OP Op-Amp	54	712
WQ20W	CA3189E	FM IF Subsystem	61	739
UR67X	MN3207	BBD 1024-Stage	60	732
WQ21X	CA3240E	Dual CA3140E	54	712
QH48C	MC3302P	Quad Voltage Comparator	57	717
CR23A	CA3306CE	Flash A/D Converter 10MHz	70	773
CR24B	CA3306E	Flash A/D Converter 15MHz	70	773
CP94C	ULN3390T	Twilight Switch	64	749
QH51F	MC3403N	Quad Op-Amp	52	711
GX09K	UGN3503U	Radiometric, Linear HL	64	747
UR05F	UM3511A	Memory Organ	60	731
UJ45Y	UM3561	Sound Effects Generator	60	733
UK77J	UM3750	Encoder/Decoder	63	743
GX54J	ULN3846A	AM Noise Blanker	61	735
GX49D	LM3876	Audio Power Amp	58	720
QH42V	LM3900N	Quad Current Mirror Op-Amp	52	711
WQ39N	LM3909N	LEO Flasher/Oscillator	48	683
WQ40T	LM3911N	Temperature Controller	64	749
WQ41U	LM3914N	Linear Bargraph Display	65	750
YY96E	LM3915N	Logarithmic Bargraph Display	65	750
YY97F	LM3916N	VU Bargraph Display	65	750

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Order Code	Device	Type	Sub-Section	Page
QW93B	4116	16K DRAM	50	696
QY74R	41256	256K DRAM	50	696
QQ06G	4164	64K DRAM	50	696
UM72P	431000	1M CMOS Static RAM	50	696
UM68Y	TMS44100-805D	4M DRAM	50	697
UH93B	4464	4 x 64K DRAM	50	697
DC01B	MK48T02B20	CMDS Timekeeper SRAM	50	695
DC02C	MK48Z02B25	SRAM IC	50	695

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Order Code	Device	Type	Sub-Section	Page
AY40T	MAX406	Lo Volt Single Rail Dp-Amp	52	711
AY38R	MAX409	LP 150KHz Dp-Amp	52	711
YH92A	ZN409CE	Servo Driver	63	745
QY27E	LF411CN	J-FET Dp-Amp	54	712
QY28F	LF412CN	Dual J-FET Op-Amp	54	712
OL41U	ZN414Z	TRF AM Radio	61	739
UR70M	ZN416E	TRF AM Radio with Amp	61	739
DB56L	ZN423	Voltage Reference Source	67	758
UF38R	ZN425E-8	D/A and A/D Converter	70	775
UF39N	ZN426E-8	D/A Converter	70	775
UF40T	ZN427E-8	A/D Converter	70	775
UF41U	ZN428E-8	D/A Converter with Latches	70	775
DB52G	ZN429E8	8-Bit D/A Converter	70	775
AY43W	MAX438CPA	U/S Receiver Dp-Amp	54	714
QY29G	LF441CN	Low-Power J-FET Dp-Amp	54	714
DB53H	SL441CDP	Triac Firing Control	66	755
QY30H	LF442CN	Dual Low-Power J-FET Op-Amp	54	714
QY31J	LF444CN	Quad Low-Power J-FET Op-Amp	54	714
UF43W	ZN448E	A/D Converter	70	776
DB54J	ZN458	Precision Reference Regulator	67	758
DB55K	ZN458B	Precision Reference Regulator	67	758
BU39N	NM485D	Dual EIA485 Transceiver	68	771
KU71N	SL486DP	Remote control IC	63	744
YH66W	SL490	Remote Control Transmitter	63	741
UL60Q	M491BB1	TV Tuner IR Decoder	63	744
RA85G	TL494CN	Switch Mode Power Supply	67	759

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Order Code	Device	Type	Sub-Section	Page
QX01B	HCF4001BEY	Quad 2-Input NDR Gate	27	662
QX02C	HCF4002BEY	Dual 4-Input NDR Gate	27	662
QX03D	HCF4006BEY	18-Bit Shift Register	37	669
QX04E	HCF4007UBEY	Complementary Pair Plus Inverter	34	666
QW14Q	HCF4008BEY	4-Bit Full Adder	44	677
	HCF4009UBEY	see 4049UBEY	31	665
QX05F	HCF4011BEY	Quad 2-Input NAND Gate	25	661
QL04E	HCF4011UBEY	Quad 2-I/P NAND Gate Unbuffered	25	661
QX06G	HCF4012BEY	Dual 4-Input NAND Gate	25	661
QX07H	HCF4013BEY	Dual D-Type Flip-Flop	35	666
AB35Q	HCF4013BM1	Dual D-type flip flop	35	666
QW15R	HCF4014BEY	8-Bit Shift Register	37	669
QW16S	HCF4015BEY	8-Bit Shift Register	37	669
AB36P	HCF4015BM1	8-bit shift register	37	669
QX08J	HCF4016BEY	4-Pole 1-Way Analogue Switch	42	676
AB37S	HCF4016BM1	4-pole 1-way switch	42	676
QX09K	HCF4017BEY	Decade Counter	38	670
AB38R	HCF4017BM1	Dec/doz counter	38	670
QX10L	HCF4018BEY	Presetable BCD Counter	38	670
QW17T	HCF4019BEY	Quad AND/DR Select Gate	29	664
AB27E	HCF4019BM1	4-bit AND-DR select	29	664
QX11M	HCF4020BEY	14-Stage Binary Ripple Counter	38	671
AB28F	HCF4020BM1	7-stage & higher counter	38	671
QW18U	HCF4021BEY	8-Stage Static Shift Register	37	669
AB29G	HCF4021BM1	8-bit shift register	37	669
QW19V	HCF4022BEY	Divide by 8 Counter	38	670
QX12N	HCF4023BEY	Triple 3-Input NAND Gate	25	661
AB39N	HCF4023BM1	Triple 3-input NAND	25	661
QX13P	HCF4024BEY	7-Stage Ripple Counter	38	671
AB31J	HCF4024BM1	7 stage & higher counter	38	671
QX14Q	HCF4025BEY	Triple 3-Input NDR Gate	27	663
AB41U	HCF4025BM1	Triple 3-input NDR	27	663
QX15R	HCF4026BEY	7-Seg. Display Decade Counter	38	671
QX16S	HCF4027BEY	Dual J-K Master-Slave Flip-Flop	35	667
AB42V	HCF4027BM1	Dual JK latch	35	667
QX17T	HCF4028BEY	BCD to Decimal Decoder	40	673
AB43W	HCF4028BM1	4 to 10 line converter	40	673
QW20W	HCF4029BEY	Presetable up/down Counter	38	670
A844X	HCF4029BM1	4-bit bin/dec counter	38	670
	HCF4030BEY	see HCF4070BEY	29	663
QW23A	HCF4033BEY	7-Seg. Display Decade Counter	38	671
QW25C	HCF4035BEY	4-Stage Shift Register	37	668
QW27E	HCF4040BEY	12-Stage Binary Counter	38	671
AB32K	HCF4040BM1	7 stage & higher counter	38	671
QX19V	HCF4042BEY	Quad Clocked D-Latch	36	668
QW29G	HCF4043BEY	Quad 3-State NOR R/S Latch	36	667
AB45Y	HCF4043BM1	Quad SR latch	36	667

Order Code	Device	Type	Sub-Section	Page
QW30H	HCF4044BEY	Quad 3-State NAND R/S Latch	36	667
AB46A	HCF4044BM1	Quad SR latch	36	667
QW32K	HCF4046BEY	Phase Locked Loop	47	680
QX20W	HCF4047BEY	Multivibrator	45	678
AB47B	HCF4047BM1	Multivibrator	45	678
QX21X	HCF4049UBEY	Hex Buffer Inverting	31	665
AB48C	HCF4049UBM	Inverting hex buffer	31	665
QX22Y	HCF4050BEY	Hex Buffer Non-Inverting	31	665
AB49D	HCF4050BM1	Non-invert hex buffer	31	665
QW34M	HCF4051BEY	8-Channel Analogue Multiplexer	42	675
AB51F	HCF4051BM	1-pole 8-way switch	42	675
QW35Q	HCF4052BEY	4-Channel Analogue Multiplexer	42	675
AB52G	HCF4052BM1	2-pole 4-way switch	42	675
QW36P	HCF4053BEY	Triple 2-Channel Multiplexer	42	676
AB53H	HCF4053BM1	3-pole 2-way switch	42	676
QW39N	HCF4056BEY	BCD to 7-Segment Decoder LCD	40	674
AE99H	HCF4056BM1	BCD to 7 segment	40	674
QW40T	HCF4060BEY	14-Stage Counter	38	671
AB54J	HCF4060BM1	7 stage & higher counter	38	671
QW41U	HCF4063BEY	4-Bit Magnitude Comparator	43	677
AB01B	HCF4063BM1	4-bit comparator	43	677
QX23A	HCF4066BEY	Quad Bilateral Switch	42	676
AB55K	HCF4066BM1	4-pole 1-way switch	42	676
QW42V	HCF4067BEY	16-Channel Multiplexer	42	675
AB02C	HCF4067BM1	1-pole 16-way switch	42	675
QX24B	HCF4068BEY	8-Input NAND Gate	25	661
AB03D	HCF4068BM1	Single 8-input NAND	25	661
AB56L	HCF4069TBM	Inverting hex buffer	31	665
QX25C	HCF4069UBEY	Hex Inverter	31	665
QX26D	HCF4070BEY	Quad Exclusive OR Gate	29	663
AB04E	HCF4070BM1	Quad exclusive-DR	29	663
QW43W	HCF4071BEY	Quad 2-Input DR Gate	28	663
AB57M	HCF4071BM1	Quad 2-input DR	28	663
QX27E	HCF4072BEY	Dual 4-Input DR Gate	28	663
AB58N	HCF4072BM1	Dual 4-input DR	28	663
QW44X	HCF4073BEY	Triple 3-Input AND Gate	26	662
QW45Y	HCF4075BEY	Triple 3-Input OR Gate	28	663
AB05F	HCF4075BM1	Triple 3-input DR	28	663
QW46A	HCF4076BEY	4-Bit D-Type Register	36	668
AB59P	HCF4076BM1	Quad D-type with register	36	668
QW47B	HCF4077BEY	Quad Exclusive NDR Gate	29	664
AB06G	HCF4077BM1	Quad exclusive-NDR	29	664
QX28F	HCF4078BEY	8-Input NDR/DR Gate	27	663
QW48C	HCF4081BEY	Quad 2-Input AND Gate	26	662
AB07H	HCF4081BM1	Quad 2-input NAND	26	662
QW49D	HCF4082BEY	Dual 4-Input AND Gate	26	662
AJ59P	EL4089CN	Low Power DC Restore Amp	61	735
QW53H	HCF4093BEY	Quad 2-I/P NAND Schmitt Trigger	30	664
AB08J	HCF4093BM1	Quad 2-input schmitt NAND	30	664
AJ60Q	EL4094CN	8-Pin Video Fader/Gain Control	61	736
QW54J	HCF4094BEY	8-Stage Shift Register	37	669
AB19V	HCF4094BM1	8-bit shift register	37	669
AJ61R	EL4095CN	Fader Gain Control With Switches	61	736
QX29G	HCF4098BEY	Dual Monostable Multivibrator	45	678
AB09K	HCF4098BM1	Multivibrator	45	678
QW57M	HCF4099BEY	8-Bit Addressable Latch	36	668
AB12N	HCF4099BM1	8-bit addressable latch	36	668
AE98G	HCF40107M	Dual 2-input NAND buffer	34	666
XX01B	RC4136N	Quad Op-Amp	52	711
UR17T	RC4152N	Voltage to Frequency Counter	70	773
UR20W	RC4156N	Quad Op-Amp	52	711
UR15R	RC4190N	Switching Regulator	67	759
AE04E	RC4194N	Dual Rail Reg	67	766
XX02C	RC4195N	15V Dual Tracking Regulator	67	766
UR16S	RC4200N	Analogue Multiplier	60	730
UR18U	RC4227GN	Dual Precision Dp-Amp	52	710
QO41U	HCF4503BEY	Hex Buffer 3-State Non-Inverting	31	665
AB13P	HCF4503BM	Non-invert hex buffer	31	665
QW83E	HCF4510BEY	Dec/doz counters	38	670
QX31J	HCF4511BEY	BCD to 7-Seg. Decoder Driver	40	674
AB21X	HCF4511BM	BCD to 7 segment	40	674
QW84F	HCF4512BEY	8-Channel Data Selector	41	674
QW85G	HCF4514BEY	4 to 16-Line Decoder	40	673
AB14Q	HCF4514BM1	4 to 16 line converter	40	673
QW87U	HCF4516BEY	Binary Presetable Counter	38	670
AB16S	HCF4516BM1	4-bit bin/oct counter	38	670
QX32K	HCF4518BEY	Dual BCD Counter	38	670
AB22Y	HCF4518BM1	Dec/doz counter	38	670
QX33L	HCF4520BEY	Dual Binary Counter	38	670
AB17T	HCF4520BM1	4-bit bin/oct counter	38	670
	HCF4528BEY	see HCF4098BEY	45	678
QW89W	HCF4532BEY	8-Bit Priority Encoder	39	671
AB18U	HCF4532BM1	8-bit priority	39	671
AB23A	HCF4538BM1	Multivibrator	45	678
QO47B	HCF4541BEY	Programmable Timer	46	679
AB24B	HCF4541BM1	Oscillator	46	679
QW90X	HCF4555BEY	Dual Binary to 1 of 4 Decoder	40	673
UR19V	RC4559N	Dual Op-Amp	52	711
AJ62S	EL4581CN	Video Sync. Separator	61	737
	HCF4585BEY	see HCF4063BEY	43	677

Order Code	Device	Type	Sub-Section	Page
AH86T	L4904A	Voltage Regulator	67	760
UK64U	L4960	2.5A Switching Regulator	67	764
AH74R	4962/A	Switching Regulator	67	761
AH75S	L4970A	Switching Regulator	67	763
AH76H	L4972A	Switching Regulator	67	763
AH77J	L4974A	Switching Regulator	67	764
AH78K	L4975A	Switching Regulator	67	762
AH79L	L4977A	Switching Regulator	67	762

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Order Code	Device	Type	Sub-Section	Page
QW61R	HCF40103BEY	8-Stage Counter	38	671
QW64U	HCF40106BEY	Hex Schmitt Trigger	30	664
AB34M	HCF40106BM	Hex inverter	30	664
QW65V	HCF40107BEY	Dual 2-Input NAND Buffer	34	666
QW68Y	HCF40110BEY	Decade Up/Down Counter	38	671
QW73Q	HCF40174BEY	Hex D-Type Flip-Flop	35	667

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Order Code	Device	Type	Sub-Section	Page
AY98G	VN05N	High Side Driver 60V 12A	66	753

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Order Code	Device	Type	Sub-Section	Page
DB59P	REF 50Z	Precision Reference IC	67	758

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Order Code	Device	Type	Sub-Section	Page
DB31J	DG508ACJ	CMDS Analogue Multiplexer	41	674
KU41U	E510	MIDI Keyboard Scanner	60	729
AD16S	DRAM512KX8	512K DRAM (SOJ)	5	

Order Code	Device	Type	Sub-Section	Page
AD62S	PCM69AP	Dual 18-bit DAC	70	727
UF33L	6116	16K CMOS Static RAM	50	695

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Order Code	Device	Type	Sub-Section	Page
AD57M	OPA604AP	FET op-amp	54	713
AD66W	OPA623AP	Wide band op-amp	52	710
QR55K	634SS2	Hall effect device	64	747
AD65V	BUF634P	High current buffer	68	771
AY39N	MAX665	MAX665 100mA	66	756
CRO0A	MAX680CPA	Voltage Doubler	66	756
GX05F	MAX690A CPA	Microprocessor Supervisor	49	683

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Order Code	Device	Type	Sub-Section	Page
UK95D	TC6011N	NICAM Chip Set	61	738
AH44X	U6047B	Long-Time Timer Circuit	66	754
AH82D	L6114	Stepper Motor Driver	66	752
AH83E	L6202	Stepper Motor Driver	66	752
UK70M	L6203	Full Bridge Motor Driver	63	745
AH69A	ST6240 Kit	LCD Display Driver Kit	65	750
UM73O	SL6270CDP	VOGAD	59	723
UL76H	MSM6322GSK	Voice Pitch Controller	60	733
QQ04E	6402	UART	49	694
QQ02C	R6502AP	Microprocessor	49	686
AH84F	L6506	Stepper Motor Driver	66	753
UF25C	R6522P VIA	Versatile Interface Adaptor	49	686
DB49D	SL6652CDG	IF Amplification IC	61	740
UK95D	TD6710N	NICAM Chip Set	61	738
WD46A	EF6821P	Peripheral Interface Adaptor	49	686
WQ48C	EF6850P	Asynchronous Comms Interface	49	686

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Order Code	Device	Type	Sub-Section	Page
RA73Q	DP-07CNB	Precision Op-Amp	52	709

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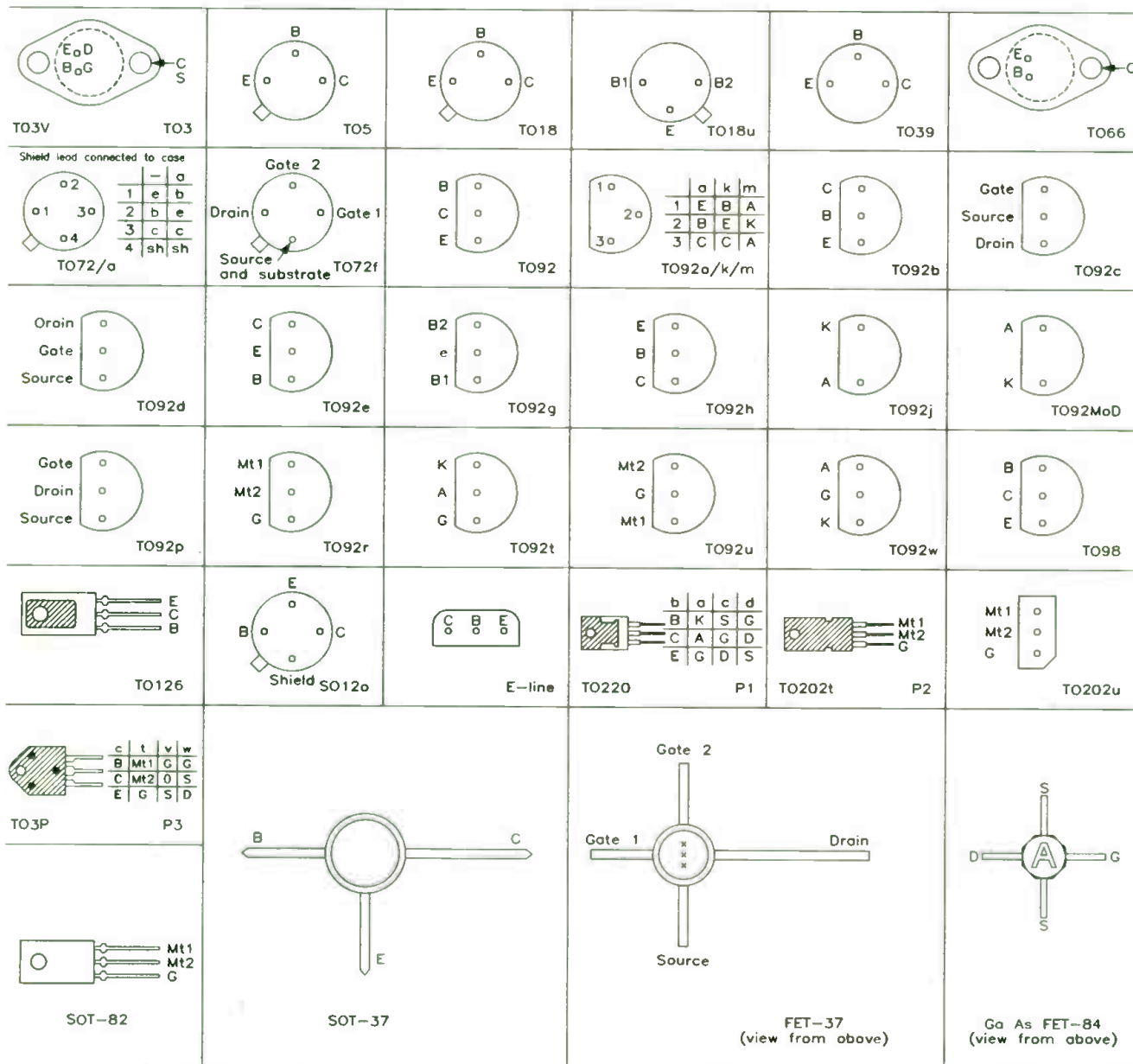
Order Code	Device	Type	Sub-Section	Page
RA67X	TL071CN	Low Noise Op-Amp	54	714
RA68Y	TL072CN	Dual Low Noise Op-Amp	54	714
UB00A	SN74HC00N	Quad 2-Input NAND Gate	25	661
YF00A	SN74LS00N	Quad 2-Input NAND Gate	25	661
RA69A	TL074CN	Quad Low Noise Op-Amp	54	714
AE40T	M74HC00M1R	Quad 2-input Schmitt NAND	25	661
AE20W	M74HCT00B1R	Quad 2-input NAND	25	661
AE83E	M74HCT00M1R	Quad 2-input Schmitt NAND	25	661
QX39N	SN7402N	Quad 2-Input NOR Gate	27	662
UB01B	SN74HC02N	Quad 2-Input NOR Gate	27	662
YF02C	SN74LS02N	Quad 2-Input NOR Gate	27	662
AE41U	M74HC02M1R	Quad 2-input NOR	27	662
AE21X	M74HCT02B1R	Quad 2-input NOR	27	662
AE84F	M74HCT02M1R	Quad 2-input NOR	27	662
YF03D	SN74LS03N	7400 with Open Collectors	25	661
UB03D	SN74HC04N	Hex Inverter	31	665
UB04E	SN74HC04N	Hex Inverter	31	665
YF04E	SN74LS04N	Hex Inverter	31	665
AE42V	M74HC04M1R	Inverting hex buffer	31	665
AE22Y	M74HCT04B1R	Inverting hex buffer	31	665
AE85G	M74HCT04M1R	Inverting hex buffer	31	665
YF05F	SN74LS05N	Hex Inverter Open Collector	31	665
QX75S	SN7406N	Hex Inverter Open Collector	31	665
QX76H	SN7407N	Hex Buffer	31	665
QX42V	SN7408N	Quad 2-Input AND Gate	26	662
UB06G	SN74HC08N	Quad 2-Input AND Gate	26	662
YF06G	SN74LS08N	Quad 2-Input AND Gate	26	662
AE43W	M74HC08M1R	Quad 2-input NAND	25	662
AE23A	M74HCT08B1R	Quad 2-input AND	26	662
AE86T	M74HCT08M1R	Quad 2-input NAND	26	662
YF08J	SN74LS10N	Triple 3-Input NAND Gate	25	661
YF09K	SN74LS11N	Triple 3-Input AND Gate	26	662
QX45Y	SN7413N	Dual 4-Input NAND Schmitt Trigger	30	664
QX46A	SN7414N	Hex Schmitt Trigger Inverter	30	664
UB10L	SN74HC14N	Hex Schmitt Trigger Inverter	30	664
YF12N	SN74LS14N	Hex Schmitt Trigger Inverter	30	664
AE46A	M74HC14M1R	Hex inverter	30	664
YF14Q	SN74LS20N	Dual 4-Input NAND Gate	25	661
YF15R	SN74LS21N	Dual 4-Input AND Gate	26	662
YF86T	SN74LS221N	Dual Monostable Multivibrator	45	678
UB13P	SN74HC27N	Triple 3-Input NOR Gate	27	663
YF18U	SN74LS27N	Triple 3-Input NOR Gate	27	663
YF20W	SN74LS30N	8-Input NAND Gate	25	661
QX51F	SN7432N	Quad 2-Input OR Gate	28	663
UB15R	SN74HC32N	Quad 2-Input OR Gate	28	663
YF21X	SN74LS32N	Quad 2-Input OR Gate	28	663
AE56L	M74HC32M1R	Quad 2-input OR	28	663
AE27E	M74HCT32B1R	Quad 2-input OR	28	663

Order Code	Device	Type	Sub-Section	Page
AE91Y	M74HCT32M1R	Quad 2-input OR	28	663
QX40T	SN7404N	Hex Inverter	31	665
QX55K	SN7447AN	BCD to 7-Segment Decoder 15V	40	674
QO52G	SN74LS47N	BCD to 7-Segment Decoder 15V	40	674
QD53H	MC74LS48P	BCD to 7-Seg. Decoder Driver	40	674
QO53H	SN74LS48N	BCD to 7-Seg. Decoder Driver	40	674
YF30H	SN74LS73N	Dual J-K Flip-Flop	35	667
QX59P	SN7474N	Dual D-Type Flip-Flop	35	666
UB19V	SN74HC74N	Dual D-Type Flip-Flop	35	666
YF31J	SN74LS74N	Dual D-Type Flip-Flop	35	666
AE71N	M74HC74M1R	Dual D-type flip flop	35	666
AE31J	M74HCT74B1R	HCT Logic	35	666
AE97F	M74HCT74M1R	Dual D-type flip flop	35	666
YF32K	SN74LS75N	4-Bit Bistable Latch	36	668
QX61R	SN7476N	Dual J-K Flip-Flop	35	667
YF33L	SN74LS76N	Dual J-K Flip-Flop	35	667
YF35Q	SN74LS85N	4-Bit Magnitude Comparator	43	677
UB23A	SN74HC86N	Quad 2-Input Exclusive-OR Gate	29	663
YF36P	SN74LS86N	Quad 2-Input Exclusive-OR Gate	29	663
AE81C	M74HC86M1R	Quad excluding-OR	29	663
QX66W	SN7490N	Decade Counter	38	670
YF38R	SN74LS90N	Decade Counter	38	670
YF40T	SN74LS93N	4-Bit Binary Counter	38	670
QX73Q	SN74121N	Monostable Multivibrator	45	678
YF48C	SN74LS123N	Dual Retriggerable Monostable	45	678
UB26D	M74HC123B1N	Dual Retriggerable Monostable	45	678
AE44X	M74HC123M1R	Multivibrator	45	678
YF49D	SN74LS125N	Quad Bus Buffer	32	665
UB29G	SN74HC132N	Quad 2-Input NAND Schmitt Trigger	30	664
YF51F	SN74LS132N	Quad 2-Input NAND Schmitt Trigger	30	664
AE72P	M74HC132M1R	Quad 2-input schmitt NAND	30	664
AE73Q	M74HC133M1R	Single 13-input NAND	25	662
UB30H	SN74HC133N	13-Input NAND Gate	25	662
UB31J	SN74HC137N	3-Line to 8-Line Decoder	40	673
AE74R	M74HC137M1R	3 to 8 line converter	40	673
UB33L	SN74HC138N	3-Line to 8-Line Decoder	40	673
YF53H	SN74LS138N	3-Line to 8-Line Decoder	40	673
AE45Y	M74HC138M1R	3 to 8 line converter	40	673
AE24B	M74HCT138B1R	3 to 8 line converter	40	673
AE24B	M74HCT138B1R	HCT Logic	40	673
AE87U	M74HCT138M1R	3 to 8 line converter	40	673
UB35Q	SN74HC139N	Dual 2- to 4-Line Decoder	40	673
YF54J	SN74LS139N	Dual 2- to 4-Line Decoder	40	673
AB82D	M74HC139M1R	Dual 2- to 4-line converter	40	673
YF58N	DM74LS154N	4-Line to 16-Line Decoder	40	673
UB38R	PC74HC154P	4-Line to 16-Line Decoder	40	673
YF61R	SN74LS157N	Quad 2- to 1-Line Data Selector	41	674
UB41U	SN74HC161N	4-Bit Binary Counter	38	670
AE48C	M74HC161M1R	4-bit bin/oct counter	38	670
UB42V	SN74HC163N	4-Bit Binary Counter	38	670
AE75S	M74HC163M1R	4-bit bin/oct counter	38	670
AE25C	M74HCT164B	8-bit shift register	37	669
UB43W	SN74HC164N	8-Bit Shift Register	37	669
YF67X	SN74LS164N	8-Bit Shift Register	37	669
AE49D	M74HC164M1R	8-bit shift register	37	669
AE25C	M74HCT164B1R	HCT Logic	37	669
AE88V	M74HCT164M1R	8-bit shift register	37	669
UB45Y	SN74HC175N	Quad D-Type Flip-Flop	35	666
YF75S	SN74LS175N	Quad D-Type Flip-Flop	35	666
AE50E	M74HC175M1R	Quad D-type flip flop	35	666
UB49D	SN74HC193N	Binary Dual Clock Counter	38	670
YF81C	SN74LS193N	Binary Dual Clock Counter	38	670
AE51F	M74HC193M1R	4-bit bin/oct counter	38	670
UB52G	M74HC221B1N	Dual Monostable Multivibrator	45	678
AE52G	M74HC221M1R	Multivibrator	45	678
YF87U	SN74LS240N	Octal Buffer	33	666
UB59P	SN74HC241N	Dctal Buffer	33	666
AE76H	M74HC241M1R	Dctal buffer	33	666
QO56L	SN74LS244N	Octal Buffer	33	666
AE53H	M74HC244M1R	Dctal buffer	33	666
AE26D	M74HCT244B1R	Octal buffer	33	666
AE89W	M74HCT244M1R	Octal buffer	33	666
UB65V	SN74HC244N	Octal buffer	33	666
UB67X	SN74HC245N	Dctal Bus Transceiver	33	666
UB68Y	SN74HCT245N	Octal Bus Transceiver	33	666
YF91Y	SN74LS245N	Dctal Bus Transceiver	33	666
AE54J	M74HC245M1R	Bus Transceiver	33	666
AE90X	M74HCT245M1R	HCT Logic	33	666
AE26D	M74HCT255B1R	HCT Logic	33	666
YF97F	SN74LS259N	8-Bit Addressable Latch	36	668
QY59P	T74LS260B1N	Dual 5-Input NOR Gate	27	663
UB71N	SN74HC266N	Quad 2-Input Exclusive-NOR Gate	29	664
YH00A	SN74LS273N	Octal 0-Type Flip-Flop	35	667
UB72P	TC74HC273AP	Dctal D-Type Flip-Flop	35	667
AE55K	M74HC273M1R	Octal D-type flip flop	35	667
YH01B	SN74LS279N	Quad S/R Latch	36	667
YH02C	SN74LS283N	4-Bit Binary Full Adder	44	677
YH11M	SN74LS365N	Non-Inverting Hex Buffer	31	665
UB80B	SN74HC373N	Octal D-Type Latch	36	668

Order Code	Device	Type	Sub-Section	Page
UB81C	SN74HCT373N	Dctal D-Type Latch	36	668
YH15R	SN74LS373N	Octal D-Type Latch	36	668
AE57M	M74HC373M1R	Octal D-type latch	36	668
AE92A	M74HCT373M1R	Dctal D-type latch	36	668
UB82D	SN74HC374N	Octal D-Type Flip-Flop	35	667
AE58N	M74HC374M1R	Dctal D-type flip flop	35	667
AE28F	M74HCT374B1R	Dctal D-type latch	35	667
AE93B	M74HCT374M1R	Octal D-type flip flop	35	667
YH16S	T74LS374B1N	Octal D-Type Flip-Flop	35	667
UB84F	SN74HC390N	Dual Decade Counter	38	670
AE59P	M74HC390M1R	Dec/doz counter	38	670
UB85G	SN74HC393N	Dual 4-Bit Binary Counter	38	670
YH22Y	SN74LS393N	Dual 4-Bit Binary Counter	38	670
AE60Q	M74HC393M1R	4-bit bin/oct counter	38	670
UB88V	SN74HCT533N	Octal D-Type Latch	36	668
UB93B	SN74HC541N	Dctal Buffer	33	666
UB94C	SN74HCT541N	Dctal Buffer	33	666
AE80B	M74HC541M1R	Dctal buffer	33	666
AE94C	M74HCT541M1R	Octal buffer	33	666
AE69A	M74HC573M1R	Octal D-type latch	36	668
AE29G	M74HCT573B1R	Dctal D-type latch	36	668
AE95D	M74HCT573M1R	Dctal D-type latch	36	668
AE70M	M74HC574M1R	Octal D-type latch	36	668
AE30H	M74HCT574B1R	Dctal D-type latch	36	668
AE96E	M74HCT574M1R	Dctal D-type latch	36	668
WH02C	SN74LS629N	Dual Voltage Controlled Osc	46	679
KP49D	SN74LS688N	8-Bit Magnitude Comparator	43	677
YH30H	SN74C917N	6-Digit Display Driver	65	750
QY08J	SN74C925N	8-Digit Counter Driver	65	750
UL57M	PC74HC40103C	4-Stage Counter	38	

Order Code	Device	Type	Sub-Section	Page	Order Code	Device	Type	Sub-Section	Page	Order Code	Device	Type	Sub-Section	Page
WQ86T	LM79L12ACZ	Voltage Reg. -12V 100mA	67	767	AD71N	DAC7802KP	12-bit multiplying DAC	70	777	UL33L	LM837N	Quad Low Noise Dp-Amp	52	708
WQ89W	LM79M12CT	Voltage Reg. -12V 500mA	67	767	AD67X	ADS7806P	12-bit ADC	70	774	AH42V	U880B	Double Flasher	66	754
QL36P	L7915CV	Voltage Reg. -15V 1A	67	767	AD68Y	ADS7807P	16-bit ADC	70	774	Base Number 8000				
WQ87U	LM79L15ACZ	Voltage Reg. -15V 100mA	67	767	Base Number 70,000					YH38R	ICL8038CCPD	Waveform Generator	69	772
WQ90X	LM79M15CT	Voltage Reg. -15V 500mA	67	767	Order Code	Device	Type	Sub-Section	Page	YH39N	ICL8069CCZR	1.2V Voltage Reference	66	755
Base number 700					AE05F	SN75172N	RS485 Driver	68	769	YH43W	ICL8211CPA	Voltage Detector	66	755
Order Code	Device	Type	Sub-Section	Page	AE07H	SN75173N	RS485 Receiver	68	769	YH49D	8251	USART	49	686
UL67X	M708L	IR Encoder Transmitter	63	744	AE06G	SN75174N	RS485 Driver	68	769	YH50E	8255A	Peripheral Interface Adaptor	49	687
AY36P	MAX712	Fast NiCd Charger	66	756	AE08J	SN75175N	RS485 Receiver	68	768	YH51F	8279	Keyboard/Display Interface	49	694
AY37S	MAX713	Fast Charge NiCd	66	757	AE09K	SN75176BP	RS485 Tx/Rx	68	769	UL27E	TDA8341-N6	TV IF Amp	61	738
QL21X	L723CN 14-pin	Variable Voltage Regulator	67	767	UF53H	DS75491N	MDS to LED Driver	65	750	UK95D	TA8662N	NICAM Chip Set	61	738
QL22Y	LM741CN 8-pin	Dp-Amp	52	710	Base Number 80					QY18U	SP8680BDG	600MHz Counter Divider	48	680
QL24B	LM747CN	Dual Dp-Amp	52	710	Order Code	Device	Type	Sub-Section	Page	DC11M	DAC8840FP	8-Bit D/A Converter	70	776
QL25C	LM748CN	Dp-Amp	52	710	QW03D	Z80A-PID	Parallel Interface Controller	49	694	AE13P	HT8950	Voice Modulator	60	734
Base number 7000					AH46A	P-80C31	8-Bit Micro 12MHz	49	685	AE14Q	HT8955A	Voice Echo	60	734
Order Code	Device	Type	Sub-Section	Page	AH47B	P-80C31-1	8-Bit Micro 12MHz	49	685	Base Number 80,000				
YH87U	TDA7000	FM Radio	61	740	AH48C	P-80C31-L	8-Bit Micro 12MHz	49	685	Order Code	Device	Type	Sub-Section	Page
UK79L	TDA7052	1.2W Power Amp	58	719	AH49D	P-80C32	8-Bit Micro 12MHz	49	686	AE11M	HT82207	American Wst Sound IC	60	731
QW94C	ICL7106CPL	A/D Converter Display Driver LCD70	779		AH50E	P-80C32-1	8-Bit Micro 12MHz	49	686	AE12N	HT82231	Farm Yard Sound IC	60	731
QW95D	ICL7107CPL	A/D Conver Display Driver LEO 70	779		AH51F	P-80C52-100	8-Bit Micro 12MHz	49	686	QW00A	Z0840004PSC	Microprocessor 4MHz	49	694
UL64U	ICM7216AIJ	10MHz Universal Counter	65	751	RA70M	TL081CN	J-FET Dp-Amp	54	714	Base Number 800,000				
YY94C	ICM7216DIP1	10MHz Frequency Counter	65	751	RA71N	TL082CN	Dual J-FET Dp-Amp	54	714	Order Code	Device	Type	Sub-Section	Page
CP95D	ICM7217AIP1	4-Digit Prog. Counter Driver	65	751	RA72P	TL084CN	Quad J-FET Dp-Amp	54	714	UF74R	Z0840006PSC	Microprocessor 6MHz	49	694
FP62S	ICM7224IPL	4-Digit Counter	65	751	AJ63T	PT86C268	Microprocessor support chip	49	683	Base Number 90				
QX37S	SN7400N	Quad 2-Input NAND Gate	25	661	AJ64U	PT86C268	Microprocessor support chip	49	683	Order Code	Device	Type	Sub-Section	Page
UL11M	PM7528HP	Dual 8-bit D/A Converter	70	776	Base Number 800					Order Code	Device	Type	Sub-Section	Page
YH63T	ICM7555IPA	CMDS Timer	48	681	Order Code	Device	Type	Sub-Section	Page	AH58N	ST93C06B1	EEPROM 256K	50	697
CP96E	ICM7556IPD	Dual CMDS Timer	48	681	QO01B	DAC0801LCN	D/A Converter	70	774	AH59P	ST93C46AB1	EEPROM 1K	50	698
YY75S	SI7660CJ	Voltage Converter	66	756	QO00A	ADC0804LCN	A/D Converter	70	773	DC03D	XLS93C46P	1024 Bit EEPROM	50	699
UH36P	ICL7673CPA	Battery Backup	66	756	QL13P	TBA810P	6W Power Amp	58	720	DC04E	XLS93C56P	2048 Bit EEPROM	50	699
AH71N	TL7702ACP/A	Voltage Supply Supervisor	67	765	AH70M	TBA810S	Audio Amp IC	58	720	DC05F	XLS93C66P	4096 Bit EEPROM	50	699
AH72P	TL7705ACD1/A	Voltage Supply Supervisor	67	765	AD72P	DAC813KP	12-bit DAC remote controlled	70	775	AH61R	ST93C566B1	EEPROM 4K	50	698
AH73Q	TL7705ACP/A	Voltage Supply Supervisor	67	765	WQ63T	TBA820M	2W Power Amp	58	719					
DC07H	AD7711AN	A/D Converter	70	779	UF49D	LM833N	Very Low Noise Dp-Amp	52	708					
AD69A	DAC7800KP	12-bit multiplying DAC	70	777										
AD70M	DAC7801KP	12-bit multiplying DAC	70	777										

Transistor Cases (all viewed from below unless stated)



IMPORTANT NOTE

With many of the ICs shown in this section of the catalogue we include an application circuit taken from the manufacturer's data sheet. These circuits are *not* intended to be complete projects in any way, but are to give the *experienced* constructor a basis on which to design circuits for his own application. The only assistance we can provide regarding these application circuits is to supply the customer with the relevant

data sheet for that particular IC.

We can supply data sheets for any of the ICs we stock, priced 80p each. Although some of these may only be a couple of sheets giving electrical specifications, the vast majority will usually contain a good deal of information on the use of the IC, including example application circuits. To order a data sheet for a particular IC, proceed as follows: in the descriptions box on your Order Coupon write 'Data Sheet for' and then the device number of

the IC you want information for, e.g. 'Data Sheet for NE555'. In the Order Code column write 'DS00A', and then the quantity, price, etc. as usual.

In addition, please note that we cannot provide data sheets for smaller devices such as diodes, transistors, triacs, etc. We will have included any relevant information we have for such a device in this catalogue. The only other source of information for these will be semiconductor data books, see Books section.

The abbreviations under the heading 'Type No. and Manufacturer' are identified as follows:

FA—Fagor GI—General Instruments HIT—Hitachi ME—Microelectronics MOT—Motorola NEC—NEC NSC—National Semiconductor PC—Philips
SEM—Semelab SIE—Siemens SLX—Siliconix ST—SGS-Thomson TFK—Telefunken TI—Texas Instruments ZET—Zetex

Table 1 Small Signal Low Frequency Silicon Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V _{CEO} (max) V	V _{CBO} (max) V	V _{EB0} (max) V	I _c (max) mA	P _{TOT} (mW)	Typ h _{FE} @ I _c	Typ f _T (MHz)	Application
QB31J	BC107B	22p	TO18	NPN	45	50	6	100	300	290 @ 2mA	300	A.F. driver (comp to BC177)
QB32K	BC108C	22p	TO18	NPN	20	30	5	100	300	520 @ 2mA	300	General purpose (comp to BC178)
QB33L	BC109C	22p	TO18	NPN	20	30	5	100	300	520 @ 2mA	300	Low noise, high gain amp (comp to BC179)
QB50E	BC168C	ME 16p	TO92	NPN	20	30	5	100	300	650 @ 2mA	85	General purpose
QB51F	BC169C	ME 16p	TO92	NPN	20	30	5	50	300	650 @ 2mA	150	High gain, low noise amp
UH55K	BC171	ME 12p	TO92a	NPN	45	50	6	100	300	290 @ 2mA	250	BC107 in plastic package
QB52G	BC177	ME 22p	TO18	PNP	-45	-50	-5	100	300	240 @ 2mA	200	A.F. amp (comp to BC107)
QB53H	BC178	ME 22p	TO18	PNP	-25	-30	-5	100	300	240 @ 2mA	200	General purpose (comp to BC108)
QB54J	BC179	ME 24p	TO18	PNP	-20	-25	-5	100	300	410 @ 2mA	200	High gain, low noise (comp to BC109)
QB55K	BC182L	ME 14p	TO92	NPN	50	60	5	200	300	>125 @ 2mA	150	A.F. driver (comp to BC212L)
QB56L	BC183L	ME 14p	TO92	NPN	30	45	5	200	300	>125 @ 2mA	150	General purpose (comp to BC213L)
QB57M	BC184L	ME 14p	TO92	NPN	30	45	5	200	300	>125 @ 2mA	150	Low noise, high gain amp (comp to BC214L)
QB60Q	BC212L	ME 14p	TO92	PNP	-50	-60	-5	200	300	>60 @ 2mA	200	A.F. driver (comp to BC182L)
QB61R	BC213L	ME 14p	TO92	PNP	-30	-45	-5	200	300	>80 @ 2mA	200	General purpose (comp to BC183L)
QB62S	BC214L	ME 14p	TO92	PNP	-30	-45	-5	200	300	>140 @ 2mA	200	Low noise, high gain amp (comp to BC184L)
UH56L	BC239	ME 12p	TO92h	NPN	45	45	5	100	350	290 @ 2mA	280	A.F. amp general purpose
QQ14Q	BC547	ME 10p	TO92a	NPN	45	50	6	100	500	<520 @ 2mA	300	BC107 in plastic package
QB73Q	BC548	ME 10p	TO92a	NPN	30	30	5	100	500	<520 @ 2mA	300	BC108 in plastic package
QQ15R	BC549	ME 10p	TO92a	NPN	30	30	5	100	500	<520 @ 2mA	300	BC109 in plastic package
UL49D	BC550	ME 12p	TO92a	NPN	45	50	5	200	500	<520 @ 2mA	300	Low noise BC549 (comp to BC560)
QQ16S	BC557	ME 10p	TO92a	PNP	-45	-50	-5	100	500	240 @ 2mA	150	BC177 in plastic package
QQ17T	BC558	ME 10p	TO92a	PNP	-30	-30	-5	100	500	240 @ 2mA	150	BC178 in plastic package
QQ18U	BC559	ME 10p	TO92a	PNP	-30	-30	-5	100	500	240 @ 2mA	150	BC179 in plastic package
UL50E	BC560	MOT 12p	TO92a	PNP	-45	-50	-5	200	500	240 @ 2mA	300	Low noise BC559 (comp to BC550)
QF00A	BCY70	ME 26p	TO18	PNP	-40	-50	-5	200	350	300 @ 1mA	450	General purpose
QF01B	BCY71	ME 26p	TO18	PNP	-45	-45	-5	200	350	300 @ 1mA	450	General purpose
QH60Q	MPSA14	ME 25p	TO92b	NPN	30	30	300	500	625	10,000 @ 10mA	125	Darlington amp
UL29G	MPSA42	ME 21p	TO92b	NPN	300	300	6	500	625	40 @ 30mA	50	High voltage (comp to MPSA92)
QH61R	MPSA65	ME 28p	TO92b	PNP	-30	-30	300	500	625	50,000 @ 10mA	175	Darlington amp
UL30H	MPSA92	ME 18p	TO92b	PNP	-300	-300	-5	500	625	25 @ 30mA	50	High voltage (comp to MPSA42)
QH63T	MPS3638A	ME 18p	TO92b	PNP	-25	-25	-4	500	310	>100 @ 10mA	150	General purpose amp and switch
QL43W	ZTX107	ZET 20p	E-line	NPN	50	60	5	100	300	240 @ 2mA	300	
QL44X	ZTX108	ZET 20p	E-line	NPN	30	45	5	100	300	240 @ 2mA	350	
QL45Y	ZTX109	ZET 21p	E-line	NPN	30	45	5	100	300	410 @ 2mA	350	
QL46A	ZTX300	ZET 20p	E-line	NPN	25	25	5	500	300	150 @ 10mA	150	(comp to ZTX500)
QL48C	ZTX302	ZET 22p	E-line	NPN	35	35	5	500	300	>100 @ 10mA	200	(comp to ZTX502)
QL50E	ZTX304	ZET 24p	E-line	NPN	70	70	5	500	300	>50 @ 10mA	150	(comp to ZTX504)
QL60Q	ZTX500	ZET 22p	E-line	PNP	-25	-25	-5	500	300	150 @ 10mA	150	(comp to ZTX300)
QL62S	ZTX502	ZET 22p	E-line	PNP	-35	-35	-5	500	300	>100 @ 10mA	150	(comp to ZTX302)
QL64U	ZTX504	ZET 26p	E-line	PNP	-70	-70	-5	500	300	>50 @ 10mA	150	(comp to ZTX304)
QL68Y	ZTX541	ZET 24p	E-line	PNP	-100	-100		100	500	>30 @ 2mA		
QL69A	ZTX542	ZET 30p	E-line	PNP	-120	-120		100	500	>40 @ 10mA		
QR01B	2N706	32p	TO18	NPN	20	25	3	100	300	>20 @ 10mA	200	High speed switching
QR19V	2N2907	ME 33p	TO18	PNP	-40	-60	-5	600	400	200 @ 150mA	200	High speed switching
QR20W	2N2926Or	ME 20p	TO98	NPN	18	18	5	100	200	150 @ 2mA	200	General purpose
QR21X	2N2926Ye	ME 20p	TO98	NPN	18	18	5	100	200	210 @ 2mA	200	General purpose
QR22Y	2N2926Gn	ME 20p	TO98	NPN	18	18	5	100	200	360 @ 2mA	200	General purpose
QR26D	2N3702	ME 15p	TO92	PNP	-25	-40	-5	200	300	180 @ 50mA	100	Audio amp
QR27E	2N3703	ME 18p	TO92	PNP	-30	-50	-5	200	300	90 @ 50mA	100	Audio amp
QR28F	2N3704	ME 14p	TO92	NPN	30	50	5	800	360	200 @ 50mA	100	Audio amp
QR29G	2N3705	ME 14p	TO92	NPN	30	50	5	800	360	100 @ 50mA	100	Audio amp
QR30H	2N3706	ME 14p	TO92	NPN	20	40	5	800	360	315 @ 50mA		Audio amp
QR31J	2N3707	ME 14p	TO92	NPN	30	30	6	30	250	250 @ 0.1mA		Low level, low noise amp
QR32K	2N3708	ME 14p	TO92	NPN	30	30	6	30	250	360 @ 1mA		General purpose
QR34M	2N3711	ME 14p	TO92	NPN	30	30	6	30	250	420 @ 1mA		General purpose
QR39N	2N3903	ME 16p	TO92b	NPN	40	60	5	200	300	100 @ 10mA		General purpose
QR40T	2N3904	ME 14p	TO92b	NPN	40	60	6	200	310	>100 @ 10mA		General purpose
QR41U	2N3905	ME 15p	TO92b	PNP	-40	-40	-5	200	310	>50 @ 10mA		General purpose
QR42V	2N3906	ME 15p	TO92b	PNP	-40	-40	-5	200	310	>100 @ 10mA		General purpose
UL37S	2N5401	ME 17p	TO92b	PNP	-150	-160	-5	600	500	120 @ 10mA	200	High voltage (comp to 2N5551)
UL36P	2N5551	NSC 12p	TO92b	NPN	160	180	6	600	500	140 @ 10mA	200	High voltage (comp to 2N5401)
UF75S	2SA872A	HIT 36p	TO92	PNP	-120	-120	-5	50	300	500 @ 2mA	120	Low noise amp
QY12N	2SA1085E	HIT 40p	TO92	PNP	-120	-120	-5	100	400	400 @ 2mA	90	Very low noise amp
QY11M	2SC2547E	HIT 38p	TO92	NPN	120	120	5	100	400	400 @ 2mA	90	Very low noise amp

Gain Groups (BC107, BC108, BC109, BC168, BC169)

The above transistor types are all available in different gain (h_{FE}) groups. For example, if the design parameter calls for the transistor to have a gain of between 110 and 800, this will be divided into groups e.g. group A – 110 to 220; group B – 200 to 450; group C – 420 to 800. The transistors are then marked with their gain group after the type number (e.g. BC108C). Transistors of the above types that have no suffix letter are ungraded and therefore where the plain-numbered device is specified a graded transistor will always, without qualification, do exactly the same job.

Table 2 Medium Power Low Frequency Silicon Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V_{CE0} (max) V	V_{CB0} (max) V	V_{EB0} (max) V	I_C (max) mA	P_{TOT} (max) mW	Typ h_{FE} @ I_C	Typ f_T (MHz)	Application
QB37S	BC140 ME	38p	TO39	NPN	40	60	7	1A	800	140 @ 100mA	50	Audio amps and switching up to 1A (comp to BC160)
QB38R	BC141 ME	45p	TO39	NPN	60	80	7	1A	800	140 @ 100mA	50	Audio amps and switching up to 1A (comp to BC161)
QB39N	BC142 ME	42p	TO5	NPN	60	80	5	800	800	>20 @ 200mA	40	Audio driver
QB40T	BC143 ME	44p	TO5	PNP	-60	-60	-5	800	800	>25 @ 500mA	100	Audio driver
QB48C	BC160 ME	39p	TO39	PNP	-40	-60	-5	1A	800	140 @ 100mA	50	Audio amps and switching up to 1A (comp to BC140)
QB49D	BC161 ME	42p	TO39	PNP	-60	-80	-5	1A	800	140 @ 100mA	50	Audio amps and switching up to 1A (comp to BC141)
QB63T	BC301/5 ME	42p	TO39	NPN	60	90	7	500	850	105 @ 150mA	120	Audio driver stages (comp to BC303/5)
QB65V	BC303/5 ME	42p	TO39	PNP	-60	-85	-7	500	850	105 @ 150mA	75	Audio driver stages (comp to BC301/5)
QB66W	BC327 ME	10p	TO92h	PNP	-45	-50	-5	500	625	350 @ 100mA	100	Driver and output stages in audio amps (comp to BC337)
QB67X	BC328 ME	15p	TO92h	PNP	-25	-30	-5	500	625	350 @ 100mA	100	Driver and output stages in audio amps (comp to BC338)
QB68Y	BC337 ME	10p	TO92h	NPN	45	50	5	500	625	350 @ 100mA	200	Driver and output stages in audio amps (comp to BC327)
QB69A	BC338 ME	12p	TO92h	NPN	25	30	5	500	625	350 @ 100mA	200	Driver and output stages in audio amps (comp to BC328)
QB70M	BC441 ME	56p	TO39	NPN	60	75	5	2A	1W	100 @ 500mA	50	Drivers and gen purpose (comp to BC461)
QB72P	BC461 ME	42p	TO39	PNP	-60	-75	-5	2A	1W	100 @ 500mA	50	Drivers and gen purpose (comp to BC441)
QF27E	BFY50 ME	44p	TO5	NPN	35	80	6	1A	800	112 @ 150mA	50	General purpose
QF28F	BFY51	44p	TO5	NPN	30	60	6	1A	800	123 @ 150mA	50	General purpose
QF29G	BFY52 ST	44p	TO5	NPN	20	40	6	1A	800	142 @ 150mA	50	General purpose
UM85G	TIPP31A TI	53p	TO92	NPN	60	60	5	2A	800	>20 @ 1A		Audio driver
UM86T	TIPP31C TI	53p	TO92	NPN	100	100	5	2A	800	>20 @ 1A		Audio driver
UM89W	TIPP112 TI	61p	TO92	NPN	100	100	5	2A	800	>1000 @ 1A		Audio darlington
DB36P	ZTX450 ZET	21p	TO92	NPN	45	60	5	1A	1W	300 @ 150mA	150	Hi-fi amps, fast pwr swch (comp to ZTX550)
DB37S	ZTX451 ZET	28p	TO92	NPN	60	80	5	1A	1W	150 @ 150mA	150	Hi-fi amps, fast pwr swch (comp to ZTX551)
DB38R	ZTX455 ZET	38p	TO92	NPN	140	160	5	1A	1W	300 @ 150mA	100	Hi-fi amps, fast pwr swch
DB39N	ZTX550 ZET	29p	TO92	PNP	-45	-60	-5	1A	1W	300 @ 150mA	150	Hi-fi amps, fast pwr swch (comp to ZTX450)
DB43W	ZTX694B ZET	43p	TO92	NPN	120	120	5	0.5A	1W	500 @ 100mA	150	High gain, general purpose
UH46A	ZTX650 ZET	46p	E-line	NPN	45	60	5	2A	1.5W	200 @ 500mA	175	Hi-fi amps, fast pwr swch (comp to ZTX750)
UH47B	ZTX651 ZET	46p	E-line	NPN	60	80	5	2A	1.5W	200 @ 500mA	175	Hi-fi amps, fast pwr swch (comp to ZTX751)
UH48C	ZTX652 ZET	48p	E-line	NPN	80	100	5	2A	1.5W	200 @ 500mA	175	Hi-fi amps, fast pwr swch (comp to ZTX752)
UH49D	ZTX653 ZET	49p	E-line	NPN	100	120	5	2A	1.5W	200 @ 500mA	175	Hi-fi amps, fast pwr swch (comp to ZTX753)
UH50E	ZTX750 ZET	40p	E-line	PNP	-45	-60	-5	2A	1.5W	200 @ 500mA	140	Hi-fi amps, fast pwr swch (comp to ZTX650)
UH51F	ZTX751 ZET	47p	E-line	PNP	-60	-60	-5	2A	1.5W	200 @ 500mA	140	Hi-fi amps, fast pwr swch (comp to ZTX651)
UH52G	ZTX752 ZET	50p	E-line	PNP	-60	-100	-5	2A	1.5W	200 @ 500mA	140	Hi-fi amps, fast pwr swch (comp to ZTX652)
UH53H	ZTX753 ZET	50p	E-line	PNP	-100	-120	-5	2A	1.5W	200 @ 500mA	140	Hi-fi amps, fast pwr swch (comp to ZTX653)
UM69A	ZTX851 ZET	65p	E-line	NPN	60	150	7	5A	1.2W	200 @ 4A		High gain, high current, low saturation voltage
UM70M	ZTX853 ZET	66p	E-line	NPN	100	200	7	4A	1.2W	200 @ 2A		High gain, high current, low saturation voltage
UM71N	ZTX857 ZET	66p	E-line	NPN	300	400	7	3A	1.2W	50 @ 1A		High voltage, low saturation voltage
QR09K	2N1711 ME	47p	TO5	NPN	30	75	7	1A	800	200 @ 150mA	100	General purpose
QR10L	2N1893 ME	62p	TO5	NPN	80	120	7	500	800	80 @ 150mA	50	Amplifier outputs
QR11M	2N2219 ME	41p	TO5	NPN	30	60	5	800	800	200 @ 150mA	50	High speed switching
QR17T	2N2905 ME	43p	TO5	PNP	-40	-60	-5	600	600	200 @ 150mA	200	High speed switching
QR23A	2N3053	43p	TO5	NPN	40	60	5	700	800	150 @ 150mA	100	Driver
QQ31J	2SB716 HIT	39p	TO92	PNP	-120	-120	-5	50	750	500 @ 2mA	350	High voltage amp (comp to 2SD756)
UF76H	2SB718 HIT	78p	P1b	PNP	-200	-200	-5	50	1.25W	100 @ 10mA	140	Very high voltage driver (comp to 2SD756)
QQ33L	2SD756 HIT	40p	TO92	NPN	120	120	5	50	750	700 @ 2mA	150	High voltage amp (comp to 2SD716)

Table 3 High Power Low Frequency Silicon Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V_{CE0} (max) V	V_{CB0} (max) V	V_{EB0} (max) V	I_C (max) mA	P_{TOT} (max) mW	Typ h_{FE} @ I_C	Typ f_T (MHz)	Application
QF03D	BD131 PC	65p	TO126	NPN	45	70	6	3A	15W	>40 @ 500mA	60	A.F. output (comp to BD132)
QF05F	BD132 PC	69p	TO126	PNP	-45	-45	-4	3A	15W	>40 @ 500mA	60	A.F. output (comp to BD131)
QF06G	BD135 ST	40p	TO126	NPN	45	45	5	1A	8W	100 @ 150mA	250	A.F. driver amp (comp to BD136)
QF75S	BD136 ST	40p	TO126	PNP	-45	-45	-5	1A	8W	100 @ 150mA	75	A.F. driver amp (comp to BD135)
QF07H	BD139 ST	38p	TO126	NPN	80	100	5	1A	8W	100 @ 150mA	250	A.F. driver amp (comp to BD140)

Table 3 High Power Low Frequency Silicon Transistors (continued from previous page).

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V _{CEO} (max) V	V _{CB0} (max) V	V _{EB0} (max) V	I _c (max) mA	P _{TOT} (max) mW	Typ h _{FE} @ I _c	Typ f _r (MHz)	Application
QF08J	BD140	51p	TO126	PNP	-80	-100	-5	1A	8W	100 @ 150mA	75	A.F. driver amp (comp to BD139)
UM78K	BD539C	85p	P1b	NPN	100	100	5	5A	45W	>30 @ 1A		Audio amp (comp to BD540C)
UM79L	BD540C	85p	P1b	PNP	-100	-100	-5	5A	45W	>30 @ 1A		Audio amp (comp to BD539C)
WH15R	BD711	65p	P1b	NPN	100	100	5	12A	75W	25 @ 4A	3	Audio amp (comp to BD712)
WH16S	BD712	58p	P1b	PNP	-100	-100	-5	12A	75W	25 @ 4A	3	Audio amp (comp to BD711)
UJ15R	BD911	78p	P1b	NPN	100	100	5	15A	90W	30 @ 5A	3	Audio amp (comp to BD912)
UJ16S	BD912	75p	P1b	PNP	-100	-100	-5	15A	90W	30 @ 5A	3	Audio amp (comp to BD911)
UM80B	BDX53C	96p	P1b	NPN	100	100	5	8A	60W	>750 @ 3A		Audio darlington amp (comp to BDX54C)
UM81C	BDX54C	96p	P1b	PNP	-100	-100	-5	8A	60W	>750 @ 3A		Audio darlington amp (comp to BDX53C)
QF39N	BU208	£1.75	TO3	NPN	700	1500†	10	8A	150W	50 @ 1A	7	Line o/p stages in colour TV's (V _{CE(sat)} =5V)
UJ17T	BU208A	£2.10	TO3	NPN	700	1500†	10	8A	150W	50 @ 1A	7	PSU's & col. TV hor. deflect (V _{CE(sat)} =1V)
UJ18U	BU806	£1.20	P1b	NPN	200	400	6	8A	60W	300 @ 4A		Power darlington with speed-up diode horiz. output stages in large screen TV's
UJ21X	BUV47A	£3.25	P3c	NPN	450	1000	7	9A	120W	20 @ 3.5A		High voltage power switch
QH57M	MJ2501	£2.25	TO3	PNP	-80	-80	-5	10A	150W	1000 @ 5A (min)1		High power darlington (comp to MJ3001)
BL38R	MJ2955	£1.20	TO3	PNP	-60	-100	-7	15A	150W	45 @ 4A	4	General purpose (comp to 2N3055)
QH58N	MJ3001	£2.39	TO3	NPN	80	80	5	10A	150W	1000 @ 5A (min) 1		High power darlington (comp to MJ2501)
UJ24B	MJ11015	£3.59	TO3	PNP	-120	-120	-5	30A	200W	2000 @ 20A		Power darlington amp (comp to MJ11016)
UJ25C	MJ11016	£2.95	TO3	NPN	120	120	5	30A	200W	2000 @ 20A		Power darlington amp (comp to MJ11015)
QH54J	MJE340	58p	TO126	NPN	300	300	3	500mA	20W	150 @ 50mA	20	Audio output stages
WQ51F	MJE350	82p	TO126	PNP	-300	-300	-3	500mA	20W	150 @ 50mA	20	Audio output stages (comp to MJE340)
UJ26D	MJE13005	98p	P1b	NPN	400	700††	9	4A	75W	30 @ 1A		High voltage switch for switch mode PSU's
UJ27E	MJE13007	£1.50	P1b	NPN	400	700††	9	8A	80W	20 @ 3.5A	4	Motor control, switch regulator
QL15R	TIP31A	49p	P1b	NPN	60	100	5	3A	40W	25 @ 3A	3	Audio amp (comp to TIP32A)
UM82D	TIP31C	51p	P1b	NPN	100	140	5	3A	40W	>25 @ 1A		Audio amp (comp to TIP32C)
QL16S	TIP32A	49p	P1b	PNP	-60	-100	-5	3A	40W	25 @ 3A	3	Audio amp (comp to TIP31A)
UM83E	TIP32C	71p	P1b	PNP	-100	-140	-5	3A	40W	>25 @ 1A		Audio amp (comp to TIP31C)
WQ71N	TIP33A	£1.10	P3c	NPN	60	100	5	10A	80W	75 @ 3A	3	Audio amp (comp to TIP34A)
WQ72P	TIP34A	£1.25	P3c	PNP	-60	-100	-5	10A	80W	75 @ 3A	3	Audio amp (comp to TIP33A)
UJ28F	TIP35C	£1.75	P3c	NPN	100	140	5	25A	125W	20 @ 15A	3	Audio amp (comp TIP36C)
UJ29G	TIP36C	£1.90	P3c	PNP	-100	-140	-5	25A	125W	20 @ 15A	3	Audio amp (comp to TIP35C)
QL17T	TIP41A	50p	P1b	NPN	60	100	5	6A	65W	50 @ 3A	3	Audio amp (comp to TIP42A)
QL18U	TIP42A	52p	P1b	PNP	-60	-100	-5	6A	65W	50 @ 3A	3	Audio amp (comp to TIP41A)
WQ73Q	TIP122	74p	P1b	NPN	100	100	5	5A	65W	5000 @ 2A	5	High power darlington (comp to TIP127)
WQ74R	TIP127	74p	P1b	PNP	-100	-100	-5	5A	65W	3000 @ 2A	5	High power darlington (comp to TIP122)
UJ30H	TIP142	£1.36	P3c	NPN	100	100	5	10A	125W	3000 @ 5A		Power darlington amp (comp to TIP147)
UJ31J	TIP147	ST £1.48	P3c	PNP	-100	-100	-5	10A	125W	3000 @ 5A		Power darlington amp (comp to TIP142)
QH55K	TIP2955	ST £1.02	P3c	PNP	-70	-100	-7	15A	90W	45 @ 4A	2	General purpose (comp to TIP3055)
QH56L	TIP3055	ST £1.02	P3c	NPN	70	100	7	15A	90W	45 @ 4A	2	General purpose (comp to TIP2955)
UM84F	TIPL770	TI 88p	P1b	NPN	400	850	10	2.5A	50W	40 @ 500mA	12	High voltage, inductive load switching
QR24B	2N3054	£1.15	TO66	NPN	55	90	7	4A	29W	>25 @ 500mA	1	Audio amp
YH98G	2N3055	ST £1.15	TO3	NPN	60	100	7	15A	115W	45 @ 4A	0.8	General purpose (comp to MJ2955)
BL45Y	2N3055H*	£1.45	TO3	NPN	60	100	7	15A	115W	45 @ 4A	0.8	General purpose (comp to MJ2955)
QW07H	2N3772	ST £2.49	TO3	NPN	60	100	7	20A	150W	30 @ 10A	0.8	High current power amps
QR35Q	2N3773	£2.75	TO3	NPN	140	160	7	16A	150W	40 @ 4A	0.2	Power switching, audio amps, inverters, solenoid drivers
QW08J	2N6609	£4.50	TO3	PNP	-140	-160	-7	16A	150W	40 @ 4A	0.2	Power switching, audio amps, inverters,
QR56L	2SA715	HIT 60p	TO126	PNP	-35	-35	-5	2.5A	10W	150 @ 500mA	160	Power switching
QR59P	2SC1162	HIT 50p	TO126	NPN	30	30	5	2.5A	10W	100 @ 500mA	180	Power switching

*2N3055H is a homotaxial base device which is highly resistant to secondary breakdown over a wide range of operating conditions. †V_{CE(s)} (V_{BE} = 0). ††V_{CEV}.

Table 4 Small Signal High Frequency Silicon Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V _{CEO} (max) V	V _{CB0} (max) V	V _{EB0} (max) V	I _c (max) mA	P _{TOT} (max) mW	Typ h _{FE} @ I _c	Typ f _r (MHz)	Application
QF09K	BF115	ME 52p	SO-12A	NPN	30	50	5	30	145	40 @ 1mA	230	AM/FM
QY53H	BF173	ME 45p	TO72a	NPN	25	25	3	25	260	38 @ 7mA	350	R.F. amps
QQ19V	BF494	ME 19p	TO92k	NPN	20	30	5	30	300	115 @ 1mA	260	AM/FM Low noise receiver I.F. stages
UH34M	BFR90A	£1.06	SOT-37	NPN	15	20	2	25	180	90 @ 14mA	5000	VHF and UHF wideband amps
QQ64U	BFY90	PC 60p	TO72	NPN	15	30	2.5	50	200	52 @ 2mA	1850	Wideband amps (40 to 860MHz)
QF32K	BSX20	ME 38p	TO18	NPN	15	40	4.5	500	360	80 @ 10mA	500	High speed saturated switch and HF amps
CR01B	MPSH10	MOT 38p	TO92e	NPN	25	30	3	20	350	>60 @ 4mA	>650	VHF/UHF amplifiers
UH54J	2N2222A	ST 25p	TO18	NPN	40	75	6	800	500	200 @ 150mA	300	DC and VHF/UHF amplifiers
QR12N	2N2369A	35p	TO18	NPN	15	40	4.5	200	360	>40 @ 10mA	500	High speed saturated switch and HF amps

** G_{UM}: Maximised unilateralised power gain.

The abbreviations under the heading 'Type No. and Manufacturer' are identified as follows:

FA-Fagor GI-General Instruments HIT-Hitachi ME-Microelectronics MOT-Motorola NEC-NEC NSC-National Semiconductor PC-Philips
 SEM-Semelab SIE-Siemens SLX-Siliconix ST-SGS-Thomson TFK-Telefunken TI-Texas Instruments ZET-Zetex

Table 5 Medium Power High Frequency Silicon Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	Material	V _{CEO} (max) V	V _{CB0} (max) V	V _{EB0} (max) V	I _c (max) mA	P _{TOT} (max) mW	Typ h _{FE} @ I _c	Typ f _r (MHz)	Application
QF18U	BF259 ME	65p	TO39	NPN	300	300	5	100	800	>25 @ 30mA	90	High voltage video output amp
QF19V	BF337 ME	65p	TO39	NPN	200	250	5	100	800	60 @ 30mA	80	R-G-B and colour difference outputs in colour TV's
QR38R	2N3866 ST	£1.55	TO5	NPN	30	55	3.5	400	5W	105 @ 50mA	700	UHF amp
UK78K	2N4427 ST	88p	TO39	NPN	20	40	3.5	500	3.5	100 @ 100mA	500	VHF amp and oscillator

Table 6 N Channel Field Effect Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	P _{TOT} (max) mW	V _{DS} (max) V	V _{DG} (max) V	V _{GS} (max) V	I _{GSS} (max) nA	Y _{FS} (typical) μS (V _{GS} = 0V)	Max input Capacitance (pF)	I _{BSS} (max) mA	Application
QF16S	BF244A	48p	TO92d	300	30	30	30	7	4500	4	25	DC, low and high frequency amps
QH59P	MPF102 NSC	55p	TO92c	310	25	25	25	2	1600 @ 100MHz	7	20	R.F. amps
QR36P	2N3819 SLX	45p	TO92d	200	25	25	25	2	4000	8	20	General purpose
QR50E	2N5459 ME	60p	TO92c	310	25	25	25	0.1	4500	7	16	General purpose
DB32K	J109 SLX	80p	TO92c	360	25	25	25	3	17,000	85	40	JFET
DB33L	J112 SLX	42p	TO92	360	35	35	35	1	6000	12	5	JFET
UF89W	2N7000 SLX	32p	TO92d	400	60	60	±40	10	200,000	30	1	Fetlington (Darlington FET), 200mA continuous drain current, on-state resistance 2.4Ω (typical)

Table 7 P Channel Field Effect Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	P _{TOT} (max) mW	V _{DS} (max) V	V _{DG} (max) V	V _{GS} (max) V	I _{GSS} (max) nA	Y _{FS} (typical) μS (V _{GS} = 0V)	Max input Capacitance (pF)	I _{BSS} (max) mA	Application
UL38R	2N5460 MOT	65p	TO92p	310	40	40	40	5	1000	7	5	Low level amps, variable resistors

Table 8 Power MOSFET's

Order Code	Type No. and Manufacturer	Price Each	Case Style	P _{TOT} (max) W	V _{DS} (max) V	V _{DG} (max) V	V _{GS} (max) V	Gate Threshold Voltage V (min to max)	I _{GSS} (max) μA	Forward Transconductance mS (typical)	I _D (max) A	I _{BSS} (max) μA	Max I/P Cap pF	Typical f (max) MHz	Material
UJ32K	BUZ10 ST	80p	P1d	70	50	50	±20	2.1 to 4	±100nA	3000 (R _{DS(on)} 0.08Ω)	20	250	550	3	N-channel
UJ33L	BUZ11 ST	£1.44	P1d	75	50	50	±20	2.1 to 4	±100nA	8000 (R _{DS(on)} 0.03Ω)	30	250	2000	2.4	N-channel
UL41U	BUZ31 SIE	£2.49	P1d	75	200	200	±20	2.1 to 4	±100nA	5000 (R _{DS(on)} 0.17Ω)	12.5	250	2100	3.3	N-channel
UR50E	IRFP250 SEM	£4.75	TO3p	150	200	200	±20	2 to 4	±100nA	12.5S (R _{DS(on)} 0.07Ω)	30	250	3000	2.7	N-channel
UR49D	IRFP450 SEM	£4.75	TO3p	180	500	500	±20	2 to 4	±100nA	10.8S (R _{DS(on)} 0.35Ω)	14	250	2950	3.2	N-channel
UR43W	IRF540 SEM	£1.80	P1d	125	100	100	±20	2 to 4	±500nA	10S (R _{DS(on)} 0.07Ω)	27	250	1275	5	N-channel
UR44X	IRF630 SEM	£1.90	P1d	75	200	200	±20	2 to 4	±500nA	4800 (R _{DS(on)} 0.25Ω)	9	250	600	5.8	N-channel
UR45Y	IRF640 SEM	£1.80	P1d	125	200	200	±20	2 to 4	±500nA	10S (R _{DS(on)} 0.14Ω)	18	250	1275	4.3	N-channel
UR46A	IRF740 SEM	£1.98	P1d	125	400	400	±20	2 to 4	±500nA	7000 (R _{DS(on)} 0.47Ω)	10	250	1250	5.7	N-channel
UR47B	IRF830 SEM	£1.28	P1d	75	500	500	±20	2 to 4	±500nA	3250 (R _{DS(on)} 1.3Ω)	4.5	250	600	6.9	N-channel
UR48C	IRF840 SEM	£1.98	P1d	125	500	500	±20	2 to 4	±500nA	6500 (R _{DS(on)} 0.8Ω)	8	250	1225	5.8	N-channel
QQ27E	VN10KM SLX	56p	TO92d	1	60	60	5	0.3 to 2.5	10	200	0.5	10	48	N-channel	
WQ97F	VN66AF SLX	£1.90	P1c	12.5	60	60	15	0.8 to 2	10	250	2	10	50	600	N-channel
UL35Q	VN1210M SLX	98p	TO92d	1	120	120	±40	0.8 to 2	±100nA	375 (R _{DS(on)} 8Ω)	0.19	10	125	18	N-channel
QQ34M	2SJ48 HIT	£6.79	TO3v	100	-120	-120	±14	-0.15 to -1.45	±100	1000	7	900	3	P-channel	
AY46A	2SJ160 HIT	£8.99	TO3w	100	-120	-120	±14	-0.15 to -1.45	±100	1000	7	900	3	P-channel	
AY47B	2SJ161 HIT	£9.25	TO3w	100	-140	-140	±14	-0.15 to -1.45	±100	1000	7	900	3	P-channel	
UR41U	2SJ162 SEM	£7.25	TO3w	100	-160	-160	±15	-0.15 to -1.45	±100	1000	7	900	3	P-channel	
AY49D	2SJ114 HIT	£12.99	TO3w	100	-200	-200	±20	-0.15 to -1.45	±100	1000	8	1200	2	P-channel	
QQ36P	2SK133 HIT	£6.49	TO3v	100	120	120	±14	0.15 to 1.45	±100	1000	7	600	4	N-channel	
AY50E	2SK1056 HIT	£8.99	TO3w	100	120	120	±14	0.15 to 1.45	±100	1000	7	600	4	N-channel	
AY51F	2SK1057 HIT	£7.99	TO3w	100	140	140	±14	0.15 to 1.45	±100	1000	7	600	4	N-channel	
UR40T	2SK1058 SEM	£7.25	TO3w	100	160	160	±15	0.15 to 1.45	±100	1000	7	600	4	N-channel	
AY53H	2SK400 HIT	£8.99	TO3w	100	200	200	±20	0.15 to 1.45	±100	1000	8	800	3	N-channel	

The following are complementary pairs: 2SJ48/2SK133, 2SJ49/2SK134, 2SJ50/2SK135, 2SJ56/2SK176, 2SJ162/2SK1058.

Table 9 N and P Channel Lateral Power MOSFETs

For high quality audio amplifier applications and designed for use as complementary pairs. Lateral structure for high resistance to electrical destruction, ultra-fine architecture for uniform power distribution, excellent frequency characteristics and having an integral reverse polarity protection diode.

Order Code	Type No. and Manufacturer	Price Each	Case Style	P _{TOT} (max)	V _{DS} (max)	V _{GS} (max)	I _D (max)	Diode I (max)	IDSS (max)	Max I/P Cap	Typical f(max)	Material
AY56L	ECF10N16	£4.99	TO3	125W	160V	±14	8	8	10	500	5	N-channel
AY54J	ECF10P16	£5.49	TO3	125W	160V	±14	8	8	10	500	5	P-channel
AY57M	ECF10N20	£5.75	TO3	125W	200V	±14	8	8	10	500	5	N-channel
AY55K	ECF10P20	£5.99	TO3	125W	200V	±14	8	8	10	500	5	P-channel

Table 10 Unijunction Transistors

Order Code	Type No. and Manufacturer	Price Each	Case Style	P _{TOT} (max) mW	V _{EB20} V	I _E (peak) A	I _{EB} (max) A	Peak point I _p (max) μA	Valley point I _v (mA)	Intrinsic stand-off ratio	V _{B2-B1} V (max)
QR14Q	2N2646	£1.50	TC18u	300	30	2	12μA	5	4	0.56 to 0.75	35

Table 11 Programmable Unijunction Transistor, S.C.S. and Thyristor Tetrode

Order Code	Type No. and Manufacturer	Price Each
QF31J	BRY39 ME	£1 16

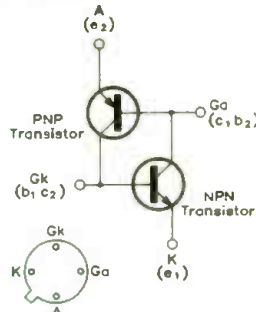
BRY39 (equivalent to 2N6027 and D:3T1) may be used in any of three modes.

1. Programmable Unijunction Transistor: Applications include motor control, oscillators, relay replacement, timers, pulse shaper, trigger device and other switching applications. When used as a P.U.T. the cathode gate (G_k) is not used.

V _{GAA} (max)	Anode gate to anode voltage:	70V
I _A (max)	Anode current DC:	250mA
I _p	Peak point current (V _S = 10V, R _G = 10kΩ):	<5μA
I _v	Valley point current (V _S = 10V, R _G = 10kΩ):	>50μA
I _{ARM} (max)	Repetitive peak anode current:	2.5A
I _{GAAO} (max)	Anode gate to anode leakage current @ V _{GAA} = 70V:	10nA
I _{GAKS} (max)	Anode gate to cathode leakage current @ V _{GAK} = 70V:	100nA

2. Silicon Controlled Switch: It is an integrated PNP-NPN transistor pair, with all electrodes accessible. Applications include numerical indicator tube drivers and other switching applications.

	PNP transistor	NPN transistor
V _{CEO} (max)	-70V	70V★
V _{CBO} (max)	-70V	70V★
V _{EBO} (max)	-70V★	5V★



I _E (max)	DC emitter current:	175mA I _{ERM}
Max repetitive peak emitter current:		2.5A
P _{TOT}	Max total dissipation:	275mW
V _{AK}	Forward on-state voltage:	<1.4V
I _H	Holding current:	<1mA
t _{on}	Turn on time:	<0.25μs
t _q	Turn off time:	<5μs
h _{FE}		>0.25 @ I _E = 1mA; >50 @ I _C = 10mA
f _T		300MHz (typ)

3. Thyristor Tetrode: Applications include relay and lamp drivers, sensing network for temperature and other switching applications. Anode to cathode DC off-state voltage (V_D) and instantaneous total value of reverse voltage (V_R): 70V max.

Max DC on-state current:	205mA	
On-state voltage:	1.4V	
Peak reverse current @ V _R = 70V:	1nA (typ); 100nA (max)	
Holding current (max):	250μA	
	Cathode gate to cathode	Anode gate to anode
Voltage that will trigger all devices (V _D = 6V):	V _{GkT} : 0.5V (min)	V _{GAT} : 1V (min)
Reverse peak voltage:	V _{GkM} : 5V (max)	V _{GAM} : 70V (max)
Current that will trigger all devices (V _D = 6V):	I _{GkT} : 1μA (min)	I _{GAT} : 100μA (min)
Forward peak current:	I _{GkM} : 100mA (max)	I _{GAM} : 100mA (max)

★ Higher voltages are permissible in numerical indicator tube driver circuits.

Table 12 Signal Diodes

Order Code	Type No. and Manufacturer	Price Each	Construction	Case Style	PIV V	Max I _F (average)	Max reverse current I _R (μA @ V)	Application			
QQ13P	BAR28 ST	45p	Schottky barrier	D035	70V	15mA	<200nA @ 50V	Low forward voltage (V _F = 410mV at 1mA), suitable replacement for germanium, very fast >10GHz			
QB28F	BAX13	7p	Si diffused whiskerless	D035★	50V	75mA	<200nA @ 50V	Fast logic			
QB29G	BAX16	9p	Si diffused whiskerless	D035★	150V	200mA	<100nA @ 150V	General purpose			
QF44X	BY206	34p	Si double diffused	D014	350V	400mA	<2μA @ 300V	Top level detector and scan rectifier and for h.f. power supplies. Soft recovery			
QH70M	OA47	36p	Ge gold bonded	D07	25V	110mA	<100μA @ 25V	High speed switch			
QH71N	OA90	24p	Ge point contact	D07	30V	10mA	<1.1mA @ 30V	High frequency detector			
QH72P	OA91	24p	Ge point contact	D07	115V	50mA	<275μA @ 100V	General purpose			
QH73Q	OA95 SEM	29p	Ge point contact	D07	115V	50mA	<250μA @ 100V	General purpose			
QL71N	1N914	5p	Si whiskerless	D035	100V	75mA	<25nA @ 20V	Fast logic			
QL72P	1N916	6p	Si whiskerless	D035	100V	75mA	<25nA @ 20V	Low capacitance 1N914			
QL80B	1N4148	5p	Si whiskerless	D035	100V	75mA	<25nA @ 20V	Fast logic			
AQ07H	1N4148	100pk	£3.49 Special price for a pack of 100 1N4148 diodes.								

★ Sometimes supplied in SOD17 package.

Table 13 Low Leakage Diodes

Order Code	Type No. and Manufacturer	Price Each	Construction	Case Style	PIV V	Max I _F (average) mA	Max reverse current I _R (μA @ V)	Application
DB35Q	J-PAD5 SLX	85p	Si JFET	TO92mod	60V	10mA	5pA @ 20V	Input protection for op-amps

Table 14 Varicaps

Order Code	Type No. and Manufacturer	Price Each	Case Style	V _R (max)	I _R (typ)	Capacitance ratio	Capacitance at various voltages between (limits)	typical	typical	Application
YH83E	BB212 PC	£2.75	TO92m	12V	50nA	>22.5 (V _R = 0.5V to 8V)	500 and 620pF @ V _F = 0.5V	550pF @ 0.5V	50pF @ 5.5V	Matched pair of diodes, common cathode. For low voltage AM radios, LW, MW and SW bands General purpose
QY81C	MV2108 MOT	£1.60	TC92j	30V	>2.5	24 and 30pF @ V _R = 4V	27pF @ 4V			

Table 15 Rectifier Diodes

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	Max V _F drop (V @ A)	Max I _R (μA @ V)
QF42V	BY127 ME	20p	D015	1250V	1A	<1.1V @ 1A	<10μA @ 1250V
QL73Q	1N4001 ME	5p	D041	50V	1A	<1.1V @ 1A	<10μA @ 50V
QL74R	1N4002 ME	5p	D041	100V	1A	<1.1V @ 1A	<10μA @ 100V
QL75S	1N4003 ME	5p	D041	200V	1A	<1.1V @ 1A	<10μA @ 200V
QL76H	1N4004 ME	6p	D041	400V	1A	<1.1V @ 1A	<10μA @ 400V
QL77J	1N4005 ME	6p	D041	600V	1A	<1.1V @ 1A	<10μA @ 600V
QL78K	1N4006 ME	6p	D041	800V	1A	<1.1V @ 1A	<10μA @ 800V
QL79L	1N4007 ME	8p	D041	1000V	1A	<1.1V @ 1A	<10μA @ 1000V
QL81C	1N5400 ME	10p	D027	50V	3A	<1.1V @ 3A	<10μA @ 50V
QL82D	1N5401 ME	12p	D027	100V	3A	<1.1V @ 3A	<10μA @ 100V

Continued on next page

Table 15 Rectifier Diodes (continued from previous page)

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	Max V _F drop (V @ A)	Max I _R (µA @ V)
QL83E	1N5402 ME	15p	D027	200V	3A	<1.1V @ 3A	<10µA @ 200V
QL84F	1N5404 ME	16p	D027	400V	3A	<1.1V @ 3A	<10µA @ 400V
QL85G	1N5406 ME	18p	D027	600V	3A	<1.1V @ 3A	<10µA @ 600V
QL86T	1N5407 ME	18p	D027	800V	3A	<1.1V @ 3A	<10µA @ 800V
QL87U	1N5408 ME	18p	D027	1000V	3A	<1.1V @ 3A	<10µA @ 1000V
YH96E	MR751	90p	194	100V	6A	<1.1V @ 6A	<250µA @ 100V
YH97F	MR754	90p	194	400V	6A	<1.1V @ 6A	<250µA @ 400V
UK59P	P600A FA	36p	P6	50V	6A	<0.9V @ 6A	<25µA @ 50V
UK60Q	P600D FA	38p	P6	200V	6A	<0.9V @ 6A	<25µA @ 200V
UK61R	P600J FA	38p	P6	600V	6A	<0.9V @ 6A	<25µA @ 600V
AY26D	R250S ME	45p	250	800V	6A	<1.1V @ 6A	<10µA @ 800V

Table 16 Fast Recovery Rectifier Diodes

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	t _{rr}	Max V _F drip (V @ A)	Max I _R (µA @ V)
UK65V	BYW98-150 ST	49p	D027	150V	3A	<35ns	<0.85V @ 3A	<10µA @ 150V
AH56L	BYW80-100 ST	86p	D0220	100V	8A	<35ns	<0.85V @ 7A	<10µA @ 100V
UK63T	BYW80-150 ST	86p	D0220	150V	8A	<35ns	<0.85V @ 8A	<10µA @ 150V
AH57M	BYW80-200 ST	99p	D0220	200V	8A	<35ns	<0.85V @ 7A	<10µA @ 200V
UL34M	BYW51-200 ST	£1.65	D0220a	200V	2 x 8A	<35ns	<0.95V @ 8A	<5µA @ 200V

Table 17 Schottky Rectifier Diodes

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	Max V _F drop (V@A)	Max T _J °C
GX29G	1N5820 MOT	80p	TS1	20V	3A	0.525V @ 3A	125
GX30H	1N5822 MOT	86p	TS1	40V	3A	0.525V @ 3A	125
GX31J	MBR745 GI	£1.49	D0220	45V	7.5A	0.57V @ 7.5A	150
GX32K	MBR1045 GI	£1.49	D0220	45V	10A	0.57V @ 10A	150
GX33L	MBR1090 MOT	£2.39	D0220	90V	10A	0.57V @ 10A	150
GX34M	MBR1535CT MOT	£1.65	D0220a	35V	15A	0.72V @ 15A	150
GX35Q	MBR2045CT GI	£1.99	D0220a	45V	20A	0.72V @ 20A	150
GX36P	MBR2080CT MOT	£3.29	D0220a	80V	20A	0.72V @ 20A	150
GX38R	MBR3045PT GI	£3.25	340E	45V	30A	0.72V @ 30A	150
GX39N	MBR3045WT MOT	£3.49	340F	45V	30A	0.72V @ 30A	150

Table 18 Ultra-Fast Recovery Rectifiers

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	t recovery nanoseconds	Max T _J °C
GX40T	MUR120 MOT	60p	D041	200V	1A	>25	175
GX41U	MUR420 MOT	86p	TS1	200V	4A	>25	175
GX42V	MUR820 MOT	£1.28	D0220	200V	8A	>35	175
GX43W	MUR1615CT MOT	£1.49	D0220a	150V	16A	35	175

Table 19 Bridge Rectifiers

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _F (av) A	Max rms input voltage	Max capacitance load (µF)	Max V _F per diode	Max reverse current at PIV per diode
QL37S	W005 ME	36p	B2	50	1.5A	35V	5000µF	1.1V @ 1A	10µA
QL38R	W01 ME	36p	B2	100	1.5A	70V	2500µF	1.1V @ 1A	10µA
QL39N	W02 ME	36p	B2	200	1.5A	140V	1250µF	1.1V @ 1A	10µA
QL40T	W04 ME	40p	B2	400	1.5A	280V	625µF	1.1V @ 1A	10µA
QL09K	S005 ME	52p	B3	50	2A	35V	5000µF	1.1V @ 1A	10µA
QL10L	S04 ME	60p	B3	400	2A	280V	625µF	1.1V @ 1A	10µA
WQ57M	PW01 ME	£1.06	B4	100	6A	70V	5000µF	1.3V @ 3A	10µA
WQ58N	PW06 ME	£1.36	B4	600	6A	420V	800µF	1.3V @ 3A	10µA
BH45Y	J005 ME	£2.25	B5	50	10A	35V		1.1V @ 5A	10µA
BL36P	J02 ME	£2.25	B5	200	10A	140V		1.1V @ 5A	10µA
BH46A	J04 ME	£2.99	B5	400	10A	280V		1.1V @ 5A	10µA
BH47B	K01 ME	£2.99	B5	100	25A	70V		1.2V @ 12.5A	10µA
BH48C	K04 ME	£3.99	B5	400	25A	280V		1.2V @ 12.5A	10µA

Table 20 Zener Diodes

BZY88C/BZX55C
 Selection tolerance: ±5%
 Max dissipation: 500mW
 Case style: D035

BZX61C/BZX85C (ZPY100)
 Selection tolerance: ±5%
 Max dissipation: 1.3W
 Case style: D035 (ZPY100:D041)

5W Zener
 Selection tolerance: ±5%
 Max dissipation: 5W
 Case style: ZD1

Order Code	Manufacturer	Volts	Price Each
QH00A	TFK	2.7V	9p
QH01B	TFK	3.0V	9p
QH02C	TFK	3.3V	9p

Order Code	Manufacturer	Volts	Price Each
QF45Y	TFK	4.7V	12p
QF46A	TFK	5.1V	12p
QF47B	TFK	5.6V	12p

Order Code	Type No. and Manufacturer	Volts	Price Each
AY65V	1N5338B MOT	5.1V	52p
QX35Q	1N5339B ST	5.6V	52p
AY66W	1N5341B MOR	6.2V	52p

The abbreviations under the heading 'Type No. and Manufacturer' are identified as follows:

FA-Fagor GI-General Instruments HIT-Hitachi ME-Microelectronics MOT-Motorola NEC-NEC NSC-National Semiconductor PC-Philips
 SEM-Semelab SIE-Siemens SLX-Siliconix ST-SGS-Thomson TFK-Telefunken TI-Texas Instruments ZET-Zetex

Table 20 Zener Diodes

BZY88C/BZX55C

Selection tolerance: ±5%
 Max dissipation: 500mW
 Case style: D035

Order Code	Manu- facturer	Volts	Price Each
QH03D	TFK	3.6V	9p
QH04E	TFK	3.9V	9p
QH05F	TFK	4.3V	9p
QH06G	TFK	4.7V	9p
QH07H	TFK	5.1V	9p
QH08J	TFK	5.6V	9p
QH09K	TFK	6.2V	9p
QH10L	TFK	6.8V	9p
QH11M	TFK	7.5V	9p
QH12N	TFK	8.2V	9p
QH13P	TFK	9.1V	9p
QH14Q	TFK	10.0V	9p
QH15R	TFK	11.0V	9p
QH16S	TFK	12.0V	9p
QH17T	TFK	13.0V	9p
QH18U	TFK	15.0V	9p
QH19V	TFK	16.0V	9p
QH20W	TFK	18.0V	9p
QH21X	TFK	20.0V	9p
QH22Y	TFK	22.0V	9p
QH23A	TFK	24.0V	9p
QH24B	TFK	27.0V	9p
QH25C	TFK	30.0V	9p

BZX61C/BZX85C (ZPY100)

Selection tolerance: ±5%
 Max dissipation: 1.3W
 Case style: D035 (ZPY100:D041)

Order Code	Manu- facturer	Volts	Price Each
QF48C	TFK	6.2V	12p
QF49D	TFK	6.8V	12p
QF50E	TFK	7.5V	12p
QF51F	TFK	8.2V	12p
QF52G	TFK	9.1V	12p
QF53H	TFK	10.0V	12p
QF54J	TFK	11.0V	12p
QF55K	TFK	12.0V	12p
QF56L	TFK	13.0V	12p
QF57M	TFK	15.0V	12p
QF58N	TFK	16.0V	12p
QF59P	TFK	18.0V	12p
QF60Q	TFK	20.0V	12p
QF61R	TFK	22.0V	12p
QF62S	TFK	24.0V	12p
QF63T	TFK	27.0V	12p
QF64U	TFK	30.0V	12p
QF65V	TFK	33.0V	12p
QF66W	TFK	36.0V	12p
QF67X	TFK	39.0V	12p
QF68Y	TFK	43.0V	12p
QF69A	TFK	47.0V	12p
QF70M	TFK	51.0V	12p
QF71N	TFK	56.0V	12p
QF72P	TFK	62.0V	12p
QF73Q	TFK	68.0V	12p
QF74R	TFK	75.0V	12p
UH89W	TFK	100V	24p

5W Zener

Selection tolerance: ±5%
 Max dissipation: 5W
 Case style: ZD1

Order Code	Type No. and Manufacturer	Volts	Price Each
AY67X	1N5344B MOT	6.8	52p
QX36P	1N5344B ST	8.2V	52p
AY68Y	1N5346B MOT	9.1V	52p
AY69A	1N5347B MOT	10V	52p
AY70M	1N5348B MOT	11V	52p
AY71N	1N5349B MOT	12V	52p
AY72P	1N5352B MOT	15V	52p
AY73Q	1N5355B MOT	16V	52p
AY74R	1N5357B MOT	20V	52p
AY75S	1N5358B MOT	22V	52p
AY76H	1N5359B MOT	24V	52p
AY77J	1N5361B MOT	27V	52p
AY78K	1N5363B MOT	30V	52p
AY79L	1N5364B MOT	33V	52p
AY80B	1N5365B MOT	36V	52p
AY81C	1N5366B MOT	39V	52p
AY82D	1N5367B MOT	43V	52p
AY83E	1N5368B MOT	47V	52p
AY85G	1N5378B MOT	100V	52p
AY86T	1N5380B MOT	120V	52p
AY87U	1N5386B MOT	180V	52p
AY88V	1N5388B MOT	200V	52p

Transient Suppressor

SA40A - For this product see P6KE47A
 (Order Code QY71N) under Table 21.

Table 21 Transient Voltage Suppressors

Order Code	Type No. and Manufacturer	Price Each	Case Style	V _R	V _{BR} (min)	V _{BR} (max)	Clamping Voltage (max)	Peak Pulse Current (max)
CP77J	P6KE6.8 ST	68p	TS7	5.8V	6.45V	7.48V	10.5V	57A
CP78K	P6KE15 ST	56p	TS7	12.8V	14.3V	16.5V	21.2V	28A
QY71N	P6KE47A ST	48p	TS7	40.2V	44.7V	49.4V	64.8V	9.3A
CP79L	1.5KE6.8 ST	£1.12	TS1	5.8V	6.45V	7.48V	10.5V	143A
CP80B	1.5KE16 ST	£1.36	TS1	13.6V	15.2V	17.6V	22.5V	67A
CP81C	1.5KE18 ST	£1.36	TS1	15.3V	17.1V	19.8V	25.2V	59.5A

P6KE types are rated at 600W peak pulse power, while 1.5KE types are rated at 1500W peak pulse power. All types are unidirectional and should be connected with the band on the body to positive; choose the type with V_R equal to or above the voltage in the circuit. Clamping voltage is maximum voltage at maximum peak pulse current and this and peak pulse power is for a current waveform where the peak is reached in 10µs and has decayed to 50% of its peak value in 1ms. Devices may be connected in series to increase the voltage and in parallel to increase the peak pulse handling.

Table 22 Thyristors (Silicon Controlled Rectifiers)

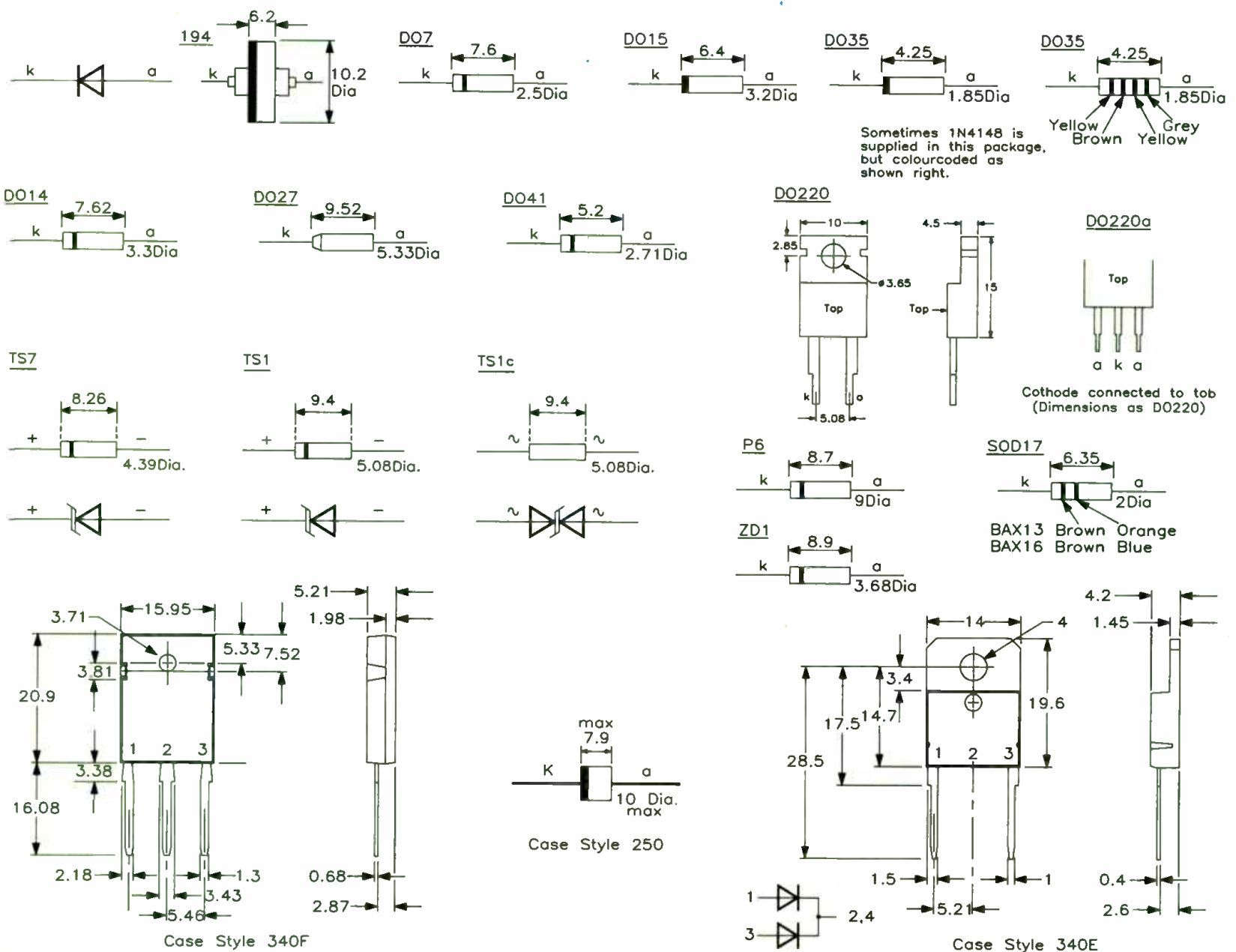
Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I _{T(rms)}	I _{T(av)}	V _{GT} (max)	I _{GT} (max)	I _H (max)	
UR23A	CF106D TI	95p	P1a	400V	5A	3.2A	1V	0.2mA	5mA	Fully isolated package
UR24B	CF106M TI	£1.06	P1a	600V	5A	3.2A	1V	0.2mA	5mA	Fully isolated package
UM74R	CP106D TI	58p	TO92t	400V	2A	1.25A	1V	0.2mA	5mA	
UM75S	CP106M TI	61p	TO92t	600V	2A	1.25A	1V	0.2mA	5mA	
QH30H	C106D TI	70p	P1a	400V	5A	3.2A	1V	0.2mA	5mA	
UM76H	C106M TI	85p	P1a	600V	5A	3.2A	1V	0.2mA	5mA	
WQ22Y	C116D TI	£1.05	P1a	400V	8A	5A	1.5V	20mA	40mA	
WQ23A	C126D TI	£1.13	P1a	400V	12A	7.5A	1.5V	20mA	40mA	
UM77J	C126M TI	£1.21	P1a	600V	12A	7.5A	1.5V	20mA	40mA	
UR42V	2N6399 SEM	£1.20	P1a	800V	12A	7.5A	1.5V	30mA	40mA	
AH00A	X0203NA TAG	48p	TO92w	800V	1.25A	0.8A	0.8V	200µA	5mA	
AH01B	X0405ME TAG	56p	TO202t	600V	4A	2.5A	0.8V	50	5mA	
AH02C	X0405MF TAG	60p	TO202u	600V	4A	1.4A	0.8V	50	5mA	
AH03D	S0602MH TAG	86p	TO220	600V	6A	3.8A	2V	200	10mA	
AH04E	S2156MH TAG	£1.36	TO220	600V	25A	16A	1.5V	50mA	50mA	
AH05F	T0606ME TAG	86p	TO202t	600V	6A	-	1.5V	5mA	5mA	
AH06G	T1006MH TAG	95p	TO220	600V	10A	-	1.5V	5mA	10mA	
AH07H	T1616MH TAG	£1.45	TO220	600V	16A	-	1.5V	50mA	50mA	
AH08J	T2516MH TAG	£1.75	TO220	600V	25A	-	1.5V	50mA	50mA	
AH09K	T0606MJ TAG	86p	TO220	600V	6A	-	1.5V	5mA	10mA	Fully isolated package
AH10L	T0606MJ TAG	98p	TO220	600V	10A	-	1.5V	5mA	10mA	Fully isolated package

Note: In most cases, a thyristor having a higher PIV than the one specified can be used. Many thyristors use a suffix letter to indicate the PIV and the international standard is as follows:
 A = 100V; B = 200V; C = 300V; D = 400V; E = 500V; F = 50V; M = 600V; N = 800V; P = 1000V; S = 700V; Y = 30V.

Table 23 Triacs (Bi-directional Silicon Controlled Rectifiers)

Order Code	Type No. and Manufacturer	Price Each	Case Style	PIV	I_T (rms)	V_{GT} (max) V	I_{GT} (max) mA	I_H (max) mA
UK54J	BTA08-600B ST	£1.12	P2	600V	8A	1.5V	50mA	50mA
UK55K	BTA16-600B ST	£1.95	P2	600V	16A	1.5V	50mA	50mA
UK56L	BTA26-600B ST	£3.12	P3t	600V	25A	1.5V	50mA	80mA
UR34M	CF206D TI	£1.10	P2	400V	4A	2V	5mA	15mA
UR35Q	CF206M TI	£1.05	P2	600V	4A	2V	5mA	15mA
UR36P	CF225D TI	£1.32	P2	400V	8A	2V	20mA	20mA
UR37S	CF225M TI	£1.75	P2	600V	8A	2V	20mA	20mA
UR38R	CF246D TI	£1.65	P2	400V	16A	2V	50mA	40mA
UR39N	CF246M TI	£1.99	P2	600V	16A	2V	50mA	40mA
UR25C	CP206D TI	66p	TO92r	400V	1.5A	2.5V	8mA	30mA
UR26D	CP206M TI	69p	TO92r	600V	1.5A	2.5V	8mA	30mA
WQ24B	C206D TI	82p	P2	400V	4A	2V	5mA	15mA
UR27E	C206M TI	88p	P2	600V	4A	2V	5mA	15mA
UR28F	C225D TI	£1.05	P2	400V	8A	2V	20mA	20mA
UR29G	C225M TI	£1.10	P2	600V	8A	2V	20mA	20mA
WQ25C	C226D TI	94p	P2	400V	8A	2V	50mA	30mA
UR30H	C226M TI	£1.05	P2	600V	8A	2V	50mA	30mA
QL14Q	C246D TI	£1.52	P2	400V	16A	2V	50mA	40mA
UR31J	C246M TI	£1.70	P2	600V	16A	2V	50mA	40mA
UR33L	C263M TI	£3.99	P3t	600V	25A	2V	50mA	40mA
AY29G	BTA08-800B ST	£1.28	P2	800V	8A	1.5V	50mA	50mA
AY30H	BTA26-800B ST	£3.95	P3t	800V	25A	1.5V	50mA	80mA
AH63T	T405600D ST	65p	SOT82	600V	4A	1.5V	≤5mA	-
AH64U	T405600T ST	65p	TO220t	600V	4A	1.5V	≤5mA	-
AH65V	T410600D ST	65p	SOT82	600V	4A	1.5V	10mA	15mA
AH66W	T410600T ST	65p	TO220t	600V	4A	1.5V	10mA	15mA
AH67X	T410800D ST	65p	SOT82	800V	4A	1.5V	10mA	15mA
AH68Y	T410800T ST	65p	TO220t	800V	4A	1.5V	10mA	15mA
AH11M	Z0105MA TAG	42p	TO92V	600V	0.8A	2V	5mA	5mA
AH12N	Z0405MF TAG	52p	TO202V	600V	4A	2V	5mA	5mA

Diode Cases

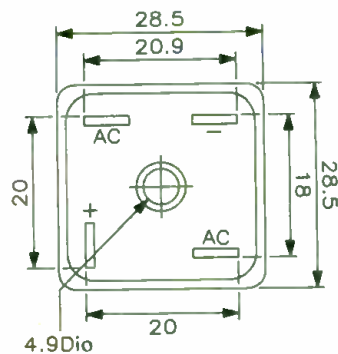
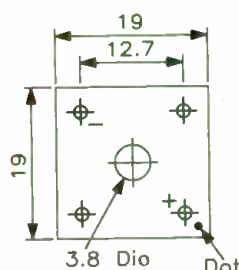
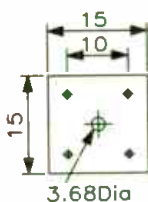
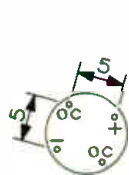


Rectifier Bridge Cases

Table 24 Diac (BI-directional Trigger Diode)

V _{BO} Breakdown voltage	32V + 4V
V _{BOH} - V _{BOH} Breakover voltage symmetry	3V
P _{TOT} (max) Total power dissipation	150mW
I _{TRM} (max) Repetitive peak current	2A
I _{BO} (max) Breakover current	200mA
Case style	D07 or D014
Equivalents:	BR100, D32, D3202Y, GT32, MPT32, 1N5761, 133.

Order Code	Type	Price each
QL08J	DB3/ST2	26p

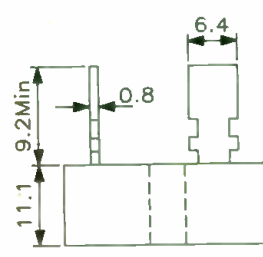
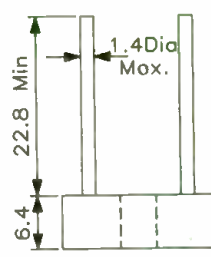
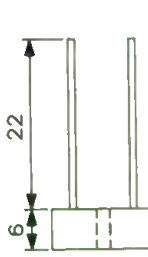
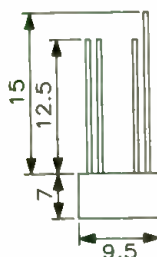


B2

B3

B4

B5



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DIGITAL IC's

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(e)	0.6	1.2	11	100	20
(f)	24	4	1.6	16	8
(g)	-	6	1.6	48	24
(h)	60	10	4	40	20
(i)	-	15	4	120	60
(j)	±0.001	±0.001	-0.001	-1.6	-0.4

74 and 74LS Series TTL

The newer 74LS series offers a superior performance to standard 74 series in most respects. However, both ranges are now gradually being superseded by the 74HC series. All inputs on 74 and 74LS have clamping diodes which stop voltages exceeding -1.5V, providing current into the input does not exceed -12mA (74 series) or -18mA (74LS series). Unused inputs should be connected to Logic '1' level (V_{CC}) via a 1k resistor. Up to 25 unused inputs may be connected to the one resistor. A 0.1µF ceramic capacitor should be connected between V_{CC} and ground close to the IC. If several IC's are in use one capacitor is required for every five IC's approx. and they should be distributed evenly amongst the IC's. Counters and shift registers should have one 0.1µF capacitor for every two IC's connected very close to the IC's. Buffers and line drivers may require even more decoupling.

4000 Series CMOS

This range is now gradually being superseded by the 74HC series.

Handling

Although all CMOS devices have input protection diodes the protection only operates up to around 4000V (800V for 4016 and 4066) and since for example the static voltage generated in the human body by walking on a nylon carpet can easily exceed 10,000V, it is obvious that it is extremely easy to totally destroy CMOS devices just by touching the pins. Therefore never remove the short circuit on the pins of the device as delivered to you until it is to be used; then work on a metal tray with the tray connected to earth and put a metal strap on your wrist and connect this to earth. Do not wear nylon clothing when handling CMOS. Always use DIL sockets; never solder directly to the IC.

B and UB Types

B types have buffered outputs whilst UB types are unbuffered and therefore ideal for analogue applications.

B Types

AC gain (gates)
68dB approx

UB Types

28dB (V_{CC} = 5V)
23dB (V_{CC} = 10V)
18dB (V_{CC} = 15V)

AC bandwidth (gates)

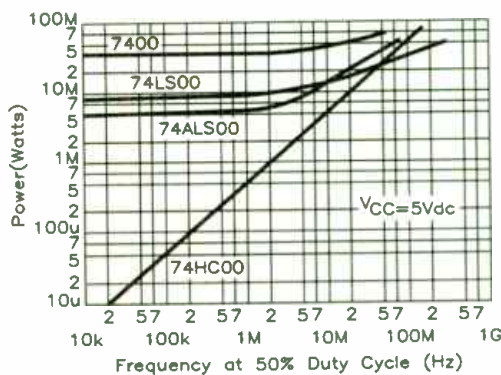
230kHz (V_{CC} = 5V) 710kHz (V_{CC} = 5V)
280kHz (V_{CC} = 10V) 885kHz (V_{CC} = 10V)

295kHz (V_{CC} = 15V) 2.8MHz (V_{CC} = 15V)

In addition 'UB' (unbuffered output) gates have lower propagation delay times than 'B' types. They have a slightly worse noise immunity margin, but they do not suffer from output oscillations when the input is a slow ramp voltage unlike the 'B' types. Unused inputs must be connected to V_{CC} or V_{SS} depending on logic function and not left floating.

74HC and 74HCT Series

The 74HC series is recommended for all new designs. It is pin-for-pin compatible with respective types in other ranges. For example 74HC00 is a direct replacement for 7400 or 74LS00, and 74HC4016 is a direct replacement for 4016B. The fan-out table shows how families may be mixed, but note that the input transition levels on 74HC are different from TTL. Therefore if you are driving 74HC devices from TTL connect a Min Res 4k7 pull-up resistor between the TTL output and V_{CC}. Alternatively you can directly connect a 74HCT device. These devices have input characteristics identical to TTL. However, in order to obtain these characteristics the ultra high input noise immunity of 74HC devices is much reduced and maximum operating frequencies are also lower.



Fan-out

Driving device	Number of IC's that can be driven			
	74	74LS	74S	CMOS 74HC(T)
74LS	5	20	4	∞
74LS buffers	15	60	12	∞
74	10	40	8	∞
74 buffers	30	60	24	∞
74HC(T) buffers	4	15	4	∞
CMOS (15V)	-	1	-	50

∞ = unlimited number of devices

In general, connect a 0.01µF ceramic capacitor between V_{CC} and ground as close as possible to each

Continued on next page.

Five ranges of Digital IC's are available: standard TTL, low-power LSTTL, CMOS, High Speed (HC) CMOS and Advanced High Speed (AC) CMOS. For all new designs we recommend 74HC CMOS which combines the best qualities of the other ranges. It has an operating speed as high as LSTTL. For even higher speeds 74AC CMOS is recommended. It has operating speeds faster than ALS TTL and FAST, and both HC and AC have power consumption similar to 4000-series CMOS.

Comparison of Digital IC Families

In the following table (a) is the power dissipation per gate (mW) at static and (b) is at 100kHz. The propagation delay time (ns) is shown in (c). Maximum clock frequency (MHz) is row (d) whilst the speed power product (pJ) at 100kHz is row (e). The minimum output drive (mA) for standard outputs when (V_O = 0.4V) is shown in (f) and for high current outputs it is shown in (g). Fan-out (LS loads) for standard outputs are in row (h) and for high current outputs in row (i). And finally, the maximum input current (mA) when (V_{IN} = 0.4V) is given in row (j).

	74AC	74HC	CMOS	TTL	LSTTL
(a)	0.0000025	0.0000025	0.001	10	2
(b)	0.17	0.17	0.1	10	2
(c)	5	10	105	10	10
(d)	120	40	12	35	40

★ All prices include VAT. A, B etc. indicates there is an additional carriage charge for this item: see end of catalogue for details. ★

Continued from previous page.

IC and a 0.1µF ceramic capacitor every 20 IC's, evenly distributed across the board. All 74HC and 74HCT devices should be very carefully handled. The details given in 'Handling' for 4000 series CMOS applies to this range also.

Unlike the other logic ranges, the current drawn by 74HC(T) devices from the power supply is almost directly proportional to the operating frequency. When quiescent, the current is almost 0, but at frequencies of about 5MHz and over, the current is about the same as 74LS devices.

Note: In the following, tables show only those major parameters that differ from those given in the General Parameters table, or those that permit comparison between types. Propagation delays are for load capacitances of 15pF unless stated. All values are typical at 25°C.

General Parameters (at 25°C)

	74 Series			74LS Series			4000B Series				4000UB Series			
	Min	Typical	Max	Min	Typical	Max	Min	Typical	Max	@ V _{cc}	Min	Typical	Max	@ V _{cc}
Supply Voltage (V _{CC})	4.75V	5V	5.25V	4.75V	5V	5.25V	3V	3 to 15V	18V		3V	3 to 15V	18V	
High level input voltage (V _{IH})	2V		5.5V	2V		5.5V	3.5V		5V	5V	4V		5V	5V
							7V		10V	10V	8V		10V	10V
							11V		15V	15V	12.5V		15V	15V
Low level input voltage (V _{IL})	0V		0.8V	0V		0.8V	0V		1.5V	5V	0V		1V	5V
							0V		3V	10V	0V		2V	10V
							0V		4V	15V	0V		2.5V	15V
High level input current (I _{IH})			40µA			20µA		10pA	0.3µA	15V		10pA	0.3µA	15V
Low level input current (I _{IL})			-1.6mA			-0.4mA		10pA	0.3µA	15V		10pA	0.3µA	15V
High level output voltage (V _{OH})	2.4V	3.4V		2.7V	3.4V		4.95V		5V	5V	4.95V		5V	5V
							9.95V		10V	10V	9.95V		10V	10V
							14.95V		15V	15V	14.95V		15V	15V
Low level output voltage (V _{OL})		0.2V	0.4V		0.25V	0.5V			0.05V				0.05V	
High level output current (I _{OH})			-400µA			-400µA	-0.16mA	-1mA		5V	-0.16mA	-1mA		5V
							-0.4mA	-2.6mA		10V	-0.4mA	-2.6mA		10V
							-1.2mA	-2.6mA		15V	-1.2mA	-6.8mA		15V
Low level output current (I _{OL})			16mA			8mA	0.44mA	1mA		5V	0.44mA	1mA		5V
							1.1mA	2.6mA		10V	1.1mA	2.6mA		10V
							3mA	6.8mA		15V	3mA	6.8mA		15V
Output 'off' current (3-state) (I _{oz})			±40µA			±20µA			±1.6µA	15V				
Propagation delay (7400/4011) (t _{PLH})		11ns	22ns		9ns	15ns		125ns	250ns	5V		90ns	180ns	5V
								50ns	100ns	10V		50ns	100ns	10V
								40ns	80ns	15V		40ns	80ns	15V
Power dissipation quiescent (7400/4011) (P _D per gate)		10mW			2mW			0.6µW				0.6µW		
Clock frequency (counter)		35MHz			40MHz			5MHz						

	74HC Series				74HCT Series		
	Min	Typical	Max	@ V _{cc}	Min	Typical	Max
Supply Voltage (V _{CC})	2V	5V	6V		4.5V	5V	5.5V
High level input voltage (V _{IH})	1.5V		2V	2V	2V		5.5V
	3.15V		4.5V	4.5V			
	4.2V		6V	6V			
Low level input voltage (V _{IL})	0V		0.3V	2V	0V		0.8V
	0V		0.9V	4.5V			
	0V		1.2V	6V			
High level input current (I _{IH})		10pA	0.1µA	6V		10pA	0.1µA
Low level input current (I _{IL})		10pA	0.1µA	6V		10pA	0.1µA
High level output voltage (V _{OH})	1.9V			2V	4.9V		
		4.4V			4.5V		
		5.9V			6V		
Low level output voltage (V _{OL})			0.1V				0.1V
High level output current (I _{OH})	-4mA			4.5V	-4mA		
	-5.2mA			6V			
Low level output current (I _{OL})	4mA			4.5V	4mA		
Output 'off' current (3-state) (I _{oz})			±0.5µA	6V			±0.5µA
Propagation delay (7400/4011) (t _{PLH})		8ns	15ns	5V	10ns	15ns	
Power dissipation quiescent (7400/4011) (P _D per gate)		1µW			1µW		
Clock frequency (counter)		40MHz					

The abbreviations

FA – Fagor
 HIT – Hitachi
 ME – Micro Electronics
 MOT – Motorola
 NEC – NEC
 NSC – National Semiconductor
 PC – Philips
 SEM – Semelab
 SIE – Siemens
 SLX – Siliconix
 ST – SGS-Thomson
 TFK – Telefunken
 TI – Texas Instruments
 TOSH – Toshiba
 ZET – Zetex

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SUBSECTION 25 NAND GATES

Quad 2-Input

A range of ICs with four 2-input NAND gates in a single package. The '00' has a standard totem-pole output, whilst the '03' has open-collector outputs. A CMOS version is available in buffered and unbuffered styles. The '00' type is also available in the 74HC and 74HCT series.
Note: In table where LS differs from standard types, values are shown thus: standard/LS.

74 and 74LS Types

	00	LS03
High level output current (max)	-400µA	250µA/100µA
Low level output current (max)	16mA/3mA	16mA/8mA
Supply current avge per gate	2mA/0.4mA	2mA/0.4mA
Propagation delay low to high	11ns/9ns	35ns/17ns
high to low	7ns/10ns	8ns/15ns

The maximum input currents of the 74S03 also differ from standard TTL as follows:
High level input current: 50µA
Low level input current: -2mA

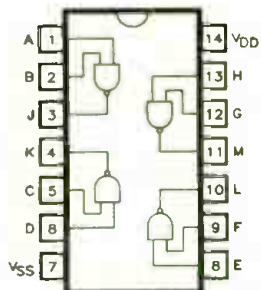
CMOS and 74AC Types

	4011B	4011UB	74AC00
Propagation delay at 5V	125ns	90ns	5ns
10V	50ns	50ns	
15V	40ns	40ns	

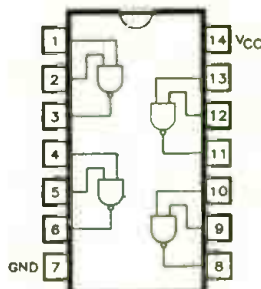
HC and HCT Types

	74HC00	74HCT00
Propagation delay at 5V:	8ns	12ns

Also available in SMD: type 74HC00M1R (AE83E)
type 74HCT00M1R (AE40T)
type HCF4011BM1 (AB26D)



4011B, 4011UB



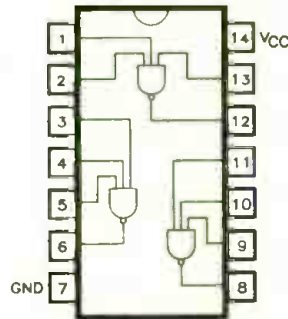
7400, 74LS00, 74HC00, 74HCT00, 74LS03

SN=Ti	MHCF=ST	
Order Code	Type	Price each ¹⁷¹²
QX37S	SN7400N	90p
YF00A	SN74LS00N	34p
UB00A	SN74HC00N	51p
AE40T	M74HC00M1R	36p
AE20W	M74HCT00B1R	36p
YF03D	SN74LS03N	39p
QX05F	HCF4011BEY	35p
QL04E	HCF4011UBEY	39p
AB26D	HCF4011BM1i	36p

Triple 3-Input

Three 3-input NAND gates in a single package, available in LS and CMOS types. CMOS type also available in surface mount package. Type '10' has standard totem-pole outputs.

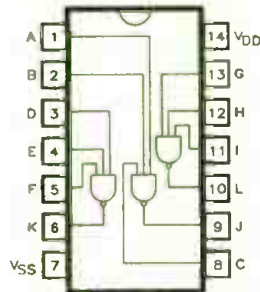
74LS Type



74LS10

	74LS10
High level output current (max)	-400µA
Low level output current (max)	8mA
Supply current avge per gate	0.4mA
Propagation delay low to high	9ns
high to low	10ns

4023B Standard



4023B

CMOS Type

	4023B
Propagation delay at 5V	160ns
at 10V	65ns
at 15V	50ns

74LS10

Also available in SMD: type HCF4023BM1(AB39N)

SN=Ti HCF=ST

Order Code	Type	Price each ¹⁷²³
YF08J	SN74LS10N	34p
QX12N	HCF4023BEY	39p
AB39N	HCF4023BM1	36p

Dual 4-Input

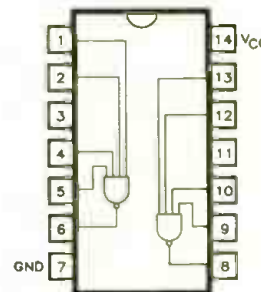
A pair of ICs with two 4-input NAND gates in a single package. Type '20' has standard totem-pole outputs. A CMOS version is available.

74LS Type

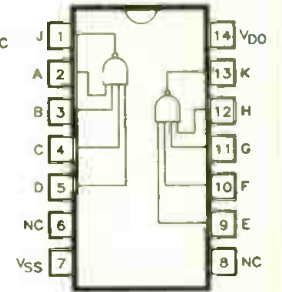
	7420
High level output current (max)	-400µA
Low level output current (max)	16mA/8mA
Supply current avge per gate	2mA/0.4mA
Propagation delay low to high	12ns/8ns
high to low	8ns/10ns

CMOS Type 4012B

	4012B
Propagation delay at 5V	160ns
10V	65ns
15V	50ns



74LS20

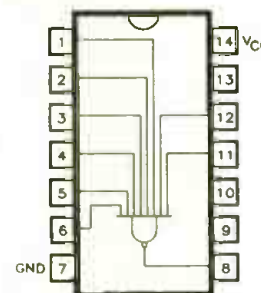


4012B Standard

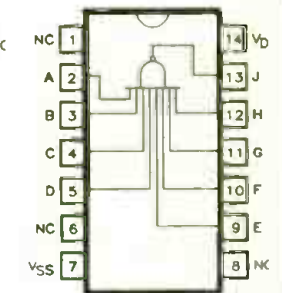
SN=Ti HCF=ST

Order Code	Type	Price each ¹⁷³³
YF14Q	SN74LS20N	40p
QX06G	HCF4012BEY	39p

8-Input



74LS30



4068B

One 8-input NAND gate in a 14-pin package available in LS and HCF CMOS types.

	74LS30
Supply current avge per gate	0.48mA
Propagation delay low to high/high to low	5V 8ns/13ns

	4068B
Propagation delay low to high/high to low	5V 200ns
10V	60ns
15V	60ns

Also available in SMD: type HCF4068BM1 (AB03D)

SN=Ti HCF=ST

Order Code	Type	Price each ¹⁷³⁸
YF20W	SN74LS30N	34p
QX24B	HCF4068BEY	39p
AB03D	HCF4068BM1	36p

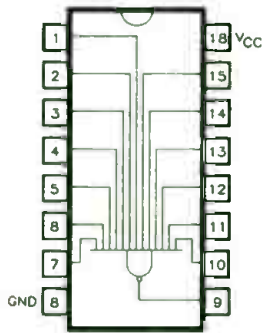
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13-Input

One 13-input NAND gate in a 16-pin package, available in 74HC series only.



74HC133

Propagation delay 5V: 20ns
Also available in SMD: type 74HC133M1R(AE73Q)

M/SN=Ti

Order Code	Type	Price each
UB30H	SN74HC133N	49p
AE73Q	M74HC133M1R	36p

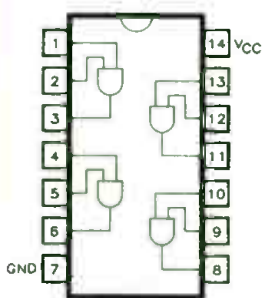
SUBSECTION 26 AND GATES

Quad 2-Input

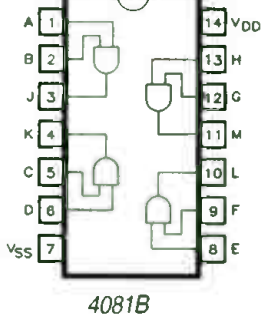
A range of ICs with four 2-input AND gates in a single package. The '08' has standard totem-pole outputs. A CMOS version is available and type '08' is available in 74HC and 74HCT series.

74 and 74LS Types

	7408	74LS08
High level output current (max)	-800µA	-400µA
Low level output current (max)	16mA	8mA
Supply current avge per gate	3.88mA	0.85mA
Propagation delay low to high	17.5ns	8ns
high to low	12ns	10ns



7408, 74LS08, 74HC08, 74HCT08



4081B

CMOS 74HC, HCF and 74HCT Types

	4081B	74HC08	74HCT08
Propagation delay at 5V	160ns	7ns/12ns	13ns
at 10V	65ns	(low to high/ high to low)	
at 15V	50ns		

Also available in SMD: type M74HC08M1R (AE43W)
type M74HCT08M1R (AE86T)
type HCF4081BM1 (AB07H)

SN=Ti HCF/M=ST

Order Code	Type	Price each
QX42V	SN7408N	£1.29
YF06G	SN74LS08N	34p
UB06G	SN74HC08N	51p
AE43W	M74HC08M1R	36p
AE23A	M74HCT08B1R	36p
AE86T	M74HCT08M1R	36p
QW48C	HCF4081BEY	39p
AB07H	MCF4081BM1	36p

Triple 3-Input

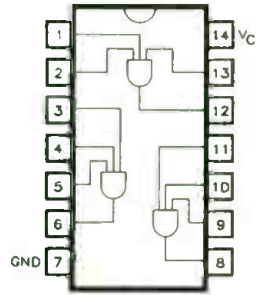
Two ICs with three 3-input AND gates in a single package. The '11' has standard totem-pole outputs. A CMOS version is available.

74LS Type

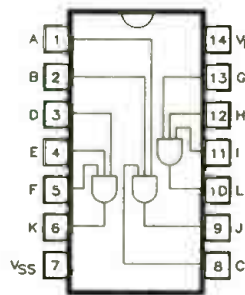
	74LS11
High level output current (max)	-400µA
Low level output current (max)	8mA
Supply current avge per gate	0.85mA
Propagation delay low to high	8ns
high to low	10ns

CMOS Type

	4073B
Propagation delay at 5V	160ns
at 10V	65ns
at 15V	50ns



74LS11



4073B Standard

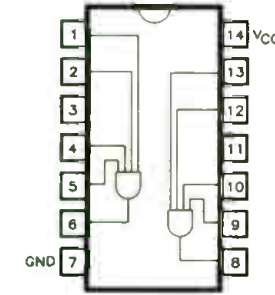
SN=Ti HCF=ST

Order Code	Type	Price each
QW44X	HCF4073BEY	39p
YF09K	SN74LS11N	34p

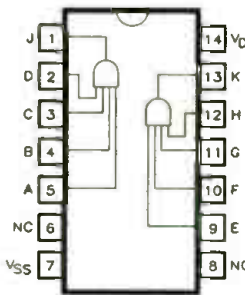
Dual 4-Input

Two 4-input AND gates in one 14-pin package available in LS and CMOS types.

	74LS21	4082B
Supply current avge per gate	0.85mA	
Propagation delay at low to high/high to low	5V: 8ns/10ns 10V: 65ns 15V: 50ns	160ns



74LS21



4082B Standard

Order Code	Type	Price each
YF15R	SN74LS21N	52p
QW49D	HCF4082BEY	39p

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SUBSECTION 27 NOR GATES

Quad 2-Input

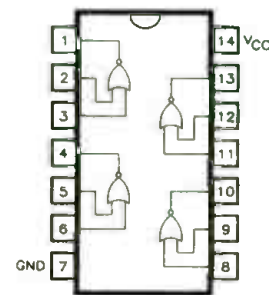
A range of ICs with four 2-input NOR gates in a single package. The '02' has standard totem-pole outputs. A CMOS version is available and type '02' is available in the 74HC series.

74 and 74LS Types

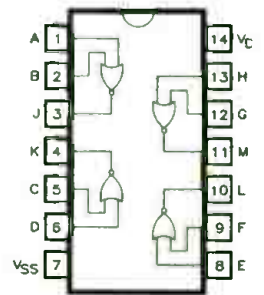
	7402	74LS02
High level output current (max)	-400µA	-400µA
Low level output current (max)	16mA	8mA
Supply current avge per gate	2.75mA	0.55mA
Propagation delay low to high	12ns	10ns
high to low	8ns	10ns

CMOS and 74HC Types

	4001B	4001UB	74HC02
Propagation delay at 5V	125ns	90ns	8ns
at 10V	50ns	50ns	
at 15V	40ns	40ns	



7402, 74LS02, 74HC02, 74HCT02



4001B Standard
4001UB

Also available in SMD: type M74HCT02M1R (AE48F)
type M74HC02M1R (AE41U)
type M74HCT02M1R (AE84F)

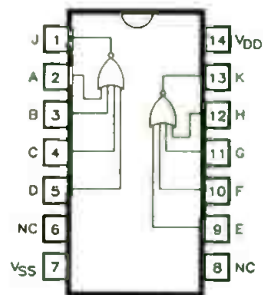
ST=Ti MC=MOT M/HCF=ST

Order Code	Type	Price each
QX39N	SN7402N	80p
YF02C	SN74LS02N	35p
UB01B	SN74HC02N	51p
AE41U	M74HC02M1R	36p
AE21X	M74HCT02B1R	36p
AE84F	M74HCT02M1R	36p
QX01B	HCF4001BEY	29p
AB33L	HCF4001BM1	36p
QL03D	MC14001UBCP	50p

Dual 4-Input

Two 4-input NOR gates in a single package available in CMOS type.

	4002B
Propagation delay low to high/high to low	5V: 160ns 10V: 65ns 15V: 50ns



4002B

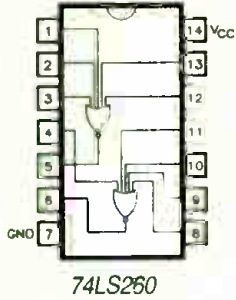
HCF=ST

Order Code	Type	Price each
QX02C	HCF4002BEY	39p

Dual 5-Input

Two 5-input NOR gates in a single package available in LSTTL only.

Propagation delay: 12ns
Supply current, average per gate 1.4mA



74LS260

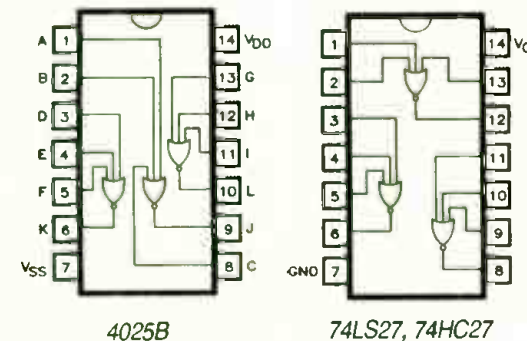
T=ST

Order Code	Type	Price each
QY59P	T74LS260B1N	38p

Triple 3-Input

Three 3-input NOR gates in a single package available in LS, CMOS and HC types.

High level output current (max) -400µA
Supply current avg per gate 0.9mA
Propagation delay low to high/high to low 5V 10ns/10ns
Propagation delay at low to high/high to low 5V 160ns 8ns
10V 65ns
15V 50ns



4025B

74LS27, 74HC27

Also available in SMD: type HCF4025BM1 (AB41U)

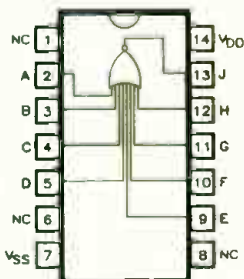
SN=Ti HCF=ST

Order Code	Type	Price each
YF18U	SN74LS27N	40p
UB13P	SN74HC27N	50p
QX14Q	HCF4025BEY	39p
AB41U	HCF4025BM1	36p

8-Input

One 8-input NOR gate in a 14-pin CMOS package.

Propagation delay 5V 200ns
10V 80ns
15V 60ns



4078B

HCF=ST

Order Code	Type	Price each
QX28F	HCF4078BEY	39p

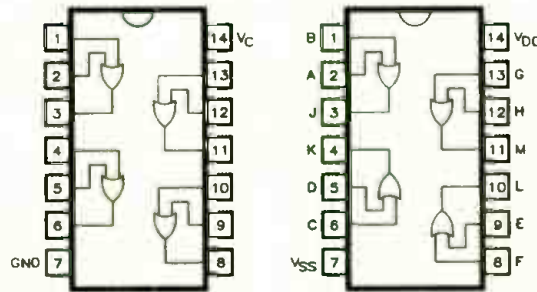
SUBSECTION 28 OR GATES

Quad 2-Input

Four 2-input OR gates in a single package available in standard TTL, LS, CMOS, HC and HCT types.

	7432	74LS32
High level output current (max)	-800µA	-400µA
Supply current avg per gate	4.75mA	1mA
Propagation delay low to high/high to low 5V	10ns/14ns	14ns/14ns
Propagation delay low to high/high to low 10V	160ns	10ns
15V	65ns	13ns

Also available in SMD: type M74HCT32M1R (AE91Y)
type M74HC32M1R (AE56L)
type HCF4071BM1 (AB57M)



7432, 74LS32,
74HC32 Standard
74HCT32

4071B

SN=Ti HCF=ST

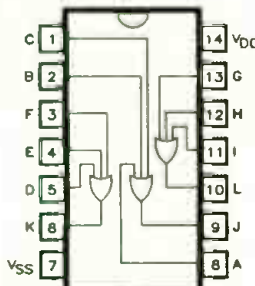
Order Code	Type	Price each
QX51F	SN7432N	£1.35
YF21X	SN74LS32N	34p
UB15R	SN74HC32N	55p
AE56L	M74H32M1R	36p
AE27E	M74HCT32B1R	36p
AE91Y	M74HCT32M1R	36p
QW43W	HCF4071BEY	39p
AB57M	HCF4071BM1	36p

Triple 3-Input

Three 3-input OR gates in a single package available in CMOS and HC types.

	4075B	74HC4075
Propagation delay low to high/high to low 5V	160ns	10ns/11ns
10V	65ns	
15V	50ns	

4075B, 74HC4075



Also available in SMD: type M74HC4075M1R (AE67X)
type HCF4075BM1 (AB05F)

SN=Ti HCF=ST

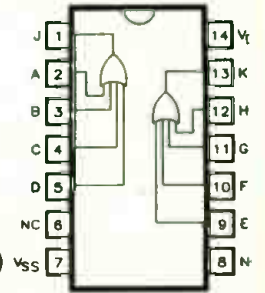
Order Code	Type	Price each
QW45Y	HCF4075BEY	36p
AB05F	HCF4075BM1	36p
UF11M	SN74HC4075N	45p
AE67X	M74HC4075M1R	36p

Dual 4-Input

Two 4-input OR gates in a single package. Available only in CMOS.

4072B	Propagation delay	5V	160ns
	10V	65ns	
	15V	50ns	

Also available in SMD: type HCF4072BM1 (AB58N)



4072B

HCF=ST

Order Code	Type	Price each
QX27E	HCF4072BEY	39p
AB58N	HCF4072BM1	36p

SUBSECTION 29 COMPLEX GATES

Quad Exclusive-OR

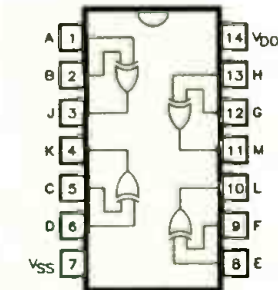
Four 2-input exclusive-OR gates in a single package. Type '86' has standard totem-pole outputs. CMOS and HC types are also available.

74LS Type	74LS86
High level output current (max)	-400µA
Supply current avg	6.1mA
Propagation delay low to high	20ns
high to low	13ns

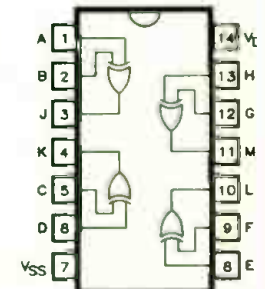
CMOS and 74HC Types

	4070B	74HC86
Propagation delay at 5V	175ns	8ns/9ns
at 10V	75ns	(low to high/ high to low)
at 15V	50ns	

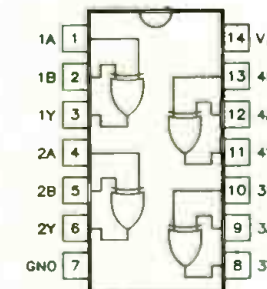
4070B is a direct pin-for-pin replacement for 4030B



74HC86 Standard



4070B Standard



74LS86

Also available in SMD: type M74HC86M1R (AE81C)
type HCF4070BM1 (AB04E)

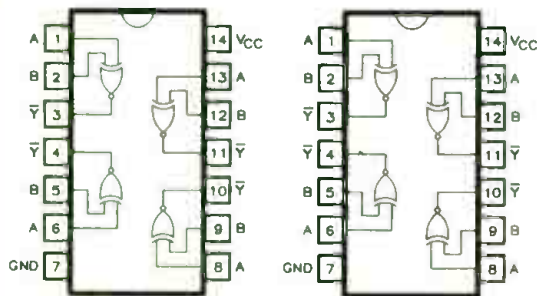
SN=Ti MHCF=ST

Order Code	Type	Price each
YF36P	SN74LS86N	54p
UB23A	SN74HC86N	70p
AE81C	M74HC86M1R	49p
QX26D	HCF4070BEY	40p
AB04E	HCF4070BM1	36p

Quad Exclusive-NOR

Four 2-input exclusive-NOR gates in a single package. Available in CMOS and HC types. The 74HC266 has open drain outputs.

	4077B	
Propagation delay at 5V	175ns	
10V	75ns	
15V	50ns	
	74HC266	
Propagation delay at 5V	8ns/9ns	(low to high/ high to low)



74HC266 Open-drain

4077B

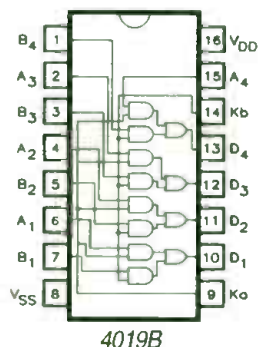
Also available in SMD: type HCF4077BM1 (AB06G)

SN=Ti HCF=ST

Order Code	Type	Price each
UB71N	SN74HC266N	£1.38
QW47B	HCF4077BEY	39p
AB06G	HCF4077BM1	36p

4-Bit AND-OR Selector

A multi-function 16-pin package which may be used as a 4-bit AND-OR selector, a quad 2-channel data selector or a quad exclusive-NOR gate. With pins 9 and 14 at 0, the outputs will be 0. With pin 9 at 0 and pin 14 at 1, the level on pins 1, 3, 5, 7 will appear on pins 13, 12, 11, 10 respectively. With pins 9 and 14 both at 1, the device will perform an exclusive-NOR function.



4019B

	4019B
Propagation delay at 5V	250ns
10V	115ns
15V	90ns

The 4019B is a plug-in replacement for the 4519B in most applications.

Also available in SMD: type HCF4019BM1 (AB27E) HCF=ST

Order Code	Type	Price each
QW17T	HCF4019BEY	49p
AB27E	HCF4019BM1	45p

The abbreviations

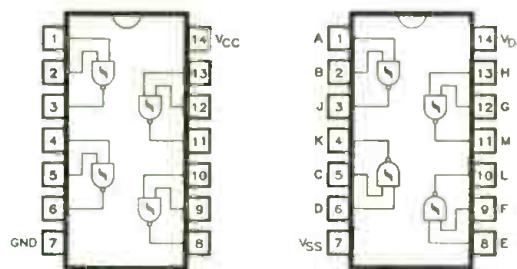
FA-Fagor	SEM - Semilab
HIT-Hitachi	SIE - Siemens
ME-Micro Electronics	SLX - Siliconix
MOT-Motorola	ST - SGS Thomson
NEC-NEC	TFK - Telefunken
NSC-National Semiconductor	Ti - Texas Instruments
PC-Philips	TOSH - Toshiba
	ZET Zefax

SUBSECTION 30 SCHMITT TRIGGERS

Quad 2-Input NAND

Four 2-input NAND Schmitt triggers in a single package, available in LS, CMOS and HC types.

	74LS132	
Positive going threshold voltage 5V	1.6V	
Negative going threshold voltage 5V	0.8V	
Supply current avge per gate	1.76mA	
Propagation delay at 5V	15ns	
	4093B	74HC132
Positive going threshold voltage 5V	2.7V	2.9V
10V	4.43V	
15V	6.03V	
Negative going threshold voltage 5V	2.44V	1.7V
10V	4.05V	
15V	5.53V	
Propagation delay at 5V	125ns	13ns
10V	50ns	
15V	40ns	



74LS132, 74HC132

4093B

Also available in SMD: type M74HC132M1R (AE72P) type HCF4093BM1 (AB08J)

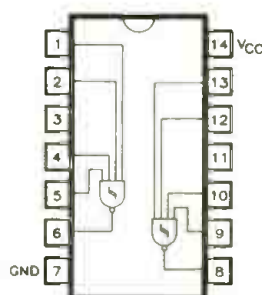
Order Code	Type	Price each
YF51F	SN74LS132N	60p
UB29G	SN74HC132N	79p
AE72P	M74HC132M1R	49p
QW53H	4093BE	42p
AB08J	HCF4093BM1	42p

Dual 4-Input NAND

Two 4-input NAND Schmitt triggers in a single package, available in standard TTL type.

	7413
Positive going threshold voltage	1.7V
Negative going threshold voltage	0.9V
Supply current avge per gate	8.5mA
Propagation delay low to high	18ns
high to low	15ns

The high level output current (max) for 7413 is -800µA.

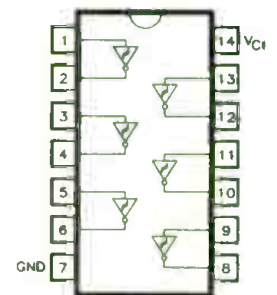


7413

SN=Ti

Order Code	Type	Price each
QX45Y	SN7413N	£1.65

Hex Inverters



7414, 74LS14, 74HC14, 40106B,

Six Schmitt trigger inverters in a single package, available in standard TTL, LS, CMOS and HC types.

	7414	74LS14
Positive going threshold voltage 5V	1.7V	1.6V
Negative going threshold voltage 5V	0.9V	0.8V
Supply current avge per gate	5.1mA	1.72mA
Propagation delay at 5V	15ns	15ns
	40106B	74HC14
Positive going threshold voltage 5V	2.9V	2.8V
10V	5.9V	
15V	8.8V	
Negative going threshold voltage 5V	1.9V	1.7V
10V	3.9V	
15V	5.8V	
Propagation delay at 5V	140ns	12ns
10V	70ns	
15V	60ns	

The high level output current (max) for 7414 is -800µA.

Also available in SMD: type M74HC14M1R (AE46A) type HCF40106BM1 (AB34M)

SN=Ti M/HCF=ST

Order Code	Type	Price each
QX46A	SN7414N	£2.25
YF12N	SN74LS14N	46p
UB10L	SN74HC14N	69p
AE46A	M74HC14M1R	42p
QW64U	HCF40106BEY	62p
AB34M	HCF40106BM1	49p

SUBSECTION 31 HEX BUFFERS

Inverting

A range of ICs with six inverting buffers in a single package. The '04' has standard totem-pole outputs whilst the '05' and '06' have open-collector outputs. In addition the '06' output can handle voltages up to 30V and has buffer-type outputs permitting higher output currents. The HCU04 is a unique device in the HC range as it is unbuffered and designed primarily for linear applications requiring a high input impedance amplifier, and for high-speed oscillators. The HCT04 combines LSTTL speed with true CMOS low power consumption. The 4069 has standard inputs and outputs while the 4049 has high current outputs and on both the 4049 and HC4049 voltages up to 15V may be applied to the inputs regardless of the supply voltage. The 4502 has a strobe facility and 3-state outputs. The 4049 is capable of driving two TTL inputs.

74 and 74LS Types

Note: Where LS differs from standard types, values are shown thus standard/LS.

	04
High level output voltage	3.4V
High level output current (max)	-400µA
Low level output current (max)	16mA/8mA
Supply current avge per gate	2mA/0.4mA
Propagation delay low to high	12ns/9ns
high to low	8ns/10ns

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06
 High level output voltage 30V max
 High level output current (max) 250µA
 Low level output current (max) 40mA
 Supply current avg per gate 5-17mA
 Propagation delay low to high 10ns
 high to low 15ns

CMOS

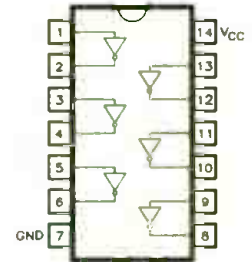
	4049UB	4069UB	4502B
High level o/p current (typ) 5V	-2.5mA	-0.88mA	-0.88mA
10V	-2.6mA	-2.25mA	-2.25mA
15V	-10mA	-8.8mA	-8.8mA
Low level o/p current (typ) 5V	6mA	0.88mA	6.6mA
10V	16mA	2.25mA	17mA
15V	40mA	8.8mA	66mA

	4049UB	4069UB	4502B
Propagation delay low to high/high to low 5V	80ns/30ns	65ns	295ns/135ns
10V	40ns/15ns	40ns	130ns/55ns
15V	30ns/10ns	30ns	95ns/40ns

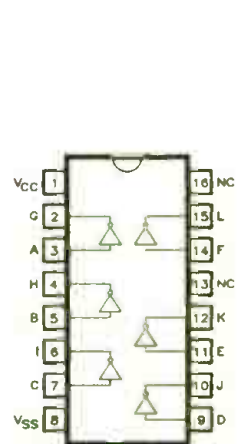
74HC

	HC04	HCU04	HCT04	HC4049
Propagation delay	10ns	7ns	11ns	8ns

7404, 74LS04, 74HC04 Standard



74HCU04 Unbuffered
 74LS05 Open-collectors
 7406 Open-collectors, 30V Buffer
 4069UB Unbuffered
 74HCT04



4049UB Unbuffered
 74HC4049 Standard

Also available in SMD: type M74HCT04M1R (AE85G)
 type M74HC04M1R (AE42V)
 type HCF4049UBM1 (AB48C)
 type M74HC4049M1R (AE78K)
 type HCF4069UBM1 (AB56L)

SN=Ti M/HCF=ST

Order Code	Type	Price each
QX40T	SN7404N	95p
YF04E	SN74LS04N	34p
UB03D	SN74HC04N	51p
AE42V	M74HC04M1R	36p
UB04E	SN74HCU04N	42p
AE22Y	M74CT04B1R	36p
AE85G	M74HCT04M1R	36p
YF05F	SN74LS05N	34p
QX75S	SN7406N	£1.10
QX21X	HCF4049UBEY	45p
AB48C	HCF4049UBM1	42p
UF04E	M74HC4049BIR	78p
AE78K	M74HC049M1R	49p
QX25C	HCF4069UBEY	49p
AB56L	HCF4069UBM1	36p

Non-Inverting

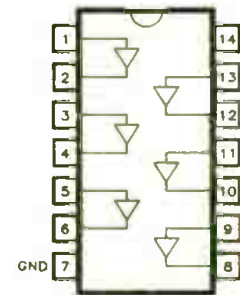
A range of ICs with six non-inverting buffers in a single package. The '07' has open-collector outputs. The '07' can handle voltages on the output up to 30V and has buffer-type outputs permitting higher output currents. The LS365 has 3-state outputs, and has all six inverter outputs controlled from a single 2-input AND gate. The 4050 has high current outputs and on both the 4050 and HC4050 voltages up to 15V may be applied to the inputs regardless of the supply voltage. The 4503 has two separate 3-state control inputs, one controlling four and one controlling the other two outputs.

74 Type	7407
High level output voltage	30V
High level output current (max)	250µA
Low level output current (max)	40mA
Supply current avg per gate	4-17mA
Propagation delay low to high	6ns
high to low	20ns

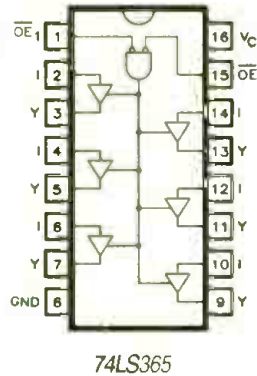
74LS Type	LS365
High level output current (max)	2.6mA
Low level output current (max)	24mA
Supply current avg	14mA
Propagation delay low to high	10ns
high to low	9ns

CMOS and HC Types	4050B	HC4050	4503B
High level o/p current (typ) 5V	-2.5mA	-2.5mA	-1.4mA
10V	-2.6mA	-2.6mA	-3.7mA
15V	-10mA	-10mA	-14.1mA
Low level o/p current (typ) 5V	6mA	6mA	2.3mA
10V	16mA	16mA	6.2mA
15V	40mA	40mA	25mA

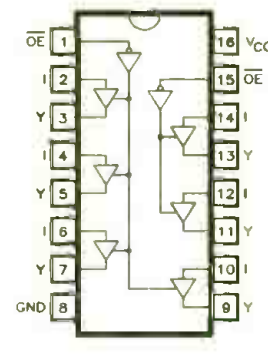
Propagation delay low to high/high to low 5V	80ns/40ns	8ns	75ns
10V	40ns/20ns		35ns
15V	30ns/15ns		25ns



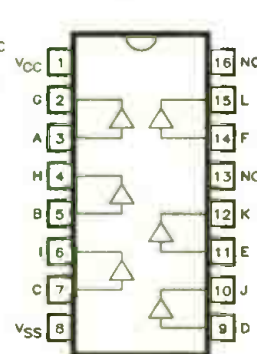
7407 Open-collector, 30V Buffer



74LS365



4503B Buffer



4050B, 74HC4050

Also available in SMD: type M74HC4050M1R (AE79L)
 type HCF4050BM1 (AB49D)
 type HCF4503BM1 (AB13P)

SN=Ti M/HCF=ST

Order Code	Type	Price each
QX76H	SN7407N	£1.10
YH11M	SN74LS365N	79p
QX22Y	HCF4050BEY	45p
AB49D	HCF4050BM1	42p
AE79L	M74HC4050M1R	49p
UF05F	M74HC4050BIR	99p
QQ41U	HCF4503BEY	95p
AB13P	HCF4003BM1	69p

SUBSECTION 32 QUAD BUFFERS

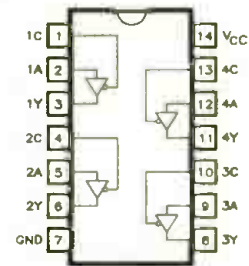
3-State

Four non-inverting buffers in a single package. Type '125' outputs are enabled when control pins are low. LS type has buffer-type outputs permitting higher output currents.

74LS Type

High level output current (max)	-2.6mA
Low level output current (max)	24mA
Supply current avg	11mA
Propagation delay low to high	9ns
high to low	7ns

LS125



74LS125

SN=Ti

Order

Code

YF49D

Type

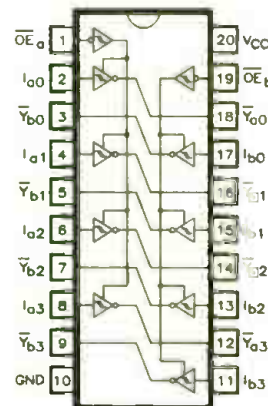
SN74LS125N

Price each

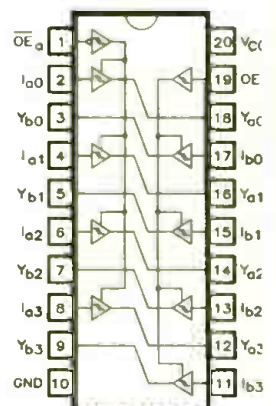
49p

SUBSECTION 33 OCTAL BUFFERS

Buffers and Line Drivers



74LS240



74HC241

A range of octal buffers. Type '240' is inverting whilst '241' and '244' are non-inverting. In these three devices, the eight buffers are divided into two groups of four with a separate output-enable input for each group. In the '240' and '244' the outputs are enabled when pins 1 and 19 are low whilst in the '241' the outputs are enabled with pin 1 low and pin 19 high. Type '541' has all eight buffers controlled from one active-low 2-input AND gate. The '541' is non-inverting. All types have buffer-type outputs to permit higher output currents.

Continued on next page.

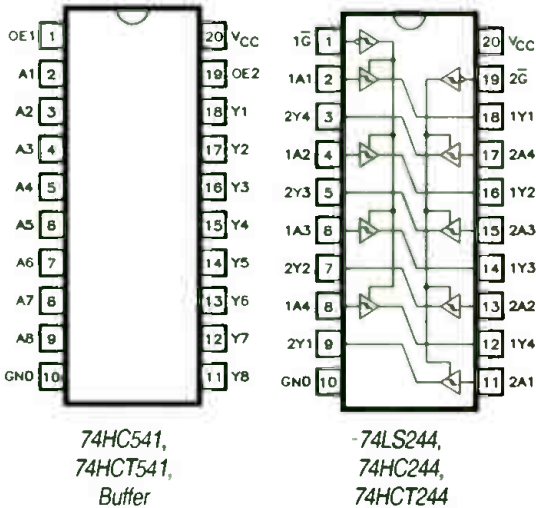
Continued from previous page.

74LS Types

	LS240	LS244
High level output current (max)	15mA	15mA
Low level output current (max)	24mA	24mA
Supply current avge	29mA	32mA
Propagation delay low to high	9ns	12ns
high to low	12ns	12ns

74HC Types

	HC241	HC244	HCT244	HC(T)541
Propagation delay	20ns	20ns	15ns	14ns



Also available in SMD: type M74HC241M1R (AE76H)
 type M74HCT244M1R (AE89W)
 type M74HC244M1R (AE53H)
 type M74HC541M1R (AE80B)
 type M74HCT541M1R (AE94C)

SN=Ti M=ST

Order Code	Type	Price each
YF87U	SN74LS240N	74p
UB59P	SN74HC241N	65p
AE76H	M74HC241M1R	70p
QQ56L	SN74LS244N	74p
AE26D	M74HCT244B1R	85p
AE89W	M74HCT244M1R	82p
UB65V	SN74HC244N	99p
AE53H	M74HC244M1R	79p
UB93B	SN74HC541N	£1.55
AE80B	M74HC541M1R	89p
UB94C	SN74HCT541N	£1.25
AE94C	M74HCT541M1R	89p

Bus Transceivers

A range of octal bus transceivers with 3-state ports. On type '245' if pin 1 is low then data is transmitted from B to A and if pin 1 is high, data is transmitted from A to B. If pin 19 is high all ports are put into a high impedance state. Type '245' performs a non-inverting transfer.

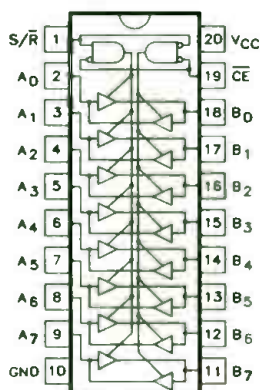
74LS245

High level output current (max)	-15mA
Low level output current (max)	24mA
Supply current avge	64mA
Propagation delay	8ns

74HC and 74HCT Types

Propagation delay (all types) 13ns

74LS245, 74HC245, 74HCT245 Buffer



Also available in SMD: type M74HC245M1R (AE54J)
 type M74HCT245M1R (AE90X)

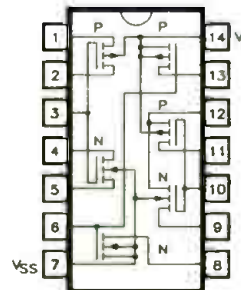
SN=Ti M=ST

Order Code	Type	Price each
YF91Y	SN74LS245N	79p
UB67X	SN74HC245N	£1.10
AE54J	M74HC245M1R	£1.19
UB68Y	SN74HCT245N	£1.25
AE90X	M74HCT245M1R	£1.12

SUBSECTION 34 DUAL BUFFERS

Complementary Pair Plus Inverter

This versatile IC is useful in inverter circuits, pulse shapers, linear amplifiers, high input impedance amplifiers, threshold detectors, transmission gating and functional gating.



4007UB

Propagation delay	5V	10V	15V
	60ns	30ns	25ns

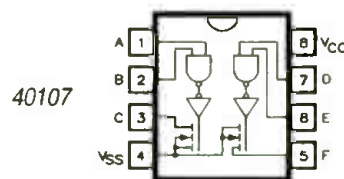
HCF=ST

Order Code	Type	Price each
QX04E	HCF4007UBEBM1	39p

Dual 2-Input NAND

A dual 2-input NAND buffer/driver containing two independent 2-input NAND buffers with open-drain single n-channel transistor outputs.

	40107B	5V	10V	15V
Low level output current (max)	32mA	74mA	100mA	
Propagation delay low to high	100ns	60ns	50ns	
high to low	100ns	45ns	30ns	



40107

Also available in SMD: type HCF40107BM1 (AE98G)

HCF=ST

Order Code	Type	Price each
QW65V	HCF40107BEY	49p
AE98G	HCF40107BM1	89p

SUBSECTION 35 FLIP FLOPS

Dual D-Type

Two D-type positive-edge-triggered flip-flops with set (preset) and reset (clear). The data at a D-input is transferred to the Q output and the Q complement output on the next positive-going edge of the clock input.

74 Types

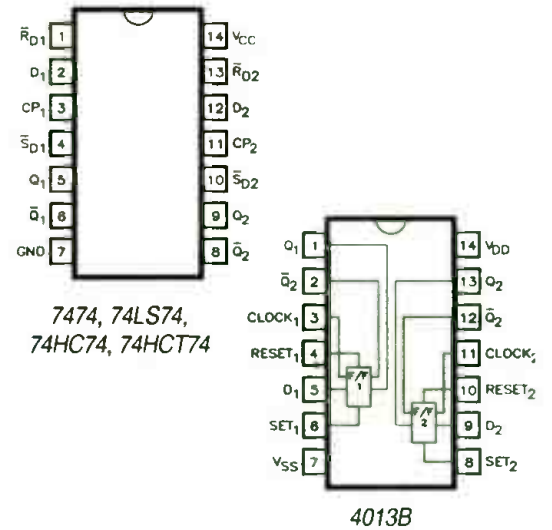
	7474	LS74
Max clock frequency	25MHz	33MHz
Propagation delay low to high	14ns	15ns
high to low	20ns	15ns
Supply current avge	17mA	4mA

HC and HCT

	HC74	HCT74
Max clock frequency	40MHz	48MHz
Propagation delay low to high	20ns	21ns
high to low	20ns	21ns

4013B

	5V	10V	15V
Max clock frequency	4MHz	10MHz	14MHz
Propagation delay	175ns	75ns	50ns



Also available in SMD: type M74HCT74M1R (AE97F)
 type M74HC74M1R (AE71N)
 type HCF4013BM1 (AB35Q)

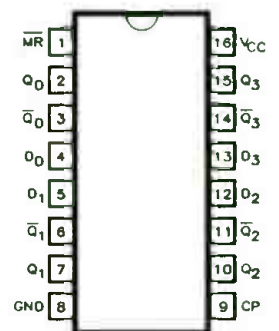
SN=Ti M/HCF=ST

Order Code	Type	Price each
QX59P	SN7474N	£1.10
YF31J	SN74LS74N	39p
UB19V	SN74HC74N	67p
AE71N	M74HC74M1R	46p
AE31J	M74HCT74B1R	45p
AE97F	M74HCT74M1R	49p
QX07H	HCF4013BEY	45p
AB35Q	HCF4013BM1	42p

Quad D-Type

Four D-type positive-edge-triggered flip-flops with reset (clear). The data at a D-input is transferred to the Q output and the Q complement output on the next positive-going edge of the clock input.

	74LS175	74HC175
Max clock frequency	40MHz	60MHz
Propagation delay low to high	13ns	15ns
high to low	16ns	15ns
Supply current avge	11mA	



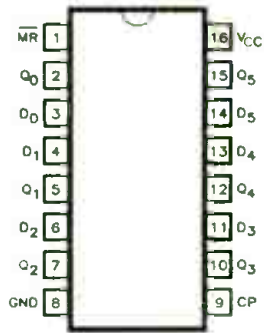
74LS175, 74HC175

Also available in SMD: type M74HC175M1R (AE50E)

SN=Ti M=ST

Order Code	Type	Price each
YF75S	SN74LS175N	72p
UB45Y	SN74HC175N	60p
AE50E	M74HC175M1R	69p

Hex D-Type



40174B

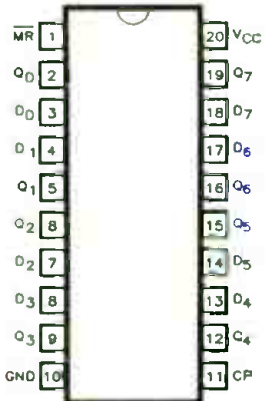
Six D-type positive-edge-triggered flip-flops with reset (clear). The data at a D-input is transferred to the Q output on the next positive-going edge of the clock input.

	5V	10V	15V	7MHz	12MHz	15.5MHz
Max clock frequency						
Max clock frequency						
Max clock frequency						
Propagation delay low to high/ high to low	5V	10V	15V	210ns	85ns	65ns

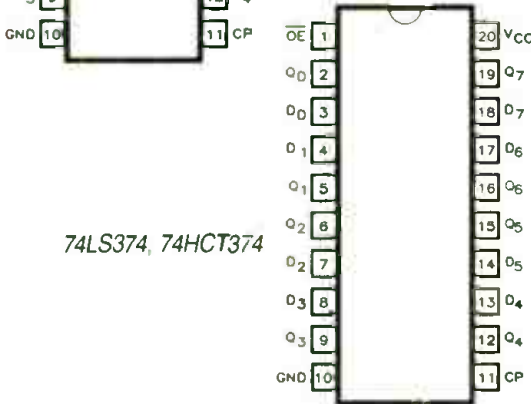
Order Code	Type	Price each
QW73Q	HCF40174BEY	95p

Octal D-Type

Eight D-type positive-edge-triggered flip-flops with reset (clear) on '273'. Type '374' is non-inverting and has 3-state outputs. The data at a D-input is transferred to the Q output on the next positive-going edge of the clock input even if the chip is deselected on 3-state types.



74LS273, 74HC273



74LS374, 74HCT374

	LS273	LS374
Max clock frequency	40MHz	50MHz
Propagation delay low to high	17ns	15ns
Propagation delay high to low	18ns	19ns
Supply current avge	17mA	27mA

	HC374	HCT374
Max clock frequency	65MHz	50MHz
Propagation delay low to high	15ns	25ns
Propagation delay high to low	15ns	25ns

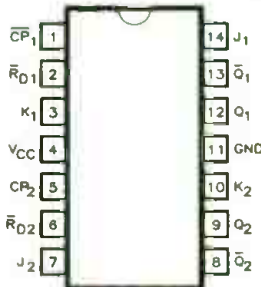
Also available in SMD: type M74HC273M1R (AE55K)
type M74HC374M1R (AE58N)
type M74HCT374M1R (AE93B)

SN=Ti M/T=ST TC=TOSH

Order Code	Type	Price each
YH00A	SN74LS273N	75p
UB72P	TC74HC273AP	84p
AE55K	M74HC273M1R	79p
YH16S	T74LS374B1N	72p
UB82D	SN74HC374N	£1.05
AE58N	M74HC374M1R	84p
AE28F	M74HCT374B1R	89p
AE93B	M74HCT374M1R	89p

Dual J-K Type

A range of ICs each containing two separate J-K flip-flops. Types '76' and 4027 offer preset (set) and clear (reset) inputs whilst type '73' has only clear (reset). All are negative-edge-triggered except 4027.



74LS73

74 Type

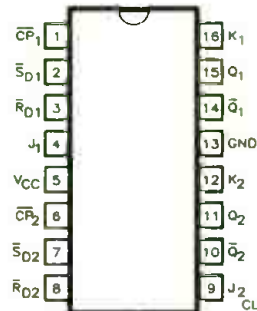
	7476
Max clock frequency	20MHz
Propagation delay low to high	16ns
high to low	25ns
Supply current avge	20mA

LS Types

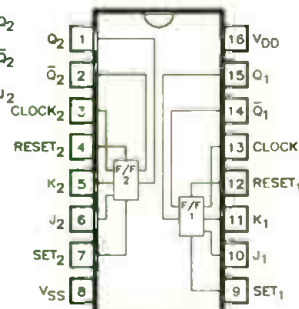
	LS73	LS76
Max clock frequency	45MHz	45MHz
Propagation delay low to high	15ns	15ns
high to low	15ns	15ns
Supply current avge	4mA	4mA

CMOS Type 4027B

	5V	10V	15V
Max clock frequency	3MHz	9MHz	13MHz
Propagation delay	175ns	75ns	50ns



7476, 74LS76



4027B

Also available in SMD: type HCF4027BM1 (AB42V)

SN=Ti HCF=ST

Order Code	Type	Price each
YF30H	SN74LS73N	£1.20
QX61R	SN7476N	£1.85
YF33L	SN74LS76AN	£1.60
QX16S	HCF4027BEY	72p
AB42V	HCF4027BM1	49p

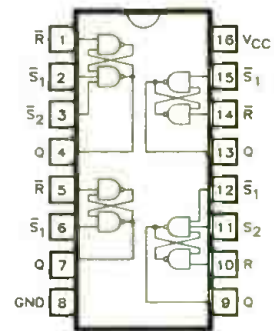
The abbreviations

FA-Fagor	SEM - Semilab
HIT-Hitachi	SIE - Siemens
ME-Micro Electronics	SLX - Siliconix
MOT-Motorola	ST - SGS Thomson
NEC-NEC	TFK - Telefunken
NSC-National Semiconductor	Ti - Texas Instruments
PC-Philips	TOSH - Toshiba
	ZET Zefax

SUBSECTION 36 LATCHES AND REGISTERS

Set-Reset Latches

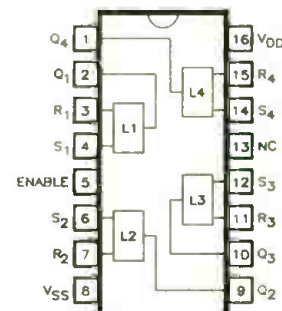
Four set-reset latches in a single package. Types '279' and 4044 have NAND inputs whilst the 4043 has NOR inputs, i.e. 4043 input is inverted with respect to 4044. The '279' has two latches with two set inputs each and both must be high for inactive (negative logic) and one or both low for active. CMOS types have 3-state outputs. A 1 on pin 5 enables the outputs.



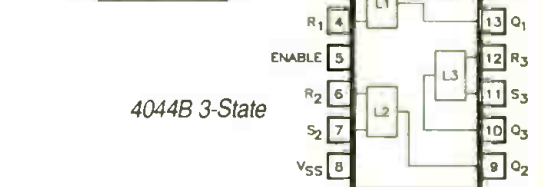
74LS279 Standard

	74LS279	4043B
Propagation delay low to high/ high to low	5V	12ns/15ns
	10V	70ns
	15V	50ns
Supply current avge		3.8mA

	4044B
Propagation delay low to high/ high to low	5V
	10V
	15V
	150ns
	70ns
	50ns



4043B 3-State



4044B 3-State

Also available in SMD: type HCF4043BM1 (AB45Y)
type HCF4044BM1 (AB46A)

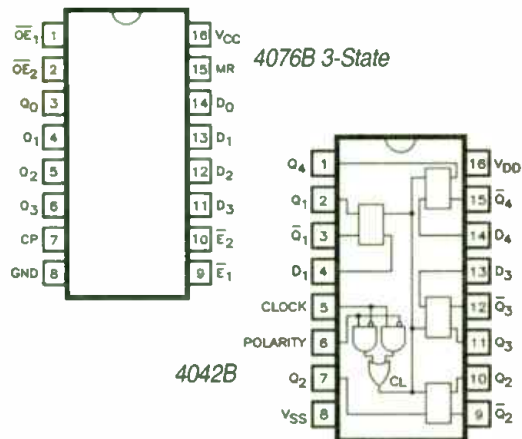
SN=Ti HCF=ST

Order Code	Type	Price each
YH01B	SN74LS279N	65p
QW29G	HCF4043BEY	85p
AB45Y	HCF4043BM1	62p
QW30H	HCF4044BEY	80p
AB46A	HCF4044BM1	62p

Quad D-Type Latches and Register

The 4042B contains four latches controlled by a common clock and a polarity input. With the polarity input low the chip is negative-edge-triggered and when high, positive-edge-triggered. The 4076B contains four D-type positive-edge-triggered flip-flops with 3-state outputs. Gated enable inputs control the entry of data into the flip-flops. When both pins 9 and 10 are low, data is loaded on the next positive clock transition. When pins 1 and 2 are both low, the outputs function normally, but if either or both are high, the outputs present a high impedance. A reset, pin 15, is also provided.

	4042B	4076B
Max clock frequency	5V 3.6MHz 10V 9MHz 15V 12MHz	
Propagation delay low to high/ high to low	5V 220ns 10V 90ns 15V 60ns	300ns 125ns 90ns



Also available in SMD: type HCF4076BM1 (AB59P)

HCF=ST

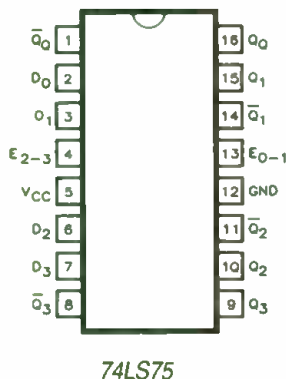
Order Code	Type	Price each
QX19V	HCF4042BEY	78p
QW46A	HCF4076BEY	95p
AB59P	HCF4076BM1	69p

4-Bit Bistable Latches

This device comprises four bistable latches organised as two 2-bit bistable latches. The data on the inputs is transferred to the output when pins 4 or 13 are high on the '75'. A low on these pins locks the data on the output.

LS Type

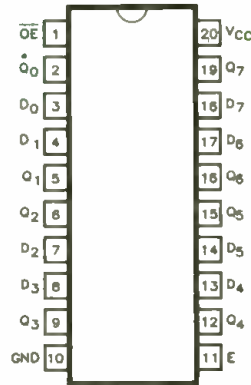
	74LS75
Propagation delay D to Q low to high/high to low 5V	15ns/9ns
Propagation delay D to \bar{Q} low to high/high to low 5V	12ns/7ns
Supply current avg	6.3mA



SN=Ti

Order Code	Type	Price each
YF32K	SN74LS75N	£1.25

Octal D-Type Latches



74LS373, 74HC373, 74HCT373
74HCT533, 74HCT573, 74HCT574

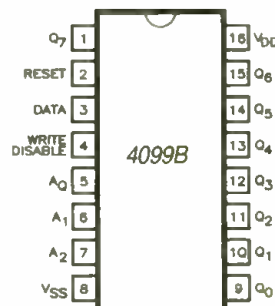
Eight D-type latches in a single package. When the enable (or LE) input is high, the outputs follow the inputs and when low, the outputs are latched. The outputs may be set to high impedance by applying a high to the output control pin 1. Type '533' has inverted outputs while the '373' is non-inverted. Types '573' and '574' are high-speed CMOS implementations, combining LS TTL equivalent performance with the low power consumption of CMOS. Type '573' behaves as the '373', while type '574' is controlled by a clock input (CK, pin 11) as well as the output enable (OE); the logic states set up on the D inputs are transferred to the Q outputs on the positive transition of the clock.

	LS373	HC(T)373	HCT533	HC(T)573	HCT574
Propagation delay	12ns	13ns	13ns	25ns	24ns
Supply current	24mA			2.5mA	2.5mA
Propagation delay					
Max supply current					
Max clock frequency					50MHz

Also available in SMD: type M74HC373M1R (AE57M)
type M74HCT373M1R (AE92A)
type M74HC573M1R (AE69A)
type M74HC574M1R (AE70M)
type M74HCT573M1R (AE95D)
type M74HCT574M1R (AE96E)

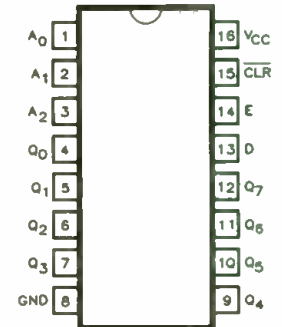
SN=Ti	PC=Philips	M=ST	Order Code	Type	Price each
			YH15R	SN74LS373N	75p
			UB80B	SN74HC373N	£1.05
			AE57M	M74HC373M1R	84p
			UB81C	SN74HCT373N	£1.15
			AE92A	M74HCT373M1R	82p
			UB88V	PC74HCT533P	£1.65
			AE29G	M74HCT573B1R	89p
			AE30H	M74HCT574B1R	89p
			AE69A	M74HC573M1R	89p
			AE70M	M74HC574M1R	89p
			AE95D	M74HCT573M1R	89p
			AE96E	M74HCT574M1R	89p

8-Bit Addressable Latches



A range of ICs each comprising eight latches any one of which may be selected by applying the appropriate address. The data is entered serially and the output is available as 8-bit parallel. A write enable and reset are available.

	LS259	4099
Propagation delay low to high/ high to low	5V 19ns/13ns 10V 15V	200ns 75ns 50ns
Supply current	22mA	



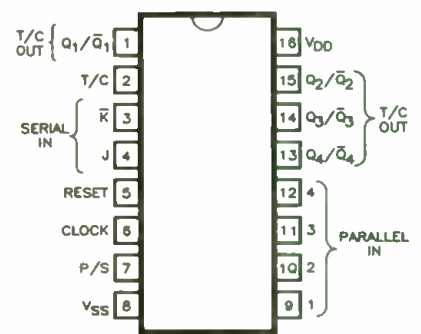
74LS259

Also available in SMD: type HCF4099BM1 (AB12N)

SN=Ti	HCF=ST	Order Code	Type	Price each
		YF97F	SN74LS259N	93p
		QW57M	HCF4099BEY	90p
		AB12N	HCF4076BM1	69p

SUBSECTION 37 SHIFT REGISTERS 4-Bit

The device features parallel loading or serial loading (shift right) using the J or K inputs.



4035B

CMOS Type

	4035
Max clock frequency	2.5MHz
5V	6MHz
10V	10MHz
15V	
Propagation delay 5V	300ns
10V	130ns
15V	95ns

HCF=ST

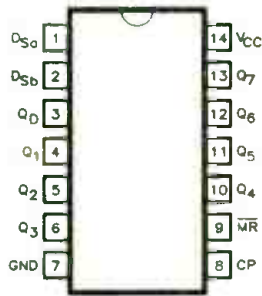
Order Code	Type	Price each
QW25C	HCF4035BEY	90p

8-Bit

The table shows the input and output configurations of the devices available.

	Serial In	Serial Out	Parallel In
74164 types	*	*	*
4014B	*	*	*
4015B	*	*	*
4021B	*	*	*
4094B	*	*	*

The '4094' has a 'store' function and 3-state outputs; the 4021 features asynchronous parallel loading; and the 4015 is arranged as two separate 4-bit registers.



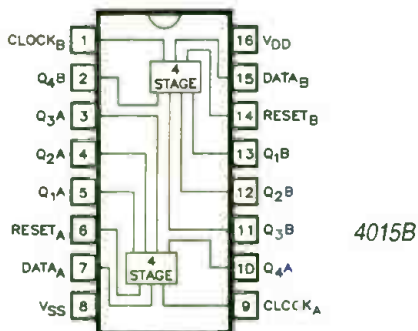
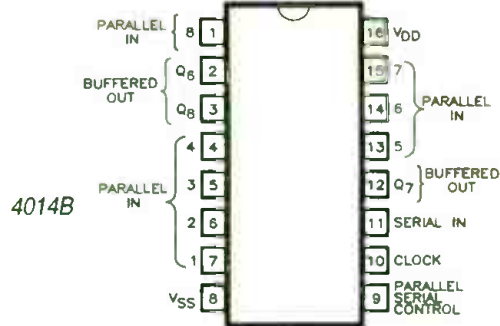
74LS164, 74HC(T)16

74LS Type

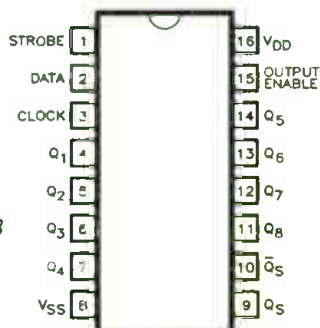
	LS164
Max clock frequency	36MHz
Propagation delay, low to high	17ns
high to low	21ns
Supply current avg	16mA

CMOS and 74HC Types

	4014	4015	4021
Max clock frequency	5V 3MHz	2MHz	3MHz
	10V 6MHz	6MHz	6MHz
	15V 8MHz	7.5MHz	8MHz
Propagation delay	5V 400ns	310ns	400ns
	10V 170ns	125ns	170ns
	15V 115ns	90ns	115ns
	4094	HC164	HCT164
Max clock frequency	5V 2.5MHz	60MHz	50MHz
	10V 5MHz		
	15V 6MHz		
Propagation delay	5V 420ns	19ns	23ns
	10V 195ns		
	15V 135ns		



4094B



Also available in SMD: type M74HC164M1R (AE49D)
type M74HCT164M1R (AE88V)
type HCF4015BM1 (AB36P)
type HCF4021BM1 (AB29G)
type HCF4094BM1 (AB19V)

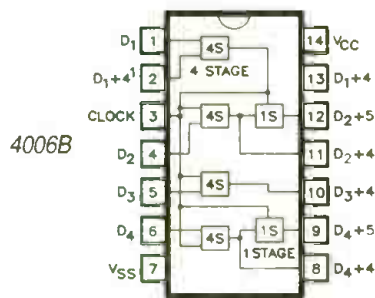
SN=Ti M/HCF=ST

Order Code	Type	Price each
YF67X	SN74LS164N	79p
UB43W	SN74HC164N	99p
AE49D	M74HC164M1R	69p
AE25C	M74HCT164B1R	65p
AE88V	M74HCT164M1R	64p
QW15R	HCF4014BEY	98p
QW16S	HCF4015BEY	£1.05
AB36P	HCF4015BM1	79p
QW18U	HCF4021BEY	98p
AB29G	HCF021BM1	79p
QW54J	HCF4094BEY	£1.25
AB19V	HCF4094BM1	69p

18-Bit

The 4006B comprises four separate shift registers controlled by a common clock. Two sections have four stages and two sections have five stages with an additional output after the fourth stage. Thus it is possible by selecting appropriate stages, to make shift registers of length 4, 5, 8, 9, 10, 12, 13, 14, 16, 17 and 18 stages.

	5V	10V	15V
Max clock frequency	5MHz	8.3MHz	12MHz
Propagation delay	300ns	110ns	80ns



HCF=ST

Order Code	Type	Price each
QX03D	HCF4006BEY	79p

SUBSECTION 38 COUNTERS

Decade (and ÷12)

Type '90' is arranged as ÷5 and ÷2 with separate inputs and outputs. To use it as a symmetrical ÷10 counter the QD output must be connected to the 'A' input. The input is then applied to 'B', and the output is available at QA. The '4510' has up-down counting capability and is programmable. The '4518' is a dual up-counter. The '4017' has ten separate outputs offering a completely decoded count, i.e. each output pulses sequentially repeating every 10 counts. The '4018' is presettable to ÷10, 8, 6, 4 or 2.

74 Type

	7490
Max count frequency	42MHz
Supply current avg	29mA

LS Type

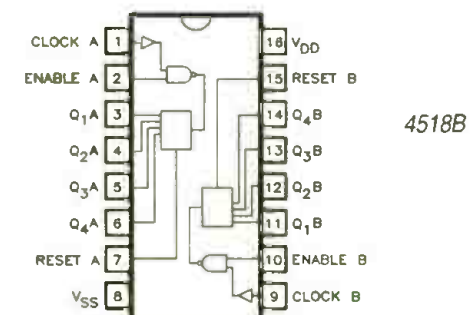
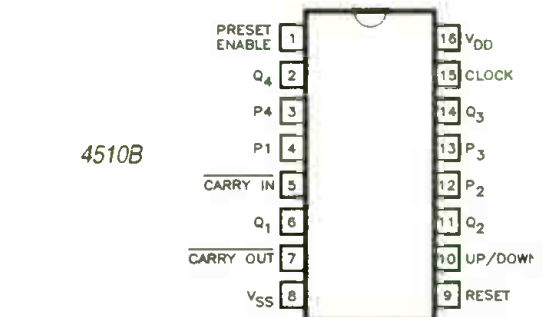
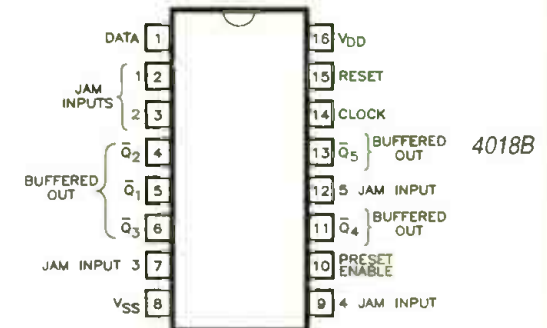
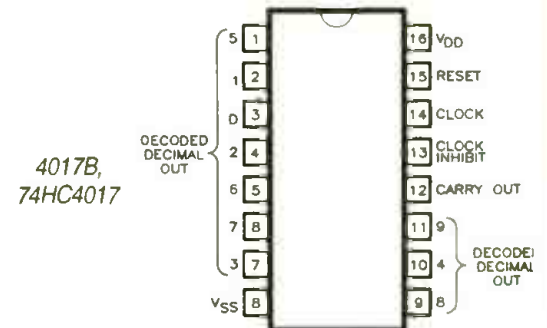
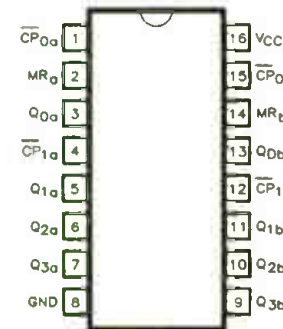
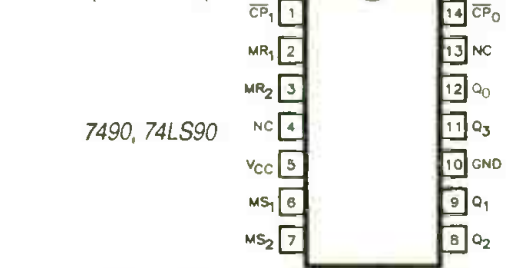
	LS90
Max count frequency	42MHz
Supply current avg	9mA

CMOS Types

	4017B	4018B	4510B	4518B
Max count frequency 5V	5MHz	2.5MHz	3MHz	2.5MHz
Max count frequency 10V	12MHz	6.5MHz	6MHz	6MHz
Max count frequency 15V	16MHz	8MHz	8MHz	8MHz

74HC Types

	HC390	HC4017
Max count frequency	60MHz	50MHz
(count down)		



Continued on next page.

Continued from previous page.

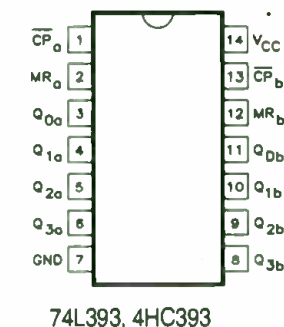
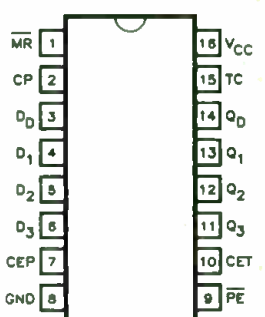
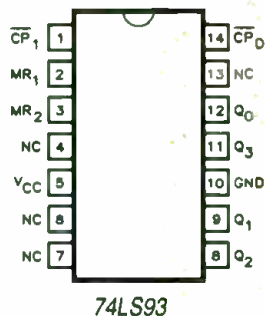
Also available in SMD: type HCF4518BM1 (AB22Y)
 type M74HC390M1R (AE59P)
 type M74HC4017M1R (AE61R)
 type HCF4017BM1 (AB38R)

M/SN=TI HCF=ST

Order Code	Type	Price each
QX66W	SN7490N	£3.99
YF38R	SN74LS90N	£1.28
UB84F	SN74HC390N	£1.09
AE59P	M74HC390M1R	74p
QX09K	HCF4017BEY	95p
UB99H	M74HC4017B1R	80p
AB38R	HCF4001BM1	36p
AE61R	M74HC4017M1R	69p
QX10L	HCF4018BEY	95p
QW83E	HCF4510BEY	£1.48
QX32K	HCF4518BEY	95p
AB22Y	HCF4518BM1R	69p

4-Bit Binary (and Octal)

Type '93' is arranged as +8 and +2 with separate inputs and outputs. The '393' is a dual version of the '93'. Type '4520' also has two separate 4-bit counters. The '4022' is an octal counter with eight separate outputs offering a completely decoded count, i.e. each output pulses sequentially repeating every eight counts. All other types are programmable. Type '161' is synchronous with asynchronous clear while the '163' is fully synchronous. Type '193' is also a synchronous up-down counter, but programming is asynchronous and it has a dual clock and clear. Type '4516' and programmable and '4516' is up-down.

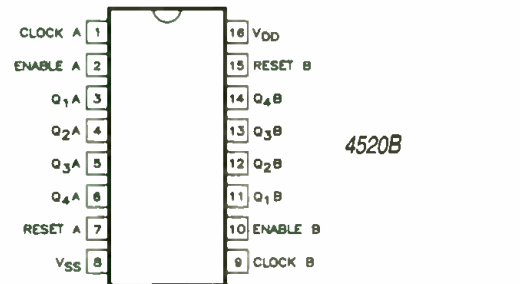
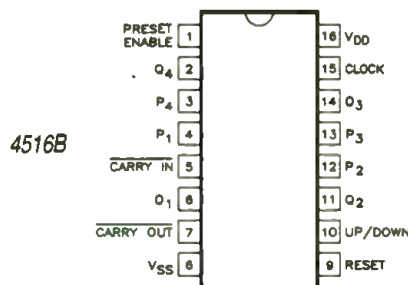
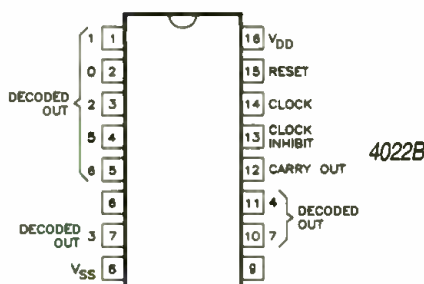
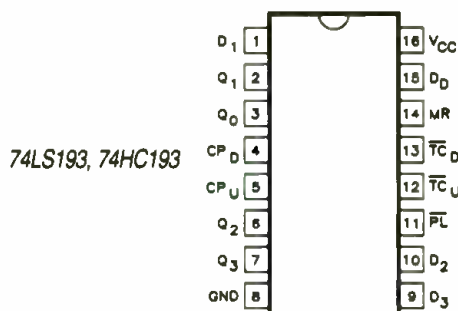


CMOS Types

	4022B	4516B	4520B
Max count frequency	5V 5MHz	3MHz	2.5MHz
	10V 12MHz	6MHz	6MHz
	15V 16MHz	8MHz	8MHz

74HC Types

	HC161	HC163	HC193	HC393
Max count frequency	43MHz	43MHz	48MHz	60MHz
Max count frequency (count down)	27MHz			



Also available in SMD: type M74HC161M1R (AE48C)
 type M74HC163M1R (AE75S)
 type M74HC193M1R (AE51F)
 type M74HC393M1R (AE60Q)
 type HCF4516BM1 (AB16S)
 type HCF4520BM1 (AB17T)

SN=TI M/HCF=ST

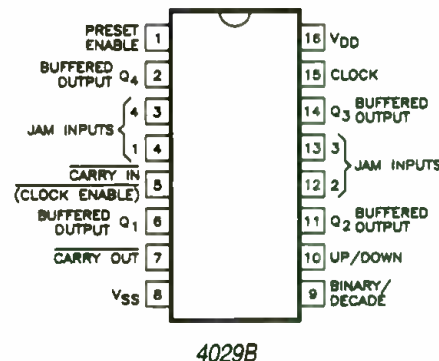
Order Code	Type	Price each
YF40T	SN74LS93N	£1.50
UB41U	SN74HC161N	99p
AE48C	M74HC161M1R	69p
UB42V	SN74HC163N	99p
AE75S	M74HC163M1R	64p
YF81C	SN74LS193N	75p
UB49D	SN74HC193N	£1.25
AE51F	M74HC193M1R	74p
YH22Y	SN74LS393N	79p
AE60Q	M74HC393M1R	74p
UB85G	SN74HC393N	£1.05
QW19V	HCF4022BEY	95p
QW87U	HCF4516BEY	£1.05
AB16S	HCF4516BM1	79p
QX33L	HCF4520BEY	75p
AB17T	HCF4520BM1	69p

4-Bit Binary/Decade

SGS-Thomson

An up-down counter switchable from decade to 4-bit binary. It is programmable and internally synchronous.

	4029B	5V	10V	15V
Max count frequency	4MHz	8MHz	10MHz	



Also available in SMD: type HCF4029BM1 (AB44X)

HCF=ST

Order Code	Type	Price each
QW20W	HCF4029BEY	98p
AB44X	HCF4029BM1	64p



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 RS12750

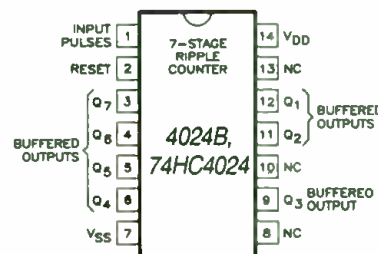


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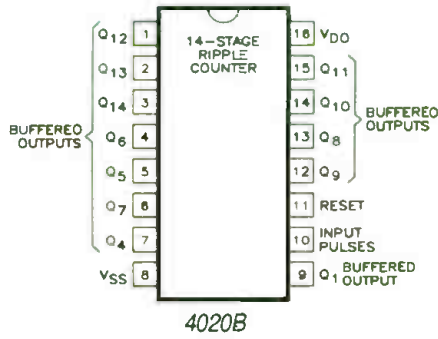
7-Stage and Higher

The following table shows the number of stages of division in each chip.

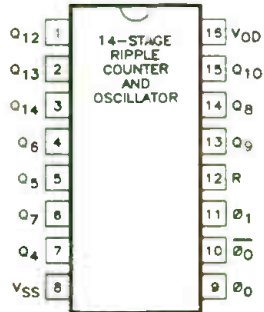
Stages	7	8	12	14
4020B				*
4024B/74HC4024	*			
4040B/74HC4040			*	
4060B/74HC4060				*
40103B		*		



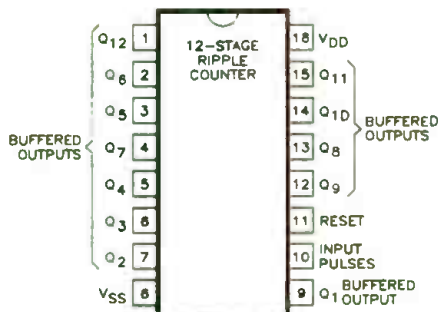
	LS93	LS193	LS393
Max count frequency	42MHz	2MHz	35MHz
Supply current avg	9mA	19mA	15mA



4020B



4060B, 74HC4060



4040B, 74HC4040

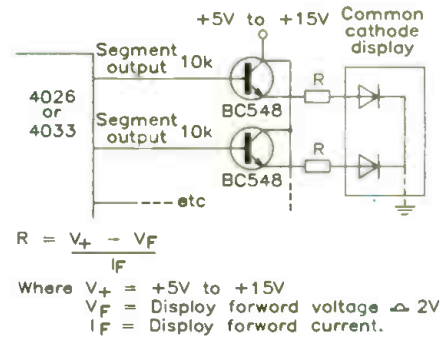
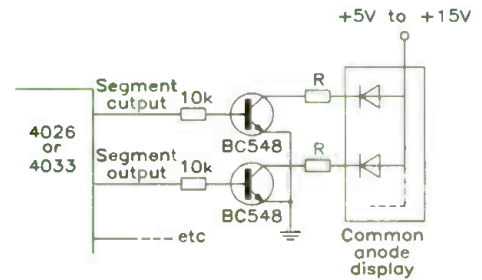
Also available in SMD: type HCF4020BM1 (AB28F)
 type HCF4024BM1 (AB31J)
 type M74HC4040M1R (AE62S)
 type HCF4040BM1 (AB32K)
 type HCF4060BM1 (AB54J)
 type M74HC4060M1R (AE65V)
 type M74HC4024M1R (AE77J)

SN=Ti M/HCF=ST PC=Philips

Order Code	Type	Price each
QX11M	HCF4020BEY	82p
AB28F	HCF4020BM1	75p
QX13P	HCF4024BEY	75p
AE77J	M74HC4024M1R	69p
UF01B	M74HC4024B1V	£1.12
AB31J	HCF4024BM1	56p
AE62S	M74HC4040M1R	82p
QW27E	HCF4040BEY	98p
AB32K	HCF4040BM1	75p
UF02C	SN74HC4040N	£1.11
AE65V	M74HC4060M1R	79p
QW40T	HCF4060BEY	98p
AB54J	HCF4060BM1	79p
UF09K	SN74HC4060N	£1.55
QW61R	HCF40103BEY	£1.35
UL57M	PC74HC40103P	£1.65

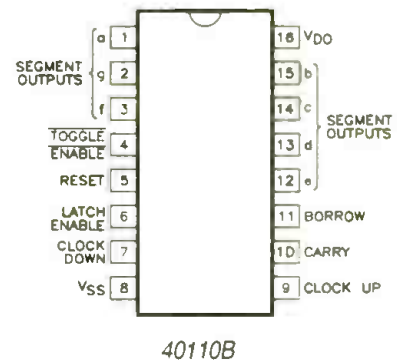
7-Segment

All types have outputs suitable for driving seven-segment displays. Type '4026' has 'display enable input', 'display enable output', and an 'ungated c segment' output. Type '4033' is identical to the '4026' except that in place of the inputs and outputs listed above, the '4033' has a 'lamp test input', 'ripple-blanking input' and a 'ripple-blanking output'. 'Display enable' permits the count to continue whilst the display is off for power saving and in this mode the 'ungated c segment' together with 'carry' are needed for some divide functions e.g. ÷60 and ÷12. 'Ripple blanking' permits leading zeros to be extinguished in seven-segment arrays and the 'lamp test', when set high, lights all segments simultaneously. Type '40110' is an up/down counter and pins that differ from the other devices are 'borrow' (like 'carry' but operates on down counts), 'latch enable', and 'toggle enable'. Taking 'latch enable' high permits the count to continue while the display remains fixed. Taking 'toggle enable' high inhibits the count and locks the display. The 40110 can drive common cathode displays directly.



$$R = \frac{V_+ - V_F}{I_F}$$

Where V_+ = +5V to +15V
 V_F = Display forward voltage Δ 2V
 I_F = Display forward current.

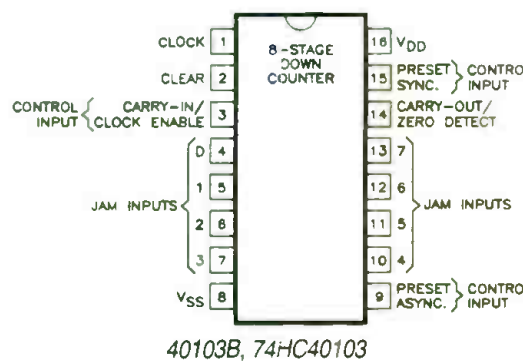


40110B

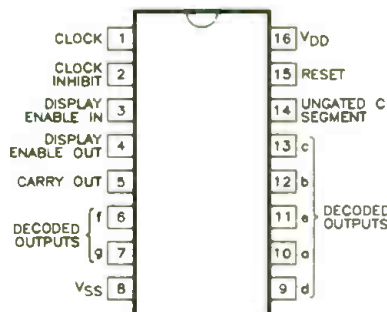
HCF=ST

Order Code	Type	Price each
QX15R	HCF4026BEY	£1.35
QW23A	HCF4033BEY	85p
QW68Y	HCF40110BEY	£1.95

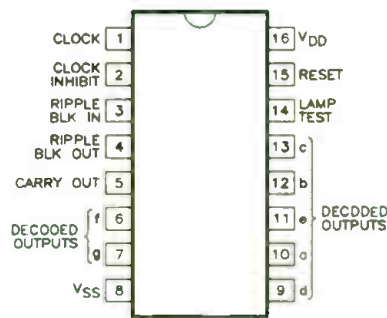
Type '40103' is programmable. On types '4024', '40103' and '4040' the outputs from each stage are available individually. On the '4020' all but stages 2 and 3 are available while on the '4060' stages 1, 2, 3 and 11 are not available, but an internal oscillator is included.



40103B, 74HC40103



4026B



4033B

CMOS Types

	4020B	4024B	4040B
Max count frequency 5V	3.5MHz	2.5MHz	2.1MHz
10V	9MHz	8MHz	7MHz
15V	13MHz	12MHz	10MHz

	4060B	40103B
Max count frequency 5V	5MHz	1.4MHz
10V	14MHz	3.6MHz
15V	17MHz	4.8MHz

74HC Types

	HC4024	HC4040	HC4060	HC40103
Max count frequency 70MHz	40MHz	40MHz	32MHz	

Max count frequency	4026B	4033B	40110B
5V	5MHz	5MHz	2.5MHz
10V	11MHz	11MHz	5MHz
15V	16MHz	16MHz	8MHz

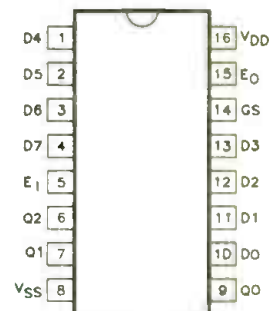
SUBSECTION 39 ENCODERS

8-Bit Priority

SGS-Thomson

If E_{in} is enabled then the most significant input set (D_0 to D_7 - D_7 is MSB) will generate a specific code at the outputs regardless of the level on any lesser significant inputs. E_{out} goes high only when E_{in} is high but all inputs are low. Group Select goes high only when E_{in} is high and one or more inputs are high.

	5V	10V	15V
4532B Propagation delay	300ns	170ns	110ns



4532B

Also available in SMD: type HCF4532BM1 (AB18U)

HCF=ST

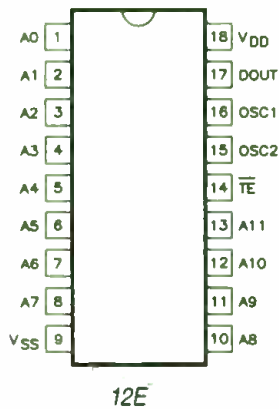
Order Code	Type	Price each
QW89W	HCF4532BEY	£1.25
AB18U	HCF4532BM1	64p

HT12E, HT12D & HT12F Remote Control Encoder/Decoders

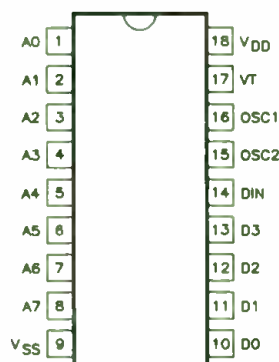
Holtek

NEW

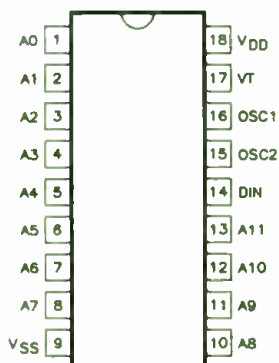
The HT12E encodes 12 bits of information and then serially transmits it upon receipt of a transmit enable signal to its active low TE pin. The data is transmitted on the pin marked DOUT, and can be easily interfaced to work with RF or infra-red transmission networks. Complementing the encoder are two decoder ICs, the HT12F and HT12D. The HT12F takes the encoded signal and decodes the whole of the 12 bits as being address data. If the received address matches with the address preset on the decoder IC then the decoder IC will make its valid transmission pin go high (VT). Using the HT12D device is very similar with the single exception that it decodes the first 8 bits of information and checks them against the first 8 bits of address preset on its pins. When both addresses match it makes available the last 4 bits of the received data word, on its four output pins. At the same time the decoder IC will send high its VT pin. This means that data can be sent from the encoder IC and only be decoded and therefore received by those decoder ICs with a matching 8-bit address. Features of the devices are low power, high noise immunity, low stand-by current of 1µA, wide operating voltage, 2¹² address code (2⁸ for the HT12D), built-in oscillator requiring only a 5% resistor, four times transmission with three times receive check, and a minimum of external components. Applications include burglar alarm systems, smoke and fire alarm systems, car door controllers, car alarm systems, security systems, cordless telephones, and many remote control systems.



12E



12D



12F

Specification

Operating voltage, V_{DD} : 2.4V to 12V, 5V typ (13V abs max)
Output drive current (sink), I_O : 1.6mA typ, 1mA min ($V_{DD}=5V$)
(source): 5mA typ, 2mA min ($V_{DD}=10V$)

Stand-by current, I_{STB} : 0.1µA typ, 1µA max (at $V_{DD}=3V$)
0.1µA typ, 1µA max (at $V_{DD}=5V$)
1µA typ, 2µA max (at $V_{DD}=10V$)
2µA typ, 4µA max (at $V_{DD}=12V$)

Operating current, I_{DD}
HT12E, ($F_{osc}=3kHz$): 40µA typ, 80µA max (at $V_{DD}=5V$)
100µA typ, 200µA max (at $V_{DD}=10V$)

HT12D & HT12F, ($F_{osc}=200kHz$): 200µA typ, 400µA max (at $V_{DD}=5V$)
400µA typ, 800µA max (at $V_{DD}=10V$)

Recommended oscillator parameters:

	HT12E	HT12D & HT12F
	1.1MΩ (3kHz)	62kΩ (150kHz)
	750kΩ (4.3kHz)	33kΩ (240kHz)

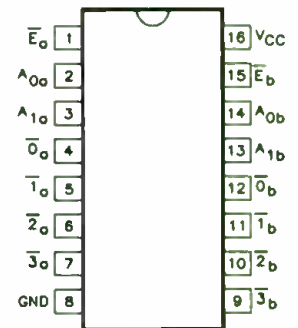
Operating temperature, T_A : 0°C to 70°C

Order Code	Type	Price each
AE17T	HT12E	£1.49
AE18U	HT12D	£1.49
AE19V	HT12F	£1.49

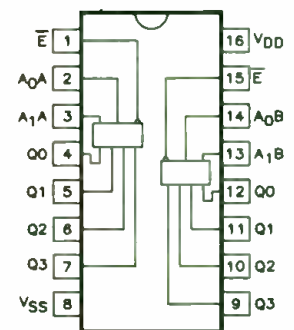
SUBSECTION 40 DECODERS AND DEMULPLEXERS

Dual 2-Line to 4-Line

The '139' and '4555' each have two fully independent 2-line to 4-line decoders where a specific code on the 'select' inputs will drive one of the four outputs on (low on '139', high on '4555') providing enable is low. The enable input can be used as a data input for demultiplexing.



74LS139, 74HC139



4555B

The 4555B is a dual 1-of-4 decoder/demultiplexer. Each has two address inputs (A₀ and A₁), an active LOW enable input (E) and four mutually exclusive outputs which are active HIGH (0₀ to 0₃). When used as a decoder, E when HIGH, forces 0₀ to 0₃ LOW. When used as a demultiplexer, the appropriate output is selected by the information on A₀ and A₁ with E as data input. All unselected outputs are LOW.

MAPLIN KEY CALL

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The abbreviations

FA—Fagor	SEM—Semelab
HIT—Hitachi	SIE—Siemens
ME—Micro Electronics	SLX—Siliconix
MOT—Motorola	ST—SGS-Thomson
NEC—NEC	TFK—Telefunken
NSC—National Semiconductor	Ti—Texas Instruments
PC—Philips	TOSH—Toshiba
	ZET—Zetex

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	LS139	HC139
Propagation delay low to high/		
high to low	5V	13ns/22ns
Supply current avge		6.8mA

	4555
Propagation delay low to high/	
high to low	5V
	10V
	15V

Also available in SMD: type M74HC139M1R (AB82D)

SN=Ti M/HCF=ST

Order Code	Type	Price each
YF54J	SN74LS139N	69p
UB35Q	SN74HC139N	78p
AB82D	M74HC139M1R	56P
QW90X	HCF4555BEY	£1.15

	HC137	LS138
Propagation delay low to high	14ns	18ns
high to low	20ns	26ns
Supply current avge	6.3mA	

	HC138	HCT138
Propagation delay low to high	13ns	16ns
high to low	20ns	17ns

Also available in SMD: type M74HC137M1R (AE74R)
type M74HC138M1R (AE45Y)
type M74HCT138M1R (AE87U)

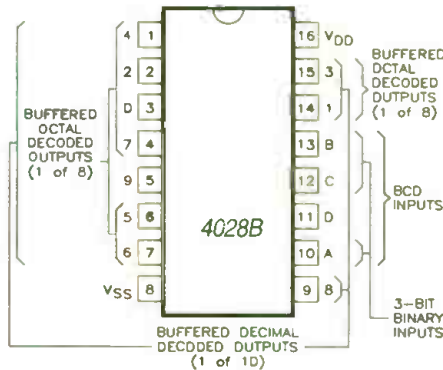
SN=Ti M=ST

Order Code	Type	Price each
UB31J	SN74HC137N	£1.45
AE74R	M74HC137M1R	59p
YF53H	SN74LS138N	54p
UB33L	SN74HC138N	85p
AE45Y	M74HC138M1R	59p
AE24B	M74HCT138B1R	62p
AE87U	M74HCT138M1R	62p

4-Line to 10-Line

A specific code between binary 0 to 9 on the 4 input lines will switch on one of the ten outputs. Binary codes 10 to 15 switch all outputs off.

	4028B
Propagation delay 5V	300ns
Propagation delay 10V	130ns
Propagation delay 15V	90ns



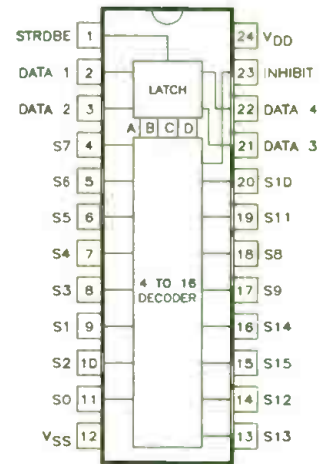
Also available in SMD: type HCF4028BM1 (AB43W)

HCF=ST

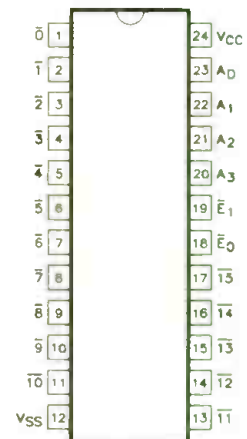
Order Code	Type	Price each
QX17T	HCF4028BEY	82p
AB43W	HCF4028BM1	64p

4-Line to 16-Line

On all types a specific code on the four input pins will switch one of the 16 output lines on. On type '154' there are two strobe inputs which must both be low. If one or both are high then all outputs are high. For demultiplexing operation, hold one strobe line low and connect data to the other strobe input. The outputs of the 4514 are active high, whilst on the '4515' they are active low. On the '4514' and '4515', an inhibit is provided which when high switches all outputs off. Only one strobe line is provided which when taken from high to low latches the input code. Changes on the inputs will have no effect while strobe is low. Note that two '138' ICs offer higher speed operation than one '154'.

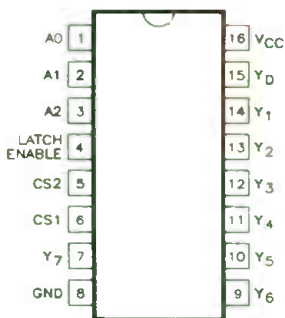


4514, 4515

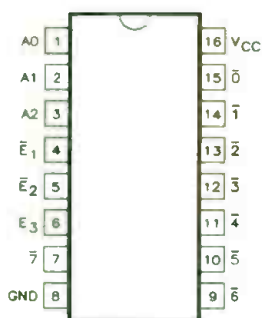


74LS154, 74HC154

3-Line to 8-Line



74HC137



74LS138, 74HC(T)138

In the '137' there are two enable inputs and an address latch, whilst in the '138' there are three enable inputs. On the '137' when pin 4 goes from low to high, the address present on the 'select' inputs is stored in the latches and further changes ignored while pin 4 remains high. All outputs are high unless pin 6 is high and pin 5 is low. On the '138' all outputs are high unless pin 6 is high and pins 4 and 5 are low. This enables easy expansion. For demultiplexing an enable input can be used as a data input. On all devices with the chip enabled, a specific code on the three select inputs will drive one of the four outputs on (low on '137' and '138').

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	LS154	HC154
Propagation delay low to high/		
high to low 5V	24ns/22ns	15ns
Supply current avge	9mA	

	4514/4515
Propagation delay low to high/	
high to low 5V	550ns
	10V
	15V

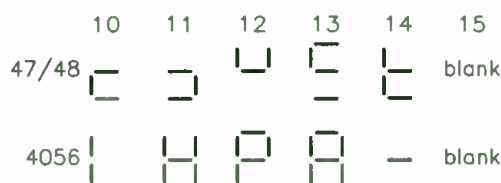
Also available in SMD: type HCF4514BM1 (AB14Q)

HCF=ST DM=NSC PC=Philips

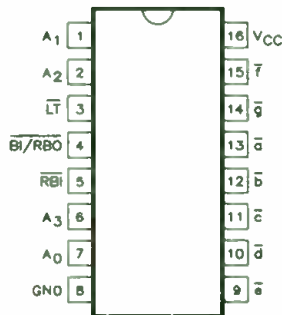
Order Code	Type	Price each
YF58N	DM74LS154N	£2.15
UB38R	PC74HC154P	£1.45
QW85G	HCF4514BEY	£2.75
AB14Q	HCF4514BM1	£3.69

BCD to 7-Segment

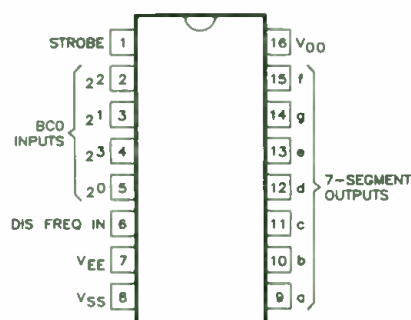
On all types a specific code on the four input lines generates an output for driving a 7-segment display. Illegal inputs are suppressed on the '4511' and '74HC4543', and on the other ICs the display is as shown below.



Type '47' has active-low open-collector outputs for driving common anode LED displays or incandescent indicators whilst the '48' has active-high (2kΩ pull-up) outputs for driving common cathode LED displays or lamp buffers. Types '4056' and '74HC4543' are designed for driving liquid crystal displays, and types '4511' and '74HC4511' will directly drive common cathode LEDs via a series resistor. Types '47' and '48' have ripple blanking inputs and outputs for leading zero suppression in lamp arrays and these and the '4511' have a lamp test input which lights all segments simultaneously. Types '4056', '4511' and '74HC4543' have 'strobe', 'latch enable' and 'latch disable' respectively which freezes the display regardless of changes on the input. In addition, types '47', '48', '4511' and '74HC4543' have a display blanking input for power saving. The '74HC4543' requires the LCD backplane frequency connected to pin 6. Alternatively the device can drive LED displays: for common cathode connect pin 6 to 0V and for common anode connect pin 6 to pin 16.



7447A
74LS47, 74LS48



4056B

74 and 74LS Types

	7447A	74LS47	74LS48
Off-state o/p voltage (max)	15V	15V	
On-state output voltage	0.3V @ 40mA	0.35V @ 24mA	
Off-state output current	250µA	250µA	
On-state o/p current (max)	40mA	24mA	
Supply current average	64mA	7mA	25mA

4056B

Display frequency range 30Hz to 200Hz
V_{EE} range 0V to -15V
(Thus voltage across display may be from 5V to 30V)

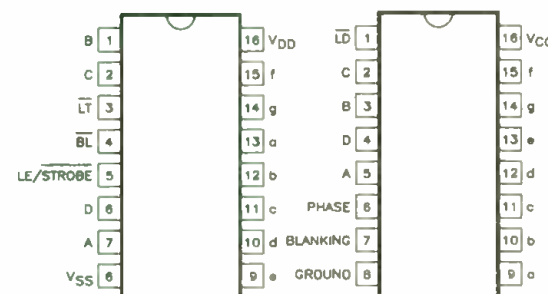
4511B and 74HC4511

	4511B	74HC4511
High level output current (max)	25mA	25mA
Low level output current (max)	5V 0.88mA 10V 2.25mA 15V 8.8mA	25mA

High level output voltage: at max current	5V	3.54V	4.2V
	10V	8.75V	
	15V	13.8V	

Low level output voltage: at max current	1.2V
--	------

Note 4056B is a pin-for-pin equivalent to 4543B in most applications.



4511B, 74HC4511 74HC4543

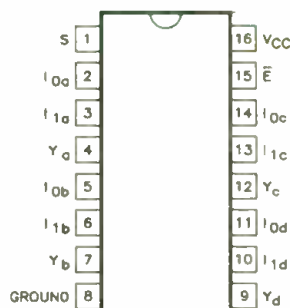
Also available in SMD: type HCF4056BM1 (AE99H)
type HCF4511BM1 (AB21X)

M/HCF=ST SN=Ti MC=MOT

Order Code	Type	Price each
QX55K	SN7447AN	£2.65
QQ52G	SN74LS47N	99p
QQ53H	MC74LS48P	£1.25
QW39N	HCF4056BEY	98p
AE99H	HCF4056BM1	79p
QX31J	HCF4511BEY	£1.05
UF17T	M74HC4511B1N	£1.35
AB21X	HCF4511BM1	79p
UH45Y	M74HC4543B1N	99p

SUBSECTION 41 MULTIPLEXERS

Quad 2-Line to 1-Line



74LS157

A 4-bit word is selected from one of the two sets of inputs and routed to the four outputs dependent on the state of the select line. Type '157', presents true data at the output. Pin 15 is a strobe which must be held low for normal functioning. When high the outputs are held low.

74LS Type

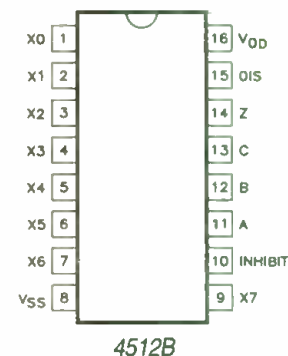
	LS157
Propagation delay low to high	9ns
high to low	9ns
Supply current avge	9.7mA

Order Code	Type	Price each
YF61R	SN74LS157N	53p

8-Line to 1-Line

A specific code on the three select lines will transfer the data on one of the eight inputs to the output. The device has output enable and inhibit pins, and features tri-state outputs.

Propagation delay:		
low to high 5V	100ns	
low to high 10V	50ns	
low to high 15V	40ns	
high to low 5V	130ns	
high to low 10V	65ns	
high to low 15V	50ns	



4512B

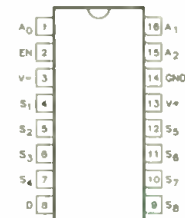
HCF=ST

Order Code	Type	Price each
QW84F	HCF4512BEY	99p

DG508ACJ 8-Channel CMOS Analogue Multiplexer

Siliconix

An 8-channel single-ended analogue multiplexer, that is designed to connect 1 of 8 inputs to a common output as determined by a 3-bit binary address (A₀, A₁, A₂). Break-before-make switching actions is used to protect against momentary shorting of the input signals. A channel in the ON state conducts current equally well in both directions (bi-directional switches). In the OFF state, each channel will block voltages up to the power supply rails, normally 30V pk to pk. An enable (EN) function allows the user to reset all the switches OFF. All control inputs, address and enable are TTL or CMOS compatible over the full specified operating temperature range. Applications include communication systems, multiplexing reference signals, data acquisition systems, audio signal routing and multiplexing. Supplied in a 16-pin DIL plastic package.



DG508A

Specification

Voltage referenced to -V	
+V:	44V
GND:	25V
Digital inputs:	(-V) -2V to (+V) +2V or 20mA, whichever occurs first.
Current (any terminal except S or D):	30mA
Continuous current (S or D):	20mA
Peak current (S or D):	40mA
Power dissipation:	470mW
Transition time:	0.6µs

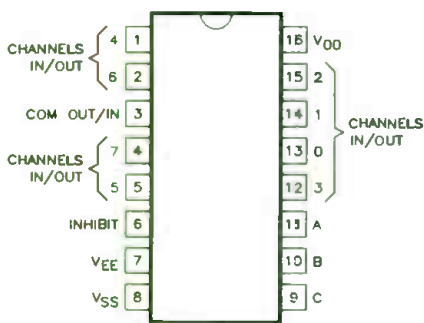
Order Code	Type	Price each
DB31J	DG508ACJ	£5.75

SUBSECTION 42 ANALOGUE SWITCHES

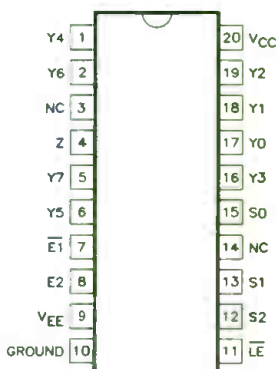
1-Pole 8-Way

A bidirectional 8-way switch where any one of 8 signals will be connected to a common pin depending on the code on the three control pins. No switch is made if the inhibit pin is high on the '4051'. On the '4351' pin 7 must be low and pin 8 high for any switch to be on. The '4351' contains a latch for the 'channel select' data. When 'latch enable' is low, the switches cannot change state regardless of changes on the 'channel select' pins. Analogue signals with peak-to-peak voltages up to the difference between V_{DD}/V_{CC} and V_{EE} may be transmitted through the switch. Note that V_{EE} must not be connected to a voltage higher than V_{SS}/Ground . For analogue signals it is usually preferable to make V_{EE} equal in magnitude to V_{DD} , e.g. $V_{DD}/V_{CC} = 5V$, $V_{EE} = -5V$.

V_{DD}/V_{CC} to V_{EE}	4051B
Supply voltage range (V_{DD}/V_{CC})	3V to 15V
Supply voltage range (V_{EE})	0 to -10V
Max difference V_{DD}/V_{CC} to V_{EE}	15V
On resistance	5V 250Ω 10V 120Ω 15V 80Ω
Matching of on resistances	5V 25Ω 10V 10Ω 15V 5Ω
Leakage current any off channel	max ±0.01nA
Propagation delay in to out	5V 35ns 10V 15ns 15V 12ns
Max switch turn on delay	5V 360ns 10V 160ns 15V 120ns
Max switch turn off delay	5V 350ns 10V 170ns 15V 140ns
Sine wave distortion	10V 0.04%
Bandwidth	10V 20MHz
Max current through switch	5V 14.3mA 10V 25mA 15V 25mA



4051B,
74HC4051



74HC4351

V_{DD}/V_{CC} to V_{EE}	74HC4051
Supply voltage range (V_{DD}/V_{CC})	2V to 6V
Supply voltage range (V_{EE})	0V to -6V
Max difference V_{DD}/V_{CC} to V_{EE}	12V
On resistance	5V 40Ω 10V 30Ω 15V 10Ω
Matching of on resistances	5V 5Ω 10V 5Ω
Leakage current any off channel	max 20nA
Propagation delay in to out	5V 5ns 10V 4ns
Max switch turn on delay	5V 18ns 10V 16ns
Max switch turn off delay	5V 28ns 10V 18ns
Bandwidth	10V 120MHz
Max current through switch	5V 25mA 10V 25mA

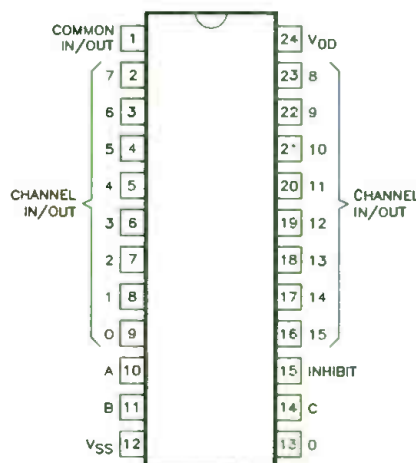
V_{DD}/V_{CC} to V_{EE}	74HC4351
Supply voltage range (V_{DD}/V_{CC})	2V to 6V
Supply voltage range (V_{EE})	0V to -6V
Max difference V_{DD}/V_{CC} to V_{EE}	12V
On resistance	5V 40 10V 30 15V 10
Matching of on resistances	5V 5 10V 5
Leakage current any off channel	max 20nA
Propagation delay in to out	5V 5ns 10V 4ns
Max switch turn on delay	5V 18ns 10V 16ns
Max switch turn off delay	5V 20ns 10V 18ns
Bandwidth	10V 120MHz
Max current through switch	5V 25mA 10V 25mA

Also available in SMD: type HCF4051BM1 (AB51F)
type M74HC4051M1R (AE63T)

M/HCF=ST MC=MOT PC=Philips

Order Code	Type	Price each
QW34M	HCF4051BEY	99p
AB51F	HCF4051BM1	64p
UF06G	MC74HC4051P	£1.45
AE63T	M74HC4051M1R	£1.16
UF14Q	PC74HC4351P	£1.59

1-Pole 16-Way



4067B

A bidirectional switch where any one of 16 signals will be connected to a common pin depending on the code on the four control pins. No switch is made if the inhibit pin is high. Voltages up to +15V may be transmitted through the switch. For analogue signals, V_{DD} and V_{SS} may be set at equal magnitudes up to $V_{DD} = +7.5V$,

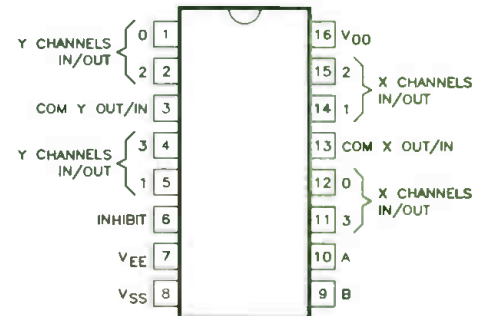
V_{DD}/V_{CC} to V_{EE}	4067B
Supply voltage range (V_{DD}/V_{CC})	3V to 15V
Supply voltage range (V_{EE})	0 to -10V
Max difference V_{DD}/V_{CC} to V_{EE}	15V
On resistance	5V 250 10V 120 15V 80
Matching of on resistance	5V 25 10V 10 15V 5
Leakage current any off channel	max ±0.01nA
Propagation delay in to out	5V 35ns 10V 15ns 15V 12ns
Max switch turn on delay	5V 240ns 10V 115ns 15V 75ns
Max switch turn off delay	5V 150ns 10V 120ns 15V 75ns
Sine wave distortion	10V 0.3%
Bandwidth	10V 15MHz
Max current through switch	5V 14.3mA 10V 25mA 15V 25mA

Also available in SMD: type HCF4067BM1 (AB02C)

Order Code	Type	Price each
QW42V	HCF4067BEY	£3.85
AB02C	HCF4067BM1	£3.69

2-Pole 4-Way

Two separate bidirectional 4-way switches in one package where any one of 4 signals will be connected to a common pin depending on the code on the two control pins. No switch is made if the inhibit pin is high. Analogue signals with peak-to-peak voltages up to the difference between V_{DD}/V_{CC} and V_{EE} may be transmitted through the switch. Note that V_{EE} must not be connected to a voltage higher than V_{SS}/Ground . For analogue signals it is usually preferable to make V_{EE} equal in magnitude to V_{DD} , e.g. if $V_{DD}/V_{CC} = 5V$ then



make $V_{EE} = -5V$.

V_{DD}/V_{CC} to V_{EE}	4052B
Supply voltage range (V_{DD}/V_{CC})	3V to 15V
Supply voltage range (V_{EE})	0 to -10V
Max difference V_{DD}/V_{CC} to V_{EE}	15V
On resistance	5V 250 10V 120 15V 80
Matching of on resistances	5V 25 10V 10 15V 5
Leakage current any off channel	max ±0.01nA
Propagation delay in to out	5V 30ns 10V 12ns 15V 10ns
Max switch turn on delay	5V 325ns 10V 130ns 15V 90ns
Max switch turn off delay	5V 350ns 10V 170ns 15V 140ns
Sine wave distortion	10V 0.04%
Bandwidth	10V 30MHz

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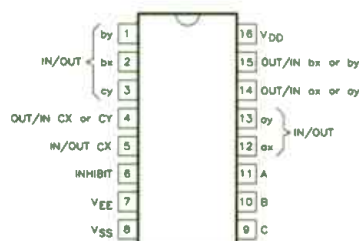
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Max current through switch	5V	14.3mA
	10V	25mA
	15V	25mA
	V_{DD}/V_{CC} to V_{EE}	74HC4052
Supply voltage range (V_{DD}/V_{CC})		2V to 6V
Supply voltage range (V_{EE})		0V to -6V
Max difference V_{DD}/V_{CC} to V_{EE}		12V
On resistance	5V	40
	10V	30
Matching of on resistances	5V	10
	10V	5
Leakage current any off channel	max	20nA
Propagation delay in to out	5V	5ns
	10V	4ns
Max switch turn on delay	5V	18ns
	10V	16ns
Max switch turn off delay	5V	28ns
	10V	18ns
Bandwidth	10V	120MHz
Max current through switch	5V	25mA
	10V	25mA

Order Code	Type	Price each
QW35Q	HCF4052BEY	82p
AB52G	HCF4052BM1	64p
UF07H	M74HC4052B1R	£1.37

3-Pole 2-Way

Three separate bidirectional 2-way switches in one package where either of two signals will be connected to a common pin depending on the level on the control wire for that 2-way switch. 'Select' pin A controls switch X0, X1, pin B controls Y0, Y1 and pin C controls Z0, Z1. When the select wire is low the 0 input is connected to the common (X, Y or Z) and when high the 1 input. No switch is made if the inhibit pin is high on the '4053'. When 'latch enable' is low, the switches cannot change state regardless of changes on the 'channel select' pins. Analogue signals with peak-to-peak voltages up to the difference between V_{DD}/V_{CC} and V_{EE} may be transmitted through the switch. Note that V_{EE} must not be connected to a voltage higher than $V_{SS}/$ Ground. For analogue signals it is usually preferable to make V_{EE} equal in magnitude to V_{DD} , e.g. if $V_{DD}/V_{CC} = 5V$ then make $V_{EE} = -5V$.



4053B 74HC4053

	V_{DD}/V_{CC} to V_{EE}	4053
Supply voltage range (V_{DD}/V_{CC})		3V to 15V
Supply voltage range (V_{EE})		0 to -10V
Max difference V_{DD}/V_{CC} to V_{EE}		15V
On resistance	5V	250
	10V	120
	15V	80
Matching of on resistances	5V	25
	10V	10
	15V	5
Leakage current any off channel	max	±0.01nA
Propagation delay in to out	5V	25ns
	10V	8ns
	15V	6ns
Max switch turn on delay	5V	300ns
	10V	120ns
	15V	80ns

Max switch turn off delay	5V	275ns
	10V	140ns
	15V	110ns
Sine wave distortion	10V	0.04%
Bandwidth	10V	55MHz
Max current through switch	5V	14.3mA
	10V	25mA
	15V	25mA
	V_{DD}/V_{CC} to V_{EE}	74HC4053
Supply voltage range (V_{DD}/V_{CC})		2V to 6V
Supply voltage range (V_{EE})		0V to -6V
Max difference V_{DD}/V_{CC} to V_{EE}		12V
On resistance	5V	40
	10V	30
Matching of on resistances	5V	10
	10V	5
Leakage current any off channel	max	20nA
Propagation delay in to out	5V	5ns
	10V	4ns
Max switch turn on delay	5V	18ns
	10V	16ns
Max switch turn off delay	5V	28ns
	10V	18ns
Bandwidth	10V	120MHz
Max current through switch	5V	25mA
	10V	25mA

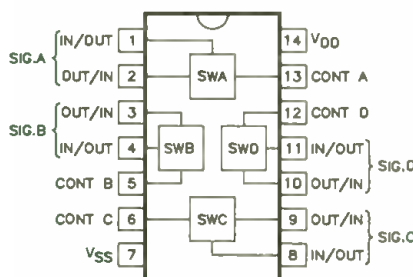
Also available in SMD: type HCF4053BM1 (AB53H) type M74HC4053M1 (AE64U)

M/HCF=ST

Order Code	Type	Price each
QW36P	HCF4053BEY	89p
AB53H	HCF4053BM1	64p
UF08J	M74HC4053B1R	£1.37
AE64U	M74HC4053M1R	£1.16

4-Pole 1-Way

Four separate bidirectional off/on switches in one package each with its own control input. A switch is off with its control wire at low level and on at high level. For analogue signals, V_{DD} and V_{SS} may be set at equal magnitudes up to $V_{DD} = +7.5V$, $V_{SS} = -7.5V$ for CMOS 'B' types and up to $\pm 6V$ for 74HC. Type '4066' has a lower 'on' resistance than '4016' type, but type '4016' is recommended for sample and hold circuits.



4016B, 74HC4016, 4066B, 74HC4066

CMOS 'B' Types

	V_{DD}	V_{SS}	4016	4066B
On resistance ($R_L = 10k$)	5V	0V	580Ω	250Ω
	5V	-5V	250Ω	120Ω
	2.5V	-2.5V	520Ω	250Ω
	7.5V	-7.5V	200Ω	80Ω
	10V	0V	250Ω	120Ω
	15V	0V	200Ω	80Ω
Matching of on resistances	5V	-5V	15Ω	10Ω
	7.5V	-7.5V	10Ω	5Ω
Leakage current any off channel	7.5V	-7.5V	±1.5nA	±0.01nA

Propagation delay in to out	5V	0V	15ns	20ns
	10V	0V	7ns	10ns
	15V	0V	6ns	7ns
Crosstalk between any 2 switches	5V	0V	-80dB @ 1MHz	-50dB @ 8MHz
Maximum control frequency	5V	0V	5MHz	6MHz
	10V	0V	10MHz	8MHz
	15V	0V	12MHz	8.5MHz
Max switch turn on/off delay	5V	0V	34ns	40ns
	10V	0V	20ns	35ns
	15V	0V	15ns	30ns
Sine wave distortion	5V	-5V	0.16%	0.1%
Bandwidth	5V	-5V	54MHz	65MHz
Max current through switch	5V	-5V	8mA	25mA
	7.5V	-7.5V	10mA	25mA
	10V	0V	8mA	25mA
	15V	0V	10mA	25mA
	5V	0V	3.2mA	14.3mA
	2.5V	-2.5V	3.3mA	14.3mA

Caution: Type 4016B does not include static protection circuitry on its inputs. Extreme care must be taken when handling this device.

74HC Types

V_{DD} to Gnd/V_{EE}	74HC4016	74HC4066
Supply voltage range (V_{CC} to Gnd)	2V to 12V	2V to 12V
On resistance		
2V	120Ω	200Ω
9V	35Ω	20Ω
12V	20Ω	15Ω
Matching of on resistances		
5V	10Ω	10Ω
9V	5Ω	5Ω
12V	5Ω	5Ω
Leakage current any off channel		
5V	10nA	10nA
9V	15nA	15nA
12V	20nA	20nA
Propagation delay in to out		
2V	25ns	25ns
5V	5ns	5ns
9V	4ns	4ns
12V	3ns	3ns
Max switch turn on delay		
2V	32ns	32ns
5V	8ns	8ns
9V	6ns	6ns
	5ns	5ns
Max switch turn off delay		
2V	45ns	45ns
5V	15ns	15ns
9V	10ns	10ns
12V	8ns	8ns
Bandwidth		
5V	100MHz	100MHz
9V	120MHz	120MHz
Max current through switch		
	25mA	25mA

Also available in SMD: type HCF4016BM1 (AB37S) type HCF4066BM1 (AB55K) type M74HC4066M1R (AE66W)

M/HCF=ST MC=MOT

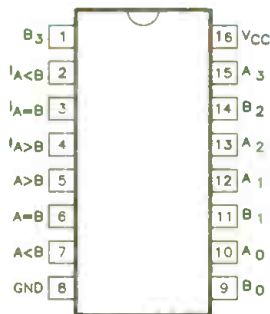
Order Code	Type	Price each
QX08J	HCF4016BEY	55p
AB37S	HCF4016BM1	42p
UB98G	MC74HC4016P	89p
QX23A	HCF4066BEY	65p
AB55K	HCF4066BM1	49p
UF10L	MC74HC4066P	89p
AE66W	M74HC4066M1R	49p

The abbreviations

FA-Fagor	SEM-Semelab
HIT-Hitachi	SIE-Siemens
ME-Micro Electronics	SLX-Siliconix
MOT-Motorola	ST-SGS-Thomson
NEC-NEC	TFK-Telefunken
NSC-National Semiconductor	Ti-Texas Instruments
PC-Philips	TOSH-Toshiba
	ZET-Zetex

SUBSECTION 43 COMPARATORS

4-Bit



74LS85,
4063BE

Four-bit magnitude comparators that determine whether the binary code on the four 'A' inputs is greater than, equal to, or smaller than the binary code on the four 'B' inputs. A separate output is available for each possible condition. Words of greater length may be compared by simply connecting the corresponding outputs on a stage handling less significant bits to the cascade inputs of the next stage handling more significant bits. The final output comes from the most significant comparator.

On the least significant comparator and where only one comparator is in use, the A=B cascade input must be connected to logic 1 and the other two cascade inputs to logic 0.

	74LS85
Propagation delay	
compare inputs to outputs	
low to high 5V	19ns
high to low 5V	15ns
cascade inputs to outputs	
low to high 5V	13ns
high to low 5V	11ns
Supply current avge	10.4mA

	4063B
Propagation delay	
compare inputs to outputs	
low to high 5V	625ns
10V	250ns
15V	175ns
high to low 5V	625ns
10V	250ns
15V	175ns
cascade inputs to outputs	
low to high 5V	500ns
10V	200ns
15V	140ns
high to low 5V	500ns
10V	200ns
15V	140ns

Also available in SMD: type HCF4063BM1 (AB01B)

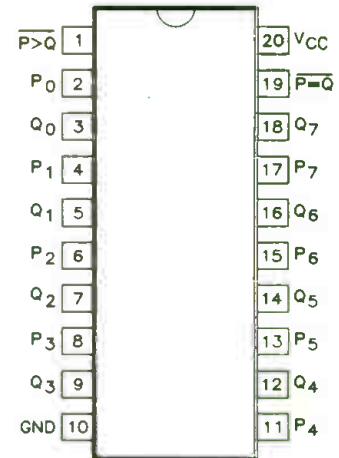
SN=Ti HCF=ST

Order Code	Type	Price each
YF35Q	SN74LS85N	85p
QW41U	HCF4063BEY	75p
AB01B	HCF4063BM1	62p

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Phone 01702 556751**

8-Bit

The 74LS688 can determine whether the binary code on the eight 'P' inputs is greater than, equal to, or less than the binary code on the eight 'Q' inputs, going low only when P=Q and with chip enable (pin 1) low.



74LS688

Propagation delay	
from P inputs to pin 19 low to high	12ns
high to low	17ns
to pin 1 low to high	-
from P inputs to pin 1 high to low	-
from Q inputs to pin 19 low to high	12ns
high to low	17ns
to pin 1 low to high	-
high to low	-
from pin 1 to pin 19 low to high	12ns
high to low	13ns
Supply current	40mA

SN=Ti

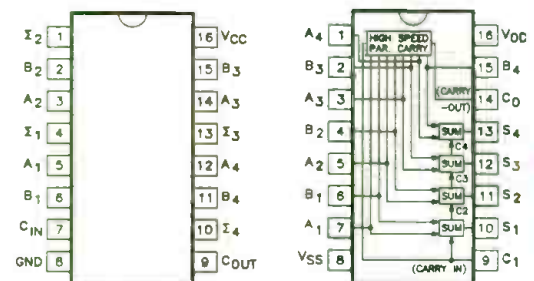
Order Code	Type	Price each
KP49D	SN74LS688N	£2.54

SUBSECTION 44 ARITHMETIC

4-Bit Full Adders

These devices will add together two four bit binary numbers and generate a carry if applicable. A fast internal look-ahead allows the carry to be generated very quickly keeping the total summing time relatively low even when large numbers of these devices are cascaded. To connect together, simply join the carry output of a stage handling less significant bits to the carry input of the next stage handling more significant bits. The carry input of the least significant device and where only one is in use, must be connected to logic 0.

	74LS283
Propagation delay carry in to	
sum out low to high 5V	16ns
high to low 5V	15ns
Propagation delay sum in to	
sum out low to high 5V	15ns
high to low 5V	15ns
Propagation delay carry in to	
carry out low to high 5V	11ns
high to low 5V	11ns
Propagation delay sum in to	
carry out low to high 5V	11ns
high to low 5V	12ns
Supply current avge	19mA



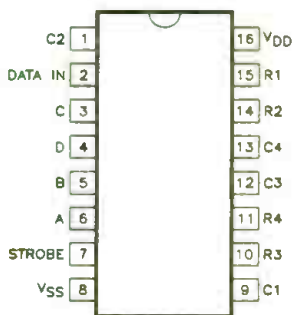
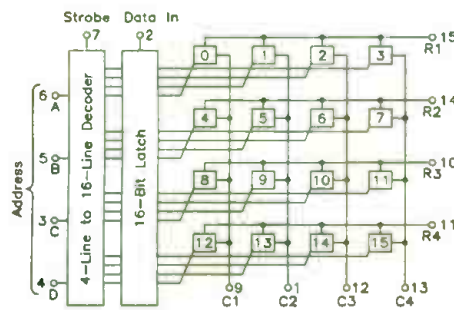
74LS283

4008B

Continued on next page.

Crosspoint MC145100 BCP Motorola

16 Crosspoint bi-directional switches organised in four rows and four columns. To turn a switch on or off, apply the appropriate code to address pins A, B, C, and D e.g. for switch 15, apply binary 15 where A is LSD and D is MSD. At the same time pulse 'strobe' high and if 'data in' is also high, the switch will turn on. If 'data in' is low the switch will turn off. In addition turning on one switch will automatically turn off all others in that row e.g. switching switch 5 on will turn off switches 4, 6 and 7. Analogue signals with peak-to-peak voltages up to the difference between V_{DD} and V_{SS} may be transmitted through the switches. For analogue signals it is usually preferable to make V_{DD} and V_{SS} equal magnitudes up to V_{DD} = +7.5V, V_{SS} = -7.5V.



145100B

	V _{DD}	145100B
On resistance	5V	250Ω
	10V	110Ω
	15V	85Ω
Matching of on resistances	5V	25Ω
	10V	15Ω
	15V	15Ω
Leakage current any off channel	15V	±0.4nA
Propagation delay in to out	5V	30ns
	10V	15ns
	15V	10ns
Crosstalk between any two switches @ 100Hz		-110dB
Sinewave distortion	10V	0.5%
Bandwidth	10V	15MHz
Max current through switch		25mA

MC=MOT

Order Code	Type	Price each
QQ51F	MC145100BCP	£1.85

Continued from previous page.

Propagation delay carry in to	4008B
sum out low to high 5V	370ns
10V	155ns
15V	115ns
high to low 5V	370ns
10V	155ns
15V	115ns
Propagation delay sum in to	
sum out low to high 5V	400ns
10V	160ns
15V	115ns
high to low 5V	400ns
10V	160ns
15V	115ns
Propagation delay carry in to	
carry out low to high 5V	100ns
10V	50ns
15V	40ns
high to low 5V	100ns
10V	50ns
15V	40ns
Propagation delay sum in to	
carry out low to high 5V	200ns
10V	90ns
15V	65ns
high to low 5V	200ns
10V	90ns
15V	65ns

HCF=ST SN=Ti

Order Code	Type	Price each
YH02C	SN74LS283N	78p
QW14Q	HCF4008BEY	89p

SUBSECTION 45 MULTIVIBRATORS

The table below shows the basic differences between the different types available.

	121	123	221	4047	4098	4538
Single	*			*		
Dual		*	*		*	*
Schmitt inputs	*		*			
Retriggerable		*		*	*	*
Precision pulse width						*
Basic type			121			4098

74 and 74LS Types

On types 74121 and 74LS221 external capacitance is limited to values between 10pF and 10µF or up to 1000µF if pulse cut-off is not critical. A1 and A2 (or A on '221') are negative-edge triggered logic inputs and will trigger the monostable when either or both go to logic 0 with B at logic 1. B is a positive Schmitt trigger input for slow edges or level detection and will trigger the monostable when it goes to logic 1 with A1, A2 at logic 0. With no external capacitor, and pin 9 connected to pin 14 ('121' only), pulse width is about 30ns. Instead a resistor in the range 1k4 to 40k (or 100k on LS221) may be connected between pin 11 and pin 14. Pulse width is equal to $0.695R_T C_T$, where R_T is in ohms and C_T in Farads. With electrolytic capacitors, connect the negative to C_{EXT} and positive to R_{EXT}/C_{EXT} . The resistor is connected between R_{EXT}/C_{EXT} and V_{CC} . On type '123' there is no restriction

CMOS Types

Type 4047B may be used in astable and monostable modes. To obtain the various functions available, make connections as follows:

Function	Connect these pins to V_{DD}	Connect these pins to V_{SS}	Connect input to	Output at pins	Output period or pulse width
Astable operation					
Free running	4,5,6,14	7,8,9,12		10,11,13	4.4RC secs
True gating	4,6,14	7,8,9,12	5	10,11,13	4.4RC secs
Complement gating	6,14	5,7,8,9,12	4	10,11,13	4.4RC secs
Monostable operation					
Pos-edge trigger	4,14	5,6,7,9,12	8	10,11	2.48RC secs
Neg-edge trigger	4,8,14	5,7,9,12	6	10,11	2.48RC secs
Retriggerable	4,14	5,6,7,8,9	12	10,11	2.48RC secs
External countdown*	14	5,6,7,8,9,12		10,11	2.48RC secs

*Connect the input pulse to reset on an external counting chip and the output of the counter to pin 4 on 4047B.

on external capacitance value and the external resistor can be between 5k and 50k (or 260k in LS types). Once triggered, the basic pulse width may be extended by retriggering at one of the inputs, or shortened by using the clear input. The pulse width is non-linear for values of C_{EXT} lower than 1000pF, but otherwise the pulse width for the '123' is as follows:

$$R_T C_T K(1 + (0.7/R_T))$$

here R_T is in ohms and C_T in Farads. When using electrolytic capacitors, a 1N4148 diode should be connected between R_{EXT}/C_{EXT} and the junction of the external resistor and capacitor, cathode to IC terminal. In this condition K is equal to 0.25 for 74123.

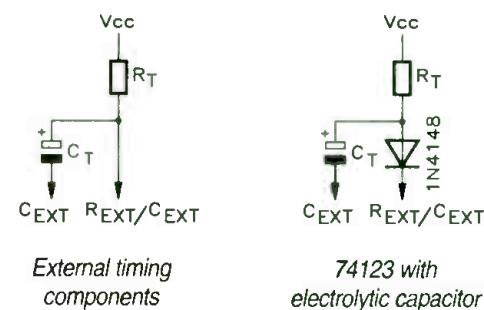
$$R_T C_T K$$

where R_T is in ohms and C_T in Farads. For 74LS123, K is determined from the graph in the next column.

	121	LS221
Propagation delay A to		
Q high to low	50ns	50ns
Q low to high	45ns	45ns
Propagation delay B to		
Q low to high	35ns	35ns
Q high to low	40ns	40ns
Duty cycle $R_T = 2k$	67%	50%
$R_T = \text{max}$	90%	90%
Supply current quiescent	13mA	4.7mA
triggered	23mA	19mA

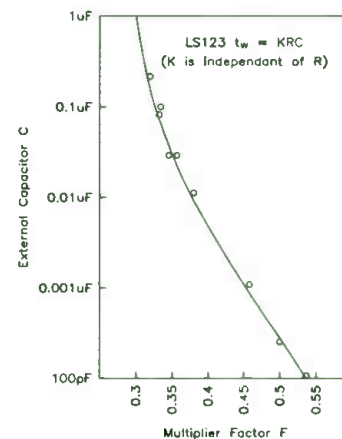
	LS123
Propagation delay A to	
Q low to high	23ns
Q high to low	32ns
Propagation delay B to	
Q low to high	23ns
Q high to low	34ns
Supply current quiescent	12mA
triggered	12mA

The C_{EXT} terminal must be connected to ground. A diode is not required when using electrolytic capacitors. These types must have a 0.0047F ceramic capacitor connected between V_{CC} and ground as close as possible to the IC.



External timing components

74123 with electrolytic capacitor



74LS123 Value of K

Frequency shown is available from pin 10 and its inversion on pin 11. In astable mode only, double the frequency of pin 10 is available at pin 13. R is any value between 10k and 1M and C is any practical value over 100pF for astable or 1000pF for monostable. Only non-polarised, low leakage capacitors are suitable. R is connected between pins 2 and 3, and C between pins 1 and 3. **Caution:** Pin 3 on this device does not have internal static protection circuitry. Extreme care must be taken when handling this device.

	5V	10V	15V
Propagation delay:			
pins 4, 5 to 13	200ns	100ns	80ns
pins 4, 5 to 10, 11	350ns	175ns	125ns
pins 6, 8 to 10, 11	500ns	225ns	150ns
pin 12 to 10, 11	300ns	150ns	100ns
pin 9 to 10, 11	250ns	100ns	70ns

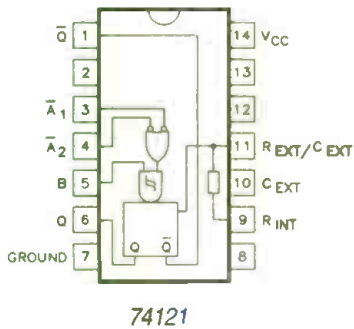
Type 4098B is a dual monostable multivibrator. To obtain the various functions available, make connections as shown in Table 1 below.

Table 1

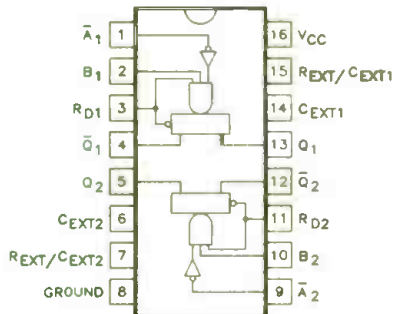
Function	Connect V_{DD} to pins		Connect V_{SS} to pins		Connect input pulse to		Also join together	
	Mono 1	Mono 2	Mono 1	Mono 2	Mono 1	Mono 2	Mono 1	Mono 2
Trigger on leading edge and retriggerable	3,5	11,13			4	12		
Trigger on leading edge and not retriggerable	3	13			4	12	5 to 7	11 to 9
Trigger on trailing edge and retriggerable	3	13	4	12	5	11		
Trigger on trailing edge and not retriggerable	3	13			5	11	4 to 6	12 to 10
One section unused: unused section	5	11	3,4	12,13				

V_{DD} must also be connected to pin 16 and V_{SS} to pin 8 for all applications.

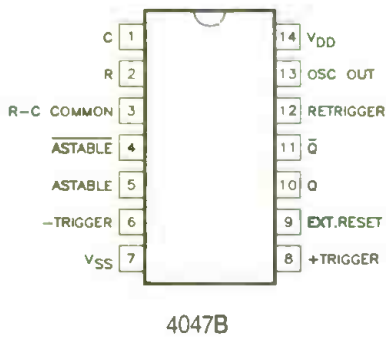
The output pulse width is equal to $R_x C_x / 2$ where R_x is any value between 5k and 10M (1M 4528BE) connected between pins 16 and 2 (14), and C_x is between 0.01 μ F and 100 μ F connected between pins 2 (14) and 1 (15). Capacitors between 10pF and 0.01 μ F may be used but the pulse width is non-linear in this area. Electrolytic capacitors are not recommended, but if used negative should be connected to pin 1 (15) and a 1N4148 connected in parallel with R_x , cathode to V_{DD} . A reset pin is provided to immediately terminate the pulse or prevent output pulses when power is first switched on.



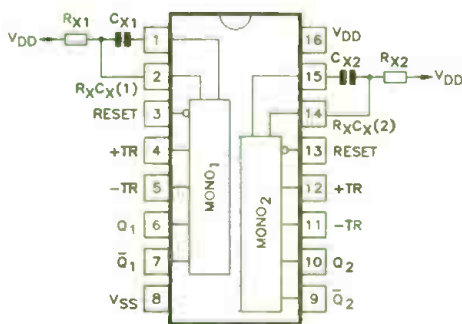
74121



74LS123, 74HC123, 74LS221, 74HC221



4047B



4098B, 74HC4538

Propagation delay trigger to output	5V	10V	15V
	250ns	125ns	100ns

4098BE is pin-for-pin compatible with type 4528BE in most applications.

74HC Types

The minimum external resistance is 1.4k, but there is no restriction on the maximum value. There is no restriction on capacitance value either, but with very large values over 1 μ F connect a diode in parallel with R_x , cathode to V_{CC} . The pulse width on types HC123 and HC221 is equal to $R_x C_x$ and on type HC4538 it is $0.7R_x C_x$.

Propagation delay:
trigger to Q
trigger to \bar{Q}

	HC123	HC221	HC4538
trigger to Q	22ns	22ns	23ns
trigger to \bar{Q}	25ns	25ns	26ns

Also available in SMD: type M74HC123M1R(AE44X)
type M74HC221M1R(AE52G)
type HCF4047BM1 (AB47B)
type HCF4098BM1 (AB09K)
type M74HC4538M1R (AE68Y)
type HCF4538BM1 (AB23A)

SN=Ti M/HCF=ST

Order Code	Type	Price each
QX73Q	SN74121N	£1.65
YF48C	SN74LS123N	72p
UB26D	M74HC123B1N	89p
AE44X	M74HC123M1R	69p
YF86T	SN74LS221N	86p
UB52G	M74HC221B1N	96p
AE52G	M74HC221M1R	69p
QX20W	HFC4047BEY	89p
AB47B	HCF4047BM1	69p
QX29G	HCF4098BEY	£1.12
AB09K	HCF4098BM1	64p
UF19V	M74HC4538B1N	£1.45
AB23A	HCF4538BM1	89p
AE68Y	M74HC4538M1R	79p

SUBSECTION 46 OSCILLATORS

74LS629

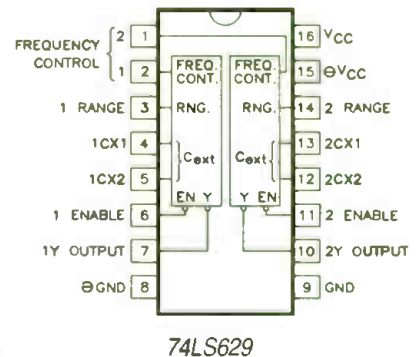
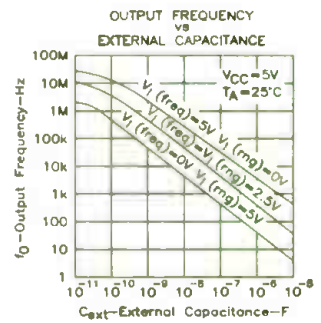
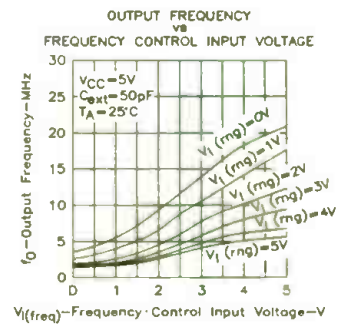
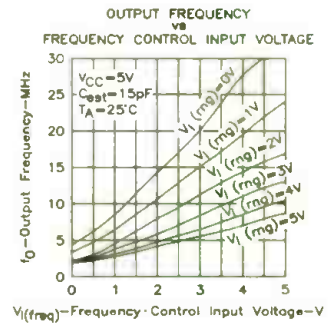
Two fully independent voltage controlled oscillators in a single package. Pins 15 and 16, and 8 and 9 may be connected together, but where high precision is required and always where frequencies over 10MHz are involved, pins 15 and 8 should be connected to a separate high stability supply. When the enable input is high, the oscillator is disabled. The output frequency is determined by the capacitor connected between pins 4 and 5 (12 and 13) and the voltage on pin 2 (1) and pin 3 (14). The smaller the voltage on 'range', the greater the frequency change when the voltage is varied on 'frequency'.

Output frequency (min)	1Hz
Output frequency (max)	20MHz
Supply current	35mA

The abbreviations

- FA-Fagor
- HIT-Hitachi
- ME-Micro Electronics
- MOT-Motorola
- NEC-NEC
- NSC-National Semiconductor
- PC-Philips
- SEM-Semelab
- SIE-Siemens
- SLX-Siliconix
- ST-SGS-Thomson
- TFK-Telefunken
- Ti-Texas Instruments
- TOSH-Toshiba
- ZET-Zetex

The graphs below allow selection of a suitable capacitor.



74LS629

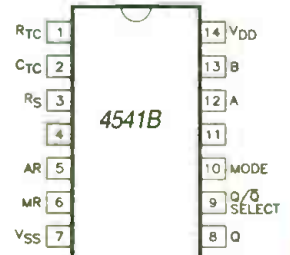
SN=Ti

Order Code	Type	Price each
WH02C	SN74LS629N	£3.25

HCF4541B

This chip comprises an oscillator and programmable divider. The oscillator frequency is determined by the RC network on pins 1, 2 and 3. $R_T C_T$ should be between 5k and 1M and R_S should be twice $R_T C_T$. $C_T C$ should be in the range 100pF to 0.1 μ F. All three components are connected to their appropriate pins and the other ends simply all connected together. The frequency is equal to $1/(2.3R_T C_T C)$ between 1kHz and 100kHz. A code set up on inputs A and B determines the division ratio of the counter stage as follows:

A	B	Count
0	0	8192
0	1	1024
1	0	256
1	1	65536



A 0 on pin 9 will set the output at 0 during reset or 1 if pin 9 is at 1. Pin 6 when set to 1, resets the counter regardless of counter state and the output goes to the

Continued on next page.

Continued from previous page.

condition set on pin 9. Set pin 6 to 0 for counting to commence. With pin 10 set to 1 the count is continuous, but with a 0 on pin 10, after one complete cycle on the output, the count will stop until pin 6 is pulsed. With a 0 on pin 5, the IC is reset when power is turned on, but if this is not required connect pin 5 to logic 1 for low power consumption. With pin 5 low, the supply current, which otherwise would be less than 15nA (quiescent), will be 30µA at 10V and 82µA at 15V (typical). An external frequency may be connected to pin 3 (and pins 1 and 2 left open) if desired.

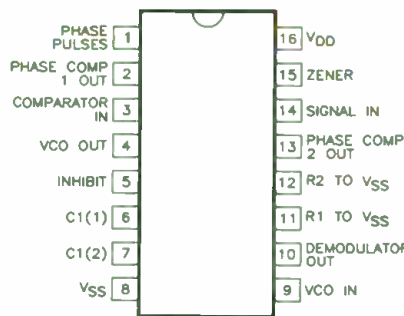
Propagation delay:	5V	10V	15V
clock to Q (-256)	3.5µs	1.25µs	0.9µs
clock to Q (-65536)	6µs	3.5µs	2.5µs

Also available in SMD: type HCF4541BM1 (AB24B)

HCF=ST

Order Code	Type	Price each
QQ47B	HCF4541BEY	£1.05
AB24B	HCF4541BM1	75p

SUBSECTION 47 PHASE LOCKED LOOPS



4046B,
74HC4046

The '4046' consists of a voltage controlled oscillator, source follower, two phase comparators having a common signal-input amplifier and a common comparator input, and a 5.2V zener diode for supply regulation if required. Resistor R1 connected between pin 11 and 8 and in the range 5k to 1M, and C1 connected between pins 6 and 7 and in the range 50pF to 0.01µF, together determine the frequency range of the VCO. R2 enables the VCO to have a frequency offset if required and is connected between pin 12 and 8 and is in the range 5k to 1M. The VCO frequency range as set by R1, R2 and C1 is as follows:

$$f_{\min} = 1/(R2(C1+32pF)) \text{ when VCO input} = V_{SS}$$

$$f_{\max} = (R1(C1+32pF))^{-1} + f_{\min} \text{ when VCO input} = V_{DD}$$

A low pass filter connected between comparator output (pin 2 or 13) determines the frequency capture range and because of the very high input impedance at pin 9 (19¹²Ω), the filter is simple to design. Connect R3 between pin 2 or 13 and 9 and C2 between pin 9 and 8. The frequency capture range (2f_c) is determined as follows:

$$2f_c = (1/\pi) \sqrt{((2\pi f_L)/(R3.C2))} \text{ where } 2f_L = f_{\max} - f_{\min}$$

In order not to load the low-pass filter, a source follower output of the VCO is available at pin 10. If in use connect a load resistor of 10k or more between pin 10 and 8. The VCO can be connected directly or via frequency dividers to the comparator inputs. A logic 0 on pin 5 enables the VCO and source follower, while a logic 1 turns off both to minimise stand-by power consumption.

4046B*

	5V	10V	15V
Phase comparators:			
Input resistance pin 14	2MΩ	0.4MΩ	0.2MΩ
Input sensitivity peak-to-peak	200mV	400mV	700mV
VCO			
Max frequency (R1 = 5k, C1 = 50pF)	0.8MHz	1.4MHz	2.4MHz
Frequency stability	0.12%/°C	0.04%/°C	
0.015%/°C			
Linearity	1%	1%	1%
Output duty cycle	50%	50%	50%
Source follower			
Offset voltage	1.8V	1.8V	1.8V

*The max frequency for the 74HC4046 is typically 15MHz.

HCF=ST PC= Philips

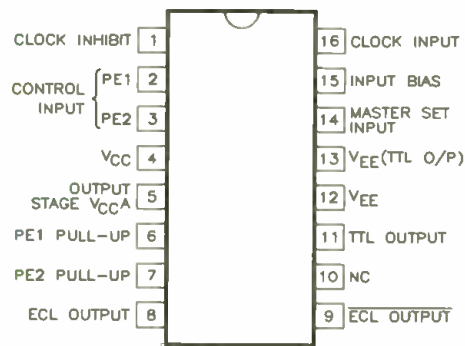
Order Code	Type	Price each
QW32K	HCF4046BEY	£1.10
UF03D	PC74HC4046P	£2.95

SUBSECTION 48 TIMER/COUNTER ICs

SP8680BDG 600MHz Counter Divider

GEC-Plessey

An ECL counter with both ECL 10k and TTL compatible outputs. The IC can operate from ECL or TTL supplies and can divide by 10 or 11. The counter will divide by 10 when either pin 2 or 3 are high and by 11 when both pins are low. A high on pin 14 sets all outputs high and a high on pin 1 holds the current output state. The counter will typically operate up to around 650MHz.



8680

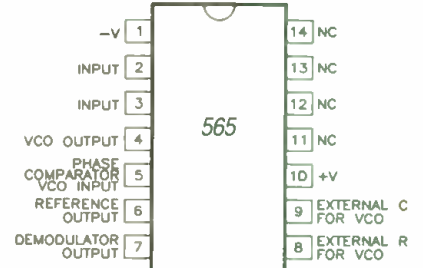
Characteristics

Supply voltage:	5V
Power consumption:	420mW
Max frequency sinewave input:	575MHz
Power supply current inc. TTL stage (max):	111mA
TTL output high voltage:	>2.3V
TTL output low voltage:	<0.5V
Input high voltage pins 2 and 3:	>3.9V
Input low voltage pins 2 and 3:	<3.5V

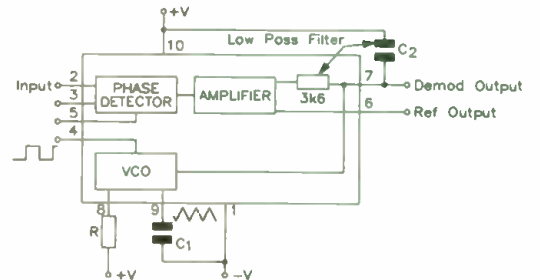
Order Code	Type	Price each
QY18U	SP8680BDG	£11.00

LM565N Phase Locked Loop National Semiconductor

A 14-pin DIL IC containing a voltage controlled oscillator, phase detector and amplifier. The IC is very stable typically 200ppm/°C with high linearity: 0.2% and only 100ppm/% frequency drift with change of supply voltage which can be between ±5V and ±12V. Centre frequency set by resistor between pin 8 and V⁻ and capacitor between pin 9 and V⁻ is f = 1.2/4RC where R is in ohms. C is in Farads and f is in Hz. There is a TTL compatible square wave output, a very linear triangular wave output and a reference output for addition of comparator or frequency discriminator. Bandpass is adjustable from <±1% to >±60% and centre frequency is adjustable over a 10 to 1 range



The frequency range is 0.001Hz to 500kHz.



with the same capacitor. Applications include frequency shift keying, modems, tone decoders, wideband FM discriminators, data synchronisers, tracking filters, signal restoration and frequency multiplication and division. The lock range will be ±8f_o/V_{CC} Hz where V_{CC} is the total supply voltage (i.e. if V⁺ is +6, V⁻ is -6 then V_{CC} = 12V).

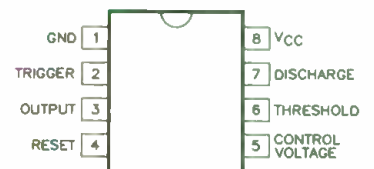
$$\text{Capture range} = \pm \left(\frac{1}{2\pi} \sqrt{\frac{2\pi f_L}{\tau}} \right)$$

where f_L is the lock range and τ = 3600C₂ where C₂ is the capacitor between pin 7 and V⁺ in Farads.

Order Code	Type	Price each
WQ56L	LM565N	£2.49

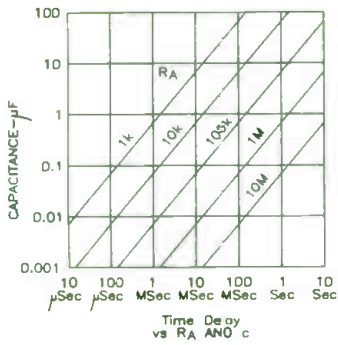
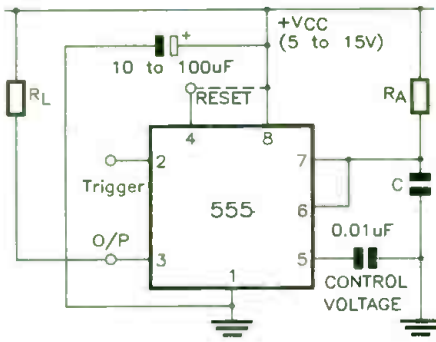
NE555N Timer

SGS-Thomson



The 555 is a highly stable device for generating accurate time delays or oscillation. Additional terminals are provided for triggering or resetting if desired. In the time delay (monostable) mode of operation the time is precisely controlled by one external resistor and one capacitor. For stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms and the output structure can source or sink up to 200mA or drive TTL directly. This IC may also be correctly supplied marked as MC1455PI. Supply decoupling must be provided close to the IC to counter the 'crowbar' effect of the device's internal discharge switch, a suitable value is 10 to 100µF as shown in the accompanying diagrams.

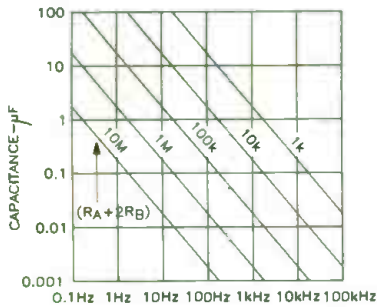
Monostable Mode



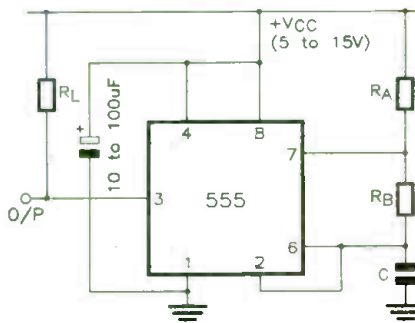
Time Delay vs RA and C

On time after triggering (i.e. applying a voltage to pin 2 less than 1/3 supply voltage) is equal to 1.1RA.C. The load may be connected to VCC for normally-on operation or between pin 3 and ground for normally-off. Connecting reset to ground during on time, drives the output low until a new trigger pulse occurs. Additional trigger pulses during on time have no effect. If reset is not being used, connect it to VCC.

Astable Mode (Oscillator)



Free Running Frequency vs RA, RB and C



The frequency is equal to $1.44/[(R_A + 2R_B)C]$. The charge time (output high) is given by $t_1 = 0.693(R_A + R_B)C$ and the discharge time (output low) is given by $t_2 = 0.693(R_B)C$.

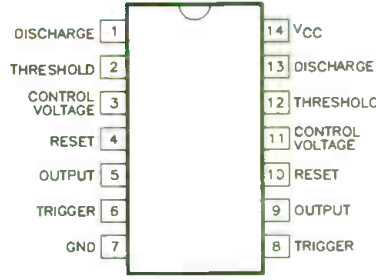
Characteristics (typical)

- Supply voltage: 4.5V (min), 16V (max)
- Supply current: 3mA (VCC = 5V), 10mA (VCC = 15V)
- Threshold voltage: VCC x 0.667
- Trigger voltage: 5V (VCC = 15V), 1.67V (VCC = 5V)
- Trigger current: 0.5uA
- Threshold current: 0.1uA
- Control voltage level: 10V (VCC = 15V), 3.33V

Order Code	Type	Price each
QH66W	NE555N	44p

NE556N Dual Timer

SGS-Thomson



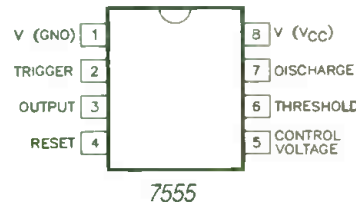
The 556 is a single 14-pin DIL package containing two 555 timers.

Order Code	Type	Price each
QH67X	NE556N	60p

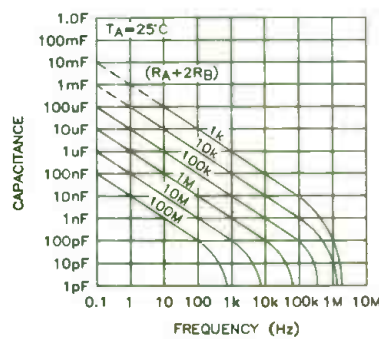
ICM7555IPA Low Power Timer

Harris

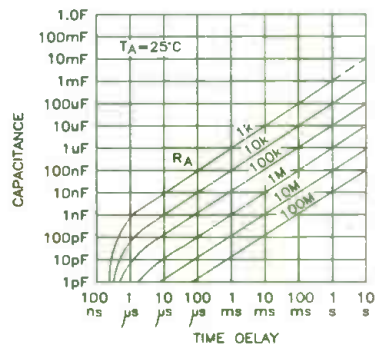
A low power timer designated 7555 is a direct pin-for-pin replacement for the 555 bipolar timer, but requires only around a hundredth of the supply current required by the 555. The CMOS device has extremely low trigger threshold and reset currents – typically 10nA; a very wide supply voltage range from 2V to 18V and the reset does not crowbar the supply during output transitions. The device can operate from microseconds up to several hours. The output can drive at least two standard TTL and CMOS and all inputs and outputs are fully protected against static discharge and no special handling is required at all. Supply decoupling is normally not required close to the IC unlike the 555, nor is the control voltage decoupling capacitor usually required as it is with the 555, thus there is a saving in external components. To keep the total power supply requirements low, choose high values for RA and RB and low values for C which should be a low leakage type and not ceramic.



Free running frequency as a function of RA, RB and C.



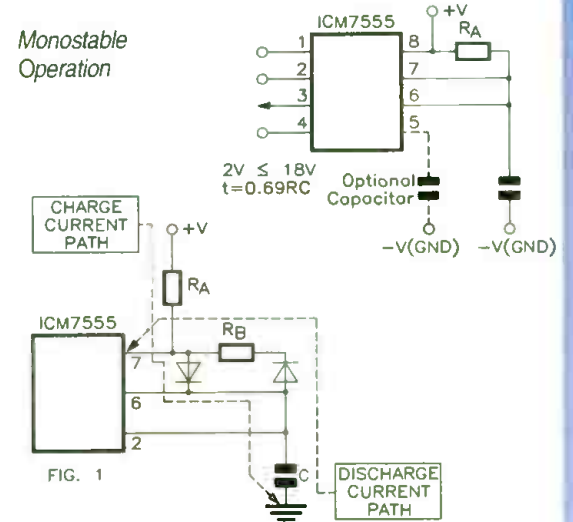
Time delay in the monostable mode as a function of RA and C.



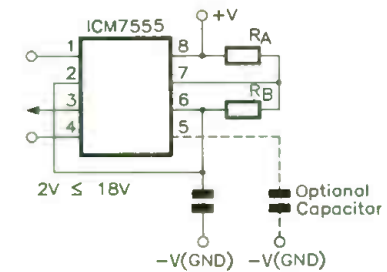
Specification

- Supply voltage: Minimum 2V, maximum 18V
- Supply current: 60uA typical
- Threshold current: 10nA at V+ = 15V
- Max frequency in astable mode: At least 500kHz
- Trigger current: 10nA at V+ = 15V
- Reset current: 10nA at V+ = 15V
- Reset voltage: +0.4V to 1.0V
- Temperature stability: 50ppm/°C at 25°C
- Output sink current: 100mA max at V- = 18V

Monostable Operation



Astable Operation



In astable mode the frequency of operation is given by: $f = 1.46/[(R_A + 2R_B)C]$ Hz.

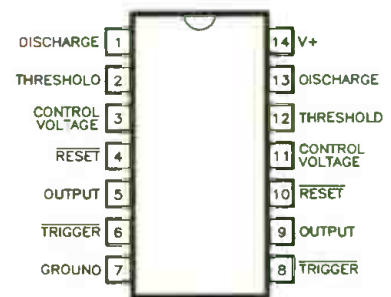
Fig. 1 shows how to achieve duty cycles of 50% and less. In a monostable mode the period time is given by:

$t = 0.69RC$ sec.
(In both equations R is in ohms and C is in Farads.)

Order Code	Type	Price each
YH63T	ICM7555IPA	80p

ICM7556IPD

Harris



A single 14-pin DIL package containing two 7555 timers. The IC is pin-for-pin compatible with 555 timers.

Order Code	Type	Price each
CP96E	ICM7556IPD	£1.38

TS555CN Low Power Timer

SGS-Thomson

A low-power pin-for-pin replacement for the 555, but requiring only about one fiftieth of the supply current. The device has extremely low trigger, threshold and reset current, typically 20pA, and a very wide supply voltage range 2V to 18V. Supply decoupling close to the device is not required. The outputs are fully CMOS, TTL and MOS compatible. Choose high values for timing resistors to keep supply currents low and low values for capacitance which should be low leakage types, not ceramic.

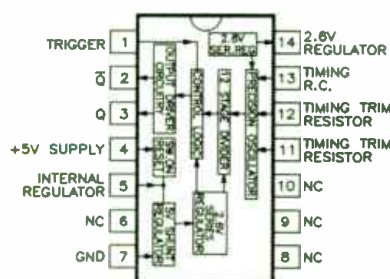
Specification

Supply voltage:	2V to 18V
Supply current:	170µA at 5V, 360µA at 15V
Threshold current	
($V_{DD} = 5V$):	10pA
Trigger current	
($V_{DD} = 5V$):	10pA
Reset current	
($V_{DD} = 5V$):	±10pA
Reset voltage level:	0.7V
Output sink current:	100mA max
Output source current:	10mA max
Max frequency in astable mode:	2.1MHz

Order Code	Type	Price each
RA76H	TS555CN	99p

ZN1034E Precision Counter Timer

GEC-Plessey



ZN1034E

A precision timer which with the addition of suitable resistors and capacitors can generate time periods from 16ms to several days. For periods of 2 seconds and greater, the timing components R_T and C_T can be determined from the equation $T = C_T \cdot R_T$, where $R_T > 12k\Omega$ and $C_T > 33nF$ and $K = 2800$. R_T is connected between pin 13 and 14 and C_T between pins 13 and 7. A trim pot may be connected between pins 11 and 12 (typical values 50k to 500k) to provide a fine adjustment though this will affect the timing constant e.g. for $R_{TRIM} = 50k$, K becomes 3700.

Characteristics (typical)

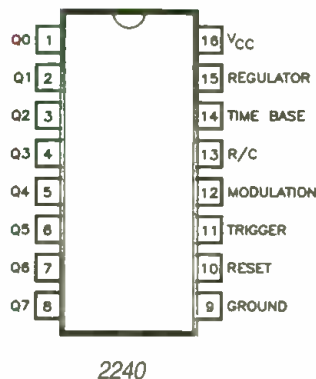
Timing resistor	3k3 to 5MΩ
Timing capacitor	>1nF
Trim range	±50% ($R_{TRIM} = 0$ to 500k) ±25% ($R_{TRIM} = 0$ to 100k) ±12% ($R_{TRIM} = 0$ to 50k)

Supply voltage	5V
Supply current	3.5mA
Reference voltage	2.6V
Output voltage high	3.6V at 25mA (max current)

Order Code	Type	Price each
UF32K	ZN1034E	£2.84

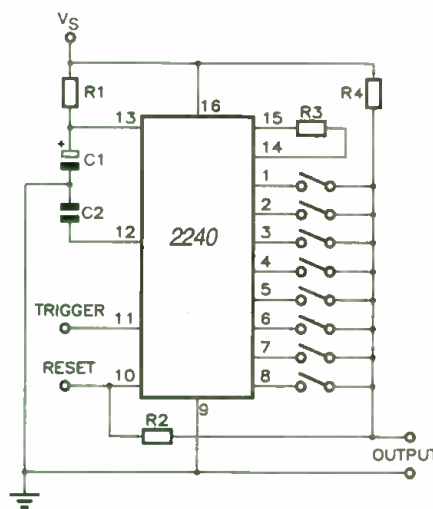
µA2240CN Programmable Timer/Counter

Texas Instruments



2240

The IC comprises a time-base oscillator, 8-bit counter, trigger and reset controls, and a voltage regulator. The frequency of the time-base oscillator is set by an external resistor and capacitor where $t = CR$ seconds and C is in farads and R is in ohms. The oscillation can be synchronised or modulated by signals applied to pin 12. For example, the open circuit voltage at pin 12 is around $0.7 \times V_S$; if a voltage of around $0.95 \times V_S$ is applied to pin 12, the frequency will double. The time-base output is internally connected to the counter input. The counter can be used separately by applying the input to pin 14 (in the application circuit R3 will not be needed) and stopping the time-base oscillator running by connecting V_S to pin 15 instead of pin 16. (R1 and C1 not used). Reset stops the oscillator and sets pins 1 to 8 and 14 to a high level. Trigger restarts the oscillator and is then inoperative until after another reset. Each stage of the counter is a square wave, half the frequency of the previous stage (pin 1 is first and pin 8 last). Two or more of the outputs can be connected together to generate complex pulse patterns or all used separately to provide eight output frequencies. Accurate timing is available from microseconds to days and with two ICs cascaded, precise time delays up to three years are possible. If V_S is over 7V and $C1$ less than $0.1\mu F$, connect a Ceramic 330pF between pin 14 and ground to ensure reliable operation of the first counter. If the supply voltage is less than 4.5V, pins 15 and 16 should be shorted together.



Specification (typical $V_S = 5V, 25^\circ C$)

Supply voltage:	4V to 14V
Timing resistor (R1):	1kΩ to 10MΩ
Timing capacitor (C1):	0.01µF to 1000µF
Counter input frequency:	1.5MHz
Pins 10,11 input pulse:	>3V
Pins 10,11 input pulse length:	>2µs
External clock input pulse:	>3V
External clock pulse length:	>1µs
Regulator output (pin 15):	4.4V
Temperature coefficient of time-base period:	-200ppm/°C

Parts List

R1	As required	
R2	Min Res 47kΩ	(M47K)
R3	Min Res 20kΩ	(M20K)
R4	Min Res 10kΩ	(M10K)
C1	As required	
C2	Minidisc 0.1µF	(YR75S)

Order Code	Type	Price each
CP99H	µA2240CN	£2.99

NE566N Function Generator

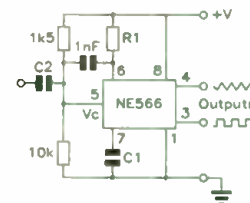
Signetics

Features

- ★ Wide range of operating voltage (10 to 24V or ±5V to ±12V)
- ★ Very high linearity of modulation
- ★ Extremely stable frequency (200ppm/°C typical)
- ★ Highly linear triangle wave output
- ★ High accuracy square wave output
- ★ Frequency determined by resistor, capacitor, voltage or current
- ★ Frequency adjustable over 10 to 1 range with same capacitor

Applications

- ★ Tone generators
- ★ Frequency shift keying
- ★ FM modulators
- ★ Clock generators
- ★ Signal generators
- ★ Function generators



566

The control voltage V_C must be between $\frac{3}{4}V^+$ and V^+ . The modulating signal should be applied to pin 5 via a suitable capacitor $C2$ or directly if the bias voltage remains within the limits. The frequency is given by:

$$f = \frac{2[(V^+) - (V_C)]}{R1 \cdot C1 \cdot V^+}$$

and $R1$ should be in the range 2k to 20k.

Order Code	Type	Price each
QH68Y	NE566N	£1.39

LM567CN Tone Decoder/Phase Locked Loop

National Semiconductor

Features

- ★ Wide frequency range (0.01Hz to 500kHz)
- ★ High stability of centre frequency
- ★ Independently controllable bandwidth (0 to 14%)
- ★ High out-band signal and noise rejection
- ★ Logic compatible output with 100mA current sinking capability
- ★ Inherent immunity to false signals
- ★ Frequency adjustment over a 20 to 1 range with an external resistor

Applications

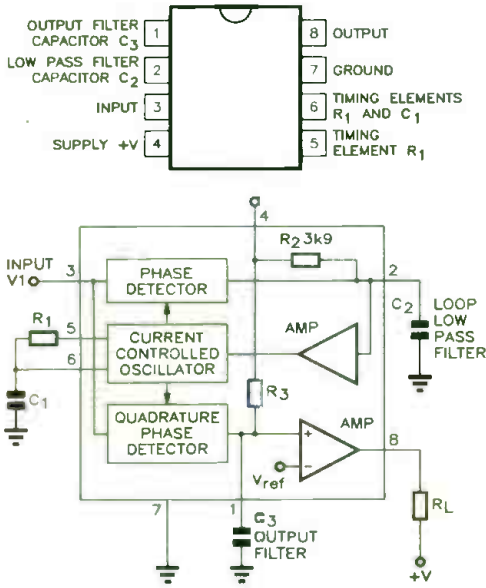
- ★ Carrier current remote controls
- ★ Ultrasonic controls (remote TV etc.)
- ★ Communications paging
- ★ Frequency monitoring and control
- ★ Wireless intercom
- ★ Precision oscillator

Characteristics

Max operating voltage: 10V
 Positive voltage at input: 0.5V above supply
 Negative voltage at input: -10V DC
 Output voltage: 15V DC
 Operating voltage range: 7mA (12mA activated)

Design Formulae

$f_0 = 1.1/R_1.C_1$ where R_1 is between 2k Ω and 20k Ω and f_0 is the centre frequency.
 Bandwidth = $1070\sqrt{V_i/f_0.C_2}$ where V_i is the input rms voltage. $C_3 = 2(C_2)$.

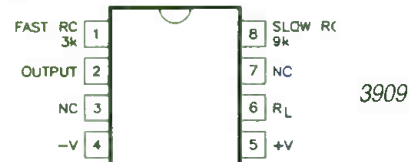


Order Code	Type	Price each
QH69A	LM567CN	£1.75

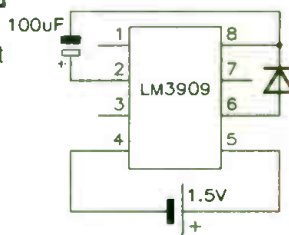
LM3909N LED Flasher/Oscillator

National Semiconductor

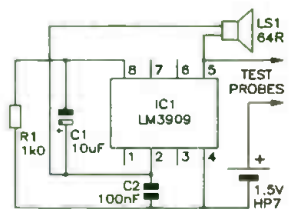
With the addition of a 1.5V battery and capacitor this IC will deliver pulses of over 2V to an LED to flash it brightly, with a current drain of less than 0.5mA. It has a powerful output and can directly drive an 8 Ω speaker. Applications include flasher to locate torch



or boat mooring floats at night, sales and advertising gimmicks, emergency locators for 1.4V to 200V (see data sheet).



In this circuit there is an audible difference between short circuits, coils and resistances of a few ohms etc.



Continuity Tester

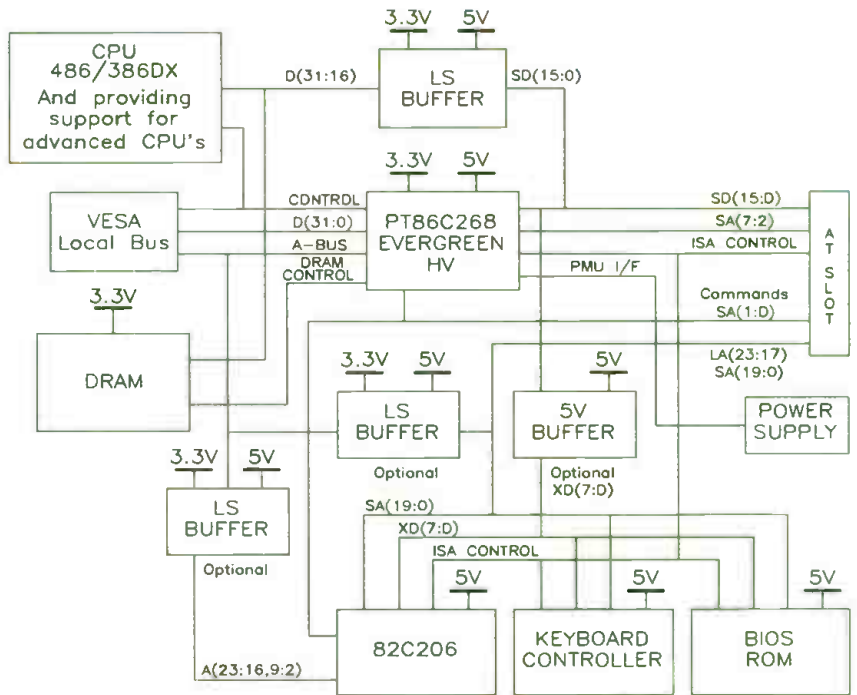
Parts List		
R1	Min Res 1k	(M1K)
C1	Minelect 10 μ F 16V	(YY34M)
C2	Minidisc 0.1 μ F	(YR755)
IC1	LM3909	(WQ39N)
LS1	Hi-Z L/S 64 Ω	(WB04E)
1	HP7 Battery Holder	(JY63T)
1 pair	Test Probes	(YR59P) (FK32K)

Order Code	Type	Price each
WQ39N	LM3909N	£2.49

SUBSECTION 49 MICROPROCESSORS, MICROCOMPUTER AND SUPPORT ICs

PT86C268

Picopower



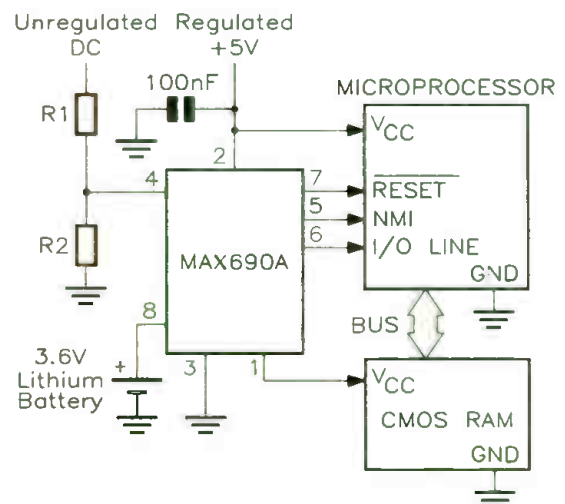
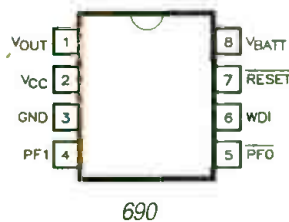
The PT86C268 is a high performance, highly integrated single core chip with active power management for portable and notebook PCs. A system using this can support a 386DX, 486 or future CPUs planned by AMD, IBM, Intel or Cyrix. It also supports system speeds up to 33MHz. The design integrates battery and power management providing 3.3/5V hybrid or pure 3.3 or 5V system design with a proprietary, open-loop heat regulator circuit to provide extended battery life and to prevent heat build-up. The active power management modes supported by the device allow power reduction while the system is in full operation, featuring fine grain 'Power On Demand' to supply

power only when required by the CPU. This device's support of future processors enhances system power management. The PT86C268 supports advanced 32-bit CPUs including the 386DX, 486DX, 486DX2, 486DLC, and S-Series M6 to 33MHz, has an advanced burst/page mode DRAM controller and a VESA local bus. Design application draft is also available separately.

Order Code	Type	Price each
AJ63T	PT86C268	£59.99
AJ64U	Design Info PT86C268	£2.50 NV

MAX690A Microprocessor Supervisor

Maxim



The MAX690A reduces the complexity and number of components required for power-supply monitoring and battery-control functions in microprocessor systems. Significantly improves system reliability and accuracy compared to an arrangement of separate ICs and discrete components. The chip performs four basic functions: it generates a RESET output during power-up for the CPU, and also during power-down and 'brown-out' conditions. This is complemented by a 1.25V threshold detector or Power Failure Input (PFI) for low battery detection, or to monitor a power supply other than +5V. It also handles all battery back-up switching for CMOS RAM and will trickle charge the back-up battery during normal power-up time. In addition a RESET pulse will be generated by a 'watchdog' timer if the WDI input has not been toggled within 1.6 seconds. In

the application shown above this is used to monitor the I/O line to ensure that normal processor activity is happening; if the processor should hang up or its software crash, then it will automatically be re-booted from start by the MAX690A. Also in the example shown the PFI is used to monitor the unregulated supply and generate an NMI upon power failure; this interrupt could be used to initiate data-preserving software. To conserve battery power, the power failure detector is turned off and PFO is forced low when V_{BATT} connects to V_{CC} . The device is encapsulated in an 8-pin DIL package and replaces several chips which together, serve supply monitoring and memory back-up functions very simply, with the absolute minimum number of additional external components.

Continued on next page.

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Specification

Operating voltage,	
V_{CC} :	1.0V min., 5.5V max.
V_{BATT} :	1.0V min., 5.5V max.
Supply current	
Run mode:	200 μ A
Battery back-up mode:	0.05 μ A
V_{OUT} voltage drop	
Run mode:	$V_{CC} - 0.25V @ 50mA$
Battery back-up mode:	$V_{BATT} - 0.02V @ 250\mu A$
Absolute maximum	
V_{OUT} current	
Run mode:	250mA
Battery back-up mode:	50mA
Current sink, RESET, PFO:	3.2mA typical, 20mA absolute max. ($I_{SOURCE} = 800\mu A @ V_{CC} = 1.5V$)

Order Code	Type	Price each
GX05F	MAX690ACPA	£5.49

Micromaster 1000 & 1000/E PC Based Programmers

NEW

ICE Technology

- ★ Program EPROMs, micros, programmable logic, etc.
- ★ Connects directly via the parallel printer port
- ★ Built-in chip tester
- ★ Full menu-driven software
- ★ EMS software
- ★ Additional micro-controllers available as standard
- ★ Programs over 80 different micro-controllers without adaptors
- ★ Allows programming of large devices in one pass



The Micromaster 1000 & 1000/E are extremely versatile development tools, designed and developed in the UK with the design engineer in mind. They offer all the facilities of truly universal programmers, each in a self-contained unit.

Programming features

Extremely fast programming times using manufacturer's approved algorithms. All chip insertion and removal via ZIF (Zero Insertion Force) sockets. Auto-program command performs test, chip erase (where applicable), program and verify all in a single keystroke. Actions can be repeated with a single keystroke. JEDEC test vectors can be edited or created and applied to the chip. Test vectors are applied automatically during programming if they are present. Also support is provided for security features of devices including checking security status, verifying

encryption and programming lock bits. Failsafe checks are performed to ensure that device selection and position in the socket are correct, preventing damage to chips. Supports on-chip features like oscillator type selection and watchdog timer settings on PIC and similar devices.

Comprehensive device coverage

Covers EPROMs, PROMs, EEPROMs, Flash EPROMs, NVRAMs, Micro-controllers, PALs, GALs, PEELs, PLUS, PLS, EPLDs, MACHs, MAX, MAPLs, etc. Also programs over 80 different types of micro-controller including their custom options.

Fast, unrivalled operation

Extremely fast programming of devices, with manufacturer's approved programming algorithms, including chip insertion and power test, download, bit test, program and verify. Below are programming times for the Micromaster 1000/E programmer.

Type	No. of bytes	Pulse width	
		100ms	500ms
2764	8k	2s	5s
27256	32k	5s	20s
27512	64k	11s	38s
27010	128k	21s	1m20s
27020	256k	41s	2m30s
27040	512k	1m21s	5m
27080	1M	2m42s	10m

In addition to all of these features the Micromaster 1000/E has a built-in ROM/RAM emulator to allow the user to read and write to an imaginary device without the need for its presence. Emulation also allows fast interaction between the imaginary device and the PC, allowing firmware to be created in a fraction of the time normally necessary.

Physical Characteristics

Dimensions:	40 x 210 x 130mm (H x W x D)
Power supply:	Mains adaptor supplied. Input 240V AC.
Connection to PC:	25-way M-M parallel cable supplied. Operates from any standard IBM parallel port.
Software:	Supplied with programmer and emulator (1000/E). Runs on any IBM PC under DOS or Windows 3.1.

Order Code	Type	Price each
AD95D	MICROMASTER 1000	£725.00
AD96E	MICROMASTER 1000E	£799.99

MAX1232CPA Microprocessor Monitor

Maxim

NEW

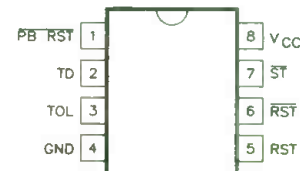
An 8-pin DIP packaged microprocessor supervisory IC, used for power supply monitoring and housekeeping functions. Whenever the power supply falls below either 5% or 10% (programmable), software execution ceases or manual reset is performed, and the IC sends a reset pulse of at least 250ms duration, for processor reset. The watchdog timer can be set for timeouts of 150ms, 600ms or 1-2s. Whenever one of these conditions holds true the reset lines are held active for at least 250ms. Applications include computers, controllers, intelligent instruments, automotive systems and critical microprocessor power monitoring.

Specification

Supply voltage, V_{CC} :	4.5V to 5.5V, 5V typ
Input high-level, V_{IH} :	2V to $V_{CC} + 0.3V$ max
Input low-level, V_{IL} :	-0.3V to 0.8V
Output current RST, I_{OH} :	1mA min, 12mA typ
Operating current, I_{CC} :	50 μ A to 200 μ A max
V_{CC} 5% trip point, V_{CCTP} :	4.50V to 4.74V, 4.74V typ
V_{CC} 10% trip point, V_{CCTP} :	4.25V to 4.49V, 4.37V typ

Note that the active low reset pin is internally pulled up to V_{CC} with an internal impedance of typically 40k Ω . The active low push-button reset must be held

low for longer than 20ms to guarantee a reset. Tolerance is set by grounding the TOL pin for 5% or connecting it to V_{CC} for 10%. Similarly the watchdog timer is set to 150ms by connecting the TD pin to ground, 600ms by leaving it floating or 1-2s by tying it to V_{CC} . Software strobes are applied to the active low ST pin.



1232

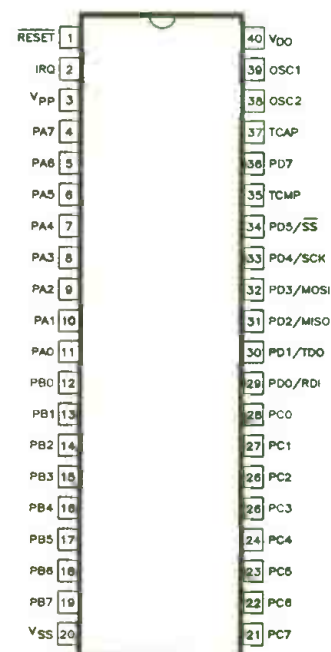
Order Code	Type	Price each
AD97F	MAX1232CPA	£2.59

MC68HC705C8P

Microcontroller Unit

Motorola

The MC68HC705C8P microcontroller unit is a member of the M68HC05 family built in HCMOS and contains its own OTP/programmable read-only memory (EPROM) and data RAM. This amazing, high performance, low-power MCU also has parallel I/O capability with individual pins programmable as either input or output. Basic features include an on-chip oscillator which only requires the addition of an external crystal or ceramic resonator or external clock signal, memory mapped I/O, selectable memory configurations, a watchdog timer for detecting MPU hang-ups or crashes, a clock monitor, a total of 24 bi-directional I/O lines and 7 input only lines, a serial communications interface, serial peripheral interface, boot-strap capability, power saving STOP, WAIT and data retention modes, software programmable external interrupt sensitivity, and a single supply requirement ranging from 3 to 5.5V.



68HC705

The 24 I/O lines are organised into three 8-bit ports (A, B, C) where any pin is programmable as either an input or an output under software control, while port D is a fixed input port of 7 input only lines (PD0 to PD5, PD7) that monitors the external pins whenever the serial port is disabled. The serial port also uses the port D pins for its functions.

The MCU is capable of addressing 8192 bytes of memory and I/O registers. The locations consist of user programmable read-only memory (EPROM), user RAM, boot-strap ROM, control registers and

I/O. The 12 user defined reset and interrupt vectors are located at the top of the boot ROM area. The shared stack area can be 64 bytes deep, and the memory map as a whole can be configured 4 different ways through altering the option register. The boot-up default is option 0, offering 176 RAM bytes and 7744 ROM bytes. RAM can be extended up to 304 bytes, versus 7600 ROM bytes in option 3. CPU registers provided are an accumulator, index X, program counter, and stack pointer registers, and a Condition Code Register (CCR) containing the half-carry, carry/borrow, interrupt, negative and zero flags. The MCU can be reset in one of four ways: internally by power-up; by an external, active-low RESET input; a COP ('Computer Operating Properly') watch-dog timer time-out condition, or an internal clock monitor reset condition. There are five sources of interrupt including IRQ and external interrupts have priority over internal ones. There are also three low power modes; STOP which places the MCU in its lowest power consumption mode; WAIT, where all CPU activity is suspended but the timer, SCI or SPI or interrupts can cause the MCU to exit; and data retention mode. There is a timer comprising a 16-bit, free-running counter driven by a fixed divide-by-four prescaler which can be used for many purposes. Other useful features include timer output compare input capture registers. The full-duplex, asynchronous serial communications interface has a standard Non-Return to Zero (NRZ) format and a variety of 32 different baud rates. A serial peripheral interface is implemented in the MCU allowing several MCUs or MCUs with peripherals to be interconnected within the same system.

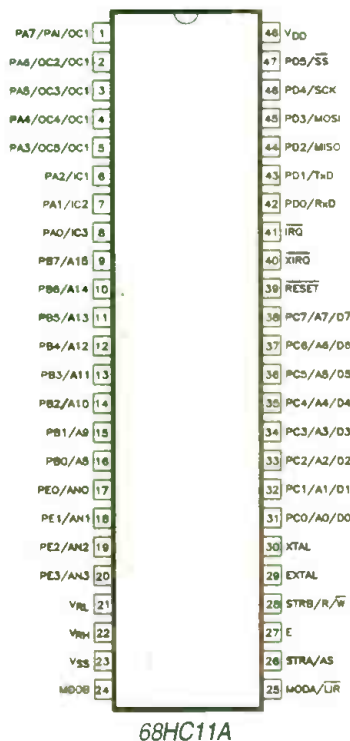
The MC68HC705C8 has a vocabulary of 64 instructions and a total of 16 addressing modes; many of these are similar or identical to existing 68XX/65XX instructions. The MPU is encapsulated in a 40-pin DIL package, and has an operating temperature range of 0 to 70°C and runs from a single 5V supply.

Order Code	Type	Price each
GX24B	MC68HC705C8P	£17.99

MC68HC11A1P 8-Bit Microcontroller

Motorola

The MC68HC11A1P is a high performance microcontroller unit based on the M68HC11 family. This high-speed, low power consumption chip has



68HC11A

multiplexed buses and a fully static design. It can operate at frequencies from 3MHz down to DC. The device includes power saving 'STOP' and 'WAIT'

modes. 512 bytes of on-chip EEPROM, and 256 bytes of on-chip static RAM (all saved during standby). It also has a 16-bit timer featuring 3 input capture channels and 5 output compare channels; an 8-bit pulse accumulator, real-time interrupt circuit and a Computer Operating Properly (COP) watchdog timer. I/O comprises a synchronous serial peripheral interface, asynchronous NRZ serial communications interface, an 8-channel, 8-bit A/D converter, 38 general-purpose I/O pins, of which 15 are bidirectional and 11 are input only and 12 are output only. There are two operating modes. In single-chip mode, the device behaves as a microcontroller without external address or data buses.

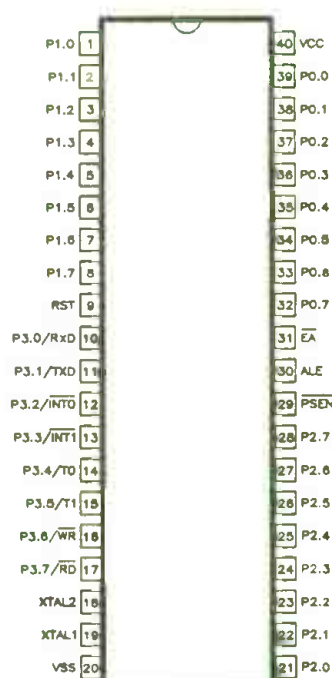
In expanded multiplexed mode, the MCU can access a 64K-byte address space. This space includes the same on-chip memory addresses used in single-chip mode, but also external peripheral and memory devices. The expansion bus is made up from ports B and C and control signals AS and R/W. These signals are active and valid for all bus cycles including accesses to internal memory locations. A recommended method for implementing multiplexed addressing and data access is to use PB0-PB7 for address lines A8 to A15, and PC0-PC7 giving the lower A0 to A7, which is latched into a 74373 non-inverting octal latch by AS, and then PC0-PC7 becomes a bidirectional data bus.

Memory maps are the same for both single-chip and expanded multiplex modes with 256 bytes of on-chip RAM initially located at \$0000, and the 64-byte register block at \$1000. This or the RAM can be relocated at any other 4K boundary after RESET. A 512-byte EEPROM is at \$B600 through to \$B7FF at RESET and an 8K-byte ROM is at \$E000 to \$FFFF. Hardware priority is built into the memory remapping. In special bootstrap mode, a boot-loader ROM is enabled at \$BF40 to \$BFFF. The operating mode and memory map can be configured in a special EEPROM register programming mode. The chip is encapsulated in a 48-pin DIL package. Operating temperature range is -40 to +85°C.

Order Code	Type	Price each
GX23A	MC68HC11A1FN	£14.99

80C31 Series Single Chip 8-Bit Microcontrollers

MHS

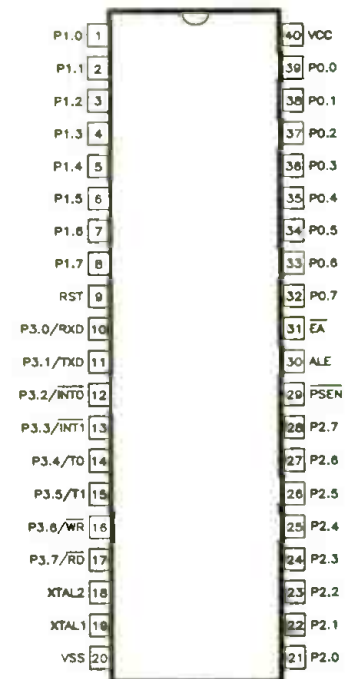


P-80C31-1

The basic 80C31 is an extremely powerful and useful CMOS version of the 8051 8031 NMOS single chip 8-bit microcontrollers, and is manufactured using a

self-aligned silicon gate CMOS process. The fully static design of the 80C31 allows a reduction of system power consumption by bringing the clock frequency down to any value, even DC, without any loss of data.

The 80C31 retains all the features of the 8051, having 128 bytes of on-chip working RAM, a total of 32 I/O lines (4 x 8-bit ports), two 16-bit timers, a 5-source, 2-level interrupt structure, a full duplex serial port, and on-chip oscillator and clock circuits and operates from a single 5V supply. In addition to the internal RAM and 28 control and I/O registers, up to 64K-bytes of external memory can be addressed using ports 0 and 2 as buses, where port 0 is multiplexed to first output the lower 8 address bits, which is then latched by an external chip under ALE control



P-80C31-L

(Address Latch Enable – exactly like e.g., the 8085 MPU), before becoming a bidirectional 8-bit data bus. (This takes place during one external read/write operation.) In fact the 80C31 must access external memory to read a program ROM, and this means therefore that software can be provided very easily through normal EPROM making methods as opposed to more awkward, specialised programming techniques and hardware often required by most microcontrollers with on-chip program ROM.

There are two software-selectable modes of reduced activity for further reduction in power consumption. In Idle Mode the CPU is frozen while the RAM, the timers, the serial port and the interrupt system continue to function. In the Power Down mode the RAM is saved and all other functions are operative. The very comprehensive instruction set includes all the usual microprocessor instructions to implement sophisticated software, for example it includes multiply and divide operations, with indirect addressing, relative conditional branches and subroutine calls and jumps, and the mnemonics will be very familiar to 8080, 8085 and Z80 programmers.

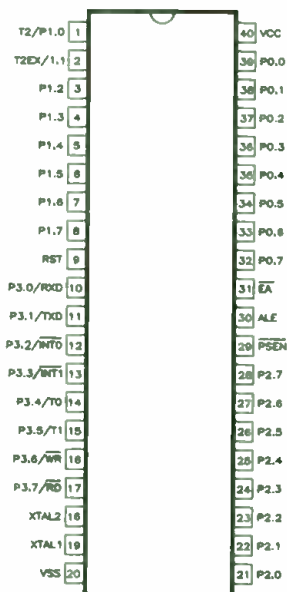
Of the three types available, P-80C31 has a maximum clock speed of 12MHz, P-80C31-1 of up to 16MHz, while P-80C31-L has the ability to operate from a supply ranging from 2.7 to 6V without disruption.

Order Code	Type	Price each
AH46A	P-80C31	£3.99
AH47B	P-80C31-1	£4.09
AH48C	P-80C31-L	£4.09

80C32/80C52 Single Chip 8-Bit Microcontrollers

MHS

The 80C32 and 80C52 are high performance, single chip 8-bit microcontrollers extending the 80C31 range (above). The fully static design allows the reduction of system power consumption by lowering the clock frequency to low levels, even DC, without data loss. The 80C52 has 8K-bytes of on-chip ROM, 256 bytes of RAM, 32 I/O lines, three 16-bit timers, a 6-source, 2-level interrupt structure, a full duplex serial port, and on-chip oscillator and clock circuits and operates from a single 5V supply. In addition the 80C52 has two software selectable modes of reduced activity for further reduction in power consumption, Idle Mode and Power Down Mode. All other features as 80C31 series above, including the 64K external memory addressing capability and the instruction set.



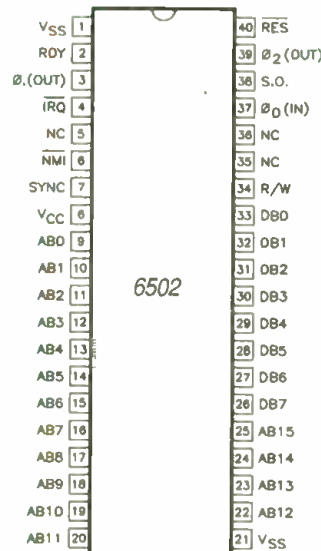
P-80C32/52

The 80C32 is as 80C52 but does not have the internal ROM. Both the 80C52 and 80C32 can operate at clock speeds up to 12MHz. The 80C32-1 has no internal ROM but can have a clock speed up to 16MHz.

Order Code	Type	Price each
AH49D	P-80C32	£5.07
AH50E	P-80C32-1	£5.45
AH51F	P-80C52-100	£5.95

RC6502AP Microprocessor

Rockwell



An 8-bit microprocessor in a 40-pin DIL package. The device requires only one +5V supply and the bus is directly compatible with MC6800 series IC's. The IC can address up to 64K bytes of memory directly with its 16-bit address lines. There are 13 addressing modes, 56 instructions and 7 internal registers. The 6502A requires a single phase TTL clock operating from a 2MHz crystal.

Order Code	Type	Price each
QQ02C	RC502AP	£4.72

EF6821P (6521) Peripheral Interface Adaptor (PIA)

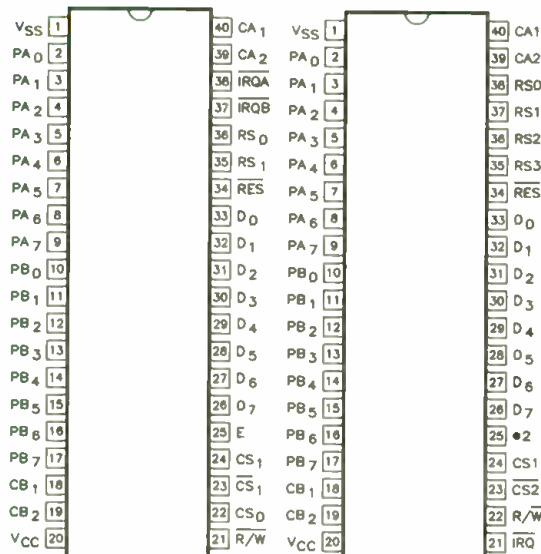
SGS-Thomson

The IC provides a universal means of interfacing parallel data to a microprocessor. One chip is capable of interfacing the 8-bit data bus of the MPU to two 8-bit peripheral buses. Data are able to flow in either direction to and from either peripheral buses under the control of the microprocessor. The two peripheral bus output/inputs are slightly different from one another in that i/o A will drive TTL or the base of a transistor up to 1mA at 1.5V in output mode while i/o B has 3-state capability allowing interface with another MPU.

Order Code	Type	Price each
WQ46A	EF6821P	£1.99

RC6522P Versatile Interface Adaptor (VIA)

Rockwell



6821

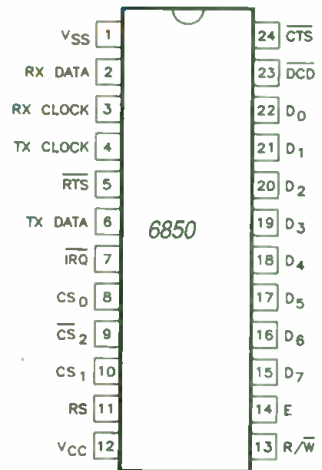
6522

A very flexible I/O device that contains a pair of very powerful 16-bit interval timers, a serial-to-parallel/parallel-to-serial shift register and input data latching on the peripheral ports. Expanded handshaking capability allows control of bi-directional data transfers between VIA's in multiple processor systems. Control of peripheral devices is handled primarily through two 8-bit bi-directional ports. Each line can be programmed as either an input or an output. Several peripheral I/O lines can be controlled directly from the interval timers for generating programmable frequency square waves or for counting externally generated pulses. To facilitate control of the many powerful features of this chip, an interrupt flag register, an interrupt enable register and a pair of function control registers are provided.

Order Code	Type	Price each
UF25C	R6522P	£3.89

EF6850P Asynchronous Communications Interface Adaptor

SGS-Thomson



This IC will interface the microprocessor data bus to serial asynchronous data, both for input and output. The parallel data of the MPU bus is serially transmitted and received by this IC with proper formatting and error checking. A programmable control register provides variable word lengths (8 or 9-bit), clock division (/16, /64), transmit, receive and interrupt control. The device has optional even or odd parity, and performs parity, overrun and framing error checking. Transmissions up to 500k bauds (kbps) are possible and three control lines are provided for control of a modem for line transmission (e.g. to cassette recorder or amateur radio transceiver).

Order Code	Type	Price each
WQ48C	EF6850P	£1.99

8251A Programmable Communication Interface

This USART chip is programmed by the MPU to operate using virtually any serial data transmission technique presently in use. It interfaces the MPU's parallel data bus with any peripheral requiring serial data (e.g. cassette recorder, modem etc.). Features are: synchronous mode - 5- to 8-bit characters, internal or external character synchronisation and automatic sync insertion; asynchronous mode - 5- to 8-bit characters, clock rate (/16, /64), break character generation, 1, 1½ or 2 stop bits, false start bit detection, automatic break detect and handling; up to 64k baud (kbps); full duplex double buffered transmitter and receiver; error detection-parity, overrun and framing; all inputs and outputs fully TTL compatible.

Order Code	Type	Price each
YH49D	8251	£3.35

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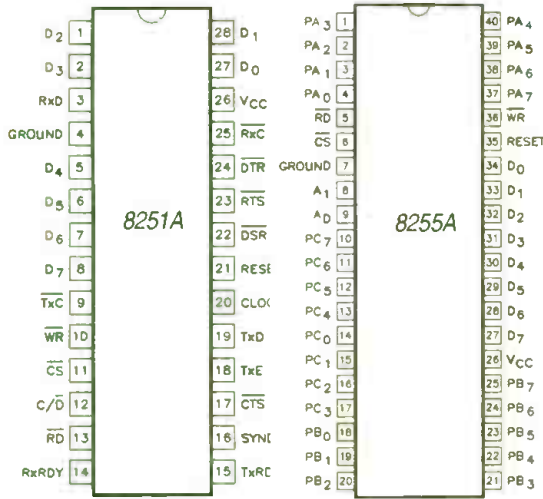
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52

8255A Peripheral Interface Adaptor



A general purpose I/O device having 24 I/O pins which may be individually programmed in two groups of 12 and used in 3 major modes of operation. In mode 0 each group of 12 I/O pins may be programmed in sets of four to be input or output. In mode 1 each group may be programmed to have 8 lines of I/O, and of the remaining 4, three are used for handshaking and interrupt control signals. Mode 2 is a bidirectional bus mode which uses 8 lines for the bus and 5 lines (one borrowed from the other group) for handshaking.

Order Code	Type	Price each
YH50E	8255A	£3.99

PIC16C71 8-Bit CMOS OTP Microcontrollers with A/D Converter

Arizona Microchip

NEW

A range of low-cost, high-performance 8-bit microcontrollers with an on-board A/D converter, all on a single chip. The RISC-like microprocessor has only 35 single-word instructions, each 14 bits wide with direct, indirect and relative addressing modes. The data path is 8 bits wide and operating speeds range between 4MHz and 16MHz (although they will work down to DC when externally clocked). The chips have 1K x 14 of on-chip OTP EPROM program memory, 36 x 8 general-purpose registers (static RAM), 15 special-function hardware registers, four interrupt sources (external, TMR0 timer, A/D conversion complete, and PortB<7:4> interrupt on change), and an 8-level deep hardware stack. There are 2 I/O ports with a total of 13 pins, each with individual direction control, an 8-bit counter with 8-bit timer and programmable prescaler, power on reset and a watchdog timer with its own RC oscillator. The A/D converter has four inputs that are multiplexed into one sample and hold, with 8-bit resolution and an accuracy of ± 1 LSB. With their power-saving sleep mode, security fuse for code protection and low-power CMOS architecture, these devices deliver a performance that is an order of magnitude higher than its competitors in a similar price category. These devices are easily programmed into any one of four states: low power

(LP), reduced cost using an RC oscillator (RC), a standard crystal/resonator (XT) or high speed (HS) modes. RC types work well between DC and 4MHz, XT at 1kHz to 4MHz, and LP between DC and 200kHz. All devices will work down to DC if an external clock is supplied. The LC versions have extended V_{DD} ranges, making them useful in battery applications, etc. In addition there is also a ceramic dual in-line package (CERDIP), a device available with a window so that the contents of the chip may be erased (JW), which operates up to 20MHz. Erasable devices are very useful for code development and testing. The above devices are also available in small outline integrated circuit (SOIC) packages, for applications that require the most efficient use of space.

Specification (typical $V_{DD}=5V$, $f_{osc}=4MHz$, $25^{\circ}C$)
 Supply voltage, V_{DD} : 3V to 6V
 Supply current: 3.3mA
 Oscillator frequency: DC to 16MHz
 Instruction cycle time: 250ns

Type	EPROM width	PC/Stack	SRAM I/O
PIC16C71-JW/P	1024 x 14	8-bit	36 x 8 13
PIC16C71-04/SO	1024 x 14	8-bit	36 x 8 13
PIC16C71-16/P	1024 x 14	8-bit	36 x 8 13
PIC16C71-16/SO	1024 x 14	8-bit	36 x 8 13
PIC16LC71-04/SO	1024 x 14	8-bit	36 x 8 13
PIC16LC71-04/P	1024 x 14	8-bit	36 x 8 13

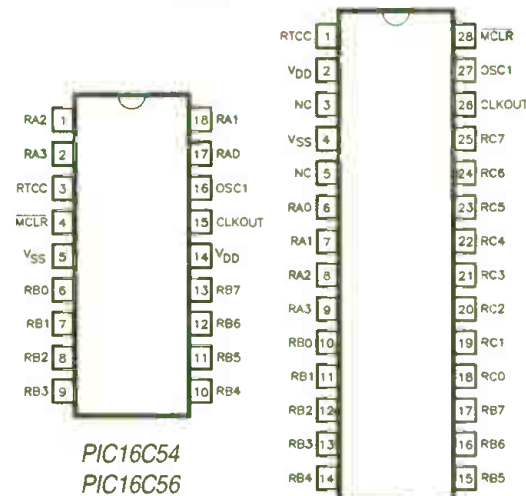
Type	Max freq.	Package	Order code
PIC16C71-JW/P	20MHz	18-pin CERDIP	AD44X
PIC16C71-04/SO	4MHz	18-pin SOIC	AD45Y
PIC16C71-16/P	16MHz	18-pin DIP	AD46A
PIC16C71-16/SO	16MHz	18-pin SOIC	AD47B
PIC16LC71-04/SO	4MHz	18-pin SOIC	AD49D
PIC16LC71-04/P	4MHz	18-pin DIP	AD48C

Order Code	Type	Price each
AD44X	PIC16C71JW	£29.50
AD45Y	PIC16C71-04/SO	£6.85
AD46A	PIC16C71-16/P	£8.99
AD47B	PIC16C71-16/SO	£8.99
AD48C	PIC16LC71-04/P	£8.99
AD49D	PIC16LC71-04/SO	£8.99

PIC16C5X 8-Bit CMOS OTP Microcontrollers

Arizona Microchip

NEW



A family of low-cost OTP, high-performance 8-bit microcontrollers with up to 640 bits of RAM and up to 24K-bits of one-time-programmable ROM. The RISC-like microprocessor has only 33 single-word instructions, each 12 bits wide with direct, indirect and relative addressing modes. The data path is 8 bits wide and operating speeds range between DC and 4MHz. The chips have between 512 and 2K x 12 of on-chip OTP EPROM program memory, 25 to 72 x 8 general-purpose registers (static RAM), 7 special-function hardware registers, and a 2-level deep hardware stack. There are 2 or 3 I/O ports with a total of 12 to 20 pins,

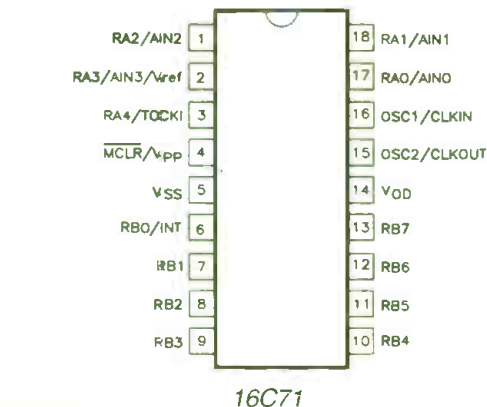
each with individual direction control; an 8-bit counter with 9-bit programmable prescaler; power on reset; and a watchdog timer with its own RC oscillator. With their power-saving sleep mode, security fuse for code protection and low-power CMOS architecture, these devices deliver a performance that is an order of magnitude higher than their competitors in a similar price category. These devices are available in low power (LP), reduced cost using an RC oscillator (RC) and a standard crystal/resonator (XT). RC types work well between DC and 4MHz, XT at 1kHz to 4MHz, and LP between DC and 200kHz. All devices will work down to DC if an external clock is supplied. In addition there is also a ceramic DIP device available with a window so that the contents of the chip may be erased (JW), which operates up to 20MHz. Erasable devices are very useful for code development and testing. The above devices are also available in small outline integrated circuit (SOIC) packages, for applications that require the most efficient use of space.

Type	EPROM width	PC/Stack	SRAM I/O
PIC16C54JW/P	512 x 12	9-bit	32 x 8 13
PIC16C54LP/P	512 x 12	9-bit	32 x 8 13
PIC16C54RC/P	512 x 12	9-bit	32 x 8 13
PIC16C54RC/SO	512 x 12	9-bit	32 x 8 13
PIC16C54XT/SO	512 x 12	9-bit	32 x 8 13
PIC16C54XT/P	512 x 12	9-bit	32 x 8 13
PIC16C55JW/P	512 x 12	9-bit	32 x 8 21
PIC16C55RC/P	512 x 12	9-bit	32 x 8 21
PIC16C55XT/P	512 x 12	9-bit	32 x 8 21
PIC16C56JW/P	1K x 12	10-bit	32 x 8 13
PIC16C56RC/P	1K x 12	10-bit	32 x 8 13
PIC16C56XT/P	1K x 12	10-bit	32 x 8 13
PIC16C57JW/P	2K x 12	11-bit	80 x 8 21
PIC16C57RC/P	2K x 12	11-bit	80 x 8 21
PIC16C57XT/SO	2K x 12	11-bit	80 x 8 21
PIC16C57XT/P	2K x 12	11-bit	80 x 8 21

Type	Max freq.	Package	Order code
PIC16C54JW/P	20MHz	18-pin CERDIP	AD32K
PIC16C54LP/P	200kHz	18-pin DIP	AD33L
PIC16C54RC/P	4MHz	18-pin DIP	CR17T
PIC16C54RC/SO	4MHz	18-pin SOIC	AD34M
PIC16C54XT/SO	4MHz	18-pin SOIC	AD36P
PIC16C54XT/P	4MHz	18-pin DIP	AD35Q
PIC16C55JW/P	20MHz	28-pin CERDIP	AD37S
PIC16C55RC/P	4MHz	28-pin DIP	CR18U
PIC16C55XT/P	4MHz	28-pin DIP	AD38R
PIC16C56JW/P	20MHz	18-pin CERDIP	AD39N
PIC16C56RC/P	4MHz	18-pin DIP	CR19V
PIC16C56XT/P	4MHz	18-pin DIP	AD40T
PIC16C57JW/P	20MHz	28-pin CERDIP	AD41U
PIC16C57RC/P	4MHz	28-pin DIP	CR20W
PIC16C57XT/SO	4MHz	28-pin SOIC	AD43W
PIC16C57XT/P	4MHz	28-pin DIP	AD42V

Specification (typical $V_{DD}=5V$, $f_{osc}=4MHz$, $25^{\circ}C$)
 Supply voltage, V_{DD} : 2.5V to 6.25V
 RAM data retention voltage: 1.5V (SLEEP mode)
 Supply current: 3.3mA
 Oscillator frequency: DC to 4MHz
 Instruction cycle time: 200ns

Order Code	Type	Price each
AD32K	PIC16C54JW	£19.50
AD33L	PIC16C54LP/P	£4.55
CR17T	PIC16C54RC/P	£3.99
AD34M	PIC16C54RC/SO	£4.36
AD36P	PIC16C54XT/SO	£4.59
AD35Q	PIC16C54XT/P	£4.19
AD37S	PIC16C55JW/P	£24.45
CR18U	PIC16C55RC/P	£4.99
AD38R	PIC16C55XT/P	£5.19
AD39N	PIC16C56JW	£23.50
CR19V	PIC16C56RC/P	£4.59
AD40T	PIC16C56XT/P	£4.79
AD41U	PIC16C57JW	£31.25
CR20W	PIC16C57RC/P	£5.69
AD43W	PIC16C57XT/SO	£6.50
AD42V	PIC16C57XT/P	£5.99

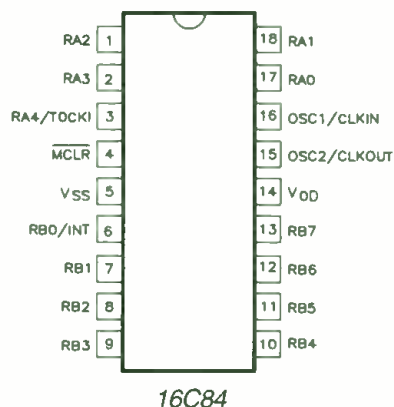


PIC16C84 8-Bit CMOS EEPROM Microcontrollers

Arizona Microchip

NEW

A low-cost, high-performance, CMOS, fully static 8-bit microcontroller with 1K x 14 EEPROM program memory and 64 bytes of EEPROM data memory. The RISC-like instruction set is easy to learn as there are only 35 commands. All instructions are single cycle (400ns), except for program branches which are two cycle. Operating speeds between DC and 10MHz. Employs 14-bit wide instructions with an 8-bit data path. 36 x 8-bit general-purpose registers and 15 special-function hardware registers. Eight-level deep hardware stack with direct, indirect and relative addressing modes. Four sources of interrupt including external, timer, PortB<7:4> interrupt on change, and data EEPROM write complete. This device is capable of typically 1,000,000 erase/write cycles, with data retention greater than 40 years. Among the many peripheral features of the device there are 13 I/O pins with individual direction control, high-current sink/source for direct LED drive and an 8-bit real-time clock/counter with 8-bit programmable prescaler.



16C84

Special microcontroller functions include a power-on reset, power-up timer, oscillator start-up timer, watchdog timer with its own on-chip RC oscillator for reliable operation, security EEPROM fuse for code-protection, power saving SLEEP mode, and user definable oscillator configurations. This device is also serially programmable and may be programmed on the application by using only two pins. This means that production runs of an application can occur before software is available, or if software becomes obsolete finished applications can be reprogrammed, saving time, money and inconvenience.

These devices are available in plastic 18-pin DIP and surface mount SOIC style packages. Options include 4MHz or 16MHz devices, with an LC version which has extended V_{DD} limits down to 3V instead of the usual 4V.

Specification

Supply voltage, V_{DD} :	4V to 6V, 5V typ (3V to 6V on LC version)
RAM retention voltage:	1.5V in SLEEP mode
Supply current	
$F_{osc}=4\text{MHz}$, $V_{DD}=5\text{-}5\text{V}$:	1.8V typ, 4.5V max
$F_{osc}=32\text{kHz}$, $V_{DD}=4\text{V}$,	
WDT disabled:	35 μA typ, 70 μA max
Operating speed:	DC - 10MHz

Type	EPROM width	PC/Stack	SRAM	I/O
PIC16C84-04/SO	1K x 14	14-bit	36 x 8	13
PIC16C84-10/P	1K x 14	14-bit	36 x 8	13
PIC16C84-10/SO	1K x 14	14-bit	36 x 8	13
PIC16LC84-04/SO	1K x 14	14-bit	36 x 8	13
PIC16LC84-04/P	1K x 14	14-bit	36 x 8	13

Type	Max freq.	Package	Order code
PIC16C84-04/SO	4MHz	18-pin SOIC	AD51F
PIC16C84-10/P	16MHz	18-pin DIP	AD50E
PIC16C84-10/SO	16MHz	18-pin SOIC	AD52G
PIC16LC84-04/SO	4MHz	18-pin SOIC	AD54J
PIC16LC84-04/P	4MHz	18-pin DIP	AD53H

Order

Code	Type	Price each
AD51F	PIC16C84-04/SO	£8.29
AD50E	PIC16C84-10/P	£10.79
AD52G	PIC16C84-10/SO	£10.85
AD54J	PIC16LC84-04/SO	£9.55
AD53H	PIC16LC84-04/P	£9.55

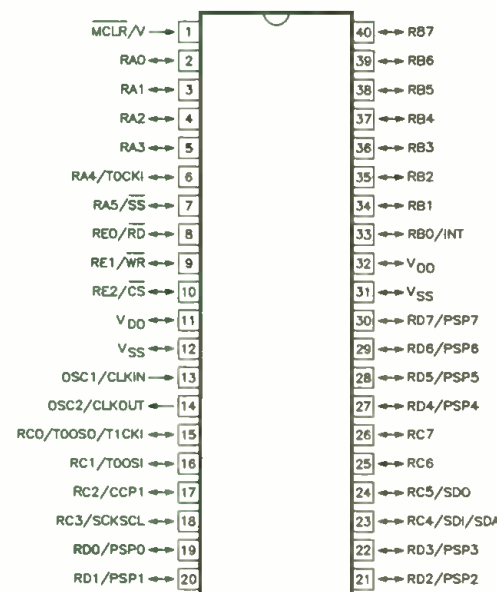
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PIC16C64 EPROM Based 8-Bit CMOS Microcontrollers

Arizona Microchip

NEW

A range of 8-bit EPROM microcontrollers featuring a RISC-like instruction set with 35 easy to learn commands. On-board memory is available as 2K x 14 bits of on-chip EPROM program memory and 128 x 8 bits of general-purpose registers (SRAM). With these microcontrollers there is an interrupt capability (up to eight sources) and 33 special-function hardware registers. Other features include an eight-level deep hardware stack, direct/indirect and relative addressing modes, 33 I/O pins with individual direction control, high-current sink/source for direct LED drive, one pin that can be configured as capture input, PWM output or compare output (capture is 16-bit, 200ns with PWM resolution 1 to 10 bits giving 80kHz at 8-bit resolution). A 16-bit timer/counter with 8-bit period register (for PWM and time base), and two 8-bit timers are available for use under software control. The device also has a parallel slave port which is 8 bits wide and has external read, write and chip select controls for forming microprocessor bus interfaces. A synchronous serial port with two modes of operation is implemented for 3-wire SPI and I²C Access bus compatibility. All the features of other families of programmable device are also implemented on the 16C64 series, like power-on reset, power-up timer, oscillator start-up timer, watchdog timer with its own on-chip RC oscillator for reliable operation, security EPROM fuses for code-protection, power-saving SLEEP mode, and user definable oscillator configuration. For versatility these devices can also be programmed in the application, with only two connections to the device being necessary. This device is supplied in 40-pin, plastic DIP.



16C64

Specification

Supply voltage, V_{DD} :	4V to 6V, 5V typ
RAM data retention voltage, V_{DR} :	1.5V typ
Supply current, I_{DD}	
$F_{osc}=4\text{MHz}$, $V_{DD}=5\text{-}5\text{V}$:	2.7mA typ, 5mA max
$F_{osc}=32\text{kHz}$, $V_{DD}=4\text{V}$,	
WDT disabled:	52.5 μA typ, 105 μA max
Maximum operating frequency:	20MHz

Type	EPROM	PC/Stack width	SRAM	I/O
PIC16C64/JW-SI	2K x 14	14-bit	128 x 8	33
PIC16C64-04/P	2K x 14	14-bit	128 x 8	33

Type	Max freq.	Package
PIC16C64/JW-SI	20MHz	40-pin CERDIP
PIC16C64-04/P	20MHz	40-pin DIP

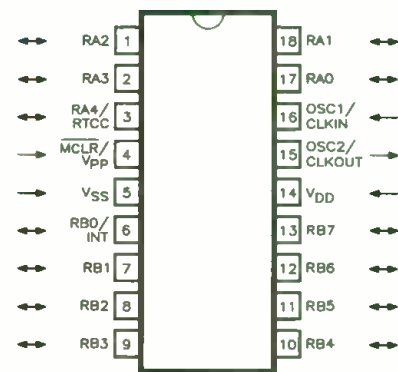
Order

Code	Type	Price each
AD55K	PIC16C64/JW-SI	£28.99
AD17T	PIC16C64-04/P	£12.99

5535

PIC16C84-04P 8-Bit Microcontroller

Arizona Microchip



PIC16C84-04P

A high-performance, low-cost, CMOS, fully-static 8-bit microcontroller which includes EEPROM for programs (1K x 14 bits), 64 bytes of non-volatile data 'RAM' (also built in EEPROM technology), 8 levels of stack space, ports and interrupt control in one 18-pin DIL package. It is the second member of an enhanced family of PIC16CXX microcontrollers, and its high performance is due to the use of single word instructions 14 bits wide, which execute in a single cycle (except for program branches which take two cycles). Clock speed can be up to 4MHz, offering instruction-cycle times down to 400ns. What sets such a microcontroller apart from other processors are special circuits to deal with the needs of real time applications. The PIC16C84 has a host of such features intended to maximise system reliability, minimise cost through elimination of external components, provide power saving operating modes and off code protection. The peripherals include an 8-bit real-time clock timer/counter with an 8-bit prescaler, effectively making a 16-bit divider, and 13 bidirectional I/O pins divided into 4 port A pins and 8 port B pins with optional 'weak pull-up' inputs. The high drive current from these pins (in output mode) is up to 25mA for sink (0 out) and 20mA for source + out). This greatly helps to reduce the number of additional external buffers and drivers thus reducing the size and cost of the overall system.

Direct, indirect and relative addressing modes are possible, and there are four interrupt sources: external INT input, timer count overflow, data changes on the upper four port B inputs 4 to 7, and if the data RAM is filled up. Special microcontroller features consist of a power-up reset, oscillator start-up timer, a 'watchdog' timer with its own on-chip RC oscillator for reliable operation. Typical current consumption of the device is at most only 5mA, typically 1.8mA at 4MHz and only 35 μA at 32kHz. In SLEEP mode the main processor is effectively powered down leaving only the watchdog timer to consume 1 μA typically, so that, unlike the majority of conventional microprocessors, the device readily lends itself to battery powered applications. The user can wake up from SLEEP mode through external reset, watchdog timer time-out or via an interrupt. Several oscillator options are also made available to allow the device to fit the application.

The PIC16C84 has an easy to learn, RISC type instruction set having only 35 single word instructions, each of which is a 4-bit word divided into an opcode, which specifies the instruction type, and one or more operands, which further specify the operation of the instruction.

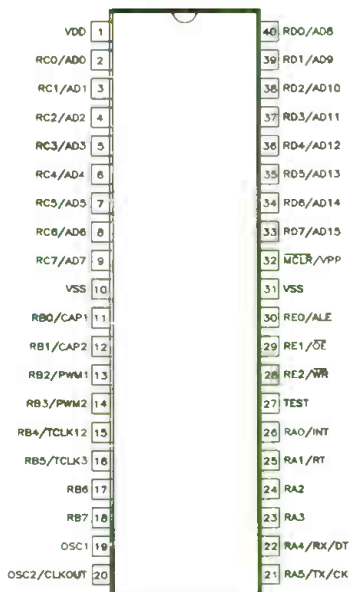
The 64 x 8-bit EEPROM data memory is readable and writable during normal operation, and there are a total of 11 special function registers at the 'file' addresses which handle port and data EEPROM addressing, with their equivalent control registers (if applicable). Indirect addressing of file registers can be performed, and there are a further 36 spare locations for general-purpose uses, which can be treated like ordinary volatile static RAM.

The device is programmed using one of two methods, serial or parallel. The serial mode will allow the device to be programmed while in the user's system using only five pins; VDD, VSS, MCLR/VPP, RB6 and RB7. The parallel mode will provide faster programming since the data is loaded into the device faster. In either mode, both program and data memory can be programmed, and also overwritten afterwards thanks to the use of EEPROM memory. This product is supported by an in-circuit emulator and software development package (see below), which runs on IBM PC and compatible machines.

Order Code	Type	Price each
AY31J	PIC16C84 DIL	£8.49

PIC17C42-16/P RISC Architecture 8-Bit Micro

Arizona Microchip



17C42-161

This 8-bit micro is based upon an advanced RISC architecture core that provides one of the fastest 8-bit microcontrollers available, and is designed to meet the needs of the most demanding 8-bit real time embedded control applications. The device has a 2K x 16 on-chip one time programmable (OTP) EPROM program memory with a total addressable program memory of 64K x 16, so for applications requiring larger program memory, external memory can be used. There is 232 x 8 of on-chip RAM for data memory and the entire 256 byte of static CMOS RAM is directly addressable.

There are two very fast PWM outputs which offer a selectable resolution of 8-bit (62.5kHz) or 10-bit (15.6kHz). The period is also selectable. These high speed, high resolution, PWM outputs allow for more precise control of motors and actuators in real-time control applications.

Two very fast capture inputs are provided, each with a 16-bit capture register, a prescaler and a resolution of 250ns. The inputs are ideal for monitoring a motor shaft encoder output for motor control or other applications with a fast bit stream.

The three 16-bit timer/counters can be configured as two 16-bit and two 8-bit timer/counters. The 16-bit RTCC has an 8-bit prescaler which in effect makes a very long count, 24-bit counter.

An on-chip USART (with baud rate generator) allows fast serial communications, and is full duplex asynchronous (up to 250Kbit/s) and half duplex synchronous (up to 4Mbit/s).

Other features include 33 I/O pins; three 8-bit, one 16-bit and one 3-bit ports; two pins with high sink current of 60mA for direct LED and relay interface; a low current drain typically 15mA at 16MHz and 10µA in 'sleep mode'. This 16MHz device is housed in a 40-pin plastic DIP package.

Order Code	Type	Price each
DC20W	PIC17C42-16/P	£16.40

Electrically Erasable and Programmable Serial ROMs for PIC Microcontrollers

Arizona Microchip

NEW

These serial EEPROMs support a bidirectional two-wire bus and data transmission protocol. A device that sends data via the bus is defined as a transmitter, and a device receiving data as a receiver. The bus has to be controlled by a master device which generates the serial clock (SCL), controls the bus access, and generates the START and STOP conditions, while the EEPROM operates as a slave. Both master and slave can operate as transmitter or receiver, but the master device determines which mode is activated.

These devices are all 2-wire serial interface (I²C) bus compatible, and will operate in the standard 100kHz or fast 400kHz modes. When using such devices having a serial protocol with a microcontroller that does not have a dedicated protocol specific port, the designer must generate the specific code routines to accomplish the several memory access functions that the microcontroller will perform. The PIC microcontrollers are versatile and efficient to program and can be made to interface with I²C protocol EEPROMs easily.

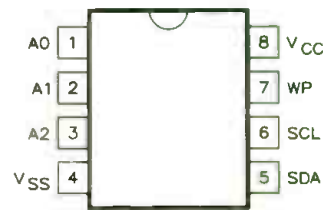
24C16B 16K 2.5V CMOS Serial EEPROM

Arizona Microchip

NEW

A 16K-bit electrically erasable PROM organised as 8 blocks of 256 x 8-bit bytes with a 2-wire serial, I²C bus compatible interface. Low power CMOS technology permits operation down to 2.5V with standby and active currents of only 5µA and 1mA respectively. It also has page write capability for up to 16 bytes of data.

The device includes Schmitt trigger, filtered inputs for noise suppression, output slope control to eliminate ground bounce, 100kHz serial speed at a supply of 2.5V and 400kHz at 5V. self-timed write cycle (including auto-erase), a page-write buffer for up to 16 bytes, a typical page-write cycle time of 2ms, a hardware write protect facility for the entire memory contents, and it can be operated as a serial ROM. It has a life of 1,000,000 ERASE/WRITE cycles, ESD protection > 4,000V and data retention exceeding 40 years.



24C16B

Order Code	Type	Price each
AD23A	24C16B/P	£3.40

24C32 32K 5V CMOS Serial EEPROM

Arizona Microchip

NEW

A 4K x 8 (32K-bit) serial electrically erasable PROM developed for advanced, low-power applications such as personal communications or data acquisition. The device features an input cache for fast write loads with a capacity of eight 8-byte pages, or 64 bytes. It also features a fixed 4K-bit block of ultra-high endurance memory for data that changes frequently. It is capable of both random and sequential reads up to the 32K boundary. Functional address lines allow up to eight 24C32 devices on the same bus, making 256K-bits of address space.

A low-cost, high performance, CMOS, fully static EPROM-based 8-bit micro with on-chip analogue to digital converter. The device uses an advanced RISC-like architecture and features a reduced set of 35 instructions, with all single word instructions (14-bit wide) executed in a single cycle (program branches take two cycles). Additionally, there are four interrupt sources and an eight level hardware stack. Other features include an 8-bit timer/counter with 8-bit prescaler, 13 bidirectional I/O pins, an 8-bit A/D converter and 36 x 8 general purpose registers (SRAM). The high current drive of the I/O pins helps reduce external drivers - 25mA maximum sink and 20mA maximum source. The A/D converter module has four analogue input channels multiplexed into one sample-and-hold and an A/D that has 8-bit resolution with a ±1LSB accuracy.

The microcontroller features: power on reset; power up timer; oscillator start-up timer; watchdog timer; security EPROM fuse for code-protection; serial, in-system programming (ISP) of EPROM program memory (1K x 14) using only two pins; user selectable oscillator options.

The device operates from a 5V supply with a typical power consumption of <2mA and <1µA in standby mode (@ 3V). Designed to run at 4MHz, the device is housed in an 18-pin plastic DIL package.

Order Code	Type	Price each
DC19V	PIC16C71-04/P	£6.90

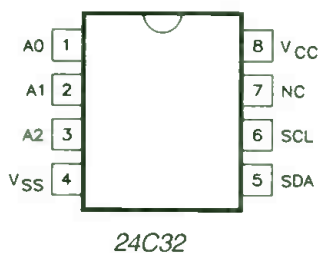
Continued on next page

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Advanced CMOS technology makes this device ideal for low-power, non-volatile code and data applications. The device includes Schmitt trigger, filtered inputs for noise suppression, output slope control to eliminate ground bounce, 100kHz and 400kHz modes, self-timed write cycle (including auto-erase), a typical page or byte-write cycle time of 2ms, and power on/off data protection circuitry.

Specification

Voltage operating range: 4.5 to 5.5V
 Peak write current: 3mA @ 5.5V
 Max. read current: 150µA @ 5.5V
 Standby current: 5µA typical
 Endurance, 60K block: 20,000 ERASE/WRITE cycles
 4K block: 1,000,000 ERASE/WRITE cycles
 ESD protection: > 4,000V
 Data retention: > 40 years



24C32

Order Code	Type	Price each
AD24B	24C32/P	£6.49

24LC65 64K 2.5V CMOS 'Smart' Serial EEPROM

Arizona Microchip

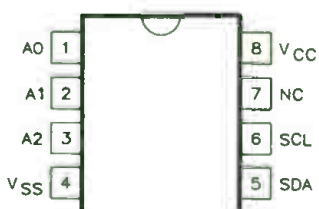


A 'smart' 8K x 8-bit serial electrically erasable PROM, developed for advanced, low-power applications such as personal communications, and providing systems designers with flexibility, through the use of many new user-programmable features. The 24LC65 offers a relocatable 4K-bit block of ultra-high endurance memory for data that changes frequently. The remainder of the array, or 60K-bits, is rated at 10,000 ERASE/WRITE cycles typical. The device features an input cache for fast write loads with a capacity of eight pages, or 64 bytes. It also has programmable security options for ERASE/WRITE protection of critical data and/or code of up to fifteen 4K blocks. Functional address lines allow the connection of up to eight 24LC65s on the same bus for up to 512K-bits contiguous EEPROM memory. Advanced CMOS technology makes this device ideal for low-power, non-volatile code and data applications.

The device includes Schmitt trigger, filtered inputs for noise suppression, output slope control to eliminate ground bounce, 100kHz and 400kHz modes, self-timed write cycle, a typical page or byte-write cycle time of 2ms, and power on/off data protection circuitry.

Specification

Voltage operating range: 2.5 to 6.0V
 Peak write current: 3mA @ 6.0V
 Max. read current: 150µA @ 6.0V
 Standby current: 5µA typical
 Endurance, 60K block: 10,000 ERASE/WRITE cycles
 4K block: 1,000,000 ERASE/WRITE cycles
 ESD protection: > 4,000V
 Data retention: > 40 years



24LC65

Order Code	Type	Price each
AD25C	24LC65 P	£9.55

24AA65 64K 1.8V CMOS 'Smart' Serial EEPROM

Arizona Microchip

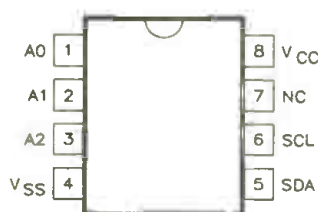


A 'smart' 8K x 8-bit serial electrically erasable PROM, developed for advanced, low-power applications such as personal communications, and providing systems designers with flexibility, through the use of many new user-programmable features. It is capable of operations down to 1.8V, the end-of-life voltage for 2 'AA' battery cells for most popular battery technologies. The 24AA65 offers a relocatable 4K-bit block of ultra-high endurance memory for data that changes frequently. The remainder of the array, or 60K-bits, is rated at 10,000 ERASE/WRITE cycles typical. The device features an input cache for fast write loads with a capacity of eight pages, or 64 bytes. It also has programmable security options for ERASE/WRITE protection of critical data and/or code of up to fifteen 4K blocks. Functional address lines allow the connection of up to eight 24AA65s on the same bus for up to 512K-bits contiguous EEPROM memory. Advanced CMOS technology makes this device ideal for low-power, non-volatile code and data applications.

The device includes Schmitt trigger, filtered inputs for noise suppression, output slope control to eliminate ground bounce, 100kHz and 400kHz modes, self-timed erase and write cycles, a typical page or byte-write cycle time of 2ms, and power on/off data protection circuitry.

Specification

Voltage operating range: 1.8 to 6.0V
 Peak write current: 3mA @ 6.0V
 Max. read current: 150µA @ 6.0V
 Standby current: 5µA typical
 Endurance, 60K block: 10,000 ERASE/WRITE cycles
 4K block: 1,000,000 ERASE/WRITE cycles
 ESD protection: > 4,000V



24AA65

Order Code	Type	Price each
AD26D	24AA65/P	£11.45

High-Performance, Universal In-Circuit Emulator System

Arizona Microchip

The PICMASTER universal in-circuit emulator system is intended to provide the designer with a complete microcontroller design tool set for all microcontrollers in the PIC16CXX and PIC17CXX families. This system currently supports the PIC16C84 described on page.

The emulator system is designed to operate on low-cost IBM PC and compatible machines ranging from 80286-AT class ISA-bus systems through to the new 80486 EISA-bus machines. The development software runs in the Microsoft Windows 3.1 environment, allowing the operator access to a wide range of supporting software and accessories. Provided with the PICMASTER system is a high performance real-time in-circuit emulator, a programmer unit and a macro assembler program. Coupled with the user's choice of text editor, the system is ready for development of products containing a PIC16C84. A 'Quick Start' PIC product sample pack containing user programmable parts is included for additional convenience.

The system has been designed as a real-time emulation system with advanced features generally found on more expensive development tools. The AT

platform and Windows 3.X environment was chosen to make these features available to the end user.

To properly take advantage of these features, PICMASTER requires installation on a system having the following minimum configuration: PC AT 80286, 386SX, 386DX or 80486 with ISA or EISA bus; EGA, VGA, 8514/A, or Hercules graphics card (EGA or higher recommended); MS-DOS/PC-DOS 3.1 or higher; Microsoft Windows 3.0 or higher operating in either standard or 386 enhanced mode; 1Mb of RAM (2M recommended); and at least one 5.25in. floppy disk drive; 10Mb of hard disk space (1Mb for PICMASTER, remainder for Windows 3.X); one available 8-bit PC AT (ISA) I/O expansion slot (half-size), and, preferably, a Microsoft mouse or equivalent.

The PICMASTER system comprises four major components:

Host-Interface Card

Connects the emulator system to the PC. This high-speed parallel system card plugs into the 8-bit expansion slot and connects to the external emulator control pod via a 37-way cable.

Emulator Control Pod

Contains all the emulation and control logic which matches the PIC16CXX microcontroller. Emulation memory, trace memory, event and cycle timers and trace/break-point logic are all included. The pod controls and interfaces to the target-specific emulator probe which actually stands in for the real microcontroller chip via a ribbon cable.

Target Specific Emulator Probe

This probe is specific to the microcontroller family to be emulated and configures the universal system for emulation of a particular microcontroller device.

PC Host Emulation Software

Necessary to control and provide a working user interface. The emulation software provides the user with full display, alteration, and control of the system under emulation. It is also universal to other microcontrollers in the family and not just the PIC16C84.

With Windows 3.X, PICMASTER emulation can operate in one window while a text editor is running in a second window. Dynamic Data Exchange (DDE), a feature of Windows 3.X, will be available in this and future versions of the software. DDE allows data to be dynamically transferred between two or more Windows programs. With this feature, data collected with PICMASTER can be automatically transferred to a spreadsheet or database program for further analysis. Under Windows 3.X, two or more PICMASTER emulators can be run simultaneously on the same PC making development of multi-microcontroller systems possible.

Order Code	Type	Price each
AY32K	H Picmaster	£2750.00

PICSTART-16B Development System

Arizona Microchip

A development system for the entire range of PIC16SX family of microcontrollers, as well as the PIC16C71 and the PIC16C84 (with EEPROM). The development system provides the product development engineer with a low-cost introductory design tool, that will work with any PC compatible computer running the MS-DOS/PC-DOS operating system.

The system comes with an MS-DOS based software simulator program (PICSIM), a microcontroller EPROM programmer, and a macro assembler program (MPALC). Sample software programs to run on the simulator are provided to help the engineer quickly become familiar with the development system and the PIC micro-controller. The user has only to provide a text editor, for the system to be operational. A full screen, user-friendly, software program is provided for full interactive control over the programmer. Parts may

be read, programmed, blank checked and verified, and all fuses and ID locations may be specified. A large screen buffer editing facility allows the user to change and program locations in either hexadecimal or ASCII (text) modes. The MPSIM simulator program provides the developer with an instruction and limited simulator



software program for debugging PIC16C5x assembler code. The macro assembler provides translation of assembler source codes to object code for all PIC microcontrollers, as well as providing object files, listing files, and special files required for symbolic debug with the PIC emulator system. Also included is a compact 3 x 5 in. development programmer board and a copy of Microchip's new Embedded Controller Handbook, which contains 30 PIC and serial EEPROM application notes. PICSTART-16B's programmer board connects to a PC and accepts 18- and 28-lead OTP PDIP PIC16Cxx devices. The kit includes software to read and program all PIC16Cxx microcontroller products. This unit uses a serial interface, not parallel, and is supplied with an RS232 lead. To connect a 25-way RS232 port to this unit, cable JC13 will be required (see Computers, section).

Order Code	Type	Price each
DM79L	Picstart 16B	£74.99

PICMASTER-16D Emulator System

Arizona Microchip



This kit supports PIC16C71 microcontrollers and contains a PICMASTER universal emulator pod, universal power supply, PC host interface card, 37-pin male/male D-range connector and 40-way emulator probe cable; logic probe cable assembly, PIC16C71 emulator probe header assembly, 18-way extension cable and 18-pin adaptor sockets; PRO MASTER programmer module, RS232 interface cable, PIC16C71 product samples, PIC16C71 18-pin PDIP/SOIC adaptor socket, complete system software (assembler) and documentation.

Order Code	Type	Price each
AD20W	Picmaster 16D	£3390.00

PICSTART-16C Development Kit

Microchip

NEW



Supporting PIC16C64 microcontrollers, this complete kit includes a PIC16C64 device programmer board, PIC16CXX assembler, simulator and host software on 3 1/2 in. floppy diskette; PIC16C64 product samples and complete system documentation comprising an Embedded Control Handbook and a data book.

Order Code	Type	Price each
AD18U	Picstart 16C	£192.50

PICSTART-17A Development Kit

Arizona Microchip

NEW



Supporting PIC17C42 microcontrollers, this complete kit includes a PIC17C42 device programmer board, PIC17CXX assembler, simulator and host software on 3 1/2 in. floppy disk, PIC17C42 product samples and complete system documentation, comprising an Embedded Control Handbook and a data book.

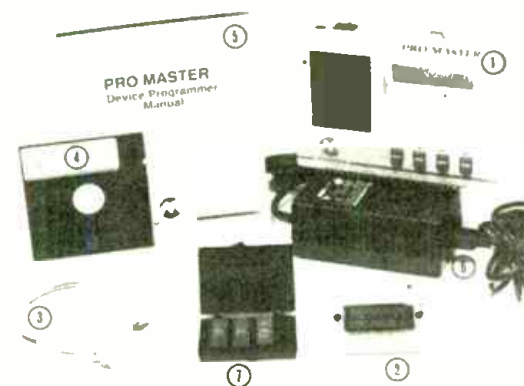
Order Code	Type	Price each
AD22Y	Picstart 17A	£192.50

Pro Master Programmer Kit

Arizona Microchip

The 'Pro Master' programmer is a production quality programmer capable of operating in stand alone mode, as well as PC-hosted mode. It supports both the PIC16C and PIC17C series of microcontrollers. The programmer has an LCD display for displaying error messages, keys to enter commands, and a separately available socket module. In stand alone mode, the programmer can read, verify or program a device, and can set fuse configuration and code-protect in this mode. The EEPROM memory can hold data and parametric information, even when power is removed. The programmer can be connected to a PC via one of the COM (RS232) ports, and the supplied PC based user interface software makes using the programmer simple and efficient. The user interface is full screen and menu driven. The software allows editing of data,

selection of fuse configuration and type, selection of the various voltage levels, load and store to and from disk files as well as a full screen display. Essential commands such as read, verify, program and blank check can all be issued from the screen. The kit includes the programmer, a RS232 interface cable, Pro Master software, Pro Master documentation and power supply unit. The socket module has to be purchased separately. Supplied with the socket modules; are suitable devices that can be used with the programmer.



Socket Module

Code	Description
AC164001	PIC16C54 to C57; 18 & 28 LD PDIP socket module.
AC164002	PIC16C54 to C57; 18 & 28 LD SOIC socket module.
AC164004	PIC16C71; 18 lead PDIP socket module.
AC164005	PIC16C71; 18 lead SOIC socket module.
AC174001	PIC17C42; 40 lead PDIP socket module.

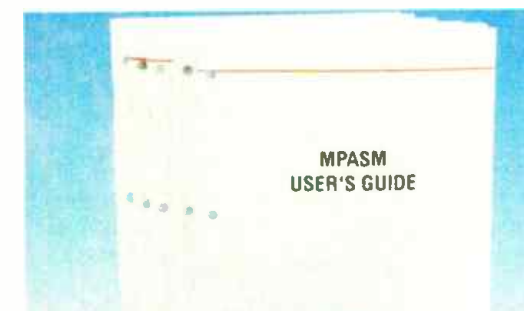
The Pro Master is ideal for low to moderate volume production.

Order Code	Type	Price each
DC22Y	Pro Master	£599.99
DM21X	SktAC164001	£124.99
DM22Y	SktAC164002	£124.99
DM23A	SktAC164004	£114.99
DM24B	SktAC164005	£114.99
DM25C	SktAC174001	£139.99

PICPROBE-16B PIC16C71 Probe Kit

Arizona Microchip

NEW



Supporting PIC16C71 microcontrollers, this in-circuit emulator or 'probe' kit contains a PIC16C71 emulator probe head assembly, 18-pin plug-in adaptor sockets, flat 18-way extension cable, MPASM (assembler) and MPSIM (simulator) software on 3 1/2 in. floppy disk, and full PICPROBE-16B documentation.

Order Code	Type	Price each
AD19V	Picprobe 16B	£374.50

THE BEST OF SERVICE

PICPROBE-16B PIC16C54/5/6/7 Probe Kit

Arizona Microchip

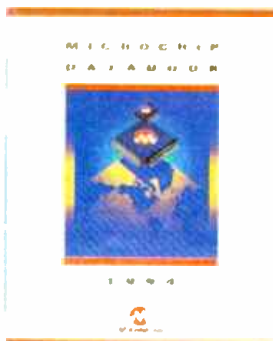


A development system supporting PIC16C54, CR54, C55, C56 and C57 microcontrollers. It comprises a PIC16C5X emulator header assembly, a PIC16C5X 18-lead header interface, a PIC16C5X 28-lead header interface, 18-pin and 28-pin adaptor sockets, 18-way and 28-way extension cables, MPASM (assembler) and MPSIM (simulator) software on a 3 1/2 in. floppy disk, and full PICPROBE-16A documentation.

Order Code	Type	Price each
AD21X	Picprobe 16D	£374.50

Microchip Data Book

A comprehensive data book covering 8-bit microcontrollers, microcontroller programming, product and logic product specifications. Also covers development systems and software tools. A useful section on packaging shows all the variations of device package available. Full breakdowns of manufacturers' part numbers including custom versions of devices are given, enabling the end user to check exactly which device they have. Graphs and timing diagrams are numerous and are displayed in a clear and concise format making them easy to read and interpret. As the book covers such a large range of products, some of the specifications are so new they have been marked 'Preliminary', ready for the newest of products, when they hit the market. A truly vast source of information. 1994. Over 1350 pages. 230 x 180mm, illustrated.



Order Code	Type	Price each
AD29G	Microchip databook	£9.50 NV

PICStart Application Guide

Contains a compilation of ideas and designs submitted to Microchip Technology, in response to the recent introduction of their low-cost programmable logic ICs and development hardware kits. The applications are varied and range from communications and computer peripherals to consumer electronics and industrial control processes. The idea of the book is to show the types of applications for which the programmable logic devices they manufacture can be used. The book is divided into 5 sections: Introduction; Communications Market Entries; Consumer Market Entries; Office Automation Market Entries; and Industrial Market Entries. The introduction covers very quickly, in three pages, a résumé of the PIC16C5X, PIC16C71 and PIC16C84 families of devices, and is enough information to allow selection of the most appropriate device. The rest of the book is full of typical applications that have been designed and manufactured; some in volume. Circuit diagrams and block diagrams help to describe the applications. 1993. 90 pages. 230 x 175mm, illustrated.



Order Code	Type	Price each
AD27E	Picstart App Guide	£1.99 NV

Embedded Control Handbook

A comprehensive guide to applications and devices in the PIC16C5X, PIC16CXX and PIC17CXX families of devices, and the development tools required to produce the applications detailed. There are application notes for all the above families, as well as interfacing diagrams and articles, to show how easy the devices can be used to interact with other systems. Tutorials and application notes specifically geared towards serial EEPROMS are supplied, showing exactly how to design and make complex circuits for problem solving and meeting with applications requirements. In addition to the detailed articles and hardware and system diagrams, there are software listings for each application. So whether you are implementing a four-channel digital voltmeter, or a fast Fourier transform algorithm, this book shows you how to go about it. Split into eight sections for easy reference. 1993. Over 800 pages. 230 x 175mm, illustrated.



Order Code	Type	Price each
AD28F	Embed Control Hbook	£9.50 NV

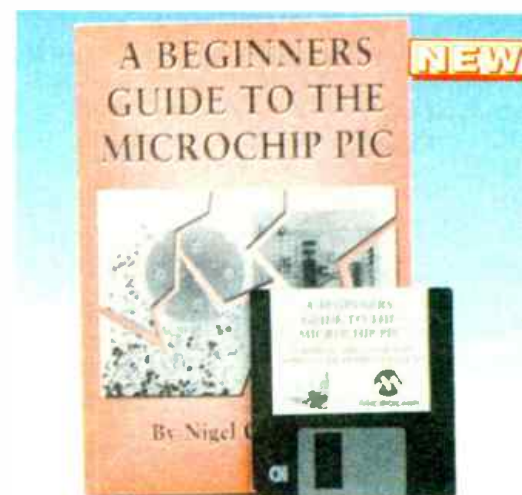
PICStart Development System Ordering Guide

A guide to buying the correct piece of hardware, best suited to your needs. The guide covers all the programmers available for the PIC16/17 families of microcontroller. Details at the back of the guide show how all of the programmers can be upgraded by adding new items, as all the programmers work on a universal development platform. If you subsequently decide that you need a more advanced programmer or decide to work with more complex devices, you can just upgrade to the level that enables you to do it. The guide covers high-performance emulator systems, low-cost development kits, programmers, probe kits and all the sockets and software accessories available.



Order Code	Type	Price each
AD30H	Picstart Dev Guide	£1.99 NV

A Beginner's Guide to the Microchip PIC



This book describes how to get to grips with PIC devices and is intended for somebody who has never used such a device before. The reader is guided through the rudiments of selecting the correct device for a job, and how to begin programming it; together with a basic knowledge of how to debug source code, and a guide to the instruction set. The use of headers, look-up tables, reset vectors, real-time clock, watchdog timer, interrupts and development practices are covered with examples and diagrams along the way. The book is accompanied with a 3 1/2 in. disk containing an assembler, simulator and various source code examples.

Order Code	Type	Price each
AD31J	Beginners Gd To Pic	£19.95

The prices of the products in this section were correct as of July 1994. However, due to the volatile nature of the semiconductor industry we cannot guarantee these prices during the lifetime of this catalogue. We therefore urge you to telephone the sales line for the latest pricing information.

ST6220 Starter Kit

SGS-Thomson

A starter kit providing a quick entry to using the ST62 series of microprocessors. It provides a basic development system that can be used by every design engineer, and is particularly useful for evaluation of the ST6210/15 and ST6220/25 microcontrollers, as well as for development of simple applications.

The ST6 software tools provided include the ST6 Assembler, the ST6 Linker, the ST6 Simulator and the interface to drive the Basic Programmer board. The application software comprises documented modules that you may copy or link into your applications. The documentation includes a kit guide, ST621x/2x Users Manual, and an ST62/ST63 Software Development Tools Users Manual.

The Users Manual gives an extensive description of the hardware and software aspects of the ST6210, ST6215, ST6220 and ST6225 microcontrollers. It contains all the information hardware and the ST6210/15 source software.

The enclosed ST6 Assembler enables the transformation of the ASCII source file into an executable file. The assembler documentation is included in the Development Tools Users Manual. 'Smart' programming implies the use of several modules, each of which performs an elementary task. Because each module can be quickly and individually tested and debugged, the overall debug time is drastically reduced, thus speeding the development of bug-free application software. The ST6 Linker is used to produce one program from several modules. The associated documentation is also included in the Development Tools Users Manual.

Each module, and the linked program, may be tested and debugged using the ST6 Simulator, also described in the Users Manual. Once debugged, the application software can then be regarded as functionally working. It can then be programmed into an EPROM device using the Basic Programmer, described later in the guide.

Once successfully simulated, application software must be tested in-circuit in order to check that there are no errors due to differences between the functional description of the environment, and the real operating conditions. This test can be made by plugging an EPROM into the application hardware, and performing standardised hardware debugging.

The last step in developing an ST62 application is to make the prototype, and the One Time Programming (OTP) devices in the ST62 family are well suited for this.

To be able to use the starter kit and its software you will also need an IBM or compatible PC AT with hard disk and 5 1/4" floppy drive, 640K of conventional memory, a parallel centronics (printer) port, and running MS-DOS V3.1 or higher.

Order Code	Type	Price each
DC32K	ST6 Kit	£149.99

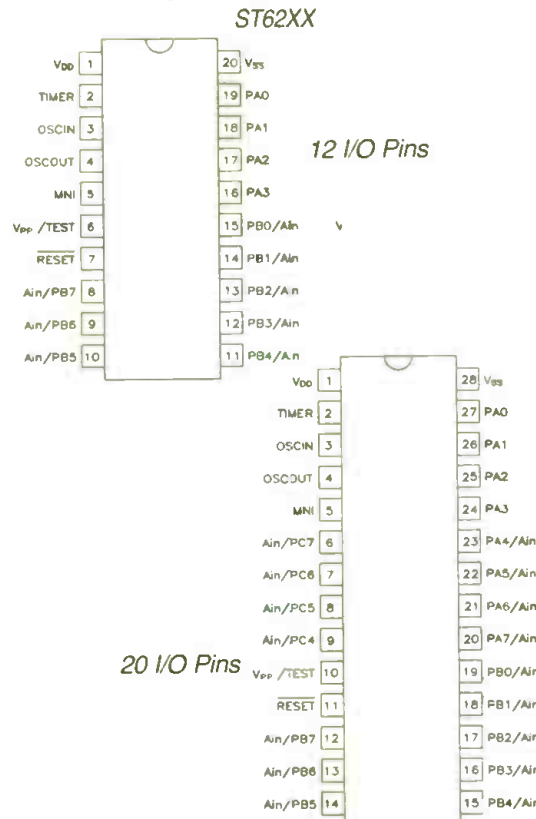
ST6 Series 8-Bit Microcontrollers

SGS-Thomson

A range of 8-bit HCMOS with an in-built 8-bit A/D converter and either 12 or 20 programmable I/Os. Four I/O lines can sink up to 10mA for direct LED driving. Types ST62T10 and ST62B15 have 2K of OTP (One Time Programmable) ROM, all others having 4K of OTP or EEPROM. The device will operate from a 3V to 6V power supply and at a frequency up to 8MHz. Other features include: an 8-bit counter with a 7-bit programmable prescaler (timer); on-chip clock oscillator; digital watchdog timer; one external non-maskable interrupt and power-up reset.

The core of the IC is implemented independently of the I/O or memory configuration, and can be treated as an independent central processor communicating with I/O and memory via internal address, data and control buses. The digital

watchdog timer consists of a down counter that can be used to provide a controlled recovery from a software disturbance. If the hardware version is selected, the watchdog is automatically initialised after reset so that this function does not need to be activated by the user program. Since the watchdog function is always activated, this counter cannot be used as a timer. For the software version, watchdog activation can be controlled by the user software so that the watchdog can be used as a simple 7-bit timer for general purpose counting.



Manufacturer's Code	EEPROM or OTP	I/O lines	WDG
ST62T10B6/HWD	OTP	12	Hardware
ST62T10B6/SWD	OTP	12	Software
ST62T15B6/HWD	OTP	20	Hardware
ST62T15B6/SWD	OTP	20	Software
ST62E20F1/HWD	EEPROM	12	Hardware
ST62E20F1/SWD	EEPROM	12	Software
ST62T20B6/HWD	OTP	12	Hardware
ST62T20B6/SWD	OTP	12	Software
ST62E25F1/HWD	EEPROM	20	Hardware
ST62E25F1/SWD	EEPROM	20	Software
ST62T25B6/HWD	OTP	20	Hardware
ST62T25B6/SWD	OTP	20	Software

Specification

Supply voltage:	3V to 6V
Oscillator frequency:	8MHz
V _{DD} = 4.5V to 6V:	2MHz
V _{DD} = 3.5V:	1MHz
V _{DD} = 3V:	0.3 x V _{DD}
Input low level voltage:	0.7 x V _{DD}
Input high level voltage:	0.1V
Low level output voltage:	3.5V
High level output voltage:	8 bit
A/D resolution:	±1/2LSB
Non-linearity:	70µs at 8MHz
Conversion time:	

Order Code	Type	Price each
DC26D	ST62T10B6/HWD	£8.35
DC27E	ST62T10B6/SWD	£8.35
DC30H	ST62T15B6/HWD	£9.35
DC31J	ST62T15B6/SWD	£9.35
KU74R	ST62E20F1/HWD	£24.99
KU76H	ST62E20F1/SWD	£24.99
KU81C	ST62T20B6/HWD	£8.99
KU80B	ST62T20B6/SWD	£8.99
KU77J	ST62E25F1/HWD	£28.99
KU78K	ST62E25F1/SWD	£28.99
KU83E	ST62T25B6/HWD	£9.99
KU82D	ST62T25B6/SWD	£9.99

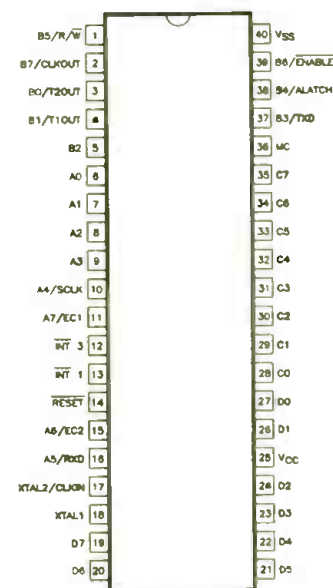
TMS77C82 Microcontroller

Texas Instruments

A 40-pin 8-bit CMOS microcomputer with 8K bytes of EPROM on chip. Programming procedure is the same as for 27C64 EPROM's. The chip also includes 256 bytes of RAM, three timers, and a serial port. There are a total of 32 CMOS compatible I/O pins of which 24 are bidirectional and 8 are outputs. The unique serial port can operate in asynchronous, isosynchronous or synchronous I/O modes with selectable parity and number of data bits and stop bits. Baud rate generation can be internal or external. The 16-bit timers, with their 5-bit prescale, 16-bit capture latch and timer outputs, simplify A/D conversions, pulse width measurements and other time critical applications. Where accuracy over long periods is required, a 42-bit timer can be effected. There are six prioritised interrupt levels all routed through a user-defined vector to the appropriate service routine. When power consumption is critical, the IC can idle selectable sections of itself and use power only where needed. In addition the entire processor can be halted whilst the RAM contents are maintained. The EPROM version (UL66W) is fully erasable. A one time programmable (OTP) version of this chip is also available (UL62S) which can be used for small production runs after the program has been verified on the EPROM. The OTP version is supplied in a low cost standard plastic package that does not have the window and therefore cannot be erased. This version also includes a security device (in software) which, when implemented, allows the user-installed program to run, but prevents it being read out. Thus it is impossible for anyone to copy your program.

Specification (typical)

Supply voltage (pin 25):	5V (3V to 6V)
Supply voltage (pin 36):	12.5V (12V to 13V)
Supply current (pin 25):	11.2mA @ 1MHz
	14.4mA @ 4MHz
	16.1mA @ 6MHz
	<20µA halt mode
Crystal frequency:	500kHz min.
	1MHz at V _s = 3V
	3MHz at V _s = 4V
	6MHz at V _s = 5V ± 10%
	6MHz at V _s = 6V

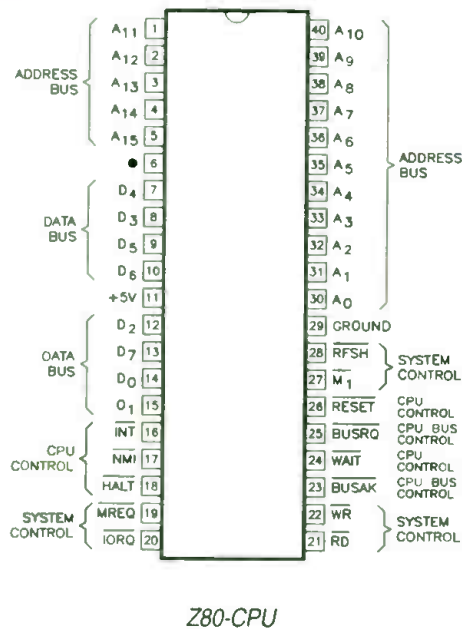


A book entitled "TMS7000 Assembly Language Programmer's Guide" is available for use with this IC. The book contains 210 pages divided into eight sections and covering the entire instruction set in detail.

Order Code	Type	Price each
UL66W	TMS77C82JDL	£59.99
UL62S	77C82NL(OTP)	£23.49
WS91Y	TMS77C82 Ass Lang Bk	£4.95 NV

Z80-CPU Microprocessor

Zilog



Z80-CPU

This 40-pin DIL IC is an extremely powerful 8-bit microprocessor having 158 instructions including all of the 8080 instructions giving total software compatibility. Thus programs written for the 8080 may be run on the Z80 and later updated to make use of the powerful Z80 instruction set. Typically the Z80 requires 25% to 50% less memory space than the 8080 and gives 5 times the throughput of the 8080. There are 17 internal registers including two real index registers, and three modes of fast interrupt response. Static memories can be interfaced using only an external address decoder to provide the appropriate chip select signals. Another advantage of the Z80 is that it can provide all of the refresh control for dynamic memories up to 64K bytes directly, and will interface directly with most 18-pin and 22-pin 4K dynamic RAM's with virtually no additional external logic (16-pin types require only an external address multiplexer). The Z80 requires only a single 5V supply as do all its support chips described below and a single-phase TTL clock operating from a suitable crystal. This amazing MPU outperforms any other microcomputer in 4, 8 or 16-bit applications. Available in 4MHz (A) or 6MHz (B) versions.

Order Code	Type	Price each
QW00A	Z0840004PSC	£3.65
UF74R	Z0840006PSC	£3.25

Z80-PIO Parallel Interface Controller

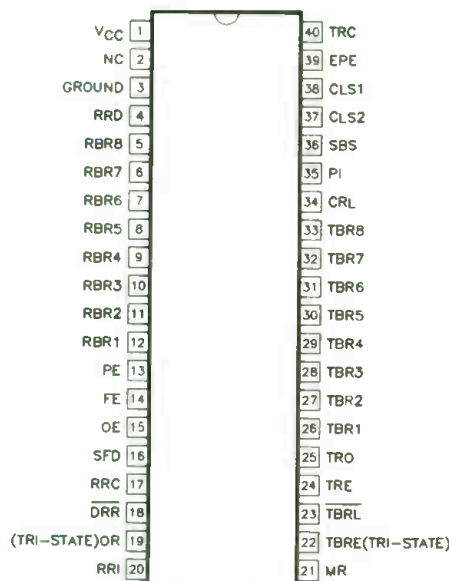
SGS-Thomson

This IC provides a universal means of interfacing parallel data to a microprocessor. It can interface the 8-bit data bus of the MPU to two 8-bit peripheral buses e.g. keyboard, VDU, printer etc. Data are able to flow in either direction to and from the peripheral buses under the control of the microprocessor. Features include interrupt driven "handshake" for fast response; byte output, byte input, byte bidirectional bus (port 'A' only), and bit modes of operation; programmable interrupts on peripheral status conditions; daisy chain priority interrupt logic included to provide automatic interrupt vectoring without external logic; eight outputs capable of driving Darlington transistors (-1.5mA at 1.5V); and all inputs and outputs fully TTL compatible.

Order Code	Type	Price each
QW03D	Z80A-PIO	£3.25

CDP6402CE Universal Asynchronous Receiver/Transmitter

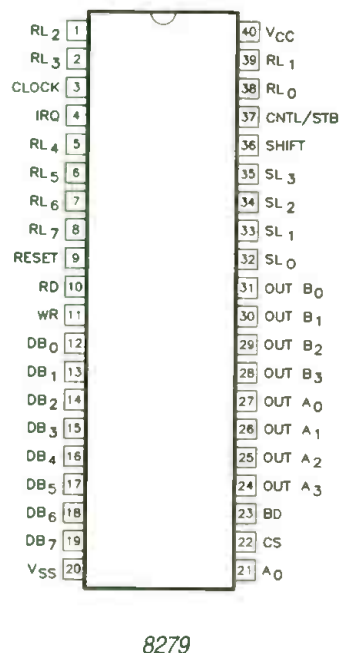
Harris



This industry standard UART will interface computers or microprocessors to asynchronous serial data channels. The receiver converts serial start, data parity and stop bits to parallel data, verifying proper code transmission, parity and stop bits. The transmitter converts parallel data into serial form and automatically adds start, parity and stop bits. The data word length can be 5, 6, 7 or 8-bits. Parity may be odd or even. Parity checking and generation can be inhibited. The stop bits may be one or two, or one and a half if transmitting five bit code. This IC is sometimes supplied coded CDP1854ACE. These two parts are identical.

Order Code	Type	Price each
QQ04E	CDP6402CE	£5.50

8279 Keyboard/Display Interface



8279

This IC is a general purpose keyboard and display I/O interface device for use with microprocessors. The IC will scan a 64-contact key matrix and perform 2-key lockout and N-key roll-over. Keyboard entries are debounced and strobed in an 8-character FIFO and if more than 8 characters are entered, overrun status is set. Key entries set the interrupt output line to the MPU. The display part of the IC provides a

scanned interface for LED and other types of displays. Numeric and alphanumeric displays and simple indicators may be used. The IC has a 16x8 display RAM which can be organised into two 16x4. The RAM can be loaded or interrogated by the MPU. Right entry calculator and left entry typewriter display formats are possible. Both read and write of the RAM can be done with auto-increment of the RAM address.

Order Code	Type	Price each
YH51F	8279	£4.50

Numeric Co-processors

Cyrix



A range of high performance numeric co-processors that offer superior performance than their Intel counterparts yet are software and socket compatible. The Cyrix 287XLT co-processor executes applications up to two times faster than the Intel 287XL. By combining CMOS technology with advanced power management features, the Cyrix 287XLT is ideal for battery-powered applications such as portable computers. Similarly, the 387SX/DX range is up to three times faster than the Intel equivalent in application performance with instruction times reduced by five times or more for 50% of instructions. Automatic idle mode cuts current drain and ensures efficient low power operation - typical current consumption in the 387SX is 0.05mA in standby mode and 75mA when operating in a 16MHz system. Being fully software compatible with the Intel equivalents, many applications software benefit from the use of a maths co-processor, these include financial spreadsheets, CAD/CAM, scientific programming, presentation graphics and postscript emulation for desktop publishing. The co-processors are designed to work at speeds up to their stated maximum and will work in systems at lower operating speeds i.e. the 287XLT will work in 286 CPU systems that operate at 6, 8, 10, 12, 16 and 20MHz.

Package

287XLT:	DIL
387SX:	68-pin J-lead chip carrier
387DX:	Ceramic 68-pin grid array
387DX+:	Ceramic 68-pin grid array

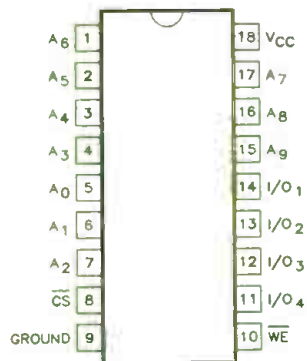
Generic type	Cyrix type	Micro	CPU speed up to
82S87-20	287XLT	PC-AT (286)	20MHz
83S87	387SX	PC-386SX	25MHz
83D87	387DX	PC-386DX	33MHz
83D87+	387DX+	PC-386DX	40MHz

Order Code	Type	Price each
CR07H	287XLT	£57.99
CR08J	387SX	£69.99
CR09K	387DX	£79.99
CR10L	387DX+	£94.99

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SUBSECTION 50 MEMORY ICs

2114 4K Static Random Access Memory

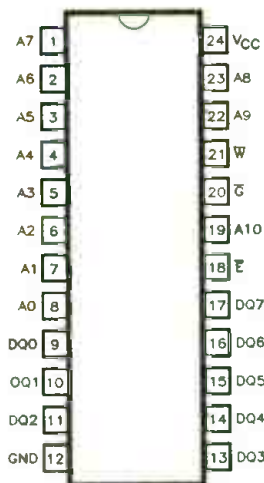


2114

A 4096-bit static random access read/write memory (RAM) organised in 1024 x 4-bit words. The IC operates from a single 5V supply at typically 80mA. Access time is <math><450\text{ns}</math> and thus the chip is suitable for use with all our microprocessors. The input/outputs are 3-state and TTL compatible and there is chip enable input for memory expansion.

Order Code	Type	Price each
QW12N	2114 450ns	£3.69

MK48Z02B25 16384 Bit SRAM with Battery Back-up SGS-Thomson



MK48Z02B25

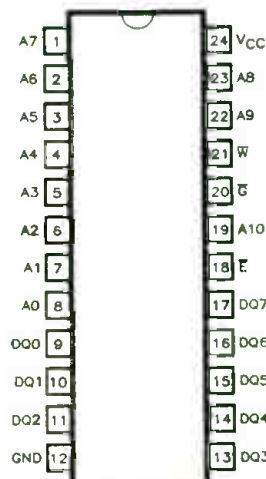
An ultra low power 16384 bit (2K x 8), non-volatile, static RAM IC that features a power-fail control circuit and a long life lithium battery. The device has the characteristics of a CMOS static RAM, with the added advantage of data being retained in the event of power failure. The IC can replace existing 2K x 8 static RAMs and also has the same pin configuration as a 2716 EPROM and 2K x 8 EEPROMs. As with other static RAMs, there is no limit to the number of write cycles that can be performed. The access time, read cycle and write cycle is 250ns, and no additional support circuitry is needed to interface to the microprocessor.

The device includes a power-fail detect circuit. The circuit deselects the device whenever V_{CC} is out of range ($4.75V \geq V_{PFD} \geq 4.50V$), and write protects itself, providing a high degree of data security. Below 3V, the device switches to internal battery back-up. A mid-write cycle power failure may corrupt data at the currently addressed location, but does not affect the rest of the RAM's content. Normal operation is resumed when V_C exceeds 4.5V. The predicted worst case battery life is 11 years at 70°C.

Specification	
Voltage supply:	4.75V to 5.5V
Average power supply current:	80mA
TTL standby current:	5mA
CMOS standby current:	1mA
Read cycle time:	250ns
Write cycle time:	250ns
Power-fail deselect voltage:	4.5V to 4.75V, 4.6V typical
Battery back-up switchover voltage:	3V

Order Code	Type	Price each
DC02C	MK48Z02B25	£6.99

MK48T02B20 16384 Bit CMOS Timekeeper SRAM SGS-Thomson



MK48T02B20

An ultra low power 16384 bit (2K x 8) SRAM IC that features a real time clock, crystal, power-fail control circuit and a long life lithium battery. The device is a non-volatile pin, and function, equivalent to any JEDEC standard 2K x 8 SRAM. Also, it will fit in to many EPROM and EEPROM sockets and will provide the non-volatility of PROMs without the need for special write timing, or the limitations on the number of writes that can be performed. Access to the clock is simple. 'Timekeeper' registers are located in the upper eight RAM locations. The registers contain year, month, date, day, minutes and seconds data in 24-hour BCD format. Corrections for 28, 29, 30 and 31 day months are made automatically. These registers are not the actual clock counters but read/write Static RAM memory locations. A clock control circuit is included, that once every second transfers the counters into RAM. Updates to the 'Timekeeper' registers should be halted before clock data is read to prevent reading data that is in transition. The device includes a power-fail detect circuit. The circuit deselects the device whenever V_{CC} is out of range ($4.75V \geq V_{PFD} \geq 4.50V$), and write protects itself, providing a high degree of data security. Below 3V, the device switches to internal battery back-up.

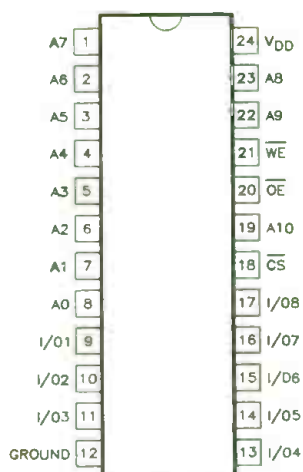
A mid-write cycle power failure may corrupt data at the currently addressed location, but does not affect the rest of the RAM's content. Normal operation is resumed when V_C exceeds 4.5V. The device is driven by a quartz controlled oscillator with a normal frequency of 32768Hz, and provides an accuracy of $\pm 1\text{m}$ per month. Clock calibration can be software controlled, to allow the end-user to calibrate the clock to suit the working environment. If necessary, the oscillator can be turned off if the device is to spend a significant amount of time 'on the shelf'. The predicted worst case battery life is 11 years at 70°C.

Specification	
Voltage supply:	4.75V to 5.5V
Average power supply current:	80mA
TTL standby current:	5mA
CMOS standby current:	3mA
Read cycle time:	200ns
Write cycle time:	200ns
Power-fail deselect voltage:	4.5V to 4.75V, 4.6V typical
Battery back-up switchover voltage:	3V

Order Code	Type	Price each
DC01B	MK48T02B20	£18.99

6116 16K CMOS Static RAM

A 2048 x 8-bit static RAM built in CMOS. Pin compatible with 16K EPROM'S the device offers access times of 150ns and data retention at voltages down to 2V with standby currents as small as 10nA at 3V. The chip operates from a single +5V supply.



6116

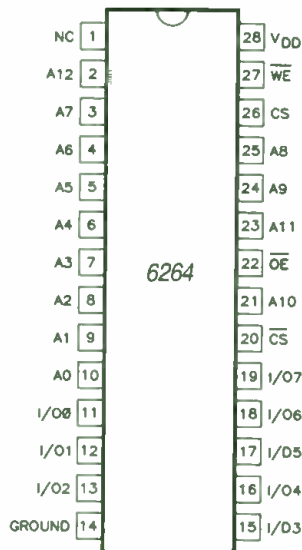
Characteristics (typical)

Supply voltage	5V
Supply current	5mA static 25mA @ 150ns cycle
Data retention voltage	2V min
current	10nA (10µA max)
Access time	100ns max

Order Code	Type	Price each
UF33L	6116 100ns	£2.29

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6264 64K CMOS Static RAM



An 8192 x 8-bit static RAM built in CMOS. Pin compatible with 64K EPROM's, the device offers access times of 100ns or 150ns and data retention at voltages down to 2V with standby currents as small as 20µA at 3V. The chip operates from a single +5V supply.

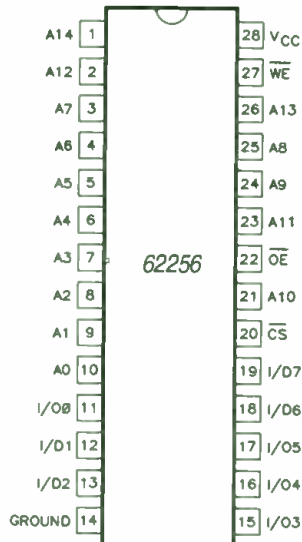
Characteristics (typical)

Supply voltage	5V
Supply current	40mA max 60mA at 100ns or 150ns cycle
Data retention voltage	2V
current	20µA
Access time	100ns or 150ns max

Order Code Type Price each

UL01B	6264 100ns	£3.87
UF34M	6264 150ns	£4.99

62256 256K CMOS Static RAM



A 32,768 x 8-bit static RAM built in CMOS. The device offers access times of 100ns and data retention with standby currents as low as 40µA. The chip operates from a single +5V supply.

Characteristics (typical)

Supply voltage:	5V±10%
Supply current:	8mA 33mA @ 150ns cycle
Standby current:	40µA
Access time:	100ns

Order Code Type Price each

UH40T	62256 100	£7.60
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431000 1M CMOS Static RAM



A 131,072 x 8-bit static RAM built in CMOS. The device offers access times of 85ns and data retention with standby currents as low as 1µA. The chip operates from a single +5V supply.

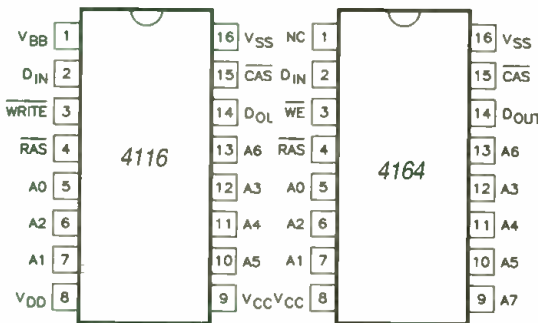
Characteristics (typical)

Supply voltage:	5V±10%
Supply current:	70mA
Data retention voltage:	2V
current:	1µA
Access time:	85ns

Order Code Type Price each

UM72P	431000 85ns	£23.25
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4116 16K Dynamic Random Access Memory



A 16,384-bit random access read/write memory (RAM) organised as 16,384 x 1-bit words. The IC operates from three voltage supplies: V_{DD} = +12V (at 45mA max) V_{CC} = +5V (the current depends on output load and is virtually nil when chip is not selected) and V_{BB} = -5V (at 200µA max) (V_{SS} = 0V). When chip is not selected V_{DD} current falls to 2mA max. Access time is <200ns, and a refresh cycle is required every 2ms, thus the chip is directly suitable for use with the Z80 and indirectly with our other microprocessors. The output is 3-state to enable memory expansion. Complete address decoding is performed on-chip and there are on-chip latches for address and data-in.

Order Code Type Price each

QW93B	4116 200ns	£1.99
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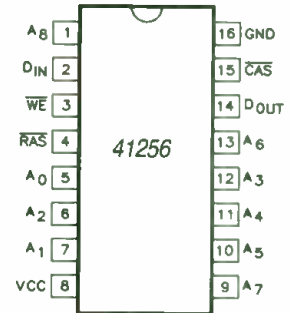
164 64K Dynamic Random Access Memory

A 65,536-bit dynamic random access read/write memory (RAM) organised as 65,536 x 1-bit words. The IC operates from a single +5V supply at less than 45mA. When chip is not selected, current falls to less than 5mA. Access time is <150ns and the output is 3-state.

Order Code Type Price each

QQ06G	4164 150ns	£3.99
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41256 256K Dynamic Random Access Memory



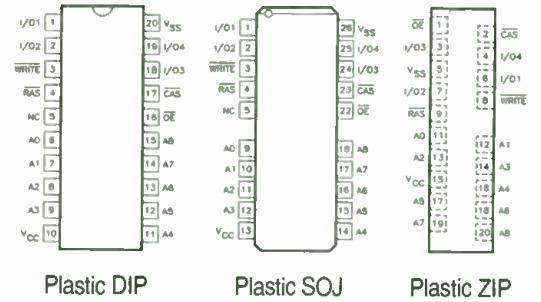
A 262,144-bit D-RAM organised as 262,144 x 1 bits. Available in DIP, ZIP and SOJ packages, the access time of the DIP version is 100ns, 70ns for the other versions. The chip operates from a single +5V supply and the output is 3-state TTL compatible.

Order Code Type Price each

QY74R	41256 100ns	£3.49
AD00A	DRAM 256K x 1 ZIP	£5.49
AD01B	DRAM 256K x 1 SOJ	£4.49

51426 1M (256K x 4) Dynamic Random Access Memory

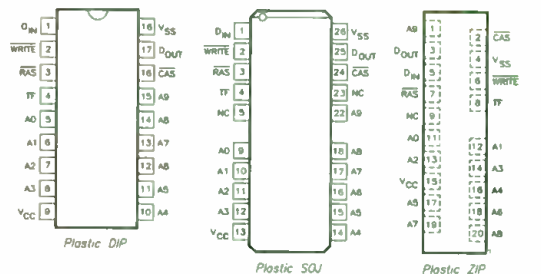
A 1,048,576-bit D-RAM organised as 262,144 x 4 bits, available in DIP, ZIP and SOJ packages. The access time is 70ns and the chip operates from a single +5V supply at 70mA, with a standby current of 2mA. The output is 3-state TTL compatible.



Order Code Type Price each

AD04E	DRAM 256K x 4 DIP	£6.99
AD02C	DRAM 256K x 4 ZIP	£7.99
AD03D	DRAM 256K x 4 SOJ	£6.99

511000 1M Dynamic Random Access Memory



1,048,576-bit D-RAM organised as 1,048,576 x 1 bits, available in DIP, ZIP and SOJ packages. The access time is 70ns and the chip operates from a single +5V supply at 70mA, with a standby current of 2mA. The output is 3-state TTL compatible.

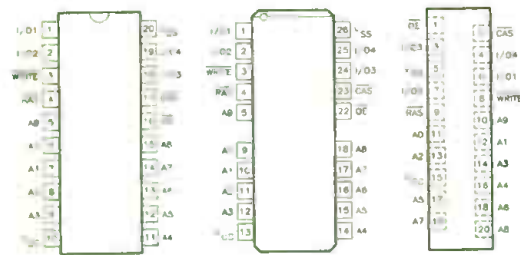
Order Code Type Price each

AD05F	DRAM 1M x 1 DIP	£6.99
AD06G	DRAM 1M x 1 ZIP	£6.99
AD07H	DRAM 1M x 1 SOJ	£6.99

514400 4M (1M x 4) Dynamic Random Access Memory

NEW

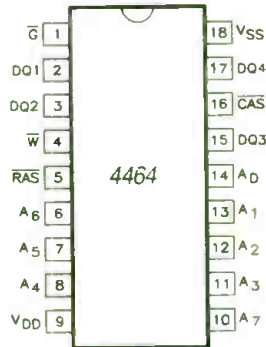
A 4,194,304-bit D-RAM organised as 1,048,576 x 4 bits, available in DIP, ZIP and SOJ packages. The access time is 70ns and the chip operates from a single +5V supply at 100mA, with a standby current of 2mA. The output is 3-state TTL compatible.



Order Code	Type	Price each
AD08J	DRAM 1M x 4 DIP	£22.99
AD09K	DRAM 1M x 4 ZIP	£16.99
AD10L	DRAM 1M x 4 SOJ	£16.99

464 256K (64K x 4) Dynamic Random Access Memory

A 262,144 bit D-RAM organised as 65,536 x 4 bits. Access time is 100ns. The chip operates from a single +5V supply at about 55mA with a standby current of 2.5mA. The output is 3-state TTL compatible.



Order Code	Type	Price each
UH93B	4464 100ns	£4.49

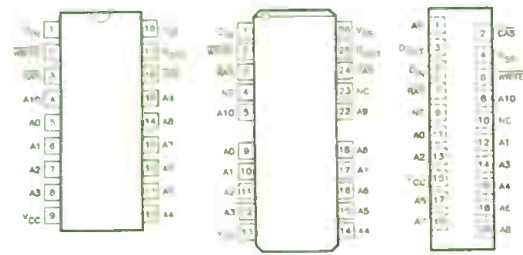
TMS44100-805D 4M Dynamic Random Access Memory

Texas Instruments

514100 4M Dynamic Random Access Memory

NEW

A 4,194,304-bit D-RAM organised as 4,194,304 x 1 bits, available in DIP, ZIP and SOJ packages. The access time is 70ns and the chip operates from a single +5V supply at 100mA, with a standby current of 2mA. The output is 3-state TTL compatible.

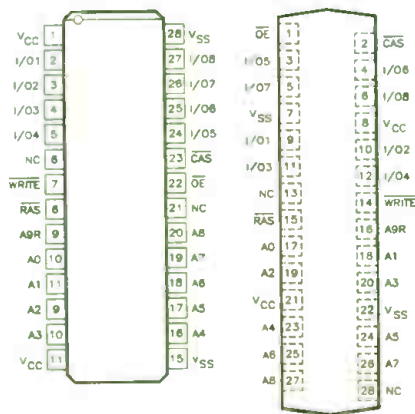


Order Code	Type	Price each
AD11M	DRAM 4M x 1 DIP	£22.99
AD12N	DRAM 4M x 1 ZIP	£16.99
AD13P	DRAM 4M x 1 SCJ	£16.99

514800 4M (512K x 8) Dynamic Random Access Memory

NEW

A 4,194,304-bit D-RAM organised as 524,288 x 8 bits, available in DIP, ZIP and SOJ packages. The access time is 70ns and the chip operates from a single +5V supply at 90mA, with a standby current of 2mA. The output is 3-state TTL compatible.



Order Code	Type	Price each
AD15R	DRAM 512k x 8 ZIP	£16.99
AD16S	DRAM 512k x 8 SOJ	£16.99

A 4,194,304-bit D-RAM having an access time of 80ns. Operation is from a single +5V supply at less than 85mA with standby current less than 2mA. The output is 3-state and all inputs and outputs are TTL compatible. The device is supplied in a standard 20-pin zig-zag package. 44100 is organised as 4,194,304 x 1 bit.

Order Code	Type	Price each
UM68Y	44100	£35.99

Memory Modules

A range of DRAM modules for use as memory expansion in computers, including PC's, Apple Mac, Amiga, etc. The range offers the latest high speed technology at the lowest possible cost. Modules are available in SIMM (edge connection type) and SIP (with pins) to suit the different types of sockets found on mother boards in computers. The following types are available.

Please note that most modern motherboards require that each memory bank in use is completely filled with SIMMs. Memory banks are usually configured in blocks of two or four SIMM sockets. It is not usually possible to fit a single SIMM, or an odd number of SIMMs to a motherboard. Most modern motherboards will only accept 9-bit SIMMs, although some of the latest boards do require 36-bit SIMMs, which have 72 pads on the edge connector. It is advisable to use faster SIMM modules on PCs running at 50MHz or above. Please check your motherboard booklet before ordering SIMMs for memory expansion.



Code	Size	Package	Speed
UR61R	256 x 9	SIMM	70ns
UR62S	256 x 9	SIP	80ns
UR63T	1M x 8	SIMM	80ns
UR64U	1M x 8	SIP	80ns
ZG53H	1M x 9	SIMM	60ns
UR59P	1M x 9	SIP	80ns
UR58N	1M x 9	SIMM	70ns
UR60Q	1M x 9	SIP	70ns
ZG55K	4M x 9	SIMM	60ns
UR65V	4M x 9	SIMM	70ns
AR19V	1M x 32	SIMM	70ns
AR20W	2M x 32	SIMM	70ns
AD98G	1M x 36	SIMM	70ns
AR17T	2M x 36	SIMM	70ns
AR18U	4M x 36	SIMM	70ns

Order Code	Type	Price each
UR61R	70SIMM 256K	£15.99
UR62S	70SIP256K	£19.99
UR63T	80SIMM 1Mx8	£44.99
UR64U	80SIP 1Mx8	£44.99
ZG53H	1Mx9 SIMM 60ns	£52.99
UR59P	80SIP 1M	£49.99
UR58N	70SIMM 1M	£44.99
UR60Q	70SIP 1M	£49.99
ZG55K	4Mx9 SIMM 60ns	£179.99
UR65V	70SIMM 4Mx9	£154.99
AR19V	1M X 32 - 70n/s	£139.99
AR20W	2M X 32 - 70n/s	£265.00
AD98G	1M X 36 - 70n/s Simm	£169.99
AR17T	2M X 36 - 70n/s	£275.00
AR18U	4M X 36 - 70n/s	£565.00

ST93C06B1 Serial Access EEPROM

SGS-Thomson

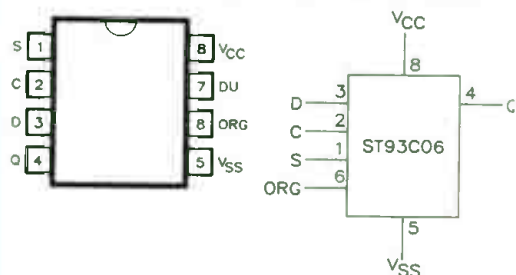
A 256-bit, Electrically Erasable Programmable Read Only Memory (EEPROM) fabricated with a high endurance, single polysilicon CMOS technology. The memory is accessed by a simple serial interface for machines which support the microwire bus topology. The 256-bit memory is divided into either 16 x 16-bit words or 32 x 8-bit bytes. This organisation may be selected by a signal on the ORG input.

The memory is accessed by a set of instructions which includes Read, Write, Erase All and Write All. A Read instruction loads the address of the first word/byte to be read into an internal address pointer. The data is then clocked out serially. The address pointer is automatically incremented after the data is output and it is possible, if the Chip Select input is

Continued on next page

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held high, to output a sequential stream of data words/bytes. In this way the memory can be read as a continuous data stream from 16 to 256 bits long. Programming is internally self-timed and does not require an erase cycle prior to the Write instruction.



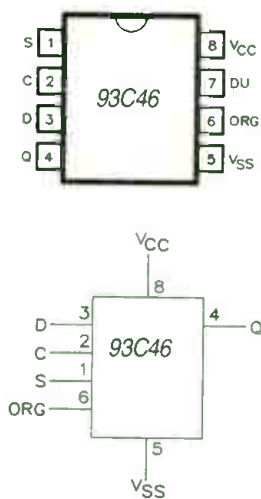
The Write instruction writes 16 or 8 bits at one time into one of the 16 words or 32 bytes. After the start of the programming cycle a Busy/Ready signal is available on the Data Output when Chip Select is High. A Power-on Data Protection feature inhibits operation when the supply is too low and is particularly useful when powering up the chip. The DU ('Don't Use') pin does not affect the function of the memory and is only provided for the manufacturer's own test sequences. For normal operation it should be left floating or connected to any voltage between V_{SS} and V_{CC} . This device offers a minimum of 1,000,000 erase/write cycles and data retention up to 10 years.

Order Code	Type	Price each
AH58N	ST93C06B1	98p

ST93C46AB1 Serial Access EEPROM

SGS-Thomson

A 1K-bit, serial access EEPROM for microwire buses divided into either 64 x 16-bit words or 128 x 8-bit bytes. The organisation may be selected by a signal on the ORG input. The memory is accessed by a set of instructions which includes Read, Write, Erase, Erase All and Write All. A Read instruction loads the address of the first word/byte to be read into an internal address pointer. The data is then clocked out serially. The address pointer is automatically incremented after the data is output and it is possible, if the Chip Select input is held high, to output a sequential stream of data words/bytes.



In this way the memory can be read as a continuous data stream from 16 to 1024 bits long. Programming is internally self-timed and does not require an erase cycle prior to the Write instruction. The Write instruction writes 16 or 8 bits at one time into one of the 64 words or 128 bytes. After the start of the programming cycle a Busy/Ready signal is available on the Data Output when Chip Select is High.

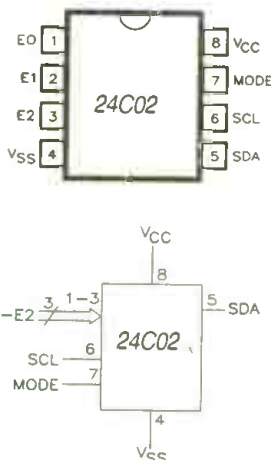
A Power-on Data Protection feature inhibits operation when the supply is too low and is particularly useful when powering up the chip. The DU ('Don't Use') pin does not affect the function of the memory and is only provided for the manufacturer's own test sequences. For normal operation it should be left floating or connected to any voltage between V_{SS} and V_{CC} . This device offers a minimum of 1,000,000 erase/write cycles and data retention up to 10 years.

Order Code	Type	Price each
AH59P	ST93C46AB1	£1.10

ST24C02AB1 Serial Access EEPROM

SGS-Thomson

A 2K-bit, serial access EEPROM for microwire buses organised as 256 x 8-bit bytes. The advanced CMOS technology guarantees an endurance of more than 1,000,000 erase/write cycles with a data retention up to 10 years. The memory is compatible with the I2C standard 2-wire, serial interface which uses a bi-directional data bus and serial clock. The I2C protocol defines any device that sends data onto the bus as a transmitter and any device that reads the data as a receiver. The device that controls the data transfer is known as the master, and the other as the slave. The ST24C02 carries a built-in 4-bit, unique-device identification code corresponding to the I2C definition. This is used with a 3-bit chip enable input to form a 7-bit memory select signal. In this way up to 8 ST24C02A's may be attached to the I2C bus and selected individually.



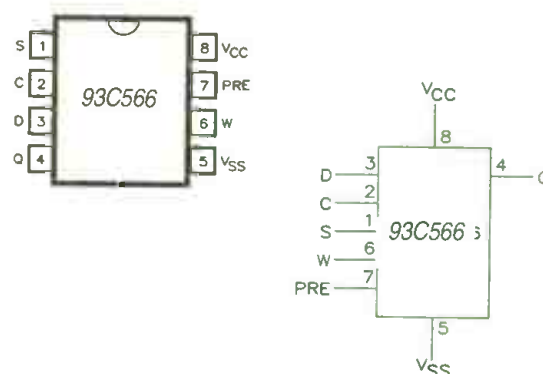
The device behaves as a slave in the I2C protocol with all memory operations synchronised by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. This is followed by a stream of 7 device select bits plus one read/write bit, and terminated by an acknowledge bit. When writing data to the memory, it responds to the 8 bits received by asserting an acknowledge bit during the 9th bit time. When data is read by the bus master, it acknowledges the receipt of the data bytes in the same way. Data transfers are terminated with a STOP condition. There are three basic modes for both read and write operations: byte write, multi-byte write and page write; current address read, random access read and sequential read.

Order Code	Type	Price each
AH60Q	ST24C02AB1	£1.65

ST93C566B1 Serial Access EEPROM

SGS-Thomson

A 4K-bit, serial access EEPROM for microwire buses organised as 256 x 16-bit words. The memory is accessed by a set of instructions which includes Read, Write, Page Write and Write All and other instructions used to manage memory protection. A Read instruction loads the address of the first word to be read into an internal address pointer. The data is then clocked out serially. The address pointer is automatically incremented after the data is output and it is possible, if the Chip Select input is held high, to output a sequential stream of data words. In this way the memory can be read as a continuous data stream from 16 to 4096 bits long. Up to 4 words may be written in a single program cycle using the Page Write instruction. The memory may be 'erased', or set to a predetermined pattern by using the Write All instruction. An external signal control Write Enable and a user defined area of the memory may be write protected. An external signal (PRE) enables access to the Protect Register which stores the lowest address to be write protected. Data may be permanently protected by programming an OTP bit which prevents further changes to the write protect starting address and the protect flag.

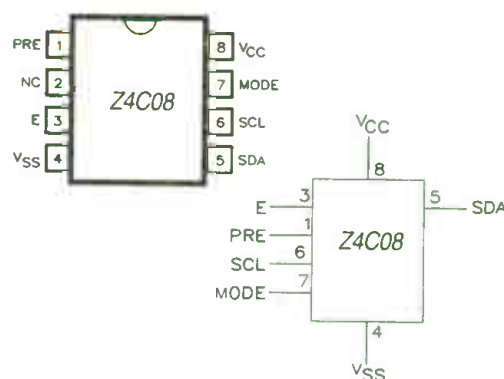


Programming is internally self-timed and does not require an erase cycle prior to the Write instruction. The Write instruction writes 16-bits at one time into one of the 256 words, the Page Write instruction writes up to 4 words of 16 bits to sequential locations, both providing that all addresses are outside the write protected area. After the start of the programming cycle a Busy/Ready signal is available on the Data Output when Chip Select is High. This device offers a minimum of 1,000,000 erase/write cycles and data retention up to 10 years.

Order Code	Type	Price each
AH61R	ST93C566B1	£2.55

ST24C08B1 Serial Access EEPROM

SGS-Thomson



An 8K-bit serial access EEPROM organised as four blocks of 256 x 8-bit bytes. It is manufactured in an advanced CMOS technology which guarantees an

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endurance of more than one million erase/write cycles with a data retention of over 10 years. The memory is compatible with the I²C bus standard, 2-wire serial interface which uses a bi-directional data bus and serial clock. The ST24C08 carries a built-in 4-bit, unique device identification code corresponding to the I²C bus definition. This is used together with a chip enable input to form a 5-bit memory select signal. In this way up to 2 ST24C08's may be attached to the I²C bus and selected individually.

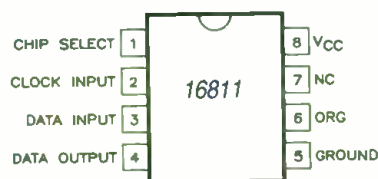
The device behaves as a slave in the I²C protocol with all memory operations synchronised by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. This is followed by a stream of 7 device select bits plus one read/write bit, and terminated by an acknowledge bit. When writing data to the memory, it responds to the 8 bits received by asserting an acknowledge bit during the 9th bit time. When data is read by the bus master, it acknowledges the receipt of the data bytes in the same way. Data transfers are terminated with a STOP condition.

Data in the upper block of the memory may be write protected, and this area may be programmed to start on any 16 byte boundary. Protection is enabled by setting a memory bit flag and the PRE signal input. There are three basic modes for both read and write operations: byte write, multi-byte write and page write; current address read, random access read and sequential read.

Order Code	Type	Price each
AH62S	ST24C08B1	£3.35

MSM16811RS 1024 Bit Serial EEPROM

OKI



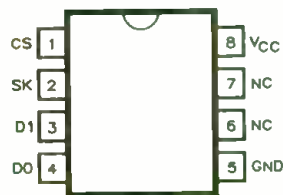
An electrically erasable and programmable read only memory (EEPROM or E²PROM). The user can select a memory organisation of 128 x 8 bits by connecting pin 6 to ground, or 64 x 16 bits with pin 6 open or connected to V_{CC}. The device has 7 operating modes: read; erase individual byte or word; write individual byte or word; enable programming; disable programming; erase who chip; and program whole chip. Instructions, address and data bits are input at pin 3 in serial format and data can be read from pin 4 also in serial format. Pin 4 is 3-stated when no data is being output.

Specification (typical at V _{CC} = +5V)	
Supply voltage:	5V ±10%
Supply current:	3mA max
Standby current:	100µA max
Input voltage low:	<0.8V
Input voltage high:	>2V
Output voltage low:	<0.4V (TTL); <0.1V (CMOS)
Output voltage high:	>2.4V (TTL); >4.9V (CMOS)
Chip select time:	200ns
Data in set-up time:	400ns
Data in hold time:	400ns
Output delay:	2µs
Output delay to 3-state:	400ns
Erase/Write pulse width:	10ms
Maximum clock frequency:	250kHz

Order Code	Type	Price each
UM63T	MSM16811RS	£1.78

XLS93C43P 1024 Bit Serial EEPROM

Exel



XLS93C43P

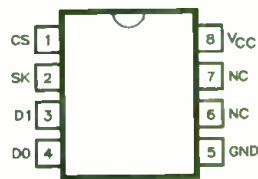
A low-cost 1024-bit, non-volatile serial EEPROM arranged as 64 registers of 16-bits each. Seven 9-bit instructions control the operation of the device, which include read, write and mode enable functions. The data output pin (DO) indicates the status of the device during the self-timed non-volatile programming cycle. The self-timed write cycle includes an automatic erase-before-write capability. Data is written in 16-bits per write instruction into the selected register. The device has full TTL compatible inputs and outputs, a 2V read capability and a typical current consumption of 1mA.

Specification	
Supply voltage:	5V ±10%
Maximum operating current	
CMOS input levels:	2mA
TTL input levels:	5mA
Standby current:	2µA maximum
Input voltage low:	<0.8V
Input voltage high:	>2V
Output voltage low:	<0.4V (TTL); <0.2V (CMOS)
Output voltage high:	>2.4V (TTL); >4.8V (CMOS)
Chip select time:	200ns
Data in set-up time:	400ns
Data in hold time:	400ns
Output delay:	2µs
Output delay to 3-state:	400ns
Write cycle time:	10ms
Maximum clock frequency	
2V supply (read only):	250kHz
5V supply:	1MHz

Order Code	Type	Price each
DC03D	XLS93C43P	82p

XLS93C56P 2048 Bit Serial EEPROM

Exel



93C56

A low-cost 2048-bit, non volatile serial EEPROM arranged as 128 registers of 16-bits each. Seven 11-bit instructions control the operation of the device, which include read, write and mode enable functions. The data output pin (DO) indicates the status of the device during the self-timed non-volatile programming cycle. The self-timed write cycle includes an automatic erase-before-write capability. Data is written in 16-bits per write instruction into the selected register. The device has full TTL compatible inputs and outputs, a 2V read capability and a typical current consumption of 1mA.

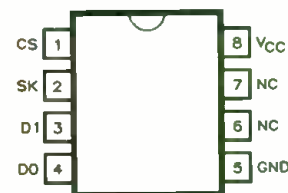
Specification	
Supply voltage:	5V ±10%
Maximum operating current	
CMOS input levels:	2mA
TTL input levels:	5mA
Standby current:	2µA maximum
Input voltage low:	<0.8V
Input voltage high:	>2V
Output voltage low:	<0.4V (TTL); <0.2V (CMOS)

Output voltage high:	>2.4V (TTL); >4.8V (CMOS)
Chip select time:	200ns
Data in set-up time:	400ns
Data in hold time:	400ns
Output delay:	2µs
Output delay to 3-state:	400ns
Write cycle time:	10ms
Maximum clock frequency	
2V supply (read only):	250kHz
5V supply:	1MHz

Order Code	Type	Price each
DC04E	XLS93C56P	£2.65

XLS93C66P 4096-Bit Serial EEPROM

Exel



XLS93C66P

A low-cost 4096-bit, non-volatile serial EEPROM arranged as 256 registers of 16-bits each. Seven 11-bit instructions control the operation of the device, which include read, write and mode enable functions. The data output pin (DO) indicates the status of the device during the self-timed non-volatile programming cycle. The self-timed write cycle includes an automatic erase-before-write capability. Data is written in 16-bits per write instruction into the selected register. The device has full TTL compatible inputs and outputs, a 2V read capability and a typical current consumption of 1mA.

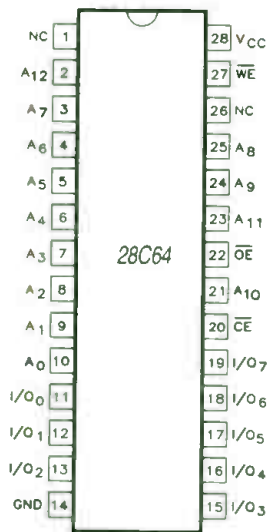
Specification	
Supply voltage:	5V ±10%
Maximum operating current	
CMOS input levels:	2mA
TTL input levels:	5mA
Standby current:	2µA maximum
Input voltage low:	<0.8V
Input voltage high:	>2V
Output voltage low:	<0.4V (TTL); <0.2V (CMOS)
Output voltage high:	>2.4V (TTL); >4.8V (CMOS)
Chip select time:	200ns
Data in set-up time:	400ns
Data in hold time:	400ns
Output delay:	2µs
Output delay to 3-state:	400ns
Write cycle time:	10ms
Maximum clock frequency	
2V supply (read only):	250kHz
5V supply:	1MHz

Order Code	Type	Price each
DC05F	XLS93C66P	£5.95

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28C64 64K EEPROM

SEEQ



An 8192 x 8 bit electrically erasable and programmable read only memory (EEPROM or E²PROM). The chip can be written to at least 10,000 times per byte and data retention is at least 10 years with power off. There are five operational modes: Read; Standby; Write; Write inhibit; and Chip erase. The chip has power up/down protection circuitry and low power operation.

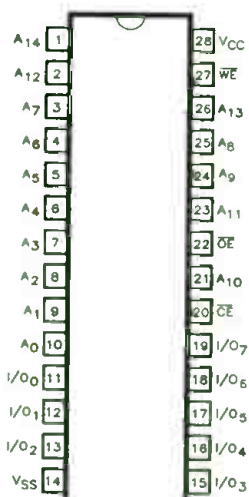
Specification (typical at V_{CC} = +5V)

Supply voltage: 5V ±10%
 Supply current: <50mA
 Standby current: <2mA
 Read cycle time: 250ns
 Access time: 250ns
 Write cycle time: <10ms

Order Code	Type	Price each
UM62S	28C64 250ns	£7.95

XLS28C256AP-15 32K x 8 Bit EEPROM

Exel



XLS28C256AP-15

A 32K x 8-bit CMOS EEPROM, that is operationally compatible with industry standard 256K devices, but with read access times of 150ns, and a stand-by current consumption of less than 100µA. The device features a page-wide input buffer and improved protection against inadvertent writes. By providing complete and automatic control of the non-volatile write cycle, the need for external timers, latches, high voltage generators etc. is eliminated. The fully automatic 64-byte page write allows the entire memory to be programmed in less than 0.65s. To add to system performance, internal latches for address and data, free the system bus during the 5ms self-timed, non-volatile write period. The device fits standard SRAM sockets and responds to typical SRAM write commands.

Specification

Supply voltage: 5V ±10%
 Supply current: 2mA max. (CMOS); 60mA max. (TTL)
 Standby current: 150µA
 Input voltage low: <0.8V
 Input voltage high: >2V
 Output voltage low: <0.4V (TTL); <0.2V (CMOS)
 Output voltage high: >2.4V (TTL); >4.8V (CMOS)
 Chip select time: 200ns
 Data in set-up time: 400ns
 Data in hold time: 400ns
 Output delay: 2µs
 Output delay to 3-state: 400ns
 Read cycle time: 150ns
 Write cycle time: 5ms

Order Code	Type	Price each
DC06G	XLS28C256P	£22.85

M2716-1F1 16K Erasable, Programmable Read Only Memory

SGS-Thomson

A 16,384-bit electrically programmable and ultra-violet erasable read only memory (EPROM) organised as 2048 x 8-bit words. The IC operates on a single +5V supply in read mode. Access time is 350ns and the IC is fully static. The

outputs are 3-state and inputs and outputs are TTL compatible. Programming is achieved by applying +25V to pin 21 and with the address and data lines stable apply a +5V pulse to pin 18. Note that only one pulse is required for each location. A transparent window on top of the IC allows the user to erase the bit pattern by exposing the chip to ultraviolet light at 253.7nm with an incident energy of 15W-seconds/cm². Thus with a 12mW/cm² UV tube and the device positioned one inch from it and with no intervening filter or glass, the IC will be completely erased in about 20 minutes.

Order Code	Type	Price each
QQ07H	M2716-1F1 350ns	£6.99

M2732A-2F1 32K Erasable, Programmable Read Only Memory

SGS-Thomson

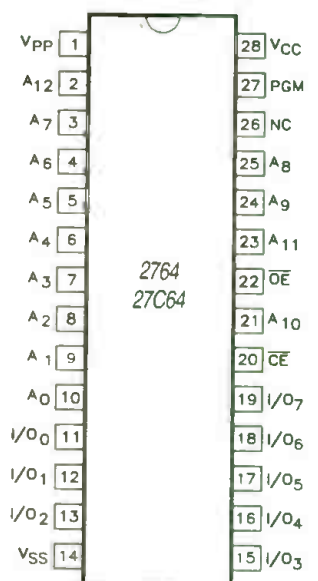
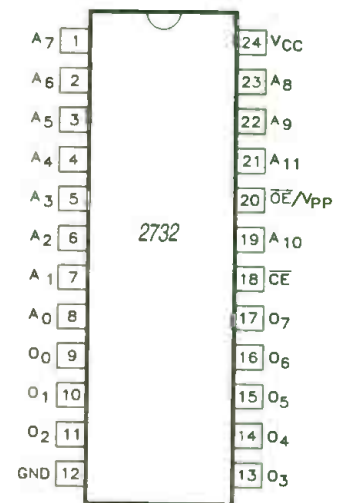
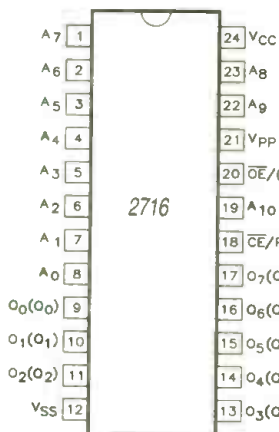
A 32,768-bit electrically programmable and ultra-violet erasable read only memory (EPROM) organised as 4096 x 8-bit words. The IC operates on a single +5V supply in read mode. Access time is 200ns and the IC is fully static. The outputs are 3-state and inputs and outputs are TTL compatible. Programming is achieved by applying +21V to pin 20 and with the address and data lines stable apply a +5V pulse to pin 18. Note that only one pulse is required for each location. A transparent window on top of the IC allows the user to erase the bit pattern by exposing the chip to ultraviolet light at 253.7nm with an incident energy of 15W-seconds/cm². Thus with a 12mW/cm² UV tube and the device positioned one inch from it and with no intervening filter or glass, the IC will be completely erased in about 20 minutes.

Order Code	Type	Price each
UH88V	M2732A-2F1 200n	£7.35

M2764AF1 64K Erasable, Programmable Read Only Memory

SGS-Thomson

A 65,536-bit electronically programmable and ultra-violet erasable read only memory (EPROM) organised as 8192 x 8-bit words. The IC operates on a single +5V supply in read mode. Access time is 250ns and the IC is fully static. The outputs are 3-state and inputs and outputs are TTL compatible. Programming is achieved by applying +12.5V to pin 21 and with the address and data lines stable apply an active low pulse to pin 27. Note that only one pulse is required for each location. A transparent window on top of the IC allows the user to erase the bit pattern by exposing the chip to ultra violet light at 253.7nm with an incident energy of 15W-seconds/cm². Thus with a 12mW/cm² UV tube and the device positioned one inch from it and with no intervening filter of glass, the IC will be completely erased in about 20 minutes.



Order Code	Type	Price each
QQ09K	M2764AF1 250ns	£5.85

M27C64A-2F1 64K CMOS EPROM

SGS-Thomson

Identical to the 2764 above, but offering a much lower power supply current, and very low standby current. 200ns access time.

Order Code	Type	Price each
UH43W	M27C64A-2F1	£4.99

M27128AF1(250ns) 128K Erasable, Programmable Read Only Memory

SGS-Thomson

A 131,072-bit electrically programmable and ultra-violet erasable read only memory (EPROM) organised as 16,384 x 8-bit words. The IC operates on a single +5V supply in read mode. Access time is 250ns and the IC is fully static. The outputs are 3-state and inputs and outputs are TTL compatible. Programming is achieved by applying +12.5V to pin 1 and with the address and data lines stable apply an active low pulse to pin 27. Note that pin 22 must also be high. A transparent window on top of the IC allows the user to erase the bit pattern by exposing the chip to ultra-violet light at 253.7nm with an incident energy of 15W-seconds/cm².

Thus with a 12mW/cm² UV tube and the device positioned one inch from it and with no intervening filter or glass, the IC will be completely erased in about 20 minutes.

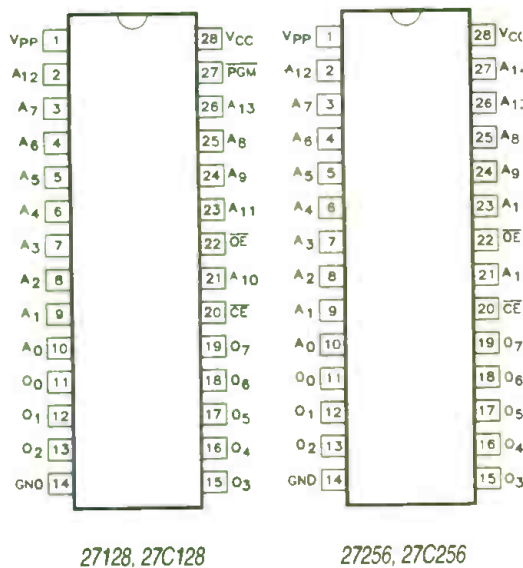
Order Code	Type	Price each
YH88V	M27128AF1 250ns	£4.75

TMS27C128-15JL 128K CMOS EPROM

Texas Instruments

Similar to the 27128 above, but offering a much lower power supply current and very low standby current. Access time is 150ns.

Order Code	Type	Price each
UH95D	TMS27C128-15JL	£4.95



M27C256B-12XF1 256K CMOS EPROM

SGS-Thomson

Similar to the 27256, but offering a much lower power supply current (30mA max) and very low standby current. Access time is 120ns.

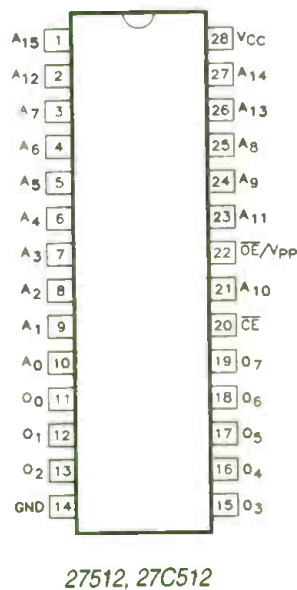
Order Code	Type	Price each
UH44X	M27C256B-12F1	£5.25

M27512 F1 512K Erasable, Programmable Read Only Memory

SGS-Thomson

A 65,536 x 8-bit ultra-violet erasable PROM, featuring 250ns access time and high performance programming at only 12.5V. Inputs and outputs are TTL compatible in read and program modes. For read operation V_{CC} and V_{PP} must be +5V ±5%. Supply current is 90mA, standby 20mA typical. For programming mode, V_{CC} must be taken to 6V ±0.25V and V_{PP} to 12.5V ±0.3V. With address and data stable (2µs) a 1ms ±5% active low pulse is applied to pin 20. An average program time is 6 minutes per chip. The erase procedure and timings are the same as for the 128K EPROM.

Order Code	Type	Price each
UH42V	M27512F1 250ns	£8.45



M27C512-15XF1 512K CMOS EPROM

SGS-Thomson

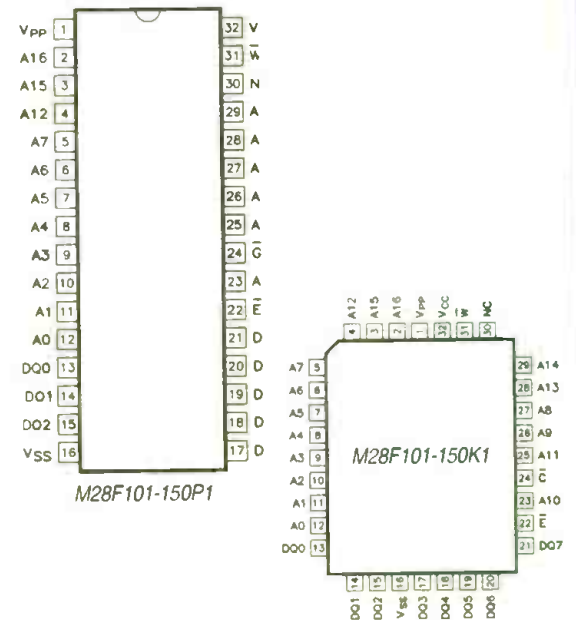
Similar to the 27512, but offering a much lower power supply current (30mA max) and very low standby current. Unlike the 27512 the programming voltages are V_{PP} = 12.75V ±0.25V and V_{CC} = 6.25V ±0.25V. Access time is 150ns.

Order Code	Type	Price each
UM57M	M27C512-15XF1	£6.45

M28F101 1M-bit Flash Memory

SGS-Thomson

A non-volatile memory which may be electrically erased at chip level, and is organised into 128K bytes of 8 bits. It uses a command register architecture to select the operating modes, thus providing a simple microprocessor interface. It is suitable for applications where the memory has to be reprogrammed while installed in the equipment. The IC operates from a single 5V supply and has an access time of 150ns, making it suitable for high speed microprocessor systems.



The M28F101 employs a technology similar to a 1M-bit EPROM, but includes electrical erase and programming, managed by a command register. These depend on a V_{PP} program voltage, if this is less than 6.5V then the command register is disabled and the device behaves as a ROM. When V_{PP} is raised to 12V the command register is enabled and both read and write operations may be performed. Commands may be written to the register to set-up then execute erase, erase verify, program, program verify and reset operations. Each mode begins with a write operation to set-up the command, followed by either read or write operations. The device always expects first cycle to be a write operation to the register and does not corrupt data in the memory. Read mode can be set-up with one cycle and followed by any number of read cycles to output the data. Electronic Signature Read mode is also set-up with one cycle, followed by a read cycle to output the manufacturer or device codes. For erase mode, the memory should first be programmed with 00H, then erased with FFH. The Erase Verify command can then be used to read the memory byte by byte for a content of FFH. Erasure of the whole chip can be done within 1 second. Typical byte programming time is 10µs (or a succession of 10µs pulses, up to a maximum of 25). Two versions are available, suffix K1 is supplied in PLCC package, while P1 is in 32-pin DIL package.

Order Code	Type	Price each
KU72P	M28F101-150K1	£14.99
KU73Q	M28F101-150P1	£14.99

M27256F1 (250ns) 256K Erasable, Programmable Read Only Memory

SGS-Thomson

A 32,768 x 8 bit ultra-violet erasable PROM, featuring 250ns access time and high-performance programming at only 12.5V. Inputs and outputs are TTL compatible in READ and program modes. For READ operation, V_{CC} and V_{PP} must be +5V ±5%. Supply current is 105mA max. (45mA typical), standby 40mA max. For programming mode, V_{CC} must be taken to 6V ±0.25V and V_{PP} to 12.5V ±0.3V (NOT 21V). With address and data stable (2µs), a 1ms ±5% active low pulse is applied to pin 20. An average program time is 1 1/4 minutes per chip. The erase procedure and timings are the same as for the 128K EPROM.

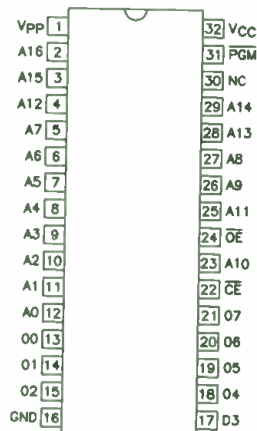
Order Code	Type	Price each
QY75S	M27256F1 250ns	£5.75

COMPARE OUR PRICE & QUALITY – SAVE MONEY TODAY!

M27C1001-15XF1 1M CMOS EPROM

SGS-Thomson

A 131,072 x 8 bit ultra-violet erasable PROM featuring 150ns access time. For READ operation, V_{CC} and V_{PP} must be +5V \pm 5%. Supply current is 35mA max, and standby current 200 μ A max. For programming mode, V_{CC} must be taken to 6.25V \pm 0.25V and V_{PP} to 12.75V \pm 0.25V. The erasure procedure and timings are the same as for the 128K EPROM. Programming can be completed in 12 seconds. 150ns access time.



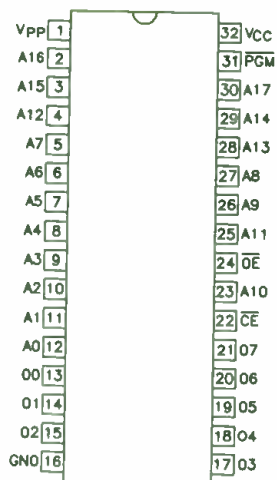
27C1001

Order Code	Type	Price each
UM58N	M27C1001-15XF1	£8.45

M27C2001-15XF1 2M CMOS EPROM

SGS-Thomson

A 262,144 x 8 bit ultra-violet erasable PROM, featuring 150ns access time. For READ operation, V_{CC} and V_{PP} must be +5V \pm 5%. Supply current is 35mA max, and standby current 200 μ A max. For programming mode, V_{CC} must be taken to 6.25V \pm 0.25V and V_{PP} to 12.75V \pm 0.25V. The erasure procedure and timings are the same as for the 128K EPROM. Programming can be completed in 24 seconds.



27C2001

Order Code	Type	Price each
UM59P	M27C2001-15XF1	£14.99

M27C4001-15XF1 4M CMOS EPROM

SGS-Thomson

A 524,288 x 8 bit ultra-violet erasable PROM, featuring 150ns access time. For READ operation, V_{CC} and V_{PP} must be +5V \pm 5%. Supply current is 70mA max, and standby current 100 μ A max. For programming mode, V_{CC} must be taken to 6.25V \pm 0.25V and V_{PP} to 12.75V \pm 0.25V. The erasure procedure and timings are the same as for the 128K EPROM. Programming can be completed in 48 seconds.



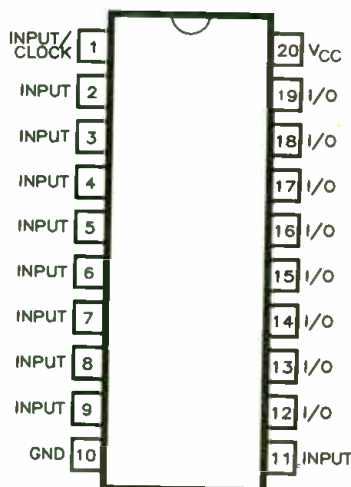
Order Code	Type	Price each
UM60Q	M27C4001-15XF1	£23.15

Programmable Electrically Erasable Logic Arrays

Ami-Gould

Programmable electrically erasable logic arrays, also known as PEELs, that provide a high performance, low power, reprogrammable and architecturally flexible alternative to conventional programmable logic devices (PLDs). Designed in advanced CMOS E²PROM technology, the performance of PEEL rivals the speed parameters of standard bipolar PLDs with a dramatic improvement in power consumption. Three different devices are available.

18CV8P-15



18CV8-15

The 18CV8 is similar to earlier PLDs to the extent that it utilises a sum-of-products logic array in a programmable-AND fixed-OR structure. This familiar logic arrangement allows user defined output functions to be created by programming the connection of input signals into the array. What makes the architecture of the PEEL 18CV8 different, however, is the increased capability and flexibility it provides resulting in a higher level of equivalent gate integration and a simplification of design. The 18CV8 provides up to 18 inputs and 8 outputs for use. At the core is a programmable electrically

erasable 'AND array' of 36 input lines by 74 product terms. The 36 input lines are derived from the true and complements of the 18 possible input pins.

The 74 product terms are made up of 1 synchronous preset term, 1 asynchronous clear term, 8 output enable terms and 64 terms divided into groups of 8, each feeding into an OR function.

Each OR function is directly associated with one of eight macro cells and I/O pins. An individual macro cell can be programmed into one of twelve different configurations. Depending on the configuration, the output of the macro cell can be fed back into the array or output via its associated I/O pin. The configurations include various arrangements for bidirectional I/O, registered or combinational feedback, registered or combinational output and output polarity control. The output enable term of each I/O pin can be used to force a high impedance state for bidirectional I/O operations or for dedicated input usage. The synchronous preset and asynchronous clear terms and clock, are globally routed to all macro cells.

The logic array of the 18CV8 can be organised into 36 input lines comprising: 10 true and complement inputs, and 8 true and complement inputs/feedbacks. The 74 product terms can form 64 product terms (8 x 8 sum-of-products form), 8 output enable product terms, 1 synchronous preset term and 1 asynchronous clear term all at the same time.

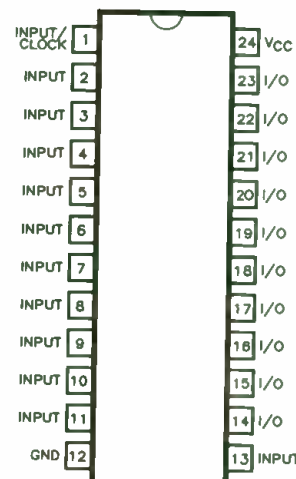
Order Code	Type	Price each
GX44X	18CV8P-15	£2.35

20CG10P-25

The 20CG10 has twelve dedicated inputs and 10 I/Os providing up to 22 inputs and 10 outputs for the creation of logic functions. At the core of the device is the programmable electrically erasable AND array which drives a fixed OR array. With these the 20CG10 can implement up to 10 sum-of-products logic expressions.

Associated with each of the 10 OR functions is an I/O macro cell which can be independently programmed to one of 12 different configurations. The programmable macro cells allow each I/O to create sequential or combinational logic functions of active-high or active-low polarity, while providing three different feedback paths into the AND array.

This array allows 44 input lines, of which 24 can carry the true and complement of the signals applied to the 12 input pins, 20 additional lines carrying the true and complement values of feedback or input signals from the 10 I/Os, and 92 product terms, comprising 80 (8 per I/O) used to form logical sums, 10 output enable terms, one for each I/O, 1 global synchronous preset term and 1 global asynchronous clear term.

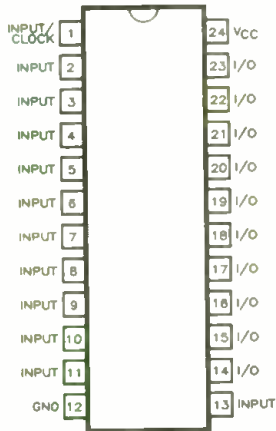


20CG10P-25

Order Code	Type	Price each
GX46A	20CG10P-25	£4.99

22CV10P-15

The 22CV10 is the same as the 18CV8 but has a total of 10 macro cells, and the programmable AND array is capable of forming 44 input lines. Comprising 24 input lines carrying the true and complement of the signal applied to the 12 input pins. 20 additional lines carry the true and complement values of feedback or input signals from the 10 I/Os. 132 product terms form 120 terms arranged as groups of 8, 10, 12, 14 and 16, used to form logical sums; 10 output enable terms, one for each I/O; 1 global synchronous preset term and 1 global asynchronous clear term.



22CV10P-15

Order Code	Type	Price each
GX45Y	22CV10P-15	£8.99

EPROM Programmer EPP1-F

Features

- * Low cost
- * Integral 240V AC 50Hz PSU
- * Connects to any computer with RS232 port and terminal software

An EPROM programmer that will program PROMs, EPROMs and EEPROMs up to 1M-bit. The EPROMs are programmed by inserting them into the 28-pin Zero Insertion Force socket on top of the case. The Programmer contains a single chip microcomputer which can be controlled easily from a terminal connected over an RS232 serial link at seven different baud speeds up to 19200. The Programmer has 9 commands which are used to communicate with it. The EPROM type is selected by sending the Programmer a 16-bit number to inform it about the type of EPROM. IBM PC compatible software is included, and a 3½in. disk containing text files with a



comprehensive range of EPROMs listed with their 16-bit selection codes. The source code files are sent from the host computer to the Programmer which supports Motorola s1f, s2f and s3f data formats. A simple program for writing to EPROMs is supplied on the disk, and allows for editing and file storage. The software is certainly equipped enough to get you programming devices straight away. Options for checking the EPROMs are empty are also supported through the programmer software. The Programmer supports the 27 series EPROMs up to 1M-bit, as the 2864 type. Instructions are included as part of the

software, and from this an EPROM from a manufacturer not mentioned in the disk text file can easily be programmed. Just determine its programming characteristics and select the correct 16-bit code to be sent. Leads are not supplied; the stock number for a suitable mains lead is BW99H and a 13A plug RW67X, the serial lead required is JC13P.

Specification

Supply voltage:	230V AC
Power consumption:	45W
Power connector:	IEC Euro connector
Fuses:	2 x 225mA, slow blow
Interface:	RS232
Interface connector:	DB25 (female)
EPROM socket:	ZIF-28
Memory:	up to 1M-bit
Data formats:	Motorola s1f, s2f, s3f
Baud rate:	300, 600, 1200, 2400, 4800, 9600, 19200 (9600 def)
Data bits:	8 (bit 7 = 0)
Parity:	None, Even, Odd (Default None)
Flow control:	None, RTS/CTS, XON/XOFF (Default RTS/CTS)
Start/Stop bits:	1
Enclosure:	Anodised aluminium
Dimensions:	175 x 103 x 65mm (L x W x H)
Weight:	630g

Order Code	Type	Price each
YT58N	A2 EPP-1F	£158.99

EPROM Programmer 'EPP-2'

Features

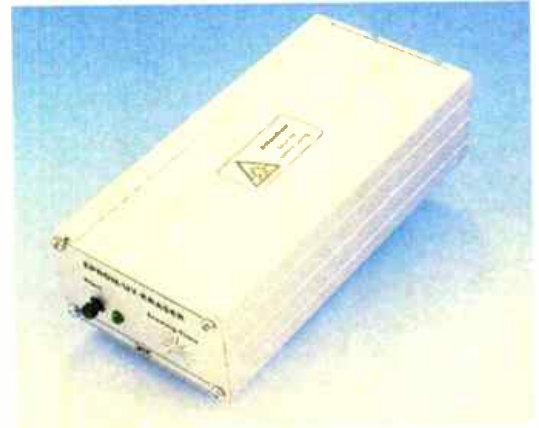
- * Mains powered
- * RS232 comms for connection to any computer



An EPROM programmer that will program PROMs, EPROMs from 2K-bytes to 512K-bytes and also (E)EPROMs. The EPROMs are programmed by inserting them into the 32-pin ZIF socket on the front panel. The programmer supports either 'Motorola.s1f', '.s2f' or '.s3f' files being used and they can be both up or downloaded to the PROM. The unit contains a single chip microcontroller and therefore is an intelligent device, which can be controlled easily from a terminal connected over an RS232 serial link. The EPP-2's command line interpreter enables the user to enter single character commands, or even multiple commands and has 16 commands which are used to communicate with it. Execution begins after a carriage return is received. The EPP-2 can program the 27 and 28 series PROMs up to 512K-bytes. Software is included for IBM PCs and compatibles, and the EPP-2 can operate from RS232 at baud speeds of up to 19200. Dimensions: 175 x 103 x 65mm; weight, 780g. Leads are not supplied. Use mains lead BW99H and 13A plug RW67X, and serial comms lead JC13P.

Order Code	Type	Price each
ZF38R	B3 EPP-2	£199.99

EPROM Eraser



A neatly styled and compact EPROM eraser with built in safety interlock and timer. The unit requires +12V DC to operate (3.5mm jack socket) and incorporates a 4W UV tube. The unit can erase two EPROMs simultaneously. The timer can be adjusted by rotating a front panel preset using a small screwdriver. The erasing cycle is initiated by pressing the start switch. A green LED indicates power ON-Stand by and Power ON-Erasing, when in standby the LED glows at half brightness and when erasing the LED glows at full brightness. Dimensions 75 x 42 x 155mm (excluding feet and controls).

WARNING: As this unit produces UV light, read safety instructions before use. When this unit is used in accordance with instructions, user will not be exposed to UV light.

Order Code	Type	Price each
YU95D	A1 Eprom Eraser	£64.99

EPROM Eraser UV Tube

A replacement 4W UV tube is available for the above EPROM Eraser.

Order Code	Type	Price each
JP43W	UV Tube	£18.99

S4 PROM Programmer



Features

- * RS232 ready
- * Ni-Cad battery powered, charger included
- * Battery backed internal data memory
- * PROM emulator lead for target system development
- * Programs 27 series EPROMs, and 28, 52, 55, 98 series FLASH EPROMs and EEPROMs

The S4 is a battery powered PROM programmer for microsystem designers, that fits into a pocket. The programmer contains 1M of RAM (upgradable to 4M) which retains data and configuration even when switched off. The RAM can be downloaded with data and manipulated either remotely from a computer via

Continued on next page

Continued from previous page

RS232 interface or directly from the keypad. The S4 can program EPROMs of the 27 series, FLASH EPROMs and most (E)EPROMs, including 28, 52, 55 & 98 series. Choose the manufacturer and device from a menu and S4 will select the algorithm to use. S4's software program comes in a supplied library ROM, which is simply placed into the 32-pin ZIF socket and then loaded. There are two ways of using S4, either by entering commands by pressing keys on the 45 colour coded rubber keypad, and reading the LCD, or by entering commands from your computer via a RS232 interface lead (not supplied). Terminal software and utilities are supplied for use with an IBM PC and S4. The S4 DRIVER program has online help and will work at speeds up to 115200 baud. The S4 can also function as a memory emulator, and if used with a cross-assembler and a computer will give you a complete microprocessor development system. S4 continuously monitors battery voltage and temperature, and can display battery charge. If the battery charger is connected and turned on, S4 will charge the batteries as necessary as internal circuitry prevents the batteries overcharging. Recharge time is about one hour, although a reasonable working capacity will be restored in much less time. Supplied with comprehensive manual, write lead (2mm plug to minihook 500mm overall length), EMU lead (ribbon cable with 32 pin DIL plug 500mm overall length), library ROM, disk with terminal driver program and utilities, and mains charger. Size: 185 x 112 x 46mm. Weight 500g.

Order Code	Type	Price each
CR11M H1	S4 Programmer	£579.99

Speedmaster 1000E PC Based Programmer

Ice Technology



- ★ Programs EPROMs, micros, programmable logic etc.
- ★ Plugs directly into standard parallel port
- ★ Emulates ROM/RAM up to 512K
- ★ Development and small/medium production
- ★ Major manufacturer approval
- ★ UK design and manufacture

The Speedmaster 1000E is an extremely versatile development tool, developed in the UK with the design engineer in mind. It offers all the facilities of a truly universal programmer Plus full ROM/RAM emulation capabilities all in one unit.

Programming features:

Extremely fast programming times, major manufacturer approval, 40-pin universal ZIF (Zero Insertion Force) socket, easy-to-use menu-driven software, supports all major file formats including Intel Hex, TekHex, extended TekHex, Motorola S records etc.

Emulation features:

Emulates ROM/RAM up to 128K (expandable up to 512K), 8 bit wide EPROMs from 2716 through to 27010 as standard (27C020,040 optional), EEPROM and RAM up to 128K RAM. Access to Speedmaster centronics control port allows a target system to access the PC (example control software

is provided). Built-in protection allows the target system to be powered down. Extremely fast download times. Hex files can be Intel Hex, Motorola S1, S2, S3, Tektronik, Extended TekHex or TI Tag.

Devices supported:

EPROMs, EEPROMs, Flash EPROMs, Serial EPROMs, NVRAMs, 8748/51 family Microprocessors, PALs, GALs, EPLDs, PEELs, AMD MACHs, National Semiconductor MAPLs, and more.

Physical Characteristics

Dimensions: 210 x 130 x 40mm
 Power supply: Mains adaptor supplied. Input 240V AC, output 17V AC, 800mA.
 Connection to PC: 25-way M-M parallel cable supplied. Operates from any standard IBM parallel port.
 Emulator cable: 34-way ribbon cable connects to programmer via IDC connector. 32-pin DIL plug connects to target system.
 Software: Supplied with programmer/emulator. Runs on any IBM compatible PC under DOS or Windows 3.1.

Order Code	Type	Price each
ZF57M	1000E Prog	£615.00

Speedmaster 8000 Gang/Set Programmer

Ice Technology

- ★ Programmes up to 8 devices simultaneously
- ★ Medium to large production runs
- ★ PC or stand-alone operation
- ★ Fast programming times
- ★ 32-pin devices as standard
- ★ Easy-to-use menu-driven software
- ★ Fail-safe device and position checking



The Speedmaster 8000 is an extremely fast gang/set EPROM programmer, which can be operated from a PC or in stand-alone mode and is a low-cost, speedy solution for the professional programming of large quantities of EEPROMs and EPROMs up to 8M-bits. The use of a PC means that there are no limitations caused by programmer memory size.

Typical programming times

8 x 2764: 2 seconds
 8 x 27010: 22 seconds

Physical Characteristics

Dimensions: 210 x 130 x 40mm
 Power supply: Mains adaptor supplied. Input 240V AC, output 17V AC, 800mA.
 Connection to PC: 25-way M-M parallel cable supplied. Operates from any standard IBM parallel port.

Order Code	Type	Price each
RC74R H	8000 Prog	£755.00

SUBSECTION 51 PROGRAMMABLE LOGIC DEVICES

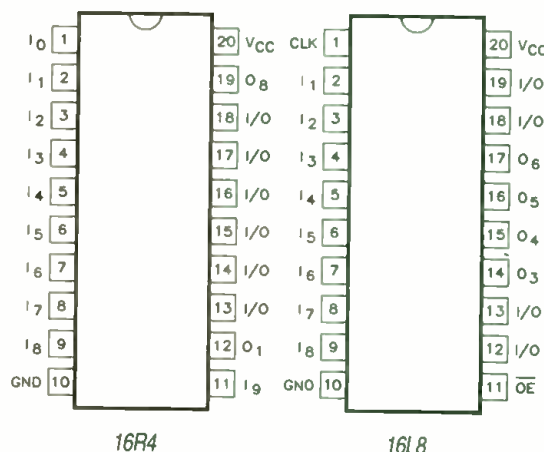
PAL16L8/R4 20-Pin TTL Programmable Array Logic

AMD

NEW

The PAL16L8 and PAL16R4 are members of AMD's standard 20-pin PAL device family. The devices provide user-programmable logic for replacing conventional SSI/MSI gates and flip-flops at a reduced chip count.

The devices allow the systems engineer to implement the design on-chip, by opening fuse links to configure AND and OR gates within the device, according to the desired logic function. Complex interconnections between gates, which previously required time-consuming layout, are lifted from the PCB and placed on silicon, where they can be easily modified during prototyping or production.



The PAL device implements the familiar Boolean logic transfer function, the sum of products. The PAL device is a programmable AND array driving a fixed OR array. The AND array is programmed to create custom product terms, while the OR array sums selected terms at the outputs. Product terms with all connections opened assume the logical HIGH state; product terms connected to both true and complement of any single input assume the logical LOW state. Registers consist of D-type flip-flops that are loaded on the LOW-to-HIGH transition of the clock. Unused input pins should be tied to V_{CC} or 0V. The PAL16L8 has 10 dedicated inputs, 6 combinatorial outputs with 7 product terms and a further 2 combinatorial outputs also with 7 product terms and I/O feedback. The PAL16R4 has 8 dedicated inputs with 4 registered outputs with 8 product terms, and 4 combinatorial outputs with 7 product terms.

Type PAL16L8ACN has a propagation delay of 25ns. Two versions of type PAL16R4 are available; PAL16R4ACN has a propagation delay of 25ns while PAL16R4BCN is 15ns.

Order Code	Type	Price each
AR00A	PAL16L8ACN	£1.29
AR01B	PAL16R4BCN	£1.79
AR02C	PAL16R4ACN	£1.29

PAL22V10 15ns TTL Versatile 10-Output PAL

AMD

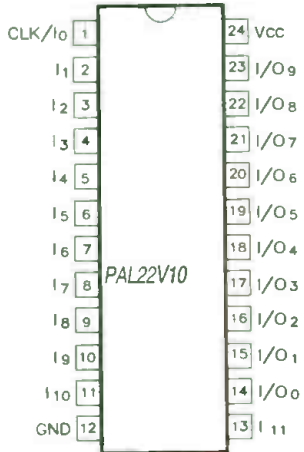
NEW

The PAL22V10 provides user-programmable logic for replacing conventional SSI/MSI gates and flip-flops at a reduced chip count.

The device implements the familiar Boolean logic transfer function, the sum of products. It comprises a programmable AND array driving a fixed OR array. The AND array is programmed to create custom product terms, while the OR array sums selected terms at the outputs.

The product terms are connected to the fixed OR array with a varied distribution from 8 to 16 across the

10 outputs and the OR sum of the products feeds the output macrocell. Each macrocell can be programmed as registered or combinatorial, and active high or active low. The output configuration is determined by two fuses controlling two multiplexers in each macrocell. The device is encapsulated in a slimline 24-pin DIL package with row spacing of 0.3in. (instead of 0.4in.), and in use has a propagation delay of 15ns.



Order Code	Type	Price each
AR03D	PAL22V10-15PC	£8.99

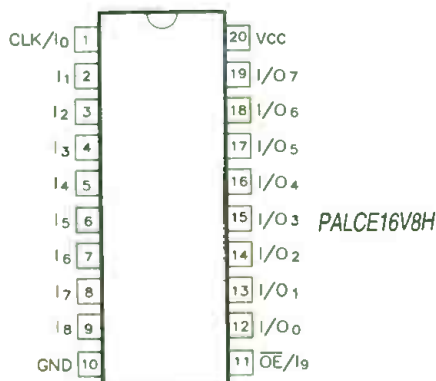
PALCE16V8H Universal Programmable and Erasable Array Logic

AMD **NEW**

The PALCE16V8 is an advanced PAL (Programmable Array Logic) device built with low-power, high-speed, electrically erasable CMOS technology. It is functionally compatible with all 20-pin GAL devices. The macrocells provide a universal device architecture, and the PALCE16V8 will directly replace other 20-pin PAL devices.

The IC utilises the familiar sum-of-products (AND/OR) architecture that allows users to implement complex logic functions easily and efficiently. Multiple levels of combinatorial logic can always be reduced to sum-of-products form, taking advantage of the very wide input gates available in PAL devices. The equations are programmed into the device through floating gate cells in the AND logic array, which can then be electrically erased prior to alterations. The erasure is much faster than that for ultraviolet erasable devices, and when a PAL is being programmed with the proprietary software and hardware, the erasing is completely transparent to the user.

The fixed OR array allows up to eight data product terms per output for logic functions. The sum of these products feeds the output macrocell. Each macrocell can be programmed as registered or combinatorial with active high or low output. The output configuration is determined by two global bits and one local bit controlling four multiplexers in each macrocell. In use, current consumption is 90 to 125mA, and the device is available with propagation delays of 15 or 25ns in a standard DIL package.



Order Code	Type	Price each
AR04E	PALCE16V8H-15PC/4	£1.49
AR05F	PALCE16V8H-25PC/4	£1.49

PALCE20V8H Universal Programmable and Erasable Array Logic

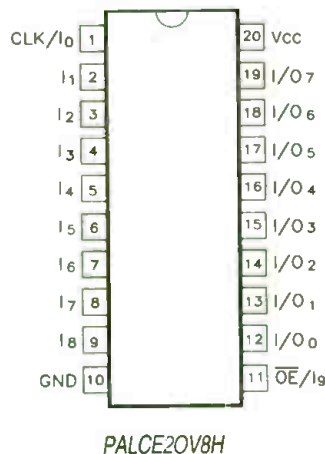
AMD **NEW**

An advanced PAL device built in low-power, high-speed, electrically erasable CMOS technology. Its macrocells provide a universal device architecture and it is fully compatible with most 24-pin combinatorial PAL devices.

Device logic is automatically configured according to the user's design specification. A design is implemented using any of a number of popular software packages, allowing automatic creation of a programming file based on Boolean or state equations. The software also verifies the design and can provide test vectors for the finished device. Programming can be accomplished on standard PAL device programmers.

The PALCE20V8 utilises the familiar sum-of-products (AND/OR) architecture that allows users to implement complex logic functions easily and efficiently. Multiple levels of combinatorial logic can always be reduced to sum-of-products form, taking advantage of the very wide input gates available in PAL devices. The equations are programmed into the device through floating gate cells in the AND logic array, which can be erased electrically.

The fixed OR array allows up to eight data product terms per output for logic functions. The sum of these products feeds the output macrocell. Each macrocell can be programmed as registered or combinatorial with an active high or low output. The output configuration is determined by two global bits and one local bit controlling four multiplexers in each macrocell. The device is encapsulated in a slimline 24-pin DIL package with row spacing of 0.3in. (instead of 0.4in.), and in use has a propagation delay of 25ns.



Order Code	Type	Price each
AR06G	PALCE20V8H-25PC/4	£1.49

PALCE22V10H Versatile Programmable and Erasable Array Logic Device

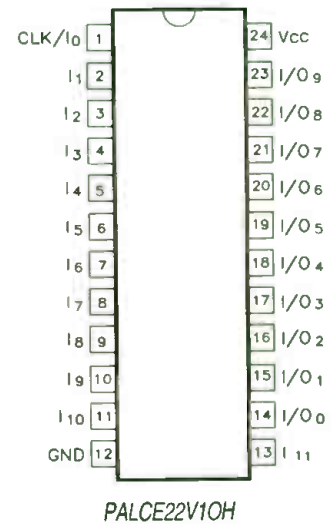
AMD **NEW**

The PALCE22V10 provides user-programmable logic for replacing conventional SSI/MSI gates and flip-flops at a reduced chip count.

The PAL device implements the familiar Boolean logic transfer function, the sum of products. The PAL device is a programmable AND array driving a fixed OR array. The AND array is programmable to create custom product terms while the OR array sums selected terms at the outputs.

The product terms are connected to the fixed OR array with a varied distribution from 8 to 16 across the outputs. The OR sum of the products feeds the output macrocell. Each macrocell can be programmed as registered or combinatorial, and be active high or low. The output configuration is determined by two bits controlling two multiplexers in each macrocell.

The device is encapsulated in a slimline 24-pin DIL package with row spacing of 0.3in. (instead of 0.4in.). Two versions are available, having propagation delays of 15ns and 25ns respectively.



Order Code	Type	Price each
AR07H	PALCE22V10H-15PC/4	£5.99
AR08J	PALCE22V10H-25PC/4	£3.99

MACH110-15/20 High-Density Programmable Logic Array

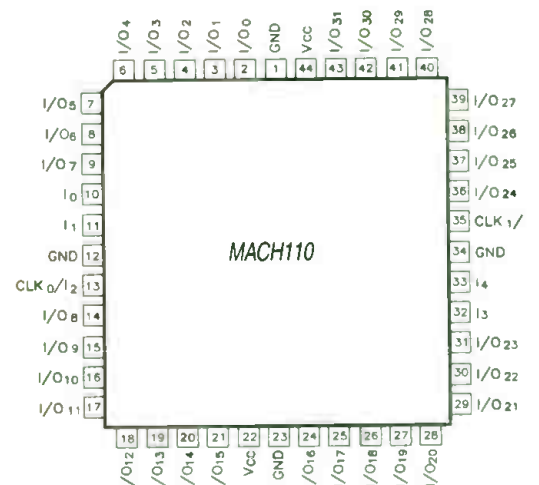
AMD **NEW**

The MACH110 is a member of AMD's high-performance, electrically programmable and erasable CMOS MACH 1 family. This device has approximately three times the logic macrocell capability of the popular PAL22V10 with no loss of speed.

The MACH110 consists of two PAL blocks interconnected by a programmable switch matrix. The two PAL blocks are essentially 'PAL22V16' structures complete with product-term arrays and programmable macrocells. The switch matrix connects the PAL blocks to each other and to all input pins, providing a high degree of connectivity between the fully-connected PAL blocks. This allows designs to be placed and routed efficiently.

The MACH110 macrocell provides either registered or combinatorial outputs with programmable polarity. If a registered configuration is chosen, the register can be configured as D-type or T-type to help reduce the number of product terms. The register type decision can be made by the designer or by the software. All macrocells can be connected to an I/O cell. If a buried macrocell is desired, the internal feedback path from the macrocell can be used, which frees up the I/O pin for use as an input.

The device is encapsulated in a 44-pin PLCC package. Two versions are available, with propagation delays of 15ns and 20ns respectively.



Order Code	Type	Price each
AR09K	MACH110-15JC	£9.99
AR10L	MACH110-20JC	£9.99

MACH210-15/20 High-Density Programmable Logic Array

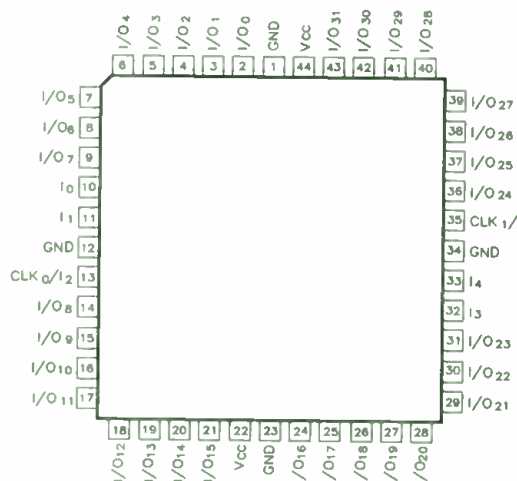
AMD

NEW

The MACH210 is a member of AMD's high-performance, electrically programmable and erasable CMOS MACH 2 device family. It has approximately six times the logic macrocell capability of the popular PAL22V10 with no loss of speed. The MACH210 consists of four PAL blocks interconnected by a programmable switch matrix. The four PAL blocks are essentially 'PAL22V16' structures complete with product-term arrays and programmable macrocells, including additional buried macrocells. The switch matrix connects the PAL blocks to each other and to all input pins, providing a high degree of connectivity between the fully-connected PAL blocks. This allows designs to be placed and routed efficiently.

The MACH210 has two kinds of macrocell: output and buried. The MACH210's output macrocell provides registered, latched or combinatorial outputs with programmable polarity. If a registered configuration is chosen, the register can be configured as D-type or T-type to help reduce the number of product terms. The register type decision can be made by the designer or by the software. All output macrocells can be connected to an I/O cell. If a buried macrocell is desired, the internal feedback path from the macrocell can be used, which frees up the I/O pin for use as an input.

The device is encapsulated in a 44-pin PLCC package. Two versions are available, with propagation delays of 15ns and 20ns respectively.



MACH210

Order Code	Type	Price each
AR11M	MACH210-15JC	£9.99
AR12N	MACH210-20JC	£9.99

PAL Device Data Book and Design Guide

AMD

NEW

A book of application notes and data providing a survey of AMD's CMOS PLDs (Programmable Logic Devices). This includes both PAL (Programmable Array Logic) devices and the more general realm of PLDs, to which PAL devices belong. With the proliferation of parts the selection of the best PLD for your application may seem difficult. If you are a new PLD user, this overview will guide you through the wide variety of different device architectures, speed, and power grades. This tutorial should increase your understanding of the basic characteristic features that make a device appropriate for a given application. 1993. 754 pages. 230 x 180mm, illustrated.

Order Code	Type	Price each
AR15R	Databook-PAL DT/DSN	£7.50 NV

MACH™ 1 and 2 Family Data Book High-Density EE CMOS Programmable Logic

AMD

NEW

This book introduces you to the new MACH (Macro Array CMOS High-density) 1 and MACH 2 families of programmable logic ICs from Advanced Micro Devices (AMD). These provide programmable logic capabilities from around 900 PLD (Programmable Logic Device) gates to 3,600 PLD gates. Included in this book is a general discussion, and final data sheets, for the MACH 1 and 2 family members.

The general discussion deals with those issues that affect the entire device family, including a brief discussion of design software used in configuring the devices. Because of the common architecture, most of the understanding of the device can come from a look at the family as a whole. Individual devices differ only in the number of resources.

The data sheets discuss items that are specific to each device. They contain the basic DC and switching specifications. Other general specifications, such as switching waveforms and endurance, follow the data sheets since they are the same for all devices.

The book concludes with the MACH device design planning guide. This section introduces you to the methodology of designing with MACH devices. It will help you select the right device and show you how to structure your designs for successful fitting within a MACH device.

1993. 176 pages. 230 x 180mm, illustrated.

Order Code	Type	Price each
AR14Q	Databook-MACH 1&2	£1.99NV

Programmable Logic Design Software

PALASM® 4 Version 1-4

AMD

NEW

PALASM 4 is a baseline PLD compiler enabling designers to configure AMD PAL® and MACH™ devices quickly, easily and effectively. PALASM offers text design entry, compilation and functional simulation of AMD PAL and MACH devices.

Easy to use, standard features include a menu-driven interface to simplify design work, on-line help to assist users in debugging designs and resolving problems, and rich documentation providing users with software and device references, recommended design strategies for MACH devices, and tutorials.

Design flexibility allows you to create your design with Boolean or state equations, use the optional capture interface for MACH-based designs, merge multiple PALASM text-based files and allow JEDEC generation for all AMD devices. The automated logic reduction and fitting feature provides automatic synthesis of user's logic, device specific optimisation routines, and automated fitting options for AMD's MACH family.

The event driven logic simulator has familiar commands to allow you to describe functions easily and generate vectors from test input.

The software supports all AMD PAL, PLS and MACH device families, and runs on an IBM PC-XT/AT or compatible having PC or MS-DOS 3.1 or higher, with 6MB of free hard disk space, and 540K or more of available conventional memory. A minimum of 1MB of extended memory is recommended for more complex designs, particularly MACH.

Order Code	Type	Price each
AR13P	AMPLDSW/PAL4B1322	£159.99

ANALOGUE/LINEAR DEVICES

Bipolar Op-Amps	707
D/A and A/D Converter ICs	773
Display Driver ICs	750
Driver and Buffer ICs	769
FET Input Op-Amps	712
Frequency Generator ICs	772
Instrumentation Amplifiers	714
Model and Remote Control ICs	741
Music and Sound Generator ICs	727
Power Amp ICs	717
Power Control and Voltage Ref ICs	752
Power Op-Amps	711
Pre-Amplifier ICs	722
Radio and TV ICs	735
Sensor ICs	747
Transconductance Op-Amps	716
Transistor Arrays	740
Voltage Comparators	716
Voltage Regulator ICs	758

44-Pin PLCC to DIL Adaptor

ICE

NEW

A plug-in adaptor to enable the 44-pin PLCC packages of the MACH 1 and 2 PAL ICs to be connected into the DIL programming socket of the Speedmaster and Micromaster range of programmers.

Order Code	Type	Price each
AR16S	AD-110/210/PLCC	£149.99

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ANALOGUE/LINEAR DEVICES

SUBSECTION 52 BIPOLAR OP-AMPS

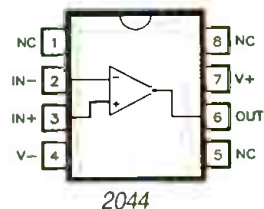
EL2044CN

Elantec

The EL2044C is a high-speed, low power, low-cost monolithic op amp built using a complementary bipolar process. It is unity-gain stable and features a 325V/μs slew rate and a 60MHz gain-bandwidth product while requiring only 5.2mA of supply current. Supply operating range is from ±18V down to as little as ±2V. For single supply operation, the device operates from 36V down to 2.5V. The excellent power supply range makes the device an obvious choice for a single +5V supply.

The EL2044C also features an extremely wide output voltage swing of ±13.6V with a supply of ±15V and a load of 1kΩ. At ±5V, output voltage swing is a wide ±3.8V into 500Ω and 3.2V into 150Ω. With a single-ended 5V supply output swing is an excellent 0.3V to 3.8V into a 500Ω load.

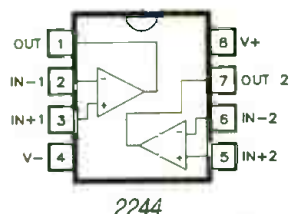
With unity gain the EL2044C has a -3dB bandwidth of 120MHz with a phase margin of 50°. It can drive unlimited load capacitance, and because of its conventional voltage feedback topology, it allows the use of reactive or non-linear elements in its feedback network. This versatility, combined with 75mA of output drive capability, makes it ideal for applications requiring low power consumption with high-speed.



Order Code	Type	Price each
AJ55K	EL2044CN	£3.25

EL2244CN

Elantec



The EL2244C is a dual version of the EL2044C and has all of the same electrical characteristics. Total supply current consumption is 10.4mA and the package is 8-pin DIL.

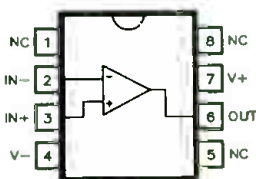
Order Code	Type	Price each
AJ56L	EL2244CN	£5.10

EL2045C

Elantec

The EL2045C is a low power, wideband, gain-of-2 stable monolithic op amp built using a high-speed complementary bipolar process. It uses a classical voltage-feedback topology which allows it to be used in a variety of applications where current-feedback amplifiers are not appropriate because of restrictions placed upon the feedback element used with the amplifier. It allows, for example, a capacitor to be placed in the feedback path, making it an excellent choice for applications such as active filters, sample-and-holds, or integrators. Similarly, because of the ability to use diodes in the feedback network the device is an excellent choice for applications such as fast log amplifiers.

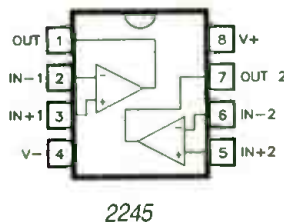
The EL2045C has a gain-bandwidth product of 100MHz while using only 5.2mA of supply current. For gains greater than 4, its closed loop -3dB bandwidth is approximately equal to the gain-bandwidth product divided by the noise of the circuit. For gains less than 4, higher-order poles in the amplifier's transfer function contribute to even higher closed loop bandwidths. The EL2045C has a -3dB bandwidth of 100MHz at a gain of +2, dropping to 20MHz at a gain of +5. This does not come at the expense of stability.



Order Code	Type	Price each
AJ57M	EL2045CN	£3.25

EL2245C

Elantec



The EL2245C is a dual version of the EL2045C and has all of the same electrical characteristics. Total supply current consumption is 10.4mA and the package is 8-pin DIL.

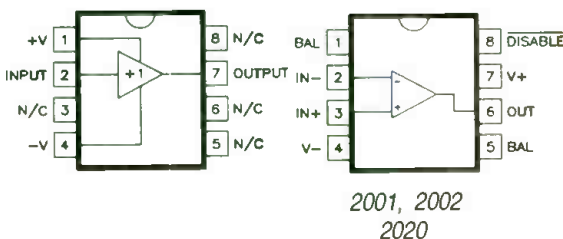
Order Code	Type	Price each
AJ58N	EL2245CN	£4.99

EL2001CN

Elantec

A low cost, high slew rate buffer amplifier for video applications. The buffer has a -3dB bandwidth of 70MHz, and can deliver 100mA yet draws only 1.3mA supply current. The device is short circuit protected, stable with capacitive loads and does not suffer from thermal runaway.

Order Code	Type	Price each
UR07H	EL2001CN	£3.99



EL2020CN

Elantec

A fast settling, wide bandwidth amplifier optimised for gains between -10 and +10. The amplifier will drive two double terminated 75Ω co-ax cables to video levels with low distortion (it can deliver ±2.4V at ±33mA into 75Ω). The device is short circuit protected and settles to 1% in 50ns for a 10V step.

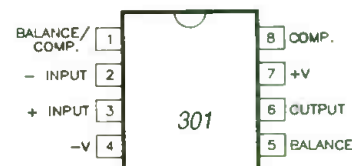
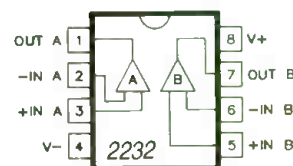
Order Code	Type	Price each
UR06G	EL2020CN	£4.65

EL2232CN

Elantec

A dual version of the EL2020CN with similar AC performance yet consuming no more power. The amplifier has a unity gain bandwidth of 60MHz and is ideal for use in video applications. The outputs can each supply 30mA and are short circuit protected.

Order Code	Type	Price each
UR10L	EL2232CN	£6.99



LM301AN

SGS-Thomson

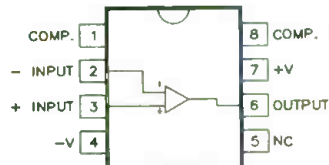
A general purpose op-amp featuring low input currents and low temperature drift on input currents. The amp is overload protected on input and output with no latch-up when the common mode range is exceeded. External compensation capacitor (33pF approx) is required for stability, but this value can be varied depending on application such that slew rates of 10V/μs and bandwidths of 10MHz can be achieved.

Order Code	Type	Price each
QH36P	LM301AN	60p

LM308N

SGS-Thomson

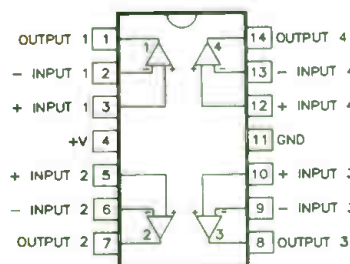
A precision op-amp featuring extremely low input currents. The circuit is directly interchangeable with the LM301AN in low frequency circuits and incorporates the same protective features. In addition it has very low power consumption making it suitable for battery operation and owing to its very high input resistance operates with less error on 10MΩ sources than a 709C with 10KΩ source.



Order Code	Type	Price each
QH37S	LM308N	98p

LM324N

SGS-Thomson

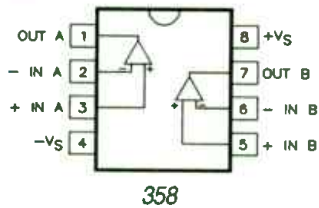


A high performance circuit containing four op-amps in one 14-pin DIL package. The amp features very low input offset and bias currents compared with μA741C. The outputs are class AB with no crossover distortion. Channel separation: 120dB at 1kHz to 20kHz.

Order Code	Type	Price each
UF26D	LM324N	45p

LM358N

SGS-Thomson



Two independent high gain internally frequency compensated op-amps designed specifically to operate from a single power supply. The output voltage can swing to ground even on single rail power supplies. Channel separation 120dB.

Order Code	Type	Price each
UJ34M	LM358N	42p

LM833N

National Semiconductor

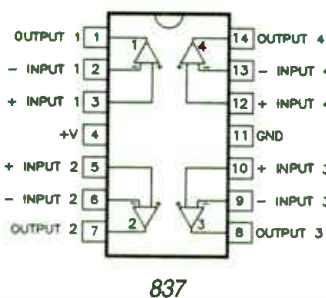


A dual op-amp designed specifically for use as sensitive pre-amps in audio circuits. The amps feature very low noise characteristics, typically 4.5nV/Hz, total harmonic distortion of 0.002% from 20Hz to 20kHz and dynamic range >140dB. Channel separation 120dB from 20Hz to 20kHz.

Order Code	Type	Price each
UF49D	LM833N	£1.40

LM837N

National Semiconductor

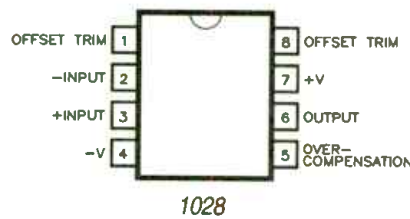


A quad op-amp designed for low noise, high speed and wide bandwidth performance. The output can drive a 600Ω load and is ideal for digital audio, graphic equalisers, pre-amplifiers and professional audio applications. It can be used to upgrade existing systems with little or no change to the circuit. The amps feature low noise 4.5nV/Hz typically, total harmonic distortion of 0.0015% from 20Hz to 20kHz, output drive capability ±40mA, and channel separation 120dB from 20Hz to 20kHz.

Order Code	Type	Price each
UL33L	LM837N	£2.50

LT1028CN8

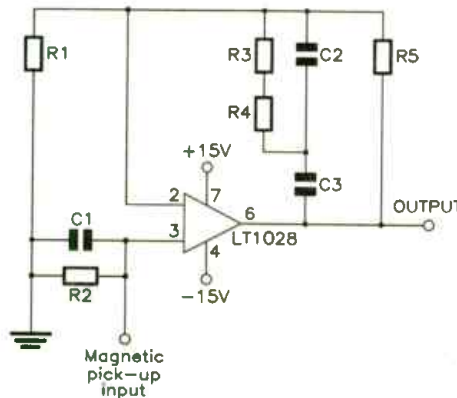
Linear Technology



A high performance op-amp that sets a new standard of excellence in noise performance only 0.9nV/Hz with low source resistances. Total harmonic distortion is less than 0.01%. The op-amp is suitable for use in high quality audio, low noise frequency synthesisers, infrared detectors etc. particularly where the source resistance is under 1kΩ.

Magnetic Cartridge Pre-amplifier Parts List

R1	Min Res 10Ω	(M10R)
R2	Min Res 47kΩ	(M47K)
R3	Min Res 750Ω	(M750R)
R4	Min Res 36Ω	(M36R)
R5	Min Res 10kΩ	(M10K)
C1	Ceramic 100pF	(WX56L)
C2	Poly Layer 0.1μF	(WW41U)
C3	Poly Layer 0.33μF	(WW47B)



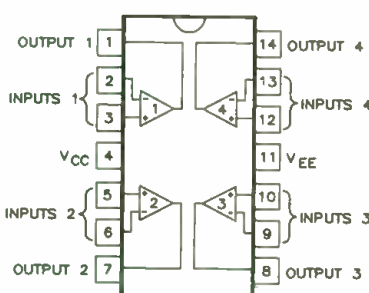
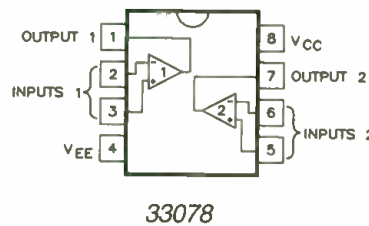
Order Code	Type	Price each
UL23A	LT1028CN8	£9.75

MC33078 & MC33079

Motorola

NEW!

A pair of high-quality bipolar op amps featuring high performance for quality audio and data signal processing applications. These amplifiers exhibit low input voltage noise with high gain bandwidth products and high slew rate. The output exhibits no dead band crossover distortion, large output voltage swing, excellent phase and gain margins, low open-loop high-frequency output impedance and symmetrical source and sink AC frequency performance. The MC33078 is a dual device, while the MC33079 is a quad device.



33079

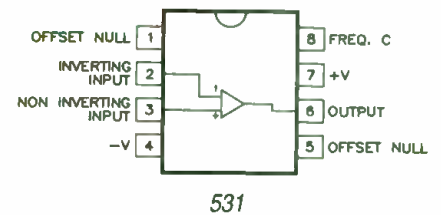
Specification

Supply voltage V_{CC} to V_{EE} , V_S :	+36V max
Input differential voltage range, V_{IDR} :	V_{EE} min, V_{CC} max
Power dissipation, P_D :	1.2W max at 25°C
Slew rate, SR:	7V/μs
Gain bandwidth product, GBW:	16MHz typ.
Total harmonic distortion, THD:	0.002%
Equivalent input noise voltage, e_n :	4.5nV/Hz

Order Code	Type	Price each
AE02C	MC33078P	99p
AE03D	MC33079P	£1.89

NE531N

Signetics

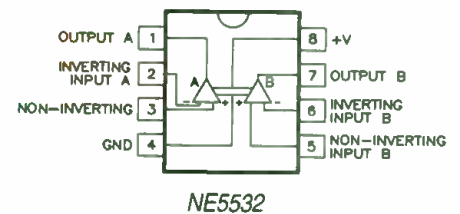


A high performance op-amp with a very high slew rate capability yet keeping the DC performance of the 741. External compensation capacitor (100pF) is required for stability, but this can be reduced to very low values (1.8pF) to give wide flat frequency responses at very high gains.

Order Code	Type	Price each
WQ54J	NE531N	£2.49

NE5532N

Signetics



A dual op-amp designed for use in high quality and professional audio equipment. The IC has a typical input noise voltage at 1kHz of 5nV/Hz. In addition it has better output drive capabilities and much higher small signal and power bandwidths than most other dual op-amps, yet is a direct pin-for-pin replacement for a 1458.

Order Code	Type	Price each
UH35Q	NE5532N	98p

NE5534AN

Signetics

Designed for use in high quality and professional audio equipment where low noise is of prime importance. The op-amp has a typical input noise voltage at 1kHz of 3.5nV/Hz. In addition it has better output drive capabilities and much higher small signal and power bandwidths than most other op-amps, yet is a direct pin-for-pin replacement for a 741.

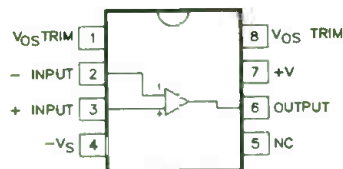
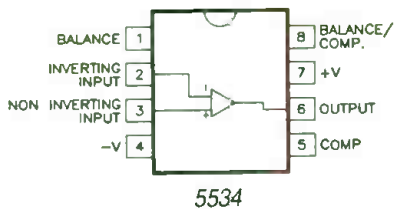
Order Code	Type	Price each
YY68Y	NE5534AN	£1.35

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Phone 01702 552941

Operational Amplifiers Specification Table Bipolar Types

	EL2001CN (JR07H)	EL2020CN (UR06G)	EL2232CN (UR10L)	LM301AN (QH36P)	LM308N (QH37S)	LM324N (UF26D)	LM358N (UJ34M)	LM833N (UF49D)	LM837N (UL33L)	LT1028CNS (UL23A)	EL2044CN (AJ55K)	EL2244CN (AJ56L)	EL2045CN (AJ57M)
Absolute max. ratings													
Voltage supply range (V_{CC})	±5V to ±15V	±18V to 36V	±18V to 36V	±5V to ±18V	±5V to ±18V	±1.5V to ±16V or 3V to 32V	±1.5V to ±15V or 3V to 30V	±5V to ±18V	±5V to ±18V	±5V to ±20V	±2V to ±18V or 2.5V to 36V	±2V to ±18V or 2.5V to 36V	±2V to ±18V or 2.5V to 36V
Power dissipation				500mW	500mW	570mW	500mW	500mW	1.2W	500mW	500mW	1W	500mW
Differential v_p volts (max)				30V	30V	32V	32V	30V	30V	±1.8V	±18V	±18V	±18V
Max input voltage, one input earthed				15V	15V	32V	32V	15V	15V	±12.2V	18V	18V	18V
Typical ratings at 25°C													
Input offset voltage	2mV	3mV	2mV	2mV	2mV	2mV	2mV	0.3mV	0.3mV	20µV	0.5mV	0.5mV	0.5mV
Input offset current	1µA	+5/-10µA	+1.2/-5µA	3nA	0.2nA	±5nA	5nA	10nA	10nA	18nA	50nA	50nA	50nA
Input bias current				70nA	1.5nA	45nA	45nA	500nA	500nA	±30nA	2.8µA	2.8µA	2.8µA
Input resistance	8MΩ	5MΩ	20MΩ	2MΩ	40MΩ					20kΩ	150Ω	150kΩ	150kΩ
Common mode rejection ratio				90dB	100dB	70dB	70dB	100dB	100dB	126dB	90dB	90dB	95dB
Supply voltage rejection ratio	75dB	75dB	80dB	96dB	96dB	70dB	100dB	100dB	100dB	132dB	80dB	80dB	85dB
Large signal voltage gain	6dB			104dB	110dB	100dB	100dB	110dB	110dB	150dB	6dB	6dB	6dB
Output voltage swing	±11V	±13V	12.5V	±13V	±14V	±14.5V	28V	±13.5V	±13.5V	±13V	±13.6V	±13.6V	±13.6V
Slew rate	2000V/µs	500V/µs	600V/µs	0.4V/µs	0.2V/µs	0.5V/µs	0.5V/µs	7V/µs	10V/µs	15V/µs	325V/µs	325V/µs	275V/µs
Unity gain bandwidth	70MHz	50MHz	60MHz	1MHz	1MHz	1MHz	1MHz	9MHz	25MHz	75MHz	60MHz	60MHz	100MHz
Full power bandwidth	70MHz			10kHz	10kHz	15kHz	10kHz	120kHz	200kHz	200kHz	5.2MHz	5.2MHz	4.4MHz
Supply current	1.3mA	9mA	9.5mA	1.8mA	0.3mA	1mA	1.5mA	5mA	10mA	7.6mA	5.2mA	10.4mA	5.2mA
Absolute max. ratings													
Voltage supply range (V_{CC})	±5V to ±18V	±5V to ±22V	±5V to ±22V	±3V to ±20V	±3V to ±20V	±9V to ±22V	±3V to ±22V	±20V to ±20V	±20V to ±20V	±3V to ±18V	±4.5V to ±5.5V	±22V to ±22V	±4V to ±11V
Power dissipation	700mW	950mW	500mW	500mW	500mW	500mW	658mW	500mW	500mW	60mW	50mW	1W	1W
Differential v_p volts (max)	±18V or V_{CC}	±18V or V_{CC}	15V	±0.5V	±0.5V	30V	0.7V	±12.3V	±14V	±30V	±V _{CC} ±0.7V	±1.2V	±11V
Max input voltage, one input earthed	±18V or V_{CC}	±18V or V_{CC}	15V	13V	13V	15V	±15V			±30V	±V _{CC} ±0.7V	±11V	
Typical ratings at 25°C													
Input offset voltage	0-15V	0-15V	2mV	0.5mV	0.3mV	60µV	30µV	30µV	50µV	4µV	8mV	20µV	
Input offset current	25nA	25nA	50nA	200nA	500nA	±1.8nA	±15nA	±15nA	1.2nA	0-3nA	1-2µA	6nA	
Input bias current	300nA	300nA	400nA	200nA	500nA	±1.8nA	±15nA	±15nA	1.2nA	0-5nA	4-5µA	15nA	
Input resistance	175kΩ	175kΩ	20MΩ	300kΩ	100kΩ	33MΩ	4MΩ	4MΩ	45MΩ	45MΩ	2-74MΩ/11pF	-	
Common mode rejection ratio	100dB	100dB	100dB	100dB	100dB	100dB	120dB	120dB	140dB	140dB	50dB	131dB	
Supply voltage rejection ratio	105dB	105dB	100dB	100dB	100dB	104dB	118dB	114dB	123dB	125dB	50dB	144dB	
Large signal voltage gain	110dB	110dB	96dB	100dB	100dB	112dB	123dB	123dB	135dB	141dB	50dB	153dB	
Output voltage swing	±13	±13	±13V	±13V	±13V	±13V	±13.5V	±13.5V	±13V	±14V	±3-1V	±13V	
Slew rate	7V/µs	7V/µs	35V/µs	9V/µs	13V/µs	0.17V/µs	2.8V/µs	13.5V/µs	0.3µs	0-3V/µs	140V/µs	2.8V/µs	
Unity gain bandwidth	16MHz	16MHz	1MHz	10MHz	10MHz	0.5MHz	8MHz	63MHz	0.6MHz	0-6MHz	350MHz	13MHz	
Full power bandwidth	120kHz	120kHz	500kHz	140kHz	200kHz	3.4kHz	34kHz	200kHz	3.4kHz	1MHz	1MHz	30kHz	
Supply current	4-1mA	8-4mA	5-5mA	10mA	4mA	2.7mA	3.5mA	3mA	1.7mA	1-3mA	4mA	3.8mA	
Absolute max. ratings													
Voltage supply range (V_{CC})	±4V to ±22V	±5V to ±18V	±5V to ±18V	±3V to ±18V	±1.25V to ±22V	±2.5V to ±18V	±1.25V to ±18V or 2.5V to 36V	±18V to ±18V	±18V to ±18V	±3V to ±18V	±3V to ±18V	±18V to ±18V	±3V to ±18V or 2.5V to 36V
Power dissipation	1W	250mW	500mW	800mW	500mW	500mW	500mW	800mW	468mW	468mW	468mW	1W	
Differential v_p volts (max)	±1.2V	5V	30V	30V	30V	36V	36V	30V	30V	0.7V	30V	±18V	
Max input voltage, one input earthed	±11V	10V	15V	15V	15V	15V	36V	15V	±15V	±15V	±15V	18V	
Typical ratings at 25°C with 2kΩ load													
Input offset voltage	20µV	2mV	1mV	1mV	1mV	1mV	2mV	0.5mV	1mV	30µV	2mV	0.5mV	
Input offset current	6nA	100nA	30nA	80nA	40nA	80nA	±30nA	5nA	30nA	5nA	5nA	50nA	
Input bias current	15nA	300nA	200nA	200nA	120nA	200nA	150nA	40nA	60nA	±7.5nA	40nA	2.8µA	
Input resistance	-	250kΩ	1MΩ	1MΩ	800kΩ	1MΩ	1MΩ	5MΩ	500kΩ	4MΩ	1MΩ	150kΩ	
Common mode rejection ratio	131dB	90dB	90dB	90dB	90dB	90dB	90dB	100dB	80dB	120dB	100dB	95dB	
Supply voltage rejection ratio	144dB	92dB	96dB	96dB	90dB	96dB	90dB	100dB	80dB	118dB	100dB	85dB	
Large signal voltage gain	153dB	93dB	104dB	104dB	104dB	104dB	100dB	110dB	100dB	118dB	110dB	6dB	
Output voltage swing	±13V	±13V	±13V	±13V	±13V	±13V	±14V	±13V	±14V	±13.8V	±14V	±13.6V	
Slew rate	7.5V/µs	0.25V/µs	0.5V/µs	0.5V/µs	0.5V/µs	0.5V/µs	1.2V/µs	1V/µs	1.6V/µs	2.7V/µs	2V/µs	275V/µs	
Unity gain bandwidth	76MHz	5MHz	1MHz	1MHz	1MHz	1MHz	40kHz	25kHz	3.5MHz	8MHz	4MHz	100MHz	
Full power bandwidth	80kHz	up to 200kHz	10kHz	10kHz	10kHz	10kHz	25kHz	25kHz	25kHz	25kHz	32kHz	4.4MHz	
Supply current	3.8mA	2.5mA	1.7mA	3mA	1.75mA	3mA	3mA	7mA	10mA	6mA	3.3mA	10.4mA	



OP-07 OP-27
OP-37 OP-47
OP-77

OP-07CNB Raytheon

A precision instrumentation grade op-amp featuring ultra-low offset voltage and very low bias currents. Low frequency noise is minimised.

Order Code	Type	Price each
RA73Q	OP-07CNB	£1.72

OP-77GP Analog Devices

An improved version of the OP-07. It can be used as a direct replacement upgrade for the OP-07, 308 and 741.

Order Code	Type	Price each
UL05F	OP-77GP	£2.70

OP-27GNB Analog Devices

An instrumentation grade op-amp featuring very low noise, wide bandwidth, high slew rate and ultra-low offset voltage. The op-amp is ideal for professional quality audio systems giving a performance adequate for the most demanding high fidelity applications. The OP-27 has an undistorted power bandwidth of 34kHz and at 8V peak-to-peak is undistorted to 100kHz. Input noise levels are typically less than 3.8nV/√Hz at 10Hz and less than 3.3nV/√Hz from 30Hz upwards.

Order Code	Type	Price each
RA74R	OP-27GNB	£3.35

OP-37GP Analog Devices

The op-amp provides the same performance as the OP-27, but with slew rate and gain-bandwidth product improved for gains greater than 5. Noise levels are also improved down to 3.5nV/√Hz at 10Hz and 3.0nV/√Hz from 30Hz upwards. Applications include microphone, tape-head and magnetic pick-up pre-amplifiers, data acquisition systems, and wide bandwidth instrumentation.

Order Code	Type	Price each
UL04E	OP-37GP	£3.95

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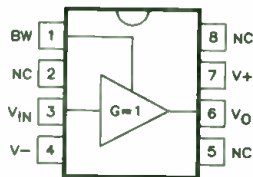
OPA177GP

Burr-Brown®

NEW

The OPA177 is a precision bipolar op amp which features very low offset voltage of 10 μ V maximum, and low drift of 0.1 μ V/ $^{\circ}$ C. The high performance and low cost make it ideally suited to a wide range of precision instrumentation, test equipment, bridge and thermocouple amplifiers.

The low quiescent current of 1.5mA, dramatically reduces warm-up drift and errors due to thermoelectric effects in input connections. It provides an effective alternative to chopper-stabilised amplifiers. The low noise of the OPA177 maintains accuracy.



OPA177

Order Code	Type	Price each
AD56L	OPA177GP	£1.52

Large signal closed-loop bandwidth (-3dB), $V_o = 2.8V_{p-p}$:

Gain = +1V/V:	340MHz
Gain = +2V/V:	350MHz
Gain = +5V/V:	260MHz
Gain = +10V/V:	210MHz
Gain = -1V/V:	360MHz
Gain = -2V/V:	330MHz

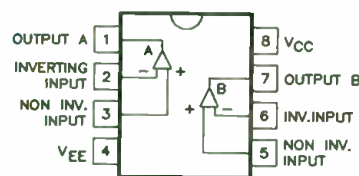
Small signal bandwidth, $V_o = 0.2V_{p-p}$:

Gain = +2V/V:	290MHz
Slew rate, gain = +2V/V, risetime = 2ns:	
$V_o = 0.2V_{p-p}$:	140V/ μ s
$V_o = 5.0V_{p-p}$:	2,100V/ μ s

Order Code	Type	Price each
AD66W	OPA623AP	£9.20

RC4227GN

Raytheon



4227

Two OP-27 op-amps in one package. It provides a superior performance for audio applications and input noise is a very low 3nV/ \sqrt Hz. Channel separation is typically 155dB.

Order Code	Type	Price each
UR18U	RC4227GN	£2.99

TLE2027CP

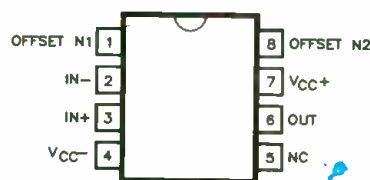
Texas Instruments

A precision op-amp offering outstanding performance, with superior specifications in almost every parameter. This competitively priced op-amp allows upgrades for systems that use lower-precision devices. The amp features low noise 2.5nV/ \sqrt Hz and total harmonic distortion <0.002%.

Order Code	Type	Price each
CP86T	TLE2027CP	£2.60

TLE2037CP

Texas Instruments



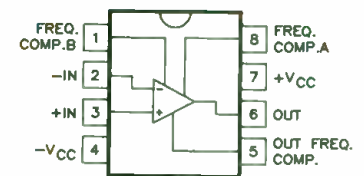
2027/2037

A decompensated version of 2027, offering a much wider frequency response and stable to a close-loop gain of 5. All other parameters are the same as 2027.

Order Code	Type	Price each
CP87U	TLE2037P	£2.60

LM1709CN

National Semiconductor



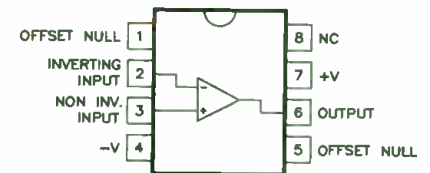
1709

A general purpose op-amp featuring wide flat frequency response capabilities at reasonably high gains owing to the input and output compensation capacitors being able to be varied.

Order Code	Type	Price each
QL20W	LM1709CN	89p

LM741CN

SGS-Thomson



741 8pin DIL

The industry standard general purpose op-amp featuring internal frequency compensation. The amp is overload protected on input and output with no latch-up if common mode range is exceeded.

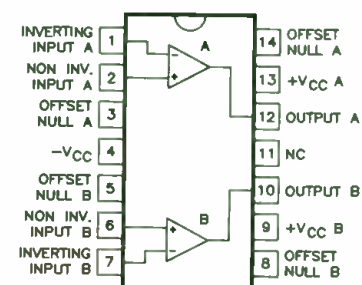
Order Code	Type	Price each
QL22Y	LM741CN	39p

LM747CN

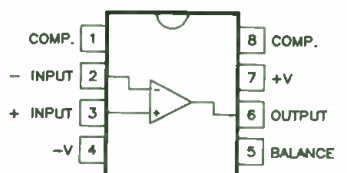
National Semiconductor

Two 741 op-amps in one 14-pin DIL package. The two amps share a common bias network and power supply leads, but otherwise are completely separate. Channel separation: 98dB at 1kHz.

Order Code	Type	Price each
QL24B	LM747CN	90p



747



748

LM748CN

National Semiconductor

A general purpose op-amp very similar to the 741, but with external frequency compensation required allowing best high frequency performance to be achieved for any gain.

Order Code	Type	Price each
QL25C	LM748CN	71p

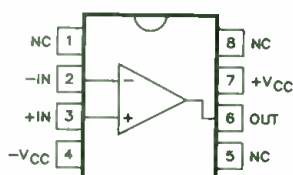
OPA623 Wideband Current-Feedback Op amp

Burr-Brown®

NEW

The OPA623 is a current-feedback op-amp designed for precision wide bandwidth signal processing for high-resolution video, RF, IF and communications equipment. The new circuit design, using complementary bipolar devices, achieves a performance previously unattainable in monolithic IC technology.

The current-feedback op-amp (an OTA block) is optimised for wide bandwidth, excellent pulse response, flat gain, low distortion and operation at a low quiescent supply current of ± 4 mA. It provides a large signal bandwidth of up to 350MHz at 2.8V pk-pk output, as well as a 2,100V/ μ s slew rate, and a gain flatness of 0.05dB over 30MHz making it suitable for HDTV designs. The output stage is capable of currents up to ± 70 mA, enabling it to drive two back-terminated 75 Ω cables when using the device as a line driver in video routers, distribution amplifiers and analogue and digital communications equipment. For most circuit configurations the device can be used like a conventional op-amp, where the feedback network connected between the output and the inverting input controls the gain, except that in the case of a current-feedback op-amp the resistor values in the network also control the open-loop gain and frequency response. These values can be selected to provide nearly constant closed-loop bandwidth over a wide adjustment range of gain versus frequency. For example, if both resistors are 300 Ω then the gain will be 6dB (2 times) and the bandwidth 350MHz.



OPA623

Specification

Supply voltage:	± 5 V
Quiescent current:	± 4 mA
Common mode input voltage range:	± 3.2 V
Common mode rejection:	50dB
Input impedance:	2.74M Ω 1pF
Input bias current:	-1.2 μ A
Input offset voltage:	± 30 mV max.

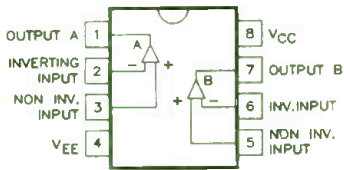
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MC1458CN

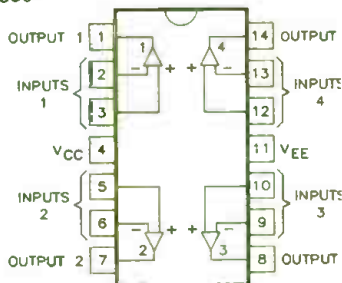
SGS-Thomson

Two 741 op-amps in one 8-pin DIL package. The two amps share a common bias network and power supply leads, but otherwise are completely separate. Channel separation: 98dB at 1kHz.

Order Code	Type	Price each
QH46A	MC1458CN	35p



1458, 4559



3403, 4156

MC3403N

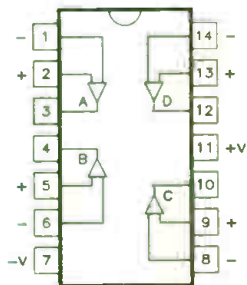
SGS-Thomson

A high performance circuit containing four op-amps in one 14-pin DIL package. The amp features a wide full power bandwidth and slew rate better than 741. The outputs are class AB with no crossover distortion. Channel separation: 120dB at 1kHz to 20kHz.

Order Code	Type	Price each
QH51F	MC3403N	59p

RC4136N

Raytheon



4136

A high performance circuit containing four op-amps in one 14-pin DIL package. The amp features low noise input transistors making it specially suitable for use in audio preamplifiers and signal processing applications. The outputs are class AB with a very low crossover distortion.

Channel separation: 123dB at 1kHz, >100dB at 20Hz to 25kHz. Total harmonic distortion typically <0.5%.

Order Code	Type	Price each
XX01B	RC4136N	86p

RC4156N

Raytheon

Four independent op-amps whose performance far exceeds that of 741 type amplifiers. With an input noise level of just 1.4µV rms, this device is the ideal choice for audio and filter applications. Channel separation is typically 108dB.

Order Code	Type	Price each
UR20W	RC4156N	£1.25

RC4559N

Raytheon

Two independent op-amps whose performance far exceeds that of 741 type amplifiers. With an input noise level of just 1.4µV rms, this device is ideal for use in low noise audio preamplifiers. The outputs can drive 600Ω loads. Total harmonic distortion is typically 0.05% and channel separation is 90dB.

Order Code	Type	Price each
UR19V	RC4559N	62p

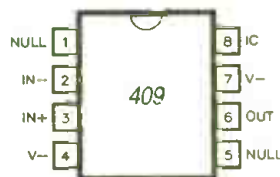
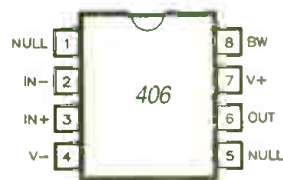
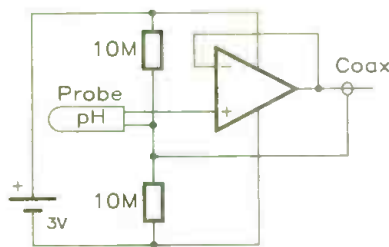
MAX406/409

Maxim

The MAX409 is a low voltage, micropower, precision op amp designed for battery operated systems. It features a 1.2µA maximum quiescent current, which represents an improvement of 15 to 20 times in supply current over industry standard micropower op amps. A unique design technique allows the device to operate at ultra-low quiescent current while maintaining linearity under loaded conditions. The output is capable of sourcing 2mA when powered by a 9V battery and drives smaller loads from a 3V battery. The total supply voltage can range from 2.5V to 10V.

The common-mode input voltage range extends from the negative rail to within 1.1V of the positive supply, and the output stage swings from rail-to-rail. The device maintains good DC characteristics, minimising the input referred errors. The output can source 2mA.

The MAX406 is a single op amp with two modes of operation: compensated mode and decompensated mode. Connecting BW (pin 8) to -V, or leaving it floating, internally compensates the amplifier. In this mode, the MAX406 is unity-gain stable with a 5V/ms typical slew rate and an 8kHz gain bandwidth. Connecting BW to +V puts the MAX406 into decompensated mode with a 20V/ms typical slew rate and a 40kHz gain bandwidth.

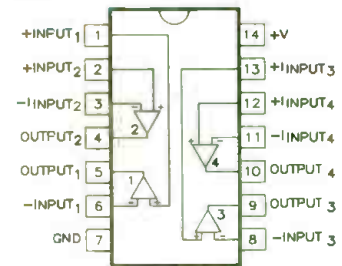


The MAX409 is a single op amp featuring 150kHz gain bandwidth and a 75V/ms slew rate, and is stable for gains of 10V/V or greater.

Order Code	Type	Price each
AY40T	MAX406	£3.99
AY38R	MAX409	£3.99

LM3900N

National Semiconductor



3900

Four dual input, internally compensated amplifiers designed primarily for single power rail operation. These current differencing amplifiers use a current mirror to achieve the non-inverting function. When driving from a low impedance source a resistor should be placed in series to limit the peak input current to less than 20mA.

Absolute max ratings
Supply voltage range: 4V to 32V or ±2V to ±16V

Power dissipation max: 570mW
Input current max: 20mA

Typical ratings at 25°C
Open loop voltage gain: 70dB
Input resistance: 1MΩ
Out resistance: 8Ω
Unity gain bandwidth: 2.5MHz
Input bias current: 30nA
Slew rate positive output swing: 0.5V/µs
Slew rate negative output swing: 20V/µs
Supply current: 6.2mA
Output voltage swing: 29 4V

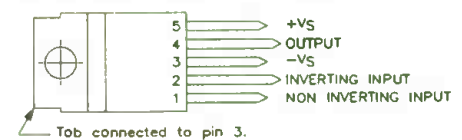
Output current capability
Source: 1.8mA
Sink: 1.3mA
Power supply rejection ratio: 70dB
Mirror gain: 1µA/µA±10%
Mirror current: 10µA (500µA max)
Negative input current: 1mA
Full power bandwidth: 35kHz

Order Code	Type	Price each
QH42V	LM3900N	£1.20

SUBSECTION 53 POWER OP-AMPS L165V

SGS-Thomson

A power op-amp for use in servo amplifiers and power supplies. The high gain and high output power capability provide superior performance wherever an op-amp and power booster combination is required.



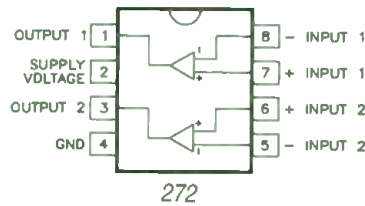
Absolute max ratings
Voltage supply range: ±6V to ±18V
Power dissipation: 20W
Differential input voltage: ±15V
Output current: 4A

Typical ratings at 25°C with V_S = ±15V
Input offset voltage: ±2mV
Input offset current: ±20nA
Input bias current: 0.2µA
Input resistance: 500kΩ
Common mode rejection ratio: 70dB
Supply voltage rejection ratio: 60dB
Large signal voltage gain: 80dB
Output voltage swing: 24V p-p
Slew rate: 8V/µs
Full power bandwidth: 50kHz
Supply current (no load): 40mA

Order Code	Type	Price each
UK66W	L165V	£2.65

L272M

SGS-Thomson



A dual power op-amp for use in a wide range of applications including servo amplifiers and power supplies, compact disc, VCR etc. Channel separation 60dB.

Absolute max ratings	272
Voltage supply range	4V to 28V
Power dissipation	1W
Differential input voltage	$\pm V_S$
Output current	1A

Typical ratings at 25°C with $V_S = 24V$	
Input offset voltage	15mV
Input offset current	50mA
Input bias current	0.3µA
Input resistance	>500kΩ
Common mode rejection ratio	75dB
Supply voltage rejection ratio	70dB
Large signal voltage gain	50dB
Output voltage swing	23V
Slew rate	1V/µs
Unity gain bandwidth	350kHz
Supply current (no load)	8mA

Order Code	Type	Price each
UJ36P	L272M	£1.56

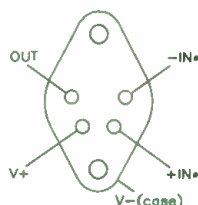
LM12CLK

National Semiconductor

A 150W power op-amp capable of driving $\pm 25V$ at $\pm 10A$ while operating from $\pm 30V$ supplies. The monolithic IC can deliver 150W of sine wave power into a 4Ω load with 0.01% distortion. The IC features input protection, controlled turn on, thermal limiting, overvoltage shutdown, output current limiting and dynamic safe area protection. Applications include operational power supplies, high voltage regulators, high quality audio amplifiers, tape-head positioners and servo control systems.

Absolute max ratings	
Voltage supply range:	$\pm 8V$ to $\pm 40V$
Power dissipation:	150W with 400in ² heatsink
Differential input voltage:	60V
Output current:	10A

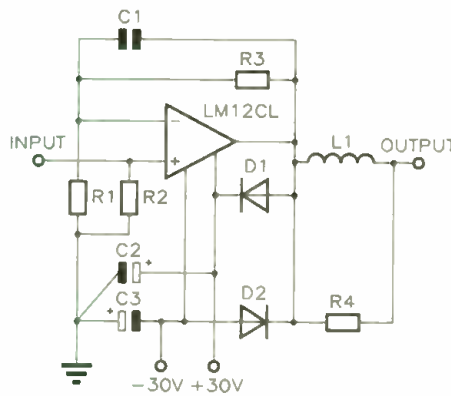
Typical ratings at 25°C with $V_S = \pm 30V$	
Input offset voltage:	2mV
Input offset current:	0.03µA
Input bias current:	0.15µA
Common mode rejection ratio:	86dB
Supply voltage rejection ratio:	90dB
Large signal voltage gain:	94dB
Slew rate:	9V/µs
Full power bandwidth:	60kHz
Supply current (no load):	60mA



View from below
* Static sensitive, do not handle

Audio Amplifier Parts List

R1	Min Res 1k1	(M1K1)
R2	Min Res 1k	(M1K)
R3	Min Res 3k3	(M3K3)
R4	7W W/W 2.2Ω	(L2R2)
C1	Polystyrene 1500pF	(BX58N)
C2,3	Snap-in 4700µF 50V	(CW74R)
D1,2	MR751	(YH96E)
L1	25 turns of 18swg enamelled copper wire wound side-by-side approx.	



Order Code	Type	Price each
UL32K	LM12CLK	£42.99

SUBSECTION 54 FET INPUT OP-AMPS CA3130E

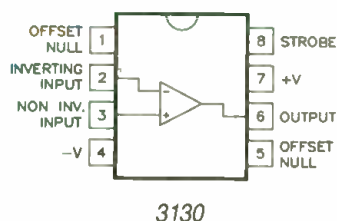
Harris

A MOS-FET input, CMOS output op-amp that will operate from a single or dual power supply, and input terminals can be swung up to 0.5V below negative rail. An external compensation capacitor between pins 1 and 8 permits adjustment of frequency/gain characteristic (typically 47pF). Offset null is achieved with 100kΩ pot between pins 1 and 5 with slider to pin 4. Max input-terminal current is 1mA. The output can be strobed.

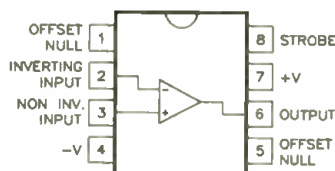
Order Code	Type	Price each
QH28F	CA3130E	95p

CA3140E & CA3240E

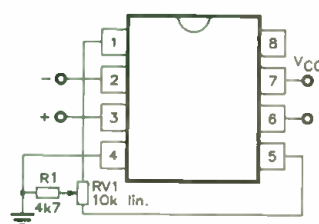
Harris



3130

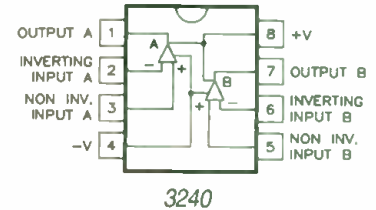


3140



3140 & 3240
Offset Null

A MOSFET input, bipolar output op-amp that will directly replace the 741 in most applications. It will operate from single or dual supply rails and input terminals can be swung up to 0.5V below negative rail. Internally compensated. Max input terminal current is 1mA. The output can be strobed. 3240 is a dual version of 3140. Both are in an 8-pin DIL package.



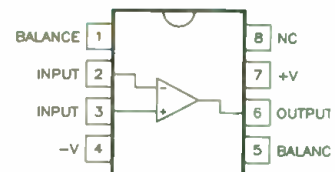
3240

Order Code	Type	Price each
QH29G	CA3140E	50p
WQ21X	CA3240E	£1.49

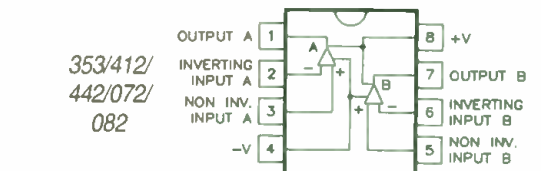
LF351N, LF353N & LF347N

SGS-Thomson

National Semiconductor



351/411/
441/041/081



353/412/
442/072/
082

Low-cost high performance J-FET input op-amps that will directly replace the 741 in most applications. The devices are low noise and have distortion figures of less than 0.02% over the audio band. It is most important that input voltages never go more negative than the negative supply voltage or the device will be destroyed. The 351 is supplied in an 8-pin DIL package as is the 353 which is a dual version and the 347 is supplied in a 14-pin DIL package and is a quad version (see page 714). Note that since the inputs are J-FET'S not MOS-FET'S no special handling is required.

Order Code	Type	Price each
WQ30H	LF351N	56p
WQ31J	LF353N	64p
WQ29G	LF347N	£1.58

LF411CN and LF412CN

National Semiconductor

High performance J-FET input op-amps similar to 351 and 353 respectively, but with very low input offset voltages and a guaranteed drift of less than 10µV/°C.

Order Code	Type	Price each
QY27E	LF411CN	£1.49
QY28F	LF412CN	£1.99

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01702 553935**

Specification Table for FET Input Op-Amp ICs

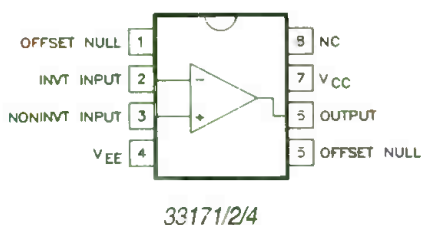
	CA3130E (QH28F)	CA3140E (QH29G)	CA3240E (WQ21X)	LF347N (WQ29G)	LF351N (WQ30Hi)	LF353N (WQ31J)	LF411CN (QY27E)	LF412CN (QY28F)	LF414CN (QY29G)	LF442CN (QY30H)	LF444CN (QY31J)
Absolute max ratings											
Voltage supply range V_{CC}	$\pm 2.5V$ to $\pm 8V$ or $5V$ to $16V$	$\pm 2V$ to $\pm 18V$ or $4V$ to $36V$	$\pm 2V$ to $\pm 18V$ or $4V$ to $36V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$	$\pm 5V$ to $\pm 18V$
Power dissipation	630mW	630mW	630mW	500mW	500mW	500mW	500mW	500mW	500mW	500mW	500mW
Differential input voltage (max)	$\pm 8V$	$\pm 8V$	$\pm 8V$	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$
Max input voltage, one input earthed	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$
Typical ratings at 25°C											
Input offset voltage	8mV	5mV	5mV	5mV	5mV	5mV	0.8mV	1mV	1mV	1mV	3mV
Input offset current	0.5pA	0.5pA	0.5pA	25pA	25pA	25pA	25pA	25pA	5pA	5pA	5pA
Input bias current	5pA	10pA	10pA	50pA	50pA	50pA	50pA	50pA	10pA	10pA	10pA
Input resistance	1.5T Ω	1.5T Ω	1.5T Ω	1T Ω	1T Ω	1T Ω	1T Ω	1T Ω	1T Ω	1T Ω	1T Ω
Common mode rejection ratio	90dB	90dB	90dB	100dB	100dB	100dB	100dB	100dB	95dB	95dB	95dB
Supply voltage rejection ratio	90dB	80dB	80dB	100dB	100dB	100dB	100dB	100dB	90dB	90dB	90dB
Large signal voltage gain	110dB	100dB	100dB	100dB	100dB	100dB	106dB	106dB	100dB	100dB	100dB
Output voltage swing	13.3V ($V_{CC} = 15V$)	13V ($V_{CC} = 15V$)	13V ($V_{CC} = 15V$)	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$	$\pm 13V$	$\pm 13V$	$\pm 13V$
Slew rate	10V/ μs	9V/ μs	9V/ μs	10V/ μs	13V/ μs	13V/ μs	15V/ μs	15V/ μs	1V/ μs	1V/ μs	1V/ μs
Unity gain bandwidth	15MHz	4.5MHz	4.5MHz	4MHz	4MHz	4MHz	4MHz	4MHz	1MHz	1MHz	1MHz
Full power bandwidth	100kHz	100kHz	100kHz	100kHz	100kHz	100kHz	100kHz	100kHz	15kHz	15kHz	15kHz
Supply current	2mA	4mA	8.4mA	7.2mA	1.8mA	3.6mA	1.8mA	3.6mA	150 μA	400 μA	800 μA

	LF13741N (YY69A)	MC33171 (AD99H)	MC33172 (AE00A)	MC33174 (AE01B)	OPA604AP (AD57M)	OPA2604AP (AD58N)	OPA124P (AD59P)	TL064CN (RA66W)	TL071CN (RA67X)	TL072CN (RA68Y)	TL074CN (RA69A)
Absolute max ratings											
Voltage supply range V_{CC}	$\pm 5V$ to $\pm 18V$	$\pm 1.5V$ to $\pm 22V$	$\pm 1.5V$ to $\pm 22V$	$\pm 1.5V$ to $\pm 22V$	$\pm 4.5V$ to $\pm 25V$	$\pm 5V$ to $\pm 25V$	$\pm 5V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$
Power dissipation	500mW	-	-	-	-	-	-	680mW	680mW	680mW	680mW
Differential input voltage (max)	$\pm 30V$	$\pm V_{CC}$	$\pm V_{CC}$	$\pm V_{CC}$	-	-	-	$\pm 30V$	$\pm 30V$	$\pm 30V$	$\pm 30V$
Max input voltage, one input earthed	$\pm 16V$	V_{EE} to $(V_{CC}-1.8V)$	V_{EE} to $(V_{CC}-1.8V)$	V_{EE} to $(V_{CC}-1.8V)$	$\pm 13V$	$\pm 13V$	$\pm 11V$	$\pm 15V$	$\pm 15V$	$\pm 15V$	$\pm 15V$
Typical ratings at 25°C											
Input offset voltage	5mV	2.5V	2.5V	2.5V	$\pm 1mV$	$\pm 1mV$	$\pm 750\mu V$	3mV	3mV	3mV	3mV
Input offset current	10pA	5nA	5nA	5nA	$\pm 3pA$	$\pm 3pA$	$\pm 5pA$	5pA	5pA	5pA	5pA
Input bias current	50pA	20nA	20nA	20nA	50pA	100pA	$\pm 5pA$	30pA	30pA	30pA	30pA
Input resistance	0.5T Ω	300M Ω	300M Ω	300M Ω	1T Ω	1T Ω	10T Ω	1T Ω	1T Ω	1T Ω	1T Ω
Common mode rejection ratio	90dB	90dB	90dB	90dB	100dB	100dB	92dB min.	95dB	76dB	76dB	76dB
Supply voltage rejection ratio	96dB	100dB	100dB	100dB	100dB	100dB	86dB min.	95dB	76dB	76dB	76dB
Large signal voltage gain	100dB	1114dB	1114dB	1114dB	100dB	100dB	106dB min.	75dB	106dB	106dB	106dB
Output voltage swing	$\pm 13V$	$\pm 14.2V$	$\pm 14.2V$	$\pm 14.2V$	$\pm 12V$	$\pm 12V$	$\pm 12V$	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$
Slew rate	0.5V/ μs	2.1V/ μs	2.1V/ μs	2.1V/ μs	25V/ μs	25V/ μs	2V/ μs	3.5V/ μs	13V/ μs	13V/ μs	13V/ μs
Unity gain bandwidth	1MHz	1.8MHz	1.8MHz	1.8MHz	20MHz	20MHz	1.5MHz	1MHz	3MHz	3MHz	3MHz
Full power bandwidth	10kHz	35kHz	35kHz	35kHz	-	-	32kHz	30kHz	100kHz	100kHz	100kHz
Supply current	2mA	180 μA	360 μA	720 μA	5.25mA	10.5mA	2.5mA	800 μA	1.4mA	2.8mA	5.6mA

	TL081CN (RA70M)	TL082CN (RA71N)	TL084CN (RA72P)
Absolute max ratings			
Voltage supply range V_{CC}	$\pm 2V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$	$\pm 2V$ to $\pm 18V$
Power dissipation	680mW	680mW	680mW
Differential input voltage (max)	$\pm 30V$	$\pm 30V$	$\pm 30V$
Max input voltage, one input earthed	$\pm 15V$	$\pm 15V$	$\pm 15V$
Typical ratings at 25°C			
Input offset voltage	5mV	5mV	5mV
Input offset current	5pA	5pA	5pA
Input bias current	30pA	30pA	30pA
Input resistance	1T Ω	1T Ω	1T Ω
Common mode rejection ratio	76dB	76dB	76dB
Supply voltage rejection ratio	76dB	76dB	76dB
Large signal voltage gain	106dB	106dB	106dB
Output voltage swing	$\pm 13.5V$	$\pm 13.5V$	$\pm 13.5V$
Slew rate	13V/ μs	13V/ μs	13V/ μs
Unity gain bandwidth	3MHz	3MHz	3MHz
Full power bandwidth	100kHz	100kHz	100kHz
Supply current	1.4mA	2.8mA	5.6mA

MC33171, MC33172 & MC33174 NEW

Motorola



A range of low-power, single supply op amps. Features include wide operating voltage range, wide bandwidth, high slew rate, large capacitance drive capability, low total harmonic distortion and output short circuit protection. The MC33171 device has a single amplifier, while the MC33172 is a dual equivalent and the MC33174 a quad equivalent.

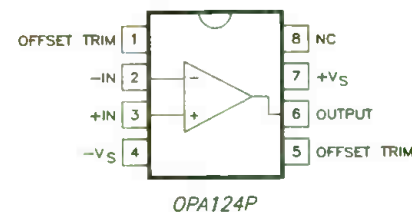
Specification

Supply voltage, V_{CC} : 3.0V to 44V, or $\pm 1.5V$ to $\pm 22V$
 Bandwidth: 1.8MHz
 Slew rate: 2.1V/ μs
 Input offset voltage: 2.0mV
 Capacitance drive capability: 0 to 500pF
 Total harmonic distortion, THD: 0.03%
 Phase margin: 60%
 Gain margin: 15dB

Order Code	Type	Price each
AD99H	MC33171P	£1.19
AE00A	MC33172P	£1.29
AE01B	MC33174P	£1.59

OPA124P NEW

Burr-Brown®



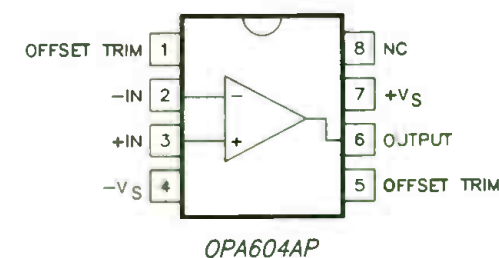
The OPA124P is a precision monolithic dielectrically isolated FET (*DIFET*) operational amplifier. Outstanding performance characteristics allow its use in the most critical instrumentation applications. Low noise 6nV/ \sqrt{Hz} (10kHz), low bias current, 1pA (maximum), high open-loop gain of 106dB (minimum), and high common-mode rejection, 100dB (minimum) make it superior to BIFET and CMOS amplifiers. Extremely low noise is achieved with patented circuit design techniques. A cascode design allows high precision input specifications.

Order Code	Type	Price each
AD59P	OPA124P	£6.20

OPA604AP NEW

Burr-Brown®

The OPA604AP is a FET-input operational amplifier designed for enhanced AC performance. Very low distortion 0.0003% at 1kHz, low noise 10nV/ \sqrt{Hz} , and wide gain-bandwidth of 20MHz. It provides superior performance in high-quality audio and other applications requiring excellent dynamic performance. The OPA604AP has a wide supply range of ± 4.5 to $\pm 24V$. The low-noise FET input of the OPA604AP provides wide dynamic range, even with a high source impedance, and drives a 600 Ω load.

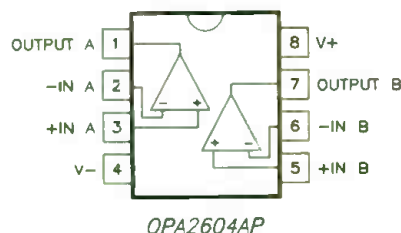


Order Code	Type	Price each
AD57M	OPA604AP	£1.68

OPA2604AP NEW

Burr-Brown®

The OPA2604AP is a dual FET-input operational amplifier designed for enhanced AC performance. Very low distortion 0.0003% at 1kHz, low noise 10nV/ \sqrt{Hz} , and wide gain-bandwidth of 20MHz. It provides superior performance in high-quality audio and other applications requiring excellent dynamic performance. The OPA2604AP has a wide supply range of ± 4.5 to $\pm 24V$. The low-noise FET input of the OPA2604AP provides wide dynamic range, even with a high source impedance, and drives a 600 Ω load.

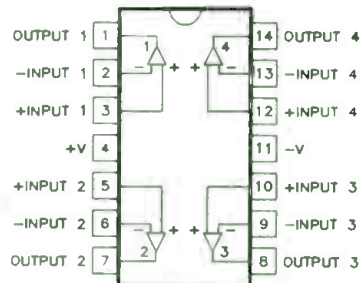


Order Code	Type	Price each
AD58N	OPA2604AP	£2.70

LF441CN, LF442CN and LF444CN

National Semiconductor

Low power J-FET input op-amps may be used as direct replacements for the μ A741C, 1458C and 3403 respectively. They offer improved DC characteristics, the same bandwidth, slew rate and gain yet only draw one tenth of the supply current (one fifth for LF444). In addition they offer extremely low input offset voltages and currents and very low bias currents.



LF347/LF444
TL064/TL074/TL084

Order Code	Type	Price each
QY29G	LF441CN	99p
QY30H	LF442CN	£1.85
QY31J	LF444CN	£2.45

TL064CN

SGS-Thomson

A low-power version of the TL084C J-FET op-amp. It features high input impedance, wide bandwidth, high slew rate and low input offset and bias currents. The package contains four op-amps and pin-out is the same as LM324.

Order Code	Type	Price each
RA66W	TL064CN	95p

TL071CN, TL072CN & TL074CN

SGS-Thomson

Low noise versions of the TL081-series J-FET op-amps. These amplifiers feature low input bias and offset currents and a fast slew rate. Their low harmonic distortion, 0.01% typical, and low noise make them suitable for use in hi-fi preamps. The TL071CN is supplied in an 8-pin DIL package, as is the TL072CN which is a dual version, and the TL074CN is supplied in a 14-pin package and is a quad version.

Order Code	Type	Price each
RA67X	TL071CN	67p
RA68Y	TL072CN	85p
RA69A	TL074CN	95p

TL081CN, TL082CN & TL084CN

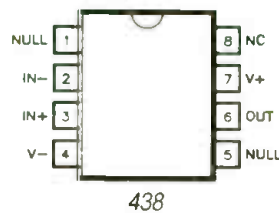
SGS-Thomson

Low cost general purpose J-FET op-amps featuring high slew rates, low input bias and offset currents and low offset voltage temperature coefficient. The TL081CN is supplied in an 8-pin DIL package, as is the TL082CN which is a dual version, and the TL084CN is supplied in a 14-pin package and is a quad version.

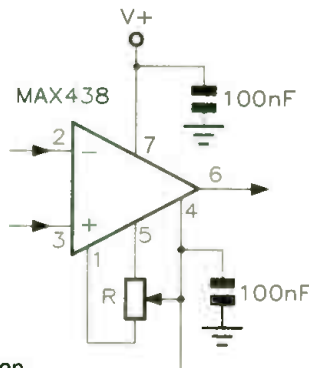
Order Code	Type	Price each
RA70M	TL081CN	69p
RA71N	TL082CN	67p
RA72P	TL084CN	97p

MAX438CPA

Maxim



The MAX438CPA is a micropower op amp combining high-speed performance with low-power operation. It is compensated for stability in applications with a closed loop gain of 5V/V or greater. It requires less than 75 μ A of supply current while delivering 6MHz gain bandwidth with 10V/ μ s slew rate. It has excellent output drive capability, driving a 10k Ω load to \pm 3.6V, and will operate from supply voltages in the range \pm 3V to \pm 5V.



Specification

Supply voltage range:	\pm 3V to \pm 5V
Absolute maximum supply voltage:	12V DC
Quiescent current:	50 μ A typical
Input offset voltage:	0.5mV
Input bias current:	\pm 2nA
Input voltage range:	\pm 3.8V
Differential input impedance:	90M Ω
Common-mode input impedance:	1G Ω
Common-mode rejection ratio:	95dB
Supply rejection ratio:	65dB
Large signal gain:	75dB
Output voltage swing:	\pm 3.9V into 10k Ω
Short-circuit output current:	3mA
Slew rate:	10V/ μ s
Gain bandwidth:	6MHz
Minimum closed loop gain:	\pm 5V/V
Operating temperature range:	0°C to +70°C

Order Code	Type	Price each
AY43W	MAX438CPA	£4.49

SUBSECTION 55 INSTRUMENTATION AMPLIFIER IC's

INA114 Precision Instrumentation Amplifier

Burr-Brown

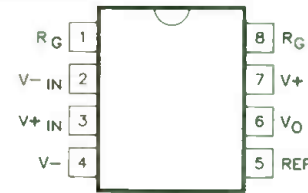
A low cost, general purpose instrumentation amplifier offering excellent accuracy in a versatile 3-opamp design ideal for a wide range of applications. A single external resistor sets any gain between 1 and 10,000. Internal input protection can withstand up to \pm 40V without damage, even without a supply voltage present. The INA114 is laser trimmed for very low offset voltage (50 μ V), drift (0.25 μ V/ $^{\circ}$ C) and high common-mode rejection (115dB at G = 1000). It operates with power supplies as low as \pm 2.25V, allowing its use in battery powered and single 5V supply systems. Quiescent current is 3mA maximum. Using the device with noisy or high impedance power supplies may require decoupling capacitors close to the device pins. In use, the output is referred to the output reference terminal (Ref, pin 5) which is normally grounded. This must be a low impedance connection to 0V to assure good common-mode rejection. The gain of the INA114 is set by connecting a single external resistor, R_G , between pins 1 and 8 where:

$$\text{gain (G)} = 1 + \frac{50k \Omega}{R_G}$$

The 50k Ω term in the equation comes from the sum of the two internal feedback resistors, and values for R_G can range from none, giving a gain of 1, 50k Ω giving x2 down to 5 Ω giving 10,000. Applications include bridge amplifiers, thermocouple amplifiers, RTD sensors, medical instrumentation and data acquisition.

Specification

Input offset voltage:	\pm 25+30/G μ V
Input impedance, differential common mode:	10 ¹⁰ Ω // 6pF
Input common mode range:	\pm 13.5V
Common mode rejection, G = 1:	90dB
G = 1000:	110dB
Bias current:	\pm 5nA max. \pm 8pA/ $^{\circ}$ C
Offset current:	\pm 5nA max. \pm 8pA/ $^{\circ}$ C
Noise voltage, G = 1000:	15nV/ $\sqrt{\text{Hz}}$ @ 10Hz 11nV/ $\sqrt{\text{Hz}}$ @ 100Hz and 1kHz
Gain range:	1 to 10,000
Gain error:	\pm 2% max.
Output voltage:	\pm 13.7V ($V_S = \pm$ 15V)
Frequency response, G = 1:	1MHz
G = 10:	100kHz
G = 100:	10kHz
G = 1000:	1kHz
Slew rate:	0.6V/ μ s ($V_S = \pm$ 10V, G = 10)
Overload recovery:	20 μ s
Power supply voltage:	\pm 2 μ 25V to \pm 15V
Quiescent current:	3mA



Order Code	Type	Price each
AD73Q	INA114AP	£6.29

INA118P Precision Low Power Instrumentation Amplifier

Burr-Brown

The INA118P is a low power, general purpose instrumentation amplifier offering excellent accuracy. Its versatile 3 op-amp design and small size make it ideal for a wide range of applications. Current-feedback input circuitry provides wide bandwidth even at high gain (100kHz at G = 100). A single external resistor sets any gain from 1 to 10,000. Internal input protection can withstand up to \pm 40V without damage. The device operates with power supplies as low as \pm 1.35V, and quiescent current is only 280 μ A, ideal for battery powered systems.

In use, the output is referred to the output reference terminal (Ref, pin 5) which is normally grounded. This must be a low impedance connection to 0V to assure good common-mode rejection. The gain of the INA118 is set by connecting a single external resistor, R_G , between pins 1 and 8 where:

$$\text{gain (G)} = 1 + \frac{50k \Omega}{R_G}$$

Applications include bridge amplifiers, thermocouple amplifiers, RTS sensor amplifiers, medical instrumentation and data acquisition.

Specification

Input offset voltage:	\pm 25+100/G μ V
Input impedance, differential common mode:	10 ¹⁰ Ω // 5pF
Input common-mode range:	\pm V_S \pm 0.9V
Common-mode rejection, G = 1:	90dB
G = 1000:	110dB
Bias current:	\pm 5nA max. \pm 20pA/ $^{\circ}$ C
Offset current:	\pm 5nA max. \pm 20pA/ $^{\circ}$ C

Noise voltage, $G = 1000$: 12nV/√Hz @ 10Hz
10nV/√Hz @ 100Hz
and 1kHz

Gain range: 1 to 10,000

Gain error: ±0.5% max.

Output voltage: +14.2V, -14.6V
($V_S = \pm 15V$)

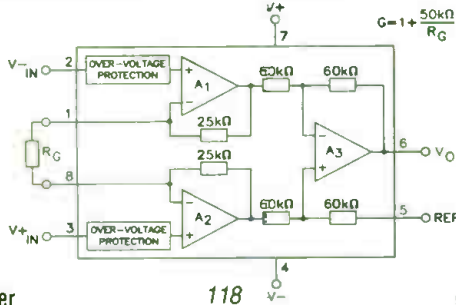
Frequency response, $G = 1$: 500MHz
 $G = 10$: 400kHz
 $G = 100$: 100kHz
 $G = 1000$: 10kHz

Slew rate: 1V/μs ($V_S = \pm 10V$,
 $G = 10$)

Overload recovery: 20μs

Power supply voltage: ±1.35V to ±15V

Quiescent current: 280mA



Order Code	Type	Price each
AD74R	INA118P	£6.29

INA117KP High Common-Mode Difference Amplifier

NEW

Burr-Brown®

The INA117KP is a precision unity-gain difference amplifier with a very high common-mode input voltage range. It is a single monolithic IC consisting of a precision op amp and integrated thin-film resistor network. It can accurately measure small differential voltages in the presence of common-mode signals up to ±200V. The INA117 inputs are protected from momentary common-mode or differential overloads up to ±500V.

In many applications where galvanic isolation is not essential, the device can replace isolation amplifiers, eliminating costly isolated input side power supplies and their associated ripple, noise and quiescent current. The IC's 0.001% non-linearity and 200kHz bandwidth are superior to those of conventional isolation amplifiers. Applications include current monitors, battery cell voltage monitors, ground breakers, input protection, signal acquisition in noisy environments and factory automation.

Specification

Initial gain: 1V/V

Gain error: 0.01%

Rated output voltage: 12V, $I_O = +20mA, -5mA$

Input impedance, differential: 10kΩ

common-mode: 110kΩ

Common-mode rejection: 100dB

Initial offset voltage: 120μV

Noise voltage: 25μV pk-pk, 0.01Hz to 10Hz
550nV/√Hz @ 10kHz

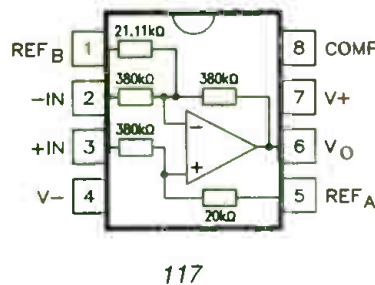
Gain bandwidth: -3dB @ 200kHz

Full power bandwidth: 30kHz @ 20V pk-pk

Slew rate: 2V/μs

Supply voltage: ±15V

Quiescent current: 1.5mA



Order Code	Type	Price each
AD76H	INA117KP	£8.99

PGA204/5 Programmable-Gain Instrumentation Amplifiers

NEW

Burr-Brown

The PGA204 and PGA205 are low cost, general purpose programmable-gain instrumentation amplifiers offering excellent accuracy. Gains are digitally selected: PGA204 has options for gains of 1, 10, 100 and 1000, while PGA205 has 1, 2, 4 and 8V/V. The precision, versatility and low cost of the PGA204 and 205 make them ideal for a wide range of applications.

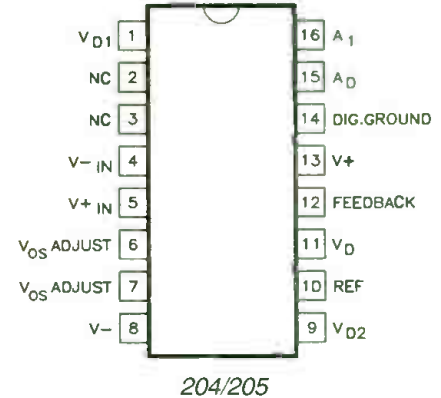
The gain is selected by two TTL or CMOS compatible address lines, A_0 and A_1 . Internal input protection can withstand up to ±40V on the analogue inputs without damage.

Both devices are laser trimmed for very low offset voltages (50μV), drift (0.25μV/°C) and high common-mode rejection ratio (115dB at $G = 1000$). They can operate from supply voltages as low as ±4.5V, allowing them to be used in battery powered systems. Quiescent current is 5mA.

In use the output is referred to the output reference (Ref, pin 10) which is normally grounded. This must be a low impedance connection to assure good

common-mode rejection. The output feedback connection, pin 12, must be connected to the output, pin 11, for proper operation, but can be used to sense the output voltage directly at the load for best accuracy.

The digital inputs A_0 and A_1 are not latched; a change in the logic immediately selects a new gain. Logic switching time is approximately 1μs. Typical applications for these devices include data acquisition, general purpose analogue boards and medical instrumentation.



Specification

Input offset voltage: ±25+30 μV

Input impedance, differential: $10^{10} \Omega \parallel 6pF$

common-mode: $10^{10} \Omega \parallel 6pF$

Common-mode rejection: 75dB min., 123dB max.

Input offset current: ±2nA

Noise voltage: 16nV/√Hz max.

Gain error: ±0.05% to ±0.1%

Output voltage: ± $V_S - 1.3V$ pk-pk

Supply voltage range: ±4.5V to ±18V

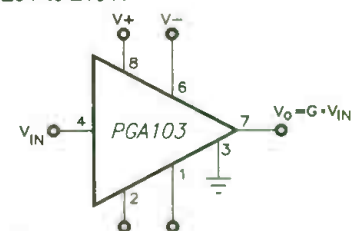
Order Code	Type	Price each
AD77J	PGA204AP	£11.29
AD78K	PGA205AP	£11.29

PGA103 Programmable-Gain Amplifier

NEW

Burr-Brown®

The PGA103 is a programmable-gain amplifier for general purpose applications. Gains of 1, 10 or 100 are digitally selected by two CMOS compatible address lines. The device is ideal for systems that must handle wide dynamic range signals, and high-speed circuitry provides fast settling time, even at $G = 100$ (8.2μs to 0.01%). Bandwidth is 250kHz at $G = 100$, yet quiescent current is only 2.4mA from ±15V supplies. The IC operates from supplies in the range of ±5V to ±18V.



Specification

Input offset voltage: ±600 to ±1,500μV max.
±7μV/°C max.

Input impedance: $10^9 \Omega \parallel 2pF$

Bias current: ±20nA ±100pA/°C

Noise voltage, $G = 100$: 20nV/√Hz @ 10Hz
18nV/√Hz @ 100Hz-1kHz

Gain error, $G = 1, 10$: ±0.01% ±2.5ppm/°C
 $G = 100$: ±0.02% ±2.5ppm/°C

Frequency response, $G = 1$: 1.5MHz -3dB
 $G = 10$: 750kHz
 $G = 100$: 250kHz

Overload recovery: 2.5μs

Supply voltage range: ±5V to ±18V

Quiescent current: 2.4mA

Order Code	Type	Price each
AD79L	PGA103P	£6.29

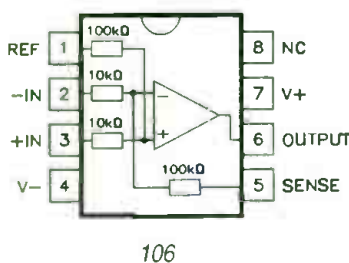
INA106KP Precision Gain of 10 Differential Amplifier

Burr-Brown®

NEW

The INA106KP is a fixed 10 x gain differential amplifier consisting of a precision op amp with on-chip metal film resistors. The resistors are laser trimmed for accurate gain and high common-mode rejection. Excellent TCR tracking of the resistors maintains gain accuracy and common-mode rejection over temperature variations.

The differential amplifier is the foundation of many commonly used circuits and the INA106 provides this precision circuit function without the additional need of an expensive resistor network. In use the output is referred to the output reference terminal (pin 1) which is normally grounded; this potential will be summed with the output signal. Otherwise the connections can be configured in various ways to produce differentiators, summing amplifiers and adders.



Specification

Initial gain: 10V/V

Gain error: 0.01%

Related output voltage: 12V, $I_O = +20mA, -5mA$

Input impedance, differential: 10kΩ

common-mode: 110kΩ

Common-mode rejection: 100dB

Initial offset voltage: 50μV

Noise voltage: 1μV pk-pk, 0.01Hz to 10Hz +30nV/√Hz @ 10kHz

Small signal dynamic response: -3dB @ 5MHz

Full power bandwidth: 50kHz @ 20V pk-pk

Slew rate: 3V/μs

Supply voltage range: ±5 to ±18V

Quiescent current: ±1.5mA

Order Code	Type	Price each
AD75S	INA106KP	£8.29

ISO122 Precision Isolation Amplifier

Burr-Brown

NEW

A precision isolation amplifier incorporating a novel duty cycle modulation-demodulation technique to transmit the signal digitally across a 2pF isolation barrier. With digital modulation the barrier characteristics do not affect signal integrity, resulting in excellent reliability and good high-frequency transient immunity across the barrier. Both barrier capacitors (1pF each) are embedded in the plastic body of the package.

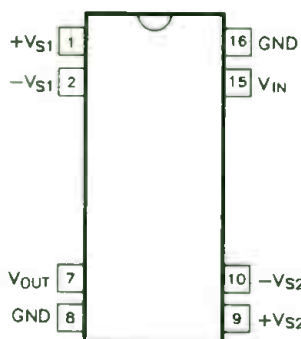
The device is very easy to use, no additional external components are needed for operation. All that is required is to provide separate \pm supply rails and a ground reference for both the input and output sides of the device, as the internal input and output circuits are completely isolated. The isolation barrier can handle 1,500VAC rms continuously and is 100% tested. The configuration has a gain of unity and for all intents and purposes a ground referenced, DC or AC signal is passed through to the output unchanged. However, small signal bandwidth should be limited to 50kHz or less, due to the internal modulation frequency being 500kHz.

A power supply range of $\pm 4.5V$ to $\pm 18V$ at each end, with quiescent currents of $\pm 5mA$ and $\pm 5.5mA$ respectively make the device ideal for a wide range of applications, including industrial process control, ground loop elimination, motor and SCR control, PC based data acquisition, etc.

Specification

Isolation rating: 1,500V AC @ 60Hz
2,400V AC max. for 1s
Isolation mode rejection: 140dB @ 60Hz
Leakage current: 0.18 μ A rms @ 60Hz
Nominal gain: 1V/V
Gain error: $\pm 0.05\%$ FSR
Gain drift: $\pm 10ppm/^{\circ}C$
Non-linearity: 0.016% FSR
($\pm 0.025\%$ FSR ISO122J)

Input offset voltage: $\pm 20mV$
Input offset drift: $\pm 200\mu V/^{\circ}C$
Noise: 4 $\mu V/\sqrt{Hz}$
Input voltage range: $\pm 12.5V$ ($V_S = \pm 15V$)
Input resistance: 200k Ω
Output voltage range: $\pm 12.5V$ ($V_S = \pm 15V$)
Output current drive: $\pm 15mA$
Capacitive load drive: 100nF
Ripple voltage: 20mV pk-pk
Small signal bandwidth: 50kHz
Slew rate: 2V/ μ s
Overload recovery time: 150 μ s
Supply voltage range: ± 4.5 to $\pm 18V$ each section
Quiescent current: $\pm 5mA$ input side, $\pm 5.5mA$ output side



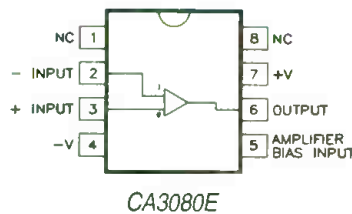
Note that version ISO122J has a non-linearity figure of $\pm 0.025\%$ FSR.

Order Code	Type	Price each
AD808	ISO122JP	£15.99
AD81C	ISO122P	£19.99

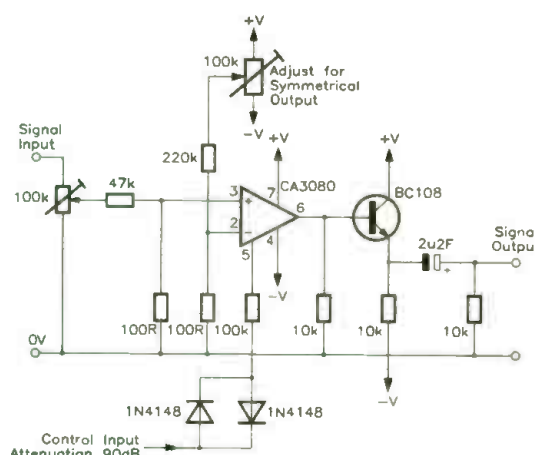
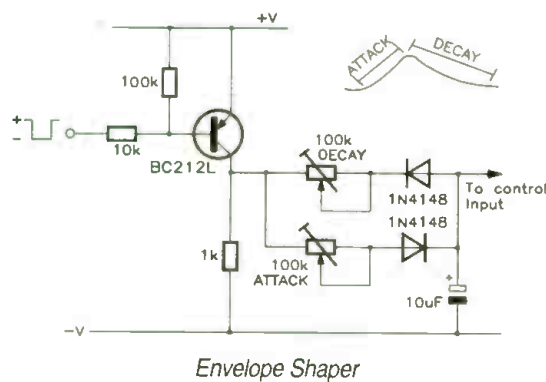
SUBSECTION 56 OPERATIONAL TRANSCONDUCTANCE AMPLIFIERS

CA3080E

Harris



This 8-pin DIL IC is an op-amp whose output current is proportional to the voltage difference between its input pins. In addition the IC has a bias input which may be used either for gating or for linear gain control. The amplifier has an excellent slew rate and in addition when gated off the amp uses only a minute 10 μ W making it ideal in multiplex applications. For technical specification see LM13700N below.



Order Code	Type	Price each
YH58N	CA3080E	72p

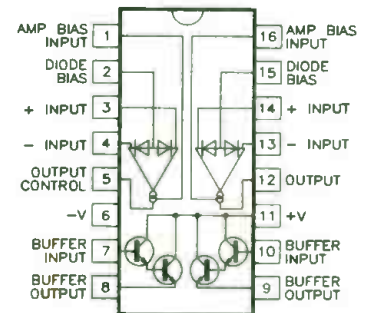
LM13700N

National Semiconductor

The 13700 is a dual operational transconductance amplifier with linearising diodes and buffers. It consists of two current controlled transconductance amplifiers each with different inputs and a push pull output. The two amplifiers share common supplies but otherwise operate independently. Linearising diodes are provided at the inputs to reduce distortion and allow higher input levels. The result is a 10dB signal-to-noise improvement referenced to 0.5% THD. High impedance buffers are provided which are specially designed to complement the dynamic range of the amplifiers.

The IC has many useful applications such as voltage controlled amplifiers, voltage controlled resistors, voltage controlled filters, voltage controlled oscillators, phase locked loop, Schmitt trigger tachometer (f to v), peak detector and hold, sample and hold, ramp and

hold, true RMS converter, variable temperature coefficient voltage reference, pulse width modulator, log current source, multiplexer, zero standby power timer, four quadrant multiplier, amplitude monitor and stereo volume control. A data sheet is available which shows circuit details of all the above applications.



13700

Absolute max ratings	CA3080E	LM13700N
Voltage supply range	$\pm 2V$ to $\pm 15V$	$\pm 2V$ to $\pm 18V$
Power dissipation	125mW	570mW
Differential input voltage	$\pm 5V$	$\pm 5V$
Diode bias current	—	2mA
Amplifier bias current	2mA	2mA

Typical ratings at 25 $^{\circ}C$ with $V_S = \pm 15V$

Input offset voltage:	0.4mA	0.4mA
Input offset current:	120nA	100nA
Input bias current:	400nA	400nA
Input resistance:	26k Ω	26k Ω
Forward transconductance (gm)	9600 μS	9600 μS
Tracking of gm:	—	0.3dB
Peak output current:	500 μ A	500 μ A
Peak output voltage:	$\pm 14V$	$\pm 14V$
Supply current (per amp):	1.1mA	1.3mA
Common mode rejection ratio	110dB	110dB
Unity gain bandwidth:	2MHz	2MHz
Full power bandwidth:	200kHz	200kHz
Slew rate:	50V/ μ s	50V/ μ s

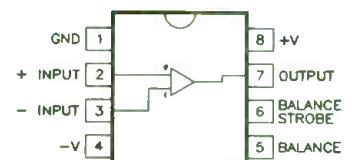
Order

Code	Type	Price each
YH64U	LM13700N	£1.87

SUBSECTION 57 VOLTAGE COMPARATORS

LM311N

SGS-Thomson



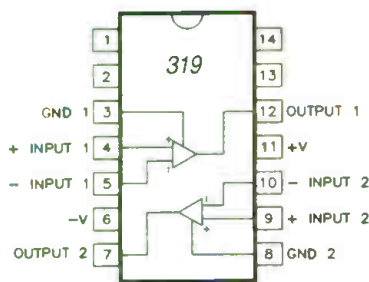
1311

A voltage comparator that has input currents more than a hundred times lower than the 710. It will operate on $\pm 14V$ or $+5V$ supplies and will drive RTL, DTL, TTL, MOS and switch voltages up to 40V at currents as high as 50mA. Both input and output can be isolated from system ground and the output can drive loads referred to ground, positive or negative. Offset balancing and strobe capability are provided and outputs can be wire-OR'ed.

Order Code	Type	Price each
QY09K	LM311N	45p

LM319N

SGS-Thomson



A precision, high speed dual comparator designed to operate over a wide voltage range including +5V and ground. It has a faster response, though higher power dissipation than the 311. It is capable of driving outputs up to 25mA.

Order Code	Type	Price each
UH33L	LM319N	£1.34

LM339N

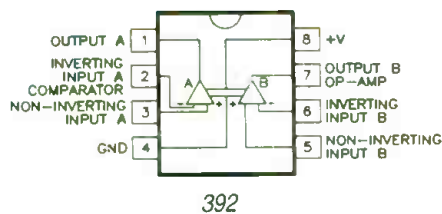
SGS-Thomson

Identical to the 3302, but offering improved supply voltage range and voltage gain.

Order Code	Type	Price each
UH31J	LM339N	36p

LM392N

National Semiconductor



This device contains a precision voltage comparator and an op-amp in one 8-pin DIL package. They operate from the same supply and will work with a +5V supply and the output of the comparator will interface directly with TTL or CMOS. The very low supply current makes the device ideal for use in battery powered equipment. The following data applies to the op-amp stage only (see table above for rest of data).

Common mode rejection ratio:	70dB
Supply voltage rejection ratio:	100dB
Large signal voltage gain:	100dB
Output voltage swing:	V ⁺ - 1.5V
Output current source:	40mA
Output current sink:	20mA

Order Code	Type	Price each
UH32K	LM392N	£1.46

LM393N

SGS-Thomson

Two independent precision voltage comparators designed specifically to operate from a single power supply. The device is similar to the 392, but offers much lower input offset voltage and draws only half the supply current.

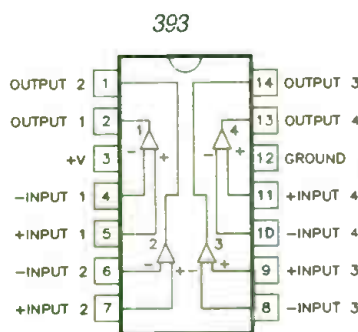
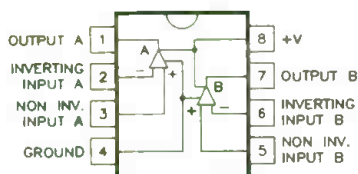
Order Code	Type	Price each
UH30H	LM393N	38p

Table of Voltage Comparator ICs

Absolute maximum ratings

LM311N (QY09K)	LM319N (UH33L)	LM339N (UH31J)	LM392 (UH32K)	LM393N (UH30H)	MC3302P (QH48C)
Voltage supply range: 4V to 36V or ±2V to ±18V	4V to 36V or ±2V to ±18V	2V to 36V or ±1V to ±18V	3V to 32V or ±1.5V to ±16V	2V to 36V or ±1V to ±18V	2V to 28V or ±1V to ±14V
Power dissipation: 500mW	500mW	570mW	570mW	570mW	570mW
Differential input voltage: ±30V	±5V	±V _{CC}	32V	36V	±V _{CC}
Typical ratings at 25°C					
Input offset voltage: 2mV	0.7mV	±2mV	±2mV	±1mV	±3mV
Input offset current: 6nA	30nA	±5nA	±5nA	±5nA	±3nA
Input bias current: 100nA	150nA	25nA	50nA	25nA	25nA
Voltage gain: 106dB	92dB	106dB	106dB*	106dB	90dB
Response time: 200ns	80ns	1.3µs	1.3µs*	1.3µs	1.3µs
Saturation voltage: 0.75V	0.75V	0.25V	0.25V*	0.25V	0.25V
Output leakage current: 0.2nA	0.2µA	0.1nA	0.1nA*	0.1nA	0.1nA
Supply current: 5.1mA (positive), 4.1mA (negative)	8mA (positive), 3mA (negative)	0.8mA	1mA	0.4mA	0.8mA

*Applies to comparator only.



MC3302P

SGS-Thomson

Four independent precision voltage comparators designed specifically to operate from a single power supply. These comparators have a unique characteristic in that the input common-mode voltage range includes ground even though operated from a single power supply.

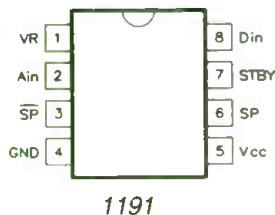
Order Code	Type	Price each
QH48C	MC3302P	74p

SUBSECTION 58 POWER AMP IC's

MSC1191 Bi-CMOS Amplifier

OKI

NEW



The MSC1191 has been developed for use with music synthesiser LSI chips which can be operated at low voltages. This Bi-CMOS amplifier circuit essentially comprises two operational amplifiers, a bias circuit and a stand-by detector provision. It can

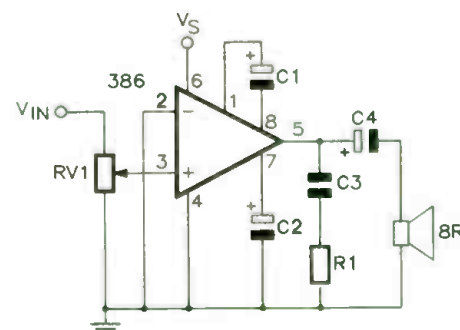
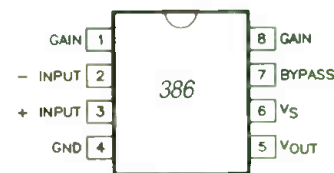
be connected directly to a speaker without a coupling capacitor to achieve an audio power of 0.3W maximum into 8Ω. A flexible power supply range from +2V to +6V and a low current requirement of typically 1.5mA are essential characteristics for battery operation. The IC is encapsulated in an 8-pin DIL package.

Order Code	Type	Price each
AY27E	MSC1191	£1.80

LM386N-1

National Semiconductor

A power amp designed for use in low voltage, especially battery-operated, applications. For minimum parts count, C1 and C2 can be omitted. With pins 1 and 8 open circuit the gain is internally set to 20dB. With a 10µF capacitor between pins 1 and 8 the gain is increased to 200dB and the gain can be set to anything between these limits by placing a resistor in series with this capacitor. For example a 1kΩ resistor here, sets the gain to 50dB.



The capacitor on pin 7 sets the power supply rejection ratio from 6dB with no connection to 50dB at 1kHz with 10µF.

Continued on next page.

Specification Table of Power Amp ICs

	MSC1191 (AY27E)	LM386N-1 (UJ37S)	TDA2822M (US38R)	TBA820M (WQ63T)	TDA7052 (UK79L)	LM1877N-9 (QH38R)
Gain (closed loop) typical	0dB	26dB	40dB	34dB	40dB	34dB
Input impedance	100kΩ	50kΩ	100kΩ	5MΩ	100kΩ	4MΩ
Output power into 4Ω†	-	-	0.65W/channel	1.6W	-	-
Output power into 8Ω†	100mW	325mW	1W/channel	2W	1.2W	2W/channel
Quiescent supply current	1.5mA	4mA	6mA	4mA	4mA	25mA
Supply voltage min to max	2V to 6V	4V to 15V	1.8V to 15V	3V to 16V	3V to 15V	6V to 26V
Recommended supply voltage	5V	4V to 12V	1.8V to 15V	3V to 16V	6V	6V to 24V
Short circuit current	-	-	-	-	-	1A
Short circuit protection**	No	No	No	No	Yes	Yes
Thermal protection	No	No	No	No	No	Yes
Power supply rejection ratio	-	50dB	30dB	42dB	50dB	65dB
Bandwidth	-	300kHz	120kHz	25Hz to 20kHz	20Hz to 20kHz	65kHz
Distortion into 8Ω	10%	0.2% $V_s = 6V$ $P_o = 125mW$	0.3% $V_s = 9V$ $P_o = 0.5W$	0.4% $V_s = 9V$ $P_o = 500mW$	0.2% $V_s = 6V$ $P_o = 100mW$	0.04% $V_s = 20V$ $P_o = 2W/channel$
Sensitivity	-	-	60mV	30mV	70mV	-
Power dissipation	660mW	660mW	1W	1W	1.14W	4W with 30°C/W heatsink

	LM380N (QH40T)	LM384N (WQ34M)	TBA810P (QL13P)	LM383T (WQ33L)	TDA2006V (WQ66W)
Gain (closed loop) typical	34dB	34dB	37dB	40dB	30dB
Input impedance	150kΩ	150kΩ	5MΩ	150kΩ	5MΩ
Output power into 4Ω†	3W	3W	6W	7W	12W
Output power into 8Ω†	5W	5.5W	-	-	8W
Quiescent supply current	7mA	8.5mA	12mA	45mA	40mA
Supply voltage min to max	8V to 22V	12V to 28V	4V to 20V	5V to 25V	±6V to ±15V
Recommended supply voltage	8V to 22V	12V to 26V	4V to 18V	5V to 20V	±12V
Short circuit current	1.3A	1.3A	3A	3.5A	3A
Short circuit protection**	Yes	Yes	Yes	Yes	Yes
Thermal protection	Yes	Yes	Yes	Yes	Yes
Power supply rejection ratio	38dB	31dB	48dB	40dB	50dB
Bandwidth	100kHz	450kHz	40Hz to 20kHz	30kHz	10Hz to 150kHz
Distortion into 8Ω	0.2% $V_s = 18V$ $P_o = 2W$	0.25% $V_s = 22V$ $P_o = 4W$	0.3% $V_s = 14.4V$ $P_o = 2.5W$	0.2% $V_s = 14.4V$ $P_o = 4W$	0.1% $V_s = ±12V$
Sensitivity	100mV	100mV	75mV	55mV	200mV
Power dissipation	10W with 12°C/W heatsink	10W with 12°C/W heatsink	5W with 10°C/W heatsink	15W with 4°C/W heatsink	15W with 4°C/W heatsink

	TDA2030AV (WQ67X)	TDA2005M (YY70M)	LM1875N (UH78K)	TDA2050V (CP88V)	TDA1514A-N7 (UK75S)
Gain (closed loop) typical	30dB	50dB	26dB	30.5dB	30dB
Input impedance	5MΩ	100kΩ	1MΩ	>500kΩ	>1MΩ
Output power into 4Ω†	18W	20W	25W (1% d)	32W	40W @ ±21V
Output power into 8Ω†	11W	-	25W (1% d)	24W	40W
Quiescent supply current	40mA	75mA	70mA	55mA	60mA
Supply voltage min to max	±6V to ±18V	6V to 18V	20V to 60V	9V to 50V	±7.5V to ±30V
Recommended supply voltage	±14V	12V to 14.4V	50V	38V to 45V	±27.5V
Short circuit current	3.5A	3.5A	4A	5A	-
Short circuit protection**	Yes	Yes	Yes	Yes	Yes
Thermal protection	Yes	Yes	Yes	Yes	Yes
Power supply rejection ratio	50dB	55dB	83dB	45dB	72dB
Bandwidth	10Hz to 140kHz	40Hz to 20kHz	20Hz to 70kHz	20Hz to 20kHz	20Hz to 25kHz
Distortion into 8Ω	0.1% $V_s = ±14V$ $P_o = 4W$	0.25% $V_s = 14.4V$ $P_o = 16W$	0.015% $V_s = 50V$ $P_o = 20W$	0.05% $V_s = ±19V$ $P_o = 15W$	0.003% $V_s = ±27.5V$ $P_o = 32W$
Sensitivity	215mV	30mV	630mV	400mV	570mV
Power dissipation	18W with 4°C/W heatsink	-	30W with 1.2°C/W heatsink	25W with 1.8°C/W heatsink	40W with 4.3°C/W heatsink

** Short circuit protection where provided operates up to supply voltages of approx 75% of the max voltage shown. † Distortion = 10% V_s = Supply voltage P_o = Power output

Continued from previous page.

Parts List

R1	Min Res 10Ω	(M10R)
RV1	Pot Log 10kΩ	(FW22Y)
C1,2	Axial or PC Elect 10μF 50V	(FF04E)
C3	Polyester 0.047μF	(BX74R)
C4	Axial or PC Elect 220μF 16V	(FF13P)

Order

Code	Type	Price each
UJ37S	LM386N-1	£1.54

TDA2822M

SGS-Thomson

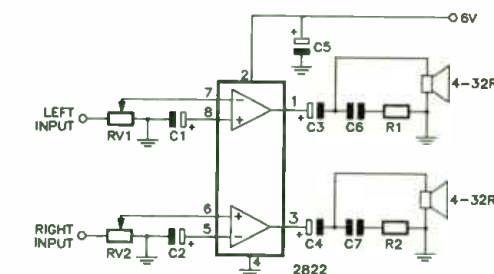
A stereo power amp designed for use in portable cassette players and radios. A 3V supply can be used to drive headphones providing 20mW in 32Ω per channel, and a 9V supply will provide 1W in 8Ω per



channel for small loudspeakers.

Parts List

R1,2	Min Res 4.7Ω	(M4R7)
RV1,2	Pot Log 47kΩ	(FW24B)
C1,2	Axial/PC Elect 100μF 35V	(JL19V)
C3,4	Axial/PC Elect 470μF 16V	(FF15R)
C5	Axial/PC Elect 10μF 50V	(FF04E)
C6,7	Polyester 0.1μF	(BX76H)



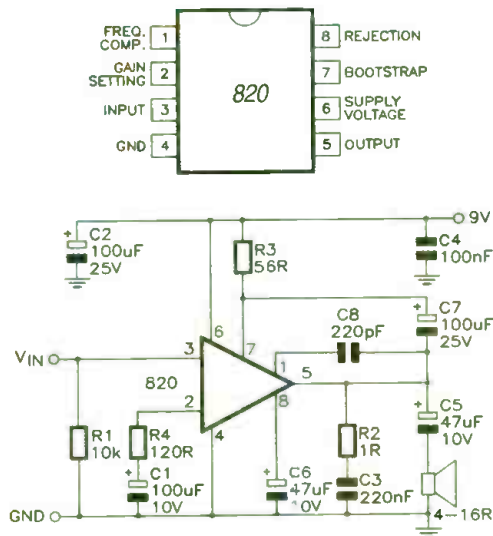
Order

Code	Type	Price each
UJ38R	TDA2822M	£1.02

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SGS-Thomson



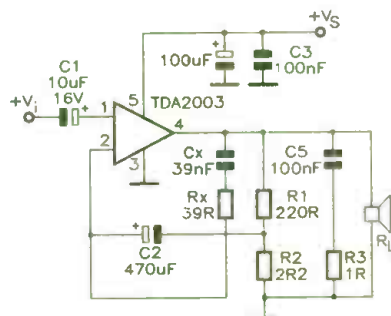
A very useful audio amp in an 8-pin DIP package. The IC features a very low minimum working supply voltage of 3V, low quiescent current, good ripple rejection, no crossover distortion and low power dissipation. Maximum supply voltage is 16V into 16Ω speaker, 12V into 8Ω and 9V into 4Ω.

R 1	Min Res 10k	(M10K)
R 2	Min Res 1Ω	(M1R)
R 3	Min Res 56Ω	(M56R)
R 4	Min Res 120Ω	(M120R)
C 1	PC Elect 100µF 10V	(FF10L)
C 2,7	PC Elect 100µ 25V	(FF11M)
C 3	0.22µF Polyester	(BX78K)
C 4	0.1µF Polyester	(BX76H)
C 5	PC Elect 470µF 16V	(FF15R)
C 6	PC Elect 47µF 25V	(FF08J)
C 8	Polystyrene 220pF	(BX30H)

Order Code	Type	Price each
WQ63T	TBA820M	47p

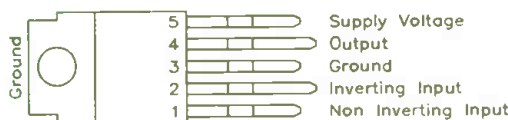
up to 12W into loads down to 1.6Ω. Two can be used to form a bridge delivering 18W into 4Ω from a 14.4V supply.

Completely safe operation is guaranteed due to protection against DC and AC short-circuit between all pins and ground, with thermal overrange, load dump voltage surge up to 40V and fortuitous open ground. No electrical insulation is required between the mounting tab and the heatsink, but lead lengths should be as short as possible. Two variations are available: TDA2003V has pins arranged for vertical PCB mounting, while TDA2003H is arranged for horizontal mounting.



$$R_x = 20 \times R_2$$

$$C_x = \frac{1}{2\pi BR_1}$$



Specification

Operating supply voltage range:	8 to 18V DC
Max. DC supply voltage:	28V
Peak supply voltage:	40V for 50ms
Repetitive peak output current:	3.5A
Non-repetitive peak output current:	4.5A
Max. power dissipation:	20W (90°C)
Frequency response:	40Hz to 15kHz -3dB @ 1W into 4Ω
Distortion:	0.15% @ 4.5W into 4Ω, 1kHz
Input impedance:	150kΩ
Open loop gain:	80dB @ 1kHz
Closed loop gain:	40dB @ 1kHz
Input noise:	5µV max.
Supply voltage rejection:	36dB
Efficiency:	69%

Order Code	Type	Price each
AH52G	TDA2003V	£1.15
AH53H	TDA2003H	£1.15

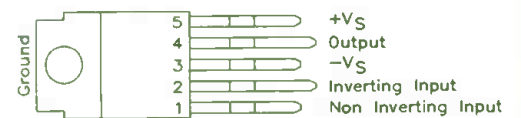
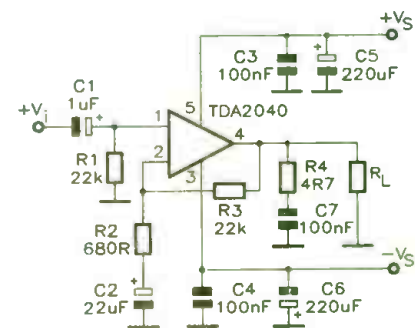
TDA2040V

SGS-Thomson

A monolithic power amplifier IC intended for use as a high quality, class AB audio power amplifier. Typically it provides 22W output power into 4Ω with 0.5% distortion, from a 32V supply. The device is designed to operate from a split power supply and no electrical isolation is needed between the mounting tab and its heatsink. It provides a high output current and has very low harmonic and crossover distortion. The device incorporates a patented short circuit protection system comprising an arrangement for automatically limiting the dissipated power so as to keep the working point of the output transistors within their safe operating area. Thus the TDA2040V is protected against temporary overloads or short-circuit. A thermal shutdown system is also included, and should the short-circuit exist for a longer time the thermal shutdown protection keeps the junction temperature within safe limits. The device's pins are arranged for vertical PCB mounting.

Specification

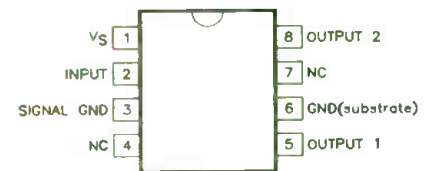
Supply voltage range:	±2.5V min. to ±20V DC
Quiescent current drain:	30mA
Max. differential input voltage:	±15V
Input offset voltage:	<±20mV
Peak output current:	4A
Output power:	22W into 4Ω, 12W into 8Ω, V _{SS} = ±16V
Power bandwidth:	100kHz (1W into 4Ω)
Open loop gain:	80dB
Closed loop gain:	30dB
Total harmonic distortion:	0.08% @ 0.1 to 10W into 4Ω, f = 40Hz to 15kHz
Input noise:	<10µV (3µV typical)
Input impedance:	5MΩ (500kΩ min.)
Supply voltage rejection:	50dB
Efficiency:	66%
Thermal shutdown junction temperature:	145°C
Max. power dissipation:	25W (75°C)



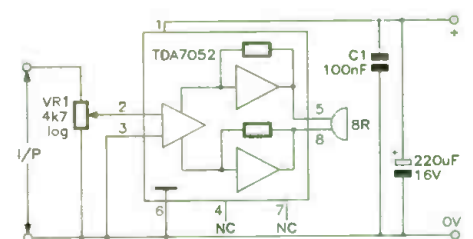
Order Code	Type	Price each
AH54J	TDA2040V	£3.15

TDA7052

Philips



A power amp designed for use in low voltage battery operated equipment, where a high output power is still required. By using the Bridge Tied Load principle in the amp an output power of 1.2W into 8Ω is achieved from a 6V supply. The gain of the amplifier is fixed internally at 40dB and almost no external components are required. The amp is short-circuit proof, requires no external heatsink and there are no switch-on or switch-off clicks.



Order Code	Type	Price each
UK79L	TDA7052	£1.68

PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

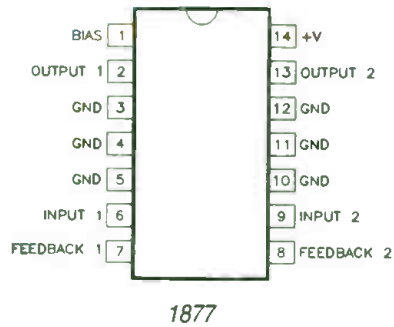
Access, Visa, American Express

TDA2003V/H

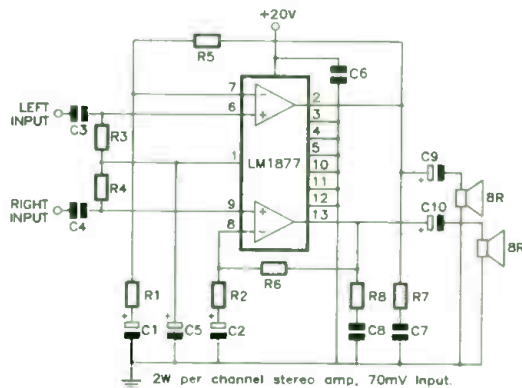
SGS-Thomson

The TDA2003 has improved performance but with the same pin configuration as the TDA2002. The additional features of the TDA2002 – very low number of external components, ease of assembly, space and cost saving – are maintained. The device provides a high output current capability of up to 3.5A, and very low harmonic and crossover distortion. The device is designed for single-ended supply operation in the range 8 to 18V and applications include in-car stereos and radios. It can output 6W into a 4Ω load from a 14.4V supply, and

LM1877N-9 National Semiconductor



A stereo amplifier in a 14-pin DIL package that requires very few external components to make a complete 2W per channel power amplifier. The IC is suitable for use with 8Ω or 16Ω speakers.



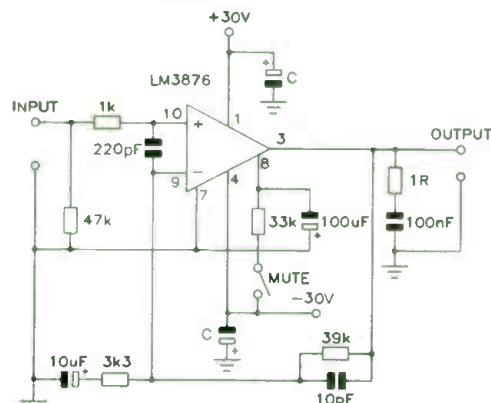
Parts List

R1,2	Min Res 510Ω	(M510R)
R3,4	Min Res 1M	(M1M)
R5,6	Min Res 100k	(M100K)
R7,8	Min Res 2.7Ω	(M2R7)
C1,2	PC Elect 10μF 50V	(FF04E)
C3,4	Poly Layer 0.1μF	(WW41U)
C5	PC Elect 47μF 25V	(FF08J)
C6,7,8	Mylar 0.1μF	(WW21X)
C9,10	PC Elect 470μF 35V	(FF16S)

Order Code	Type	Price each
QH38R	LM1877N-9	£4.85

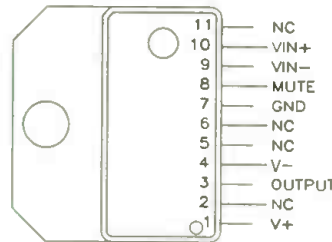
LM3876 40W Audio Power Amplifier National Semiconductor

The LM3876 is a high performance audio power amplifier with an output mute function which can be used to eliminate switch-on and switch-off 'thumps' to the loudspeaker load. It is capable of delivering 40W continuously into an 8Ω load, and is fully protected using established techniques. The output stage is protected against short circuit to ground or either supply rail. Protection against transients from inductive loads is also provided at the output stage via internal clamp diodes.



The device also contains thermal shut-down protection which comes into operation if the chip temperature exceeds its safe operating range, and under-voltage shut-down in the event that there is not sufficient supply voltage to enable it to operate properly.

The LM3876 is internally compensated and stable for gains ≥ 10 . In the application circuit shown, the three earth points for input, supply and output should have separate return paths to the power supply earth (both capacitors 'C' share the supply earth point). When S1 is closed switch-on/switch-off muting is enabled. Applications include self-powered speakers, surround-sound amplifiers and compact stereo systems. Contained in an 11-pin plastic package.



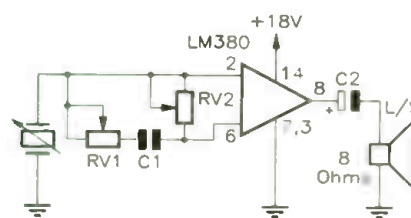
Specification

Output power, continuous:	40W
Instantaneous output power:	100W
Signal to noise ratio:	95dB
Total harmonic distortion:	0.05%

Order Code	Type	Price each
GX49D	LM3876	£12.49

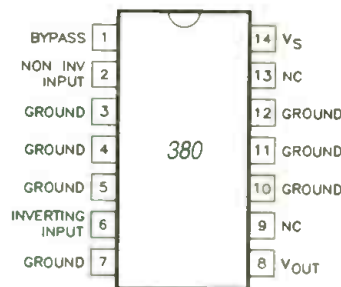
LM380N National Semiconductor

An audio amp in a 14-pin DIL package that requires very few external components to make a complete 2.5W power amplifier. In most cases, however, it is advisable to add a Min Res 2.7Ω and Polyester 0.1μF in series from pin 8 to ground and an Axial 4.7μF from pin 1 to ground.



High-Output-Crystal-Cartridge Power Amp

A 2.5W rms power amp the 380 is shown in the circuit driven by a high output crystal pickup. The IC requires only 4 other components (without tone control only two other components! — simply omit C1 and RV1).



Component list

RV1:	Pot Lin 2M2	(FW09K)
RV2:	Pot Log 2M2	(FW29G)
C1:	Polystyrene 3300pF	(BX38R)
C2:	Axial 470μF 35V	(FF16S)
IC:	LM380	(QH40T)

Order Code	Type	Price each
QH40T	LM380N	£1.48

LM383T National Semiconductor



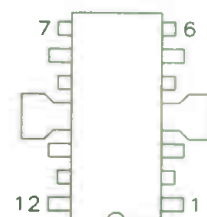
A high quality audio op amp that is pin for pin compatible with the TDA2002A, but offering lower noise and improved frequency response. The amp is supplied in a 5-pin TO220 package that does not require insulating washers between the metal tab and the heatsink in single rail applications. The IC will supply up to 11W into 1.6Ω loads with $V_S = 20V$, but take care that power dissipation limits are not exceeded and that transients on the supply do not take V_S above 25V.

Order Code	Type	Price each
WQ33L	LM383T	£3.49

TBA810 SGS-Thomson

The TBA810S is a monolithic audio amp IC in a 12-lead quad inline package, and intended for use as an audio frequency class B power amplifier. It can provide 7W power output at 16V supply into 4Ω, 6W at 14.4V into 4Ω, 2.5W at 9V into 4Ω, 1W at 6V into 4Ω and operates with a wide range of supply voltages from 4 to 20V. It gives a high output current up to 2.5A, a high efficiency of 75% at 6W output, and low harmonic and crossover distortion. In addition, the circuit is provided with a thermal protection circuit.

The TBA810P is an updated version of the TBA810S, having a higher output, lower noise, protection against polarity inversion, and a higher supply voltage rejection. It can provide 7W into a 2Ω load at 14.4V supply voltage with very low harmonic and crossover distortion.



810

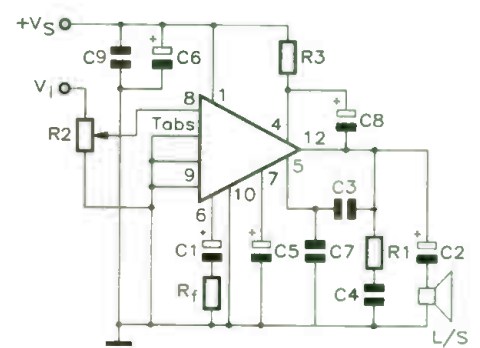


Figure 1

Parts List

R1	Min Res 1Ω	(M1R)
R2	Pot Log 470Ω	(FW27E)
R3	Min Res 100Ω	(M100R)
Rf	Min Res 68Ω	(M68R)
C1	Axial 100μF 10V	(FB48C)
C2	Axial 1000μF 16V	(FB82D)
C3	Poly Layer 1nF	(WW22Y)
C4,9	Polyester 100nF	(BX76H)
C5,6,8	Axial 100μF 35V	(FB49D)
C7	Poly Layer 47nF	(WW37S)

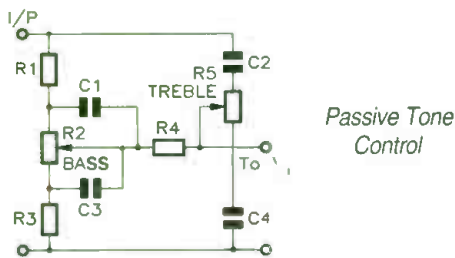
Fax your orders to:
01702 553935

A printed circuit board is available with component designations marked. The board does not include the tone control or power supply circuits.

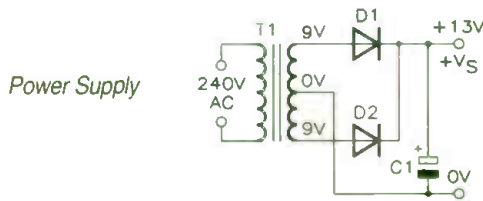
Component list for passive tone control circuit

R1	Min Res 22k	(M22K)
R2,5	Pot log 100k	(FW25C)
R3	Min Res 1k	(M1K)
R4	Min Res 5k6	(M5K6)
C1	Polyester 15nF	(BX71N)
C2	Polystyrene 1nF	(BX35Q)
C3	Polyester 150nF	(BX77J)
C4	Polyester 10nF	(BX70M)

If using this tone control change R2 in Figure 1 to a Pot Log 100k.



Passive Tone Control



Power Supply

Power supply components list

T1	Min Tr9V	(WB11M)
D1,2	1N4001	(QL73Q)
C1	Axial 4700µF 25V	(FB96E)

Order Code	Type	Price each
AH70M	TBA810S	£1.12
QL13P	TBA810P	£1.90
BR02C	5W Amp PCB	£3.75

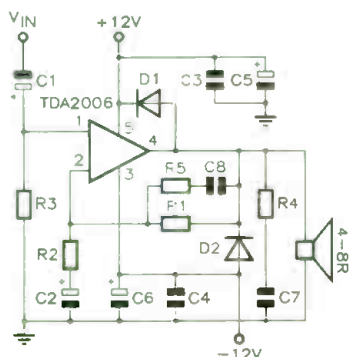
TDA2006V

SGS-Thomson

A high quality audio amp in a 5-pin TO220 package that does not require insulating washers between the metal tab and the heatsink in single rail applications. The amp will operate with single or split power supplies. The distortion up to 8W with 4Ω load or 4W with 2Ω load is less than 0.1% (typically).

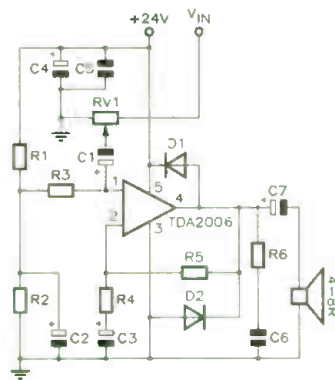
Parts List

R1:	Min Res 22k	(M22K)
R2:	Min Res 680Ω	(M680R)
R3:	Min Res 22k	(M22K)
R4:	Min Res 1Ω	(M1R)
R5:	Min Res 1k8	(M1K8)
C1:	Axial 1µF 100V	(FB12N)
C2:	Axial 22µF 35V	(FB30H)
C3,4:	Polyester 0.1µF	(BX76H)
C5,6:	Axial 100µF 35V	(FB49D)
C7:	Polyester 0.22µF	(BX78K)
C8:	Polystyrene 220pF	(BX30H)
D1,2:	1N4001	(QL73Q)



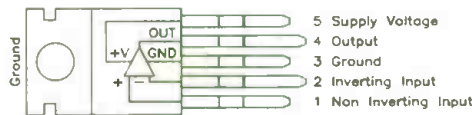
Typical application with split-rail power supply

Typical application with single-rail power supply



Parts List

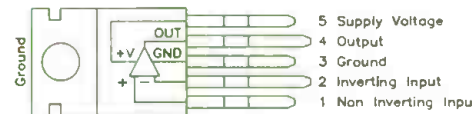
R1,2,3:	Min Res 100k	(M100K)
R4	Min Res 4k7	(M4K7)
R5	Min Res 150k	(M150K)
R6	Min Res 1Ω	(M1R)
RV1:	Pot Log 22Ω	(FW23A)
C1:	Axial 1µF 100V	(FB12N)
C2:	Axial 22µF 35V	(FB30H)
C3:	Axial 2.2µF 100V	(FB15R)
C4:	Axial 100µF 63V	(FB51F)
C5:	Polyester 0.1µF	(BX76H)
C6:	Polyester 0.22µF	(BX78K)
C7:	Axial 2200µF 35V	(FB90X)
D1,2:	1N4001	(QL73Q)



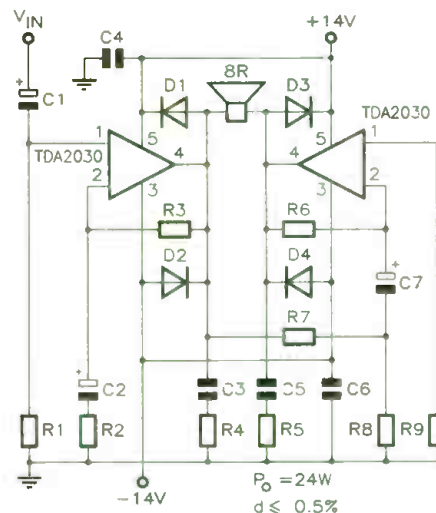
Order Code	Type	Price each
WQ66W	TDA2006V	£1.52

TDA2030AV

SGS-Thomson



Bridge Amplifier with split-rail power supply.



A high quality audio amp in a 5-pin TO220 package that does not require insulating washers between the metal tab and heatsink in single rail supply applications. The amp will operate with single or split supplies. The distortion up to 12W into 4Ω is less than 0.2% typically (less than 0.5% up to 14W) and up to 8W into 8Ω is less than 0.1% (less than 0.5% up to 9W). The circuits shown for the 2006 are suitable for use with this IC, but the supply voltage should be increased to +14V and -14V (or 28V for the single supply circuit). In addition the bridge amplifier will deliver 24W into 8Ω (or with 2006 and power supplies of +12V and -12V it will deliver 20W into 8Ω).

Parts List

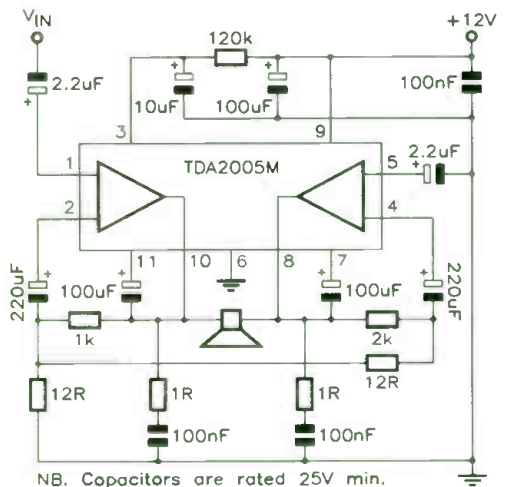
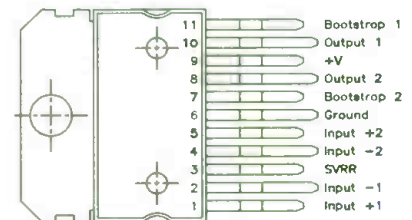
R1:	Min Res 22k	(M22K)
R2:	Min Res 680Ω	(M680R)
R3:	Min Res 22k	(M22K)
R4,5:	Min Res 1Ω	(M1R)
R6,7:	Min Res 22k	(M22K)
R8:	Min Res 680Ω	(M680R)
R9:	Min Res 22k	(M22K)
C1:	Axial 1µF 100V	(FB12N)
C2:	Axial 22µF 35V	(FB30H)
C3:	Polyester 0.22µF	(BX78K)
C4:	Polyester 0.1µF	(BX76H)
C5:	Polyester 0.22µF	(BX78K)
C6:	Polyester 0.1µF	(BX76H)
C7:	Axial 22µF 35V	(FB30H)
D1,2,3,4:	1N4001	(QL73Q)

Order Code	Type	Price each
WQ67X	TDA2030AV	£1.88

TDA2005M

SGS-Thomson

A 20W power booster IC for use in cars. The integrated circuit is fully protected against damage in use. It is protected against output short circuits across the speaker or to ground (AC or DC) and it



Bridge Amplifier

protects the loudspeaker under this condition as well. It is protected against voltage surges up to 40V and it can withstand polarity reversal for longer than it would take a 2A quick blow fuse to blow. The IC consists of two power amps internally connected in a bridge configuration to achieve the high power, low voltage operation.

Order Code	Type	Price each
YY70M	TDA2005M	£2.79

MAPLIN KEY CALL

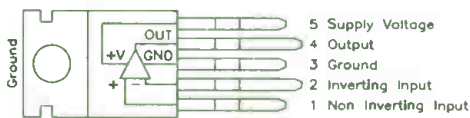
Phone 01702 556751

LM1875N

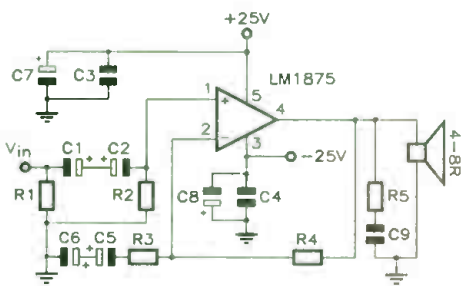
National Semiconductor

A very high quality audio amp in a 5-pin TO-220 package that does not require insulating washers between the tab and the heatsink in single rail supply applications. The amp will deliver 20W into 4Ω or 8Ω loads with a 50V supply. The device uses advance circuit techniques to achieve extremely low distortion levels even at high output levels (only 0.015% at 1kHz and 0.05% at 20kHz into 8Ω and 0.07% at 20kHz into 4Ω all with 20W output). Care must be taken with the pcb layout and the data sheet shows suitable layouts for the circuits shown.

Note that if using a dual supply the IC's tab must be insulated from the heatsink and since this increases the thermal resistance a larger heatsink will be required.



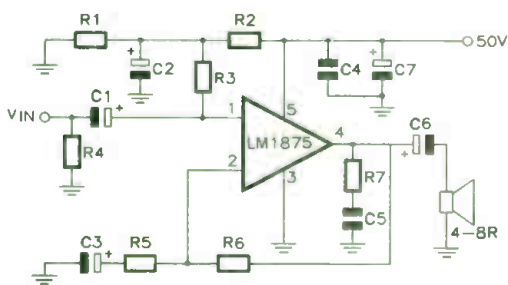
20W Amplifier Dual Supply



Parts List Dual Supply Amp

R1	Min Res 1M	(M1M)
R2	Min Res 22k	(M22K)
R3	Min Res 1k	(M1K)
R4	Min Res 20k	(M20K)
R5	Min Res 1Ω	(M1R)
C1,2	Minelect 4.7μF 35V	(YY33L)
C3,4	Disc 0.1μF	(BX03D)
C5,6	PC Elect 47μF 63V	(FF09K)
C7,8	PC Elect 1000μF 35V	(FF18U)
C9	Monores Cap 0.22μF	(RA50E)

20W Amplifier Single Supply



Parts List for Single Supply Amp

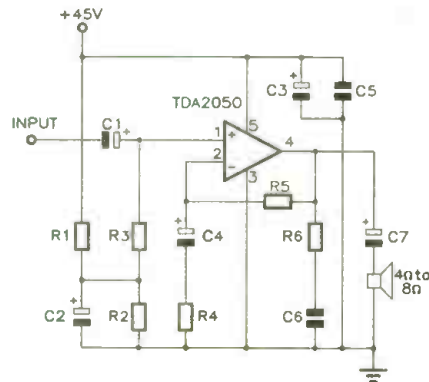
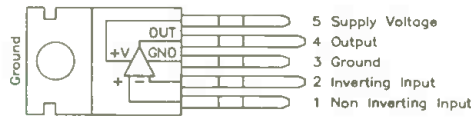
R1,2,3	Min Res 22k	(M22K)
R4	Min Res 1M	(M1M)
R5	Min Res 1k	(M1K)
R6	Min Res 20k	(M20K)
R7	Min Res 1Ω	(M1R)
C1	Minelect 1μF 63V	(YY31J)
C2,3	PC Elect 47μF 63V	(FF09K)
C4	Monores Cap 0.1μF	(RA49D)
C5	Monores Cap 0.22μF	(RA50E)
C6	Can 2200μF 63V	(FF22Y)
C7	Axial 1000μF 63V	(FB84F)

Order Code	Type	Price each
UH78K	LM1875N	£6.49

TDA2050V

SGS-Thomson

A high quality audio amp in a 5-pin TO220 package that does not require insulating washers between the metal tab and heatsink in single rail supply applications. The amp will operate with single or split supplies. The amp can provide 32W rms into a 4Ω load and 25W rms into 8Ω. The device features low harmonic and crossover distortion and a low external component count.



Typical application gives 25W into 8Ω. 32W into 4Ω.

Parts List

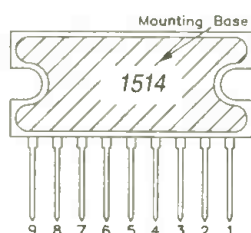
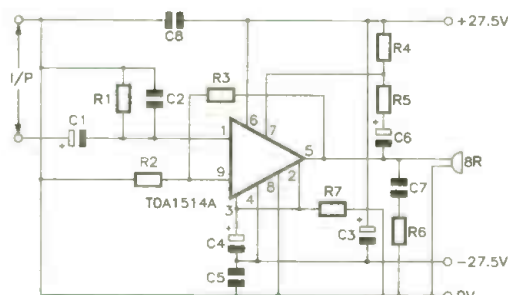
R1,2,3,5	Min Res 22kΩ	(M22K)
R4	Min Res 680Ω	(M680R)
R6	Min Res 2.2Ω	(M2R2)
C1	PC Elect 2.2μF 100V	(FF02C)
C2	PC Elect 100μF 35V	(JL19V)
C3,7	PC Elect 1000μF 63V	(JL26D)
C4	PC Elect 22μF 25V	(FF06G)
C5	Disc 0.1μF 50V	(BX03D)
C6	Polyester 0.47μF	(BX80B)

Order Code	Type	Price each
CP88V	TDA2050V	£4.49

TDA1514AN-7

Philips

A very high quality audio amp in a 9-pin flat package. The heatsink must be insulated from ground. The amp will deliver 40W into an 8Ω load with a ±27.5V power rail or 40W into a 4Ω load with a ±21V power rail. The device is designed to meet the requirements of digital sound sources such as Compact Disc. The total harmonic distortion at 32W is less than 0.0032%.



An output mute circuit prevents switch-on and switch-off clicks, and the device is totally protected against short-circuits and thermal runaway. The device will deliver 25W into 8Ω with a ±22V supply or 12.5W into 8Ω with a ±16V supply. The metal plate on the package is connected to pin 4.

Parts List

R1,3	Min Res 20kΩ	(M20K)
R2	Min Res 680Ω	(M680R)
R4	Min Res 82Ω	(M82R)
R5	Min Res 150Ω	(M150R)
R6	Min Res 3.3Ω	(M3R3)
R7	Min Res 470k	(M470K)
C1	PC Elect 1μF 100V	(FF01B)
C2	Ceramic 220pF	(WX60Q)
C3	PC Elect 47μF 63V	(FF09K)
C4	PC Elect 47μF 50V	(JL16S)
C5,8	Polyester 0.47μF	(BX80B)
C6	PC Elect 220μF 35V	(JL22Y)
C7	Mylar 0.022μF	(WW19V)

Order Code	Type	Price each
UK75S	TDA1514A-N7	£8.49

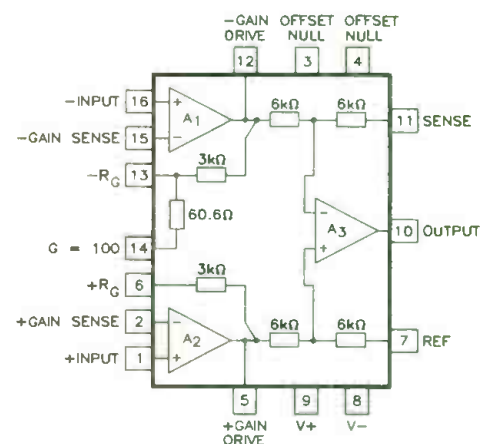
SUBSECTION 59 PRE-AMPLIFIER IC's

INA103KP

Burr-Brown®

NEW!

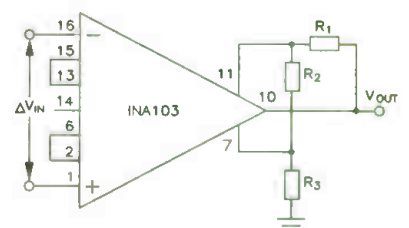
The INA103KP is a very low noise, 1nV/√Hz, low distortion, 0.0009% at 1kHz, monolithic instrumentation amplifier. Wide supply range of ±9V to ±25V. Its current-feedback circuitry achieves very wide bandwidth, 100MHz at G = 1000, and excellent dynamic response. It is ideal for low-level audio signals, such as balanced low-impedance microphones. The INA103KP provides near-theoretical limit noise performance for 200Ω source impedances. Unique distortion cancellation circuitry reduces distortion to extremely low levels, even in high gain. Its balanced input, low noise and low distortion provide superior performance compared to transformer-coupled microphone amplifiers.



INA103KP

Specification (typical at V_s = 15V)

Supply voltage:	±9 to ±25V
Supply current:	9mA
Input impedance:	60MΩ
Input voltage range:	±12V
Output impedance:	R _L = 600Ω
Output voltage:	12V typical
Equivalent input noise figure:	1pA/√Hz at 1kHz
Dynamic response G = 1	—3dB bandwidth: 6MHz



INA103KP

Output stage with Gain = 10

Output Stage Gain =
 $(R1 \parallel 12k) + R1 + R3 / (R2 \parallel 12k)$

Components List

R1,3	1k2	(M1K2)
R2	2k4	(M2K4)
IC	INA103KP	(AD60Q)

Order Code	Type	Price each
AD60Q	INA103KP	£6.38

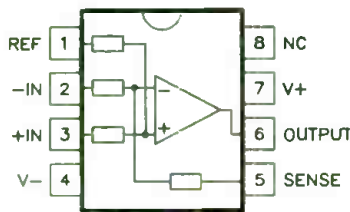
INA105KP

Burr-Brown®

NEW

The INA105KP is a monolithic Gain = 1 differential amplifier, consisting of a precision op amp and on-chip metal film resistors. Excellent TCR tracking of the resistors maintains gain accuracy and common-mode rejection 86dB over temperature.

The differential amplifier is the foundation of many commonly used circuits. The INA105KP provides this precision circuit function without using an expensive precision resistor network, thus is easy to use and with low cost.



1NA105KP

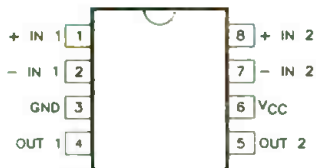
Specification (typical at $V_s = 15V$)

Supply voltage:	± 5 to $\pm 18V$
Supply current:	1.5mA
Input impedance:	50k Ω
Input voltage range:	$\pm 10V$
Output impedance:	0.01 Ω
Output voltage:	12V typical
Dynamic response $G = 1$ -3dB bandwidth:	1MHz

Order Code	Type	Price each
AD61R	INA105KP	£7.15

LM387N Low Noise Dual Pre-amplifier

National Semiconductor

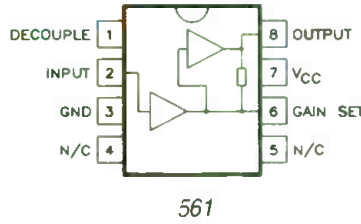


A stereo pre-amplifier in an 8-pin DIL package similar to the now obsolete 381, but it will only operate up to 30V and the input noise is slightly higher.

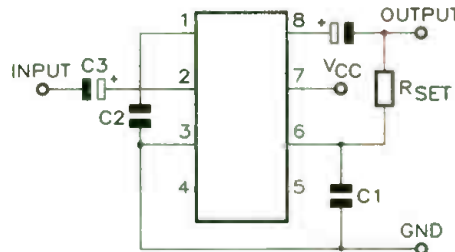
Order Code	Type	Price each
WQ35Q	LM387N	£2.10

SL561CDP Ultra Low Noise Pre-amplifier

GEC-Plessey



A high gain, low noise preamplifier designed for use in audio and video systems up to 6MHz. Noise performance is optimised for source impedances between 20 Ω and 1k Ω , making the device suitable for use with a number of transducers including photoconductive IR detectors, magnetic tape heads and dynamic microphones. With pin 1 open circuit, the device has a typical gain of 60dB. The gain can be adjusted by connecting a suitable resistor between pin 6 and the output i.e. a 1k Ω results in a gain of approximately 28dB. The upper cut-off frequency can be reduced by connecting a suitable capacitor from pin 6 to ground. A 47nF capacitor produces a cut-off frequency of approximately 10kHz. Similarly the lower cut-off frequency can be determined by C_2 and C_3 .



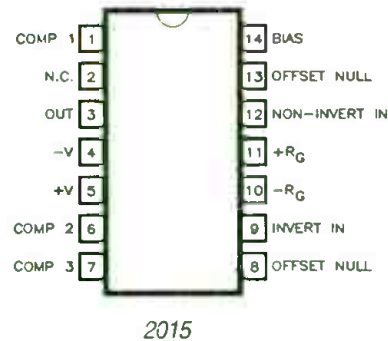
Specification

Supply voltage:	+5V typical, 10V maximum
Supply current:	2.0mA typical, 3.0mA maximum
Power consumption:	10mW
Output voltage:	3V typical
Output resistance:	50 Ω
Input resistance:	3k Ω
Input capacitance:	15pF
Equivalent input noise figure:	0.8nV/ \sqrt{Hz}

Order Code	Type	Price each
DB47B	SL561CDP	£3.15

SSM2015P Microphone Pre-amplifier

Analog Devices

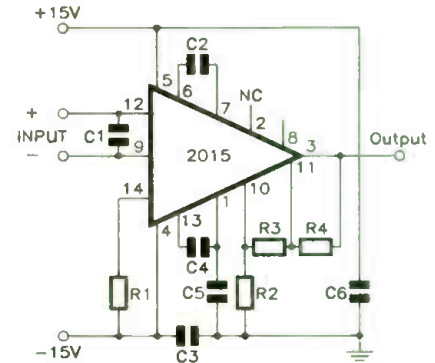


An ultra low noise audio preamplifier particularly suited to microphone preamplification including balanced microphones. The IC features wide bandwidth, low distortion only 0.007% at a gain of 100, and very low noise only 1.3nV/ \sqrt{Hz} for source impedances up to 4k Ω .

Specification (Typical at $V_s = \pm 15V, 25^\circ C, Gain = 100$)	
Supply voltage:	$\pm 15V (\pm 12V \text{ to } \pm 17V)$
Supply current:	12mA
Supply voltage rejection ratio:	100dB

Common mode

rejection ratio:	95dB
Input offset voltage:	0.3mV
Input offset current:	0.5 μA
Input bias current:	4.5 μA
Output voltage swing:	$\pm 12.5V (R_L = 2k\Omega)$
Bandwidth:	700kHz
Slew rate:	6V/ μs



Microphone Amplifier with Gain = 100
 (Microphone impedance $\approx 600\Omega$)

Parts List

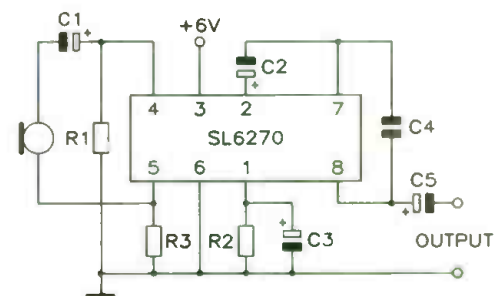
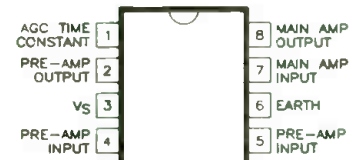
R1	Min Res 33k (for unbalanced microphone) Min Res 47k (for balanced microphone)	(M33K) (M47K)
R2,4	Min Res 10k	(M10K)
R3	Min Res 200 Ω	(M200R)
C1	Ceramic 220pF	(WX60Q)
C2	Ceramic 47pF	(WX52G)
C3,6	Poly Layer 0.1 μF	(WW41U)
C4,5	Ceramic 15pF	(WX46A)

Order Code	Type	Price each
UL16S	SSM2015P	£8.99

SL6270CDP Microphone Pre-amplifier/VOGAD

GEC-Plessey

The IC combines the functions of audio amplifier and voice operated gain adjusting device (VOGAD). It is designed to accept signals from a low sensitivity microphone and provide an essentially constant output signal for a 50dB range of input. The application circuit shows a radio transmitter microphone with constant output.



6270

Gain controlled microphone pre-amplifier

Specification (Typical at $V_s = 6V$)

Supply voltage:	4.5V to 10V (12V max.)
Supply current:	5mA
Input impedance:	150 Ω (pin 4 or 5)
Differential input Impedance:	300 Ω
Voltage gain:	52dB (72 μV rms at pin 4)
Output level:	90mV rms (4mV rms at pin 4)
Distortion:	2% (90mV rms at pin 4)

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Input noise: 1µV (300Ω source)

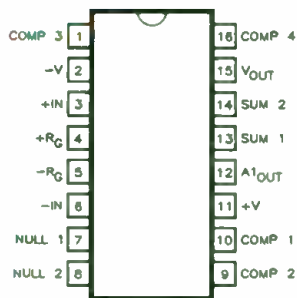
Parts List

R1, R3	Min Res 27kΩ	(M27K)
R2	Min Res 1MΩ	(M1M)
C1,2	Minelect 2.2µF 63V	(YY32K)

Order Code	Type	Price each
UM73Q	SL6270CDP	£3.15

SM2016P Differential Audio Preamplifier

Analog Devices

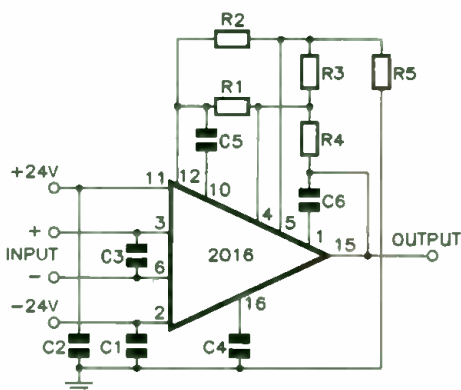


2016

An ultra low noise preamplifier for use as a microphone preamplifier, differential line receiver or low gain balanced input stage. The noise is 0.8nV/√Hz with 150Ω source impedance. The output can source and sink >40mA allowing a jack-field to be driven directly. The special package can dissipate 1.5W.

Specification (Typical at 25°C, V_S = ±18V, Gain = 100)

Supply voltage:	±9V to ±36V
Supply current:	12mA
Supply voltage rejection ratio:	100dB
Common mode rejection ratio:	95dB
Input offset voltage:	1.5mV
Input offset current:	1.5µA
Input bias current:	9 µA
Output voltage swing:	±17V (R _L = 2kΩ)
Total harmonic distortion:	0.003% (R _L = 2kΩ)
Bandwidth:	1MHz
Slew rate:	10V/µs



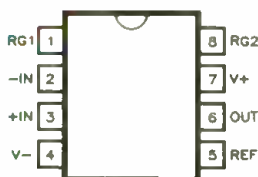
Parts List

R1,2	Min Res 2k	(M2K)
R3	Min Res 100Ω	(M100R)
R4,5	Min Res 5k1	(M5K1)
C1,2	Poly Layer 0.1µF	(WW41U)
C3	Ceramic 470pF	(WX64U)
C4	Ceramic 39pF	(WX51F)
C5	Ceramic 47pF	(WX52G)
C6	Ceramic 120pF	(WX57M)

Order Code	Type	Price each
UL17T	SSM2016P	£11.50

SSM2017P Audio Preamplifier

Analog Devices

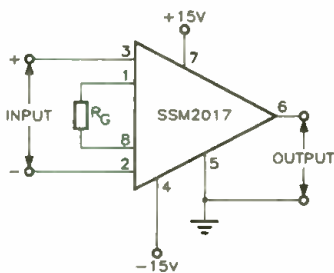


A state-of-the-art audio preamplifier that requires just one external resistor or potentiometer to set the gain between x1 and x3500. The value of the gain setting resistor R_G can be found from the formula:

$$R_G = 10,000 \text{ where } G \text{ is the gain.}$$

$$G-1$$

For example: for a gain of 100 times (=40dB), R_G is equal to 100Ω. For x1 gain, pins 1 and 8 should be left open circuit and for maximum gain use Min Res 1.8Ω and Min Res 1.2Ω in series. The very low noise mixer amplifier circuit shows how to connect the amplifier so that pins 1 and 8 are true dc virtual ground allowing almost perfect summing of the circuits connected to the input. With its superb noise performance of just 950pV/√Hz, and its ultra low total harmonic distortion over the full audio bandwidth of <0.01% and 1MHz bandwidth at x100 gain, this low cost device is suitable for the most demanding hi-fi applications.



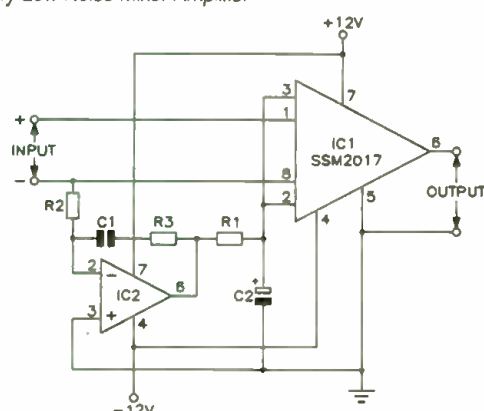
Basic Amplifier

Specification (Typical at V_S = ±15V, 25°C)

Supply voltage:	±15V (±6V to ±22V)
Supply current:	±10.6mA
Input voltage range:	±8V
Input offset voltage:	100µV
Input offset current:	±2nA
Input bias current:	6µA
Output voltage swing:	±12.3V
Minimum load:	2kΩ
Max capacitive load:	50pF

Gain	1	10	100	1000
Total harmonic distortion + noise:	0.008%	0.004%	0.005%	0.012%
Input voltage noise (nV/√Hz):	107.14	11.83	1.95	0.95
Slew rate:		17V/µs		
Bandwidth:	4MHz	2MHz	1MHz	200kHz
Common mode rejection ratio:	54dB	74dB	92dB	112dB
Power supply rejection ratio:	82dB	101dB	118dB	124dB
Gain accuracy:	0.05dB	0.2dB	0.2dB	0.25dB

Very Low Noise Mixer Amplifier



Parts List

R1	Min Res 5.1kΩ	(M5K1)
R2	Min Res 6.2kΩ	(M6K2)
R3	Min Res 33kΩ	(M33K)
C1	Poly Layer 0.33µF	(WW47B)
C2	PC Elect 220µF 16V	(FF13P)
IC1	SSM2017	(CP89W)
IC2	741	(2L22Y)

Order Code	Type	Price each
CP89W	SSM2017P	£3.79

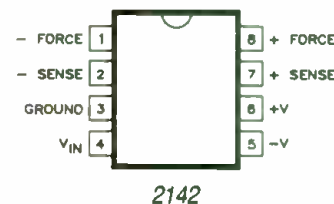
SSM2142P Balanced Line Driver

Analog Devices

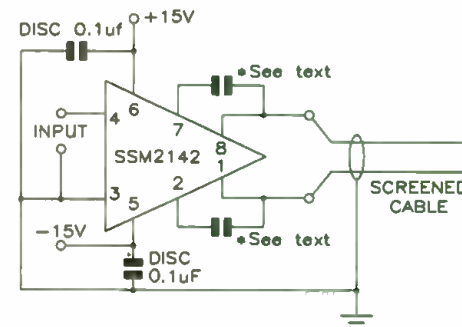
A differential output buffer amplifier that converts a single-ended input signal to a balanced output with high drive capability. The IC helps to maintain audio quality on long cable runs by eliminating mains hum, rf interference, voltage drops and noise. It is capable of driving a 10V rms signal into 600Ω loads, or even extremely long cables, with a very low distortion performance. The 0.1µF capacitors shown in the application circuit must be connected close to the IC. For optimal performance Reversolytic 10µF capacitors can be connected between pins 1 and 2, and between pins 7 and 8, otherwise pin 1 should be connected to pin 2, and pin 7 should be connected to pin 8.

Specification (typical at V_S = ±15V)

Supply voltage:	±4V to ±18V
Supply current:	5.5mA
Input impedance:	10kΩ
Input current:	750µA
Differential gain:	5.98dB
Total harmonic distortion:	0.006%
Signal to noise ratio:	-109dB
Output voltage swing:	±14V
Output impedance:	50Ω



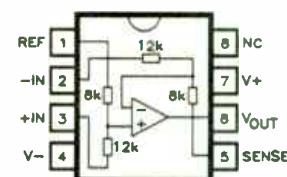
2142



Order Code	Type	Price each
UM54J	SSM2142P	£7.25

SSM2143P Balanced Line Receiver

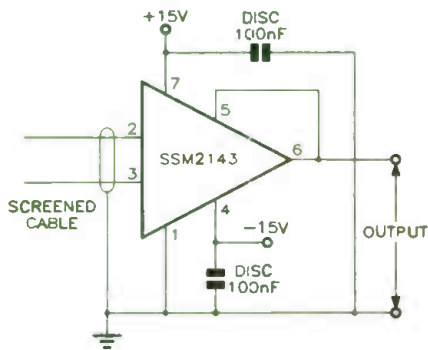
Analog Devices



2143

A differential amplifier designed to receive balanced line inputs in audio applications requiring a high level of immunity from common-mode noise. Total harmonic distortion is less than 0.004% over the full audio band

even while driving low impedance loads. The input stage is designed to handle input signals as large as +28dBu (0dBu = 0.775V) when the gain is x0.5. With gain = 0.5 the SSM2142/SSM2143 combination provides a fully integrated, unity gain solution to driving high quality audio signals over long cable runs.



Specification (typical at $V_s = \pm 15V$)

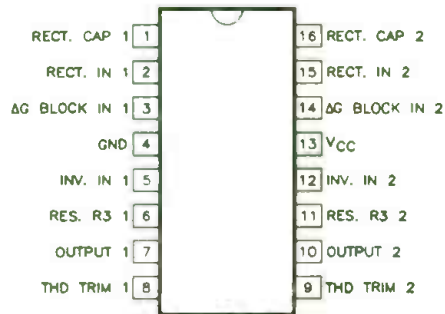
Supply voltage:	$\pm 6V$ to $\pm 18V$
Supply current:	$\pm 2.7mA$
Gain:	0.5 (-6dB)
Total harmonic distortion + noise:	0.0006% (at 1kHz, $V_{in} = 10V_{rms}$)
Signal to noise ratio:	-107.3dB
Headroom:	+28dBu
Bandwidth:	7MHz
Output voltage swing:	$\pm 14V$
Minimum resistive load drive:	2k Ω
Maximum capacitive load drive:	300pF

Order Code	Type	Price each
CP90X	SSM2143P	£4.35

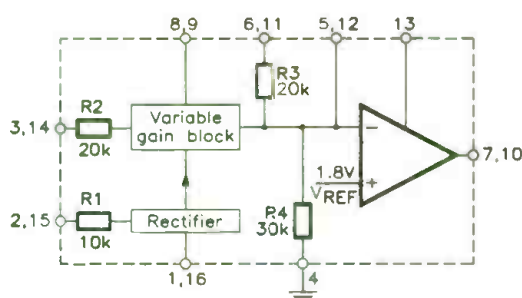
NE571N Compaider

Signetics

Versatile, low cost, two channel (stereo) gain control circuits in which either channel may be used as a dynamic range compressor or expander. Each channel has a full wave rectifier to detect the average value of a signal, a linearised temperature compensated variable gain block and an operational amplifier.



571



Basic Input to output characteristics.

Compressor input level or expander output level (dBm)	Compressor output level or expander input level (dBm)
+20	+10
0	0
-20	-10
-40	-20
-60	-30
-80	-40

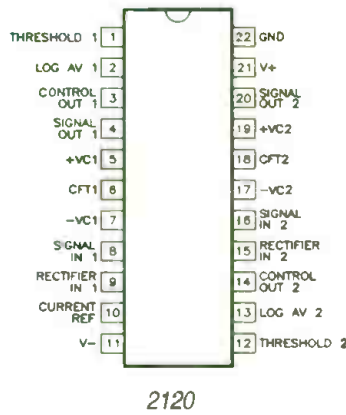
Characteristics

Supply voltage range	6V to 18V
Supply current	3.2mA
Output current capability	$\geq \pm 20mA$
Output slew rate	0.5V/ μs
Gain block distortion untrimmed	0.5%
Gain block distortion trimmed	0.1%
Resistor tolerance	$\pm 5\%$
Internal reference voltage	1.8V
Output dc shift	$\pm 30mV$
Expander output noise	20 μV

Order Code	Type	Price each
YY87U	NE571N	£3.45

SSM2120P Dynamic Range Processor

Analog Devices



2120

The IC consists of two VCA's and two level detectors, a combination that allows construction of compressors, expanders, limiters, AGC circuits, voltage controlled filters, noise reduction systems and stereo noise gates. Detailed information about how to use this IC can be found in Maplin Magazine Issue 47.

Specification (typical at $V_s = \pm 15V$)

Supply voltage:	$\pm 5V$ to $\pm 15V$ ($\pm 18V$ max.)
Positive supply current:	8mA
Negative supply current:	6mA
Max. input current (pins 8 and 16):	$\pm 400\mu A$
Gain control range:	-100dB to +40dB
Control sensitivity:	6mV/dB
Frequency response:	250kHz
Off isolation:	100dB
Total harmonic distortion:	0.005%
Noise:	-80dB
Level detector dynamic range:	110dB
Input current (pins 9 and 15):	0.03 μA to 3mA p-p
Output drive (pins 3 and 14):	7.5mA sink

This device is supplied in a 22-pin 0.3in DIL package.

Order Code	Type	Price each
UL78K	SSM2120P	£9.95

LM1035N Dual DC Operated Tone/Volume/Balance Circuit

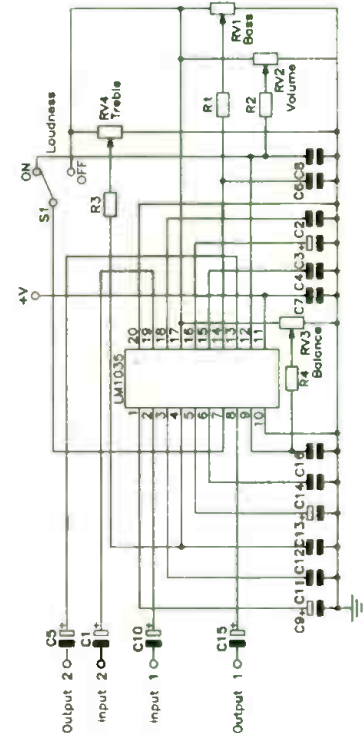
National Semiconductor

A stereo, DC controlled bass, treble, volume and balance circuit that can be operated by remote control or from four potentiometers which may be biased from a zener regulated supply provided on the chip. Each tone response is defined by a single capacitor chosen to give the desired characteristic. An additional control input is provided to effect loudness compensation.

Features

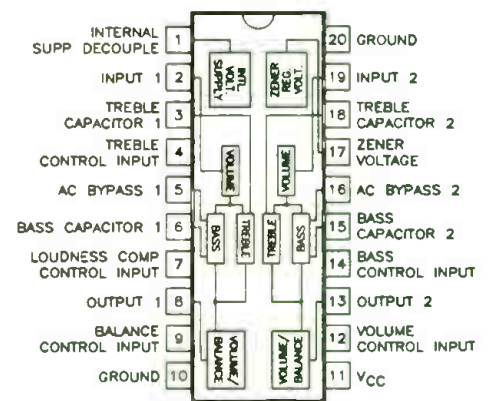
- Wide supply voltage range, 8V to 18V
- Large volume control range, 80dB typical

- Tone controls, $\pm 15dB$ typical
- Channel separation, 75dB typical
- Low distortion, 0.05% typical at 1V rms input
- High signal to noise ratio, 80dB typical at 1V rms input



Characteristics (typical)

Supply current:	35mA
Zener output:	5.4V @ 5mA (max)
Output voltage max:	1.3V rms ($V_{CC} = 8V$) 2.5V rms ($V_{CC} = 12V$) 3.5V rms ($V_{CC} = 18V$) 1V rms ($V_{CC} = 8V$) 2V rms ($V_{CC} = 12V$)
Input voltage max:	2V rms ($V_{CC} = 12V$)
Maximum gain:	0dB
Volume control range:	80dB
Balance control range:	$\pm 1dB$ to -26dB
Bass control range:	$\pm 15dB$ @ 40Hz ($C = 0.39\mu F$)
Treble control range:	$\pm 15dB$ @ 16kHz ($C = 0.01\mu F$)
Frequency response:	30Hz to 16kHz, flat 20Hz to 250kHz, -1dB
Input resistance:	30k Ω
Output resistance:	20 Ω
Total harmonic distortion:	0.05%
Control input current:	-0.6 μA



1035

Parts List

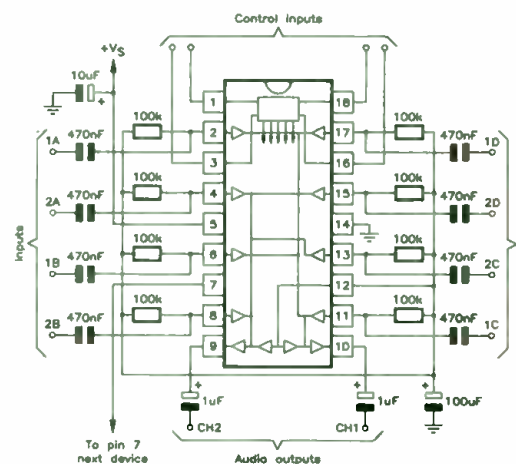
R1,2,3,4:	Min Res 47k	(M47K)
C1,10:	Poly Layer 0.47 μF	(WW49D)
C2,7,11:	Poly Layer 0.01 μF	(WW29G)
C3,13:	Axial 10 μF 25V	(FB22Y)
C4,14:	Poly Layer 0.39 μF	(WW48C)
C5,15:	Axial 2.2 μF 100V	(FB15R)
C6,8,12,16:	Poly Layer 0.22 μF	(WW45Y)
C9:	Axial 47 μF 63V	(FB39N)
RV1,2,3,4:	Pot Lin 47k	(FW04E)
S1:	Switch SPDT	(FH98G)

Order Code	Type	Price each
QY19V	LM1035N	£5.95

LM1037N Dual 4-Channel Analogue Switch

National Semiconductor

Dual electronically controlled, four channel analogue switch with internal muting facility. It is ideal for use as a stereo source selector or in multiplexing or sampling applications. An additional pin is included to allow parallel connection of two or more integrated circuits. Channel selection is achieved by taking one of the four control lines high (>2V and up to 50V). Each signal should be connected to one of the eight inputs via an 0.47µF capacitor. Also a Min Res 100k should be connected to each input with the other end of the resistor connected to a common point. This common point should then be connected to pin 12 and via a 100µF 40V capacitor to earth. Decouple the supply voltage close to the chip with a 10µF 63V capacitor. Each output should be connected via a 1µF 63V capacitor. Two or more devices can be connected together by directly coupling all pin 7's and the output pins 9 and 10. Only one output capacitor is required for each common output.



Channel Selection

Taking control pin high	Connects this pin to pin 10	pin 9
1	11	13
3	17	15
16	2	4
18	6	8

Characteristics

Supply voltage range:	5V to 28V
Supply current:	V _S = 12V 6.4mA; V _S = 30V 10mA
Signal handling:	V _S = 12V 2.9V rms
Total harmonic distortion:	(1V rms) 0.04%
Noise voltage at output:	5µV
Channel separation:	-95dB
Relative unselected output:	-90dB

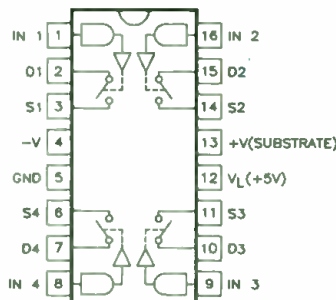
Order

Code	Type	Price each
QY33L	LM1037N	£4.85

DG211CJ 4-Channel SPST Analogue Switch

Siliconix

A 4-Channel single-pole single-throw analogue switch for use in communications, instrumentation and process control. The device is completely bi-directional in the on condition and will block 30V peak-to-peak signals when off. A logic 0 on the inputs turns the appropriate switch on and logic 1 turns it off.



211

Characteristics

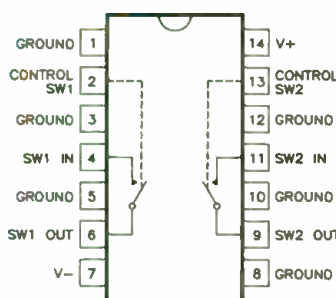
Analogue signal range:	±15V
On resistance:	115Ω
Turn on time:	460ns
Turn off time:	360ns
Continuous current through switch:	20mA max
Supply voltage:	±20V max
recommended:	±15V
minimum:	±8V
Logic voltage (pin 12):	+5V
Positive supply current:	0.35mA
Negative supply current:	0.3mA
Logic supply current:	0.5mA

Order

Code	Type	Price each
UH57M	DG211CJ	£1.60

SSM2412P Dual Audio Analogue Switch

Analog Devices



2412

A dual analogue switch designed for high performance audio applications. Distortion and noise are negligible over the full operating range of 20Hz to 20kHz and with signals up to 10Vrms. The IC provides superb fidelity with no clicks during switching. It can be controlled by standard TTL or CMOS logic and pull-up resistors are not required. The switches provide superb off-isolation and true bilateral operation. The analogue inputs and outputs are protected against overload and overvoltage. The switches are guaranteed to break before make even in multiple systems. A logic 0 (less than 0.8V) turns the switch off, whilst a logic 1 (greater than 2V) turns the switch on.

Specification (Typical at V_S = ±18V)

Supply voltage:	±7.5V to ±18V (±20V max.)
Positive supply current:	6mA
Negative supply current:	4.8mA
Ground current:	0.6mA
Logic input current:	1µA
Analogue voltage range:	±14.2V*
On resistance:	60Ω
On resistance matching:	1%
Turn on time:	3.5ms
Turn off time:	1.5ms
Break before make time delay:	2ms
On-state input capacitance:	12pF
Off-state input capacitance:	4pF
Off isolation:	120dB
Crosstalk:	96dB
Total harmonic distortion:	0.003%
Noise (20Hz to 20kHz):	1nV/√Hz
	0.2µV p-p

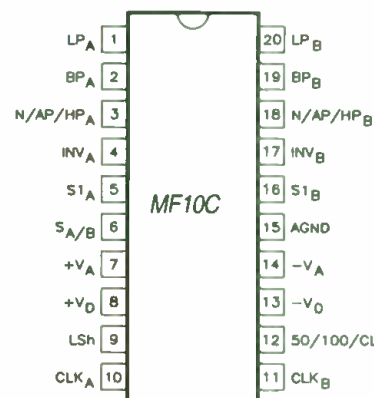
*With V_S lower than ±18V, the analogue voltage (VA) must not exceed 3.5V less than the rail voltage. E.g. with V_S = ±7.5V, VA must be <±4V, with V_S = ±12V, VA must be <±8.5V.

Order

Code	Type	Price each
UL81C	SSM2412P	£8.75

MF10CCN Universal Monolithic Switched Capacitor Filter

National Semiconductor



Two independent general purpose CMOS active filter building blocks each requiring just the addition of 3 to 4 resistors and an external clock to produce various 2nd order functions. Each block has three output pins. One of the outputs can be configured to perform either an allpass, highpass, or a notch function. The other two pins perform lowpass and bandpass functions. The centre frequency of the lowpass and bandpass 2nd order functions can be either directly dependent on the clock frequency or they can depend on both clock frequency and external resistor ratios. The centre frequency of the notch and allpass functions is directly dependent on the clock frequency while the highpass centre frequency depends on both resistor ratio and clock.

Up to 4th order functions can be performed by cascading the two 2nd order building blocks in each MF10C. Higher than 4th order functions can be obtained by cascading MF10C packages. Any of the classic filter configurations (such as Butterworth, Bessel, Cauer and Chebyshev) can be formed.

Characteristics (typical)

Recommended supply voltage:	+5V (+4V to +7V max)
Frequency range:	30kHz
Clock to centre frequency ratio:	49.94 (pin 12 high) 99.35 (pin 12 at mid V _D)
Q accuracy:	±2%
Centre frequency temperature:	±10ppm/°C (pin 12 high)
Coefficient:	±100ppm/°C (pin 12 at mid V _D)
Q temperature coefficient:	±500ppm/°C
DC low pass gain accuracy:	±2% max
Crosstalk:	50dB
Clock feedthrough:	10mV
Maximum clock frequency:	1.5MHz
Power supply current:	8mA
Voltage swing (pins 1,2,3,9,18,20):	±3.7V
Output short circuit current:	3mA source, 1.5mA sink
Op-amp unity gain bandwidth:	2.5MHz
Op-amp slew rate:	7V/µs

Order

Code	Type	Price each
QY35Q	MF10CN	£4.95

FAX YOUR ORDER NOW!

01702 553935

SUBSECTION 60 MUSIC AND SOUND GENERATOR IC's

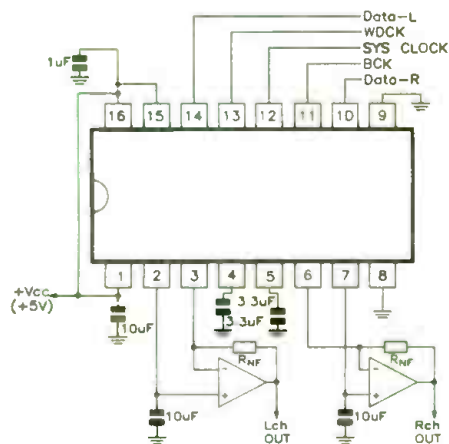
PCM69A Advanced 1-Bit BiCMOS Dual 18-Bit DAC

Burr-Brown

NEW

The PCM69A dual 18-bit DAC is a low cost, dual output 18-bit BiCMOS digital-to-analogue converter utilising a novel architecture to achieve excellent low level performance. By combining a conventional thin-film R-2R ladder DAC, a digital offset technique with analogue correction and an advanced 1-bit DAC using a first order noise shaping technique, the device achieves high resolution, minimal glitch and low zero-crossing distortion.

The PCM69A digital offset occurs at bit 4, making it an excellent choice for digital musical instruments and audio DSP. Capable of 16 times oversampling, it has excellent THD performance and very high signal to noise ratio. Left and right channel analogue outputs are current drives for direct connection to the inverting inputs of operational amplifiers with single gain setting feedback resistors. Logical inputs are TTL and CMOS compatible, and the device requires only a single 5V supply and consumes 75mW typically.



PCM69A

Specification

Resolution:	18 bits
Dynamic range:	106dB
Logic input data format:	serial MSB first
Input system clock frequency:	16.9344 MHz
Total harmonic distortion:	-86dB @ 0dB output
Channel separation:	106dB @ 1kHz
Level linearity:	±1dB @ -90dB signal level
Gain error:	±3%
Gain mismatch, channel-to-channel:	P1%
Gain drift:	95ppm/°C
Warm-up time:	1 minute
Idle channel signal to noise ratio:	110dB, 20Hz to 40kHz
Analogue output range:	±1.2mA ±3%
Output impedance:	1.8kΩ ±30%
Supply voltage range:	+4.75 to +5.25V (5V nominal)
Combined supply current:	15mA
Power dissipation:	75mW

Order Code	Type	Price each
AD62S	PCM69AP	£21.99

DF1700 Dual Channel 8 x Oversampling Digital Filter

Burr-Brown

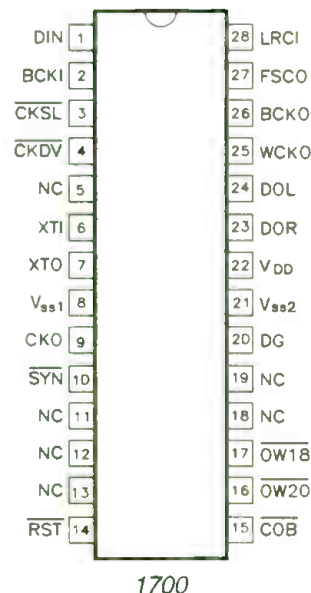
NEW

The DF1700 is a high-performance, 8 times oversampling CMOS digital filter which accepts 16-bit input data and is user selectable to output 16, 18 or 20-bit data, according to a 2-bit binary code applied to pins 16 and 17. The 8 x oversampling feature converts the input data frequency (fs) to an output data frequency of 8 x fs by digital interpolation. By providing 8 x oversampled data to an audio DAC, lower order analogue filters can be used at the DAC's output, thus reducing filter phase non-linearities. Oversampling with the DF1700 simultaneously improves the fidelity of the analogue reconstruction and reduces analogue filter complexity at the output of the DAC.

The most common application for this IC is in high-performance digital audio playback, such as compact disc players. Digital information from a compact disc is often formatted using a Digital Interface Format Receiver Chip (DIFRC). The DF1700 can be interfaced directly to the output of many popular DIFRCs able to provide the Left/Right Channel Input multiplex clock (LRCI), the serial Data INput stream (DIN), and the timing clock for serial input data (BCKI).

The fs data stream, which has been formatted by the DIFRC, is 8 times oversampled by the DF1700 and separated into left and right channel data for input to the PCM1700 DAC (AD64U). The analogue stereo outputs from the PCM1700 should then each pass through a three-pole Generalised Intermittence Converter (GIC) low-pass filter, which has extremely low distortion and negligible phase shift.

The frequency of the DF1700's master clock oscillator can be selected as 192, 384, 256 or 512 times fs according to a 2-bit binary code applied to CKSL and CKDV (pins 3 and 4). The IC also needs a crystal, or an external clock signal, to operate at 16.9344MHz (e.g. crystal UL00A).



1700

Specification	CKSL	CKDV	x fs
Oscillator frequency range:	H	H	192 1 to 13MHz
	H	L	384 2 to 26MHz
	L	H	256 1 to 13MHz
	L	L	512 2 to 26MHz

BCKI pulse width:	100ns min.
BCKI cycle time:	200ns min.
DIN setup time:	75ns min.
DIN hold time:	75ns min.
BCKO delay time:	120ns max.
Supply voltage:	+5V single-ended
Power dissipation:	250mW

Order Code	Type	Price each
AD63T	DF1700P	£16.99

PCM1700 Dual 18-Bit Audio DAC

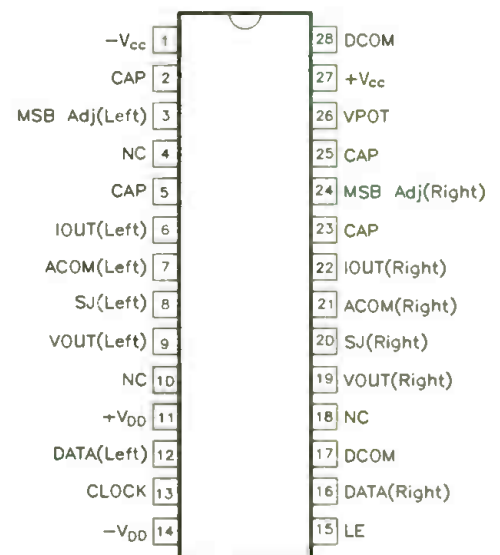
Burr-Brown

NEW

A low cost, high-performance, dual (stereo) 18-bit digital-to-analogue converter specifically for recovering high-fidelity music from a digital storage medium, primarily compact disc. The PCM1700 features true glitch-free, 'co-phase' current and voltage outputs and only requires ±5V supply rails to operate. It comes complete with an internal reference and optional MSB adjustability for even greater THD performance, over and above the -92dB achievable without the external adjustment. This low maximum harmonic distortion figure, plus noise, is 100% tested. The IC is also very fast, capable of 16 times oversampling rates on both channels simultaneously, allowing very simple output filters to be used which will introduce the minimum additional distortion and phase shift.

For compact disc reproduction, this IC is intended to be driven by the DF1700, which will expand the 16-bit CD data stream to 18 bits with 8 times oversampling added. The PCM1700 includes on-chip op-amps to convert the left and right channel current outputs to signal voltages. Alternatively the current outputs can be accessed directly for externally added op-amp ICs of the designer's choice.

Total power dissipation is less than 400mW maximum and the IC runs from ±5V supply rails. (See also DF1700.)



Specification

Resolution:	18 bits
Dynamic range:	108dB
Input data format:	serial BTC
Input clock frequency:	16.9MHz
Total Harmonic Distortion, + noise:	-88dB @ 0dB output
Channel separation:	108dB
Signal to noise ratio:	108dB
Gain error:	+1%
Gain mismatch:	±1%
Bipolar zero error:	10mV
BPZ error mismatch:	5mV
Gain drift:	100ppm/°C
Bipolar zero drift:	20ppm of FSR/°C
Warm-up time:	1 minute
Voltage output range:	±3V (using internal op-amps)
Voltage output impedance:	0-1Ω
Voltage output current:	±8mA max.
Current output range:	±670µA ±2%
Current output impedance:	1-67kΩ ±2%
Supply voltage:	±4.75 to 5.25V (plus ±15V for external op-amp filters)
Supply current:	+40mA and -16mA

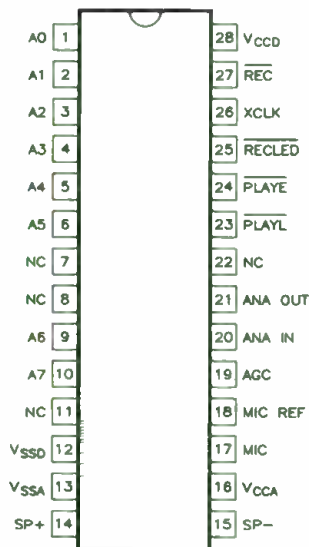
Order Code	Type	Price each
AD64U	PCM1710U	£19.75

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ISD1212 Single-Chip Record/Playback

ISD

NEW



The ISD1212 is controlled by a single REC signal, with either of two push-button controlled playback control signals PLAYE and PLAYL. The IC is configured for simplicity of design in a single message playback application. Using the address lines will allow multiple message applications.

Patented technology provides a natural record and playback of sound. The input voice signals are stored directly in non-volatile EEPROM cells, and are played back without the synthetic effect so often heard with digital speech storage methods. A complete sample is stored in a single cell, minimising the memory necessary to store a recording of a given duration, up to a total recording time of 12s. At the end of a playback or record cycle, the device automatically returns to a low power standby mode, consuming typically only 0.5µA, so is ideal for battery powered applications. During a playback cycle, the device powers down automatically at the end of the message. During recording, the device powers down immediately after REC is released.

In addition to providing simple message playback, the ISD1212 also provides full addressing capability. Six address lines allow it to be directly controlled by a microprocessor. Alternatively these modes can be hard-wired to provide the desired system operation. With few peripheral components the device can drive a 16Ω speaker directly, and accept input from an electret microphone. The device is available as a 28-pin DIL package (suffix P), or as an SMD (suffix G).

Specification

Supply voltage:	7V max.
Supply current:	30mA max., operating 2µA max., standby
Output load impedance:	16Ω min.
Output power:	12.2mW into 16Ω
Harmonic distortion:	1%
Mic. input level:	20mV pk-pk
Mic. input impedance:	10kΩ
AGC output impedance:	5kΩ
Sampling frequency:	5.3kHz max.
Bandwidth:	2.3kHz max.

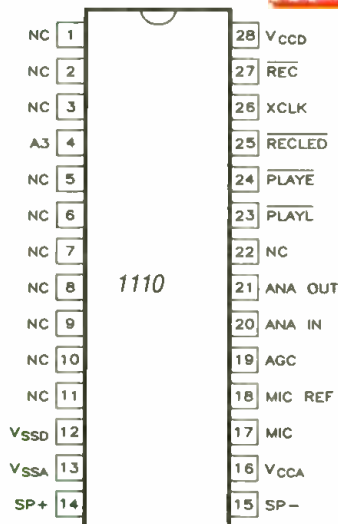
Order

Code	Type	Price each
KU59P	ISD1212P	£12.99
KU62S	ISD1212G	£13.49

ISD1110P 10-Second Voice Record/Playback

ISD

NEW



A high quality, single-chip record/playback device for short duration messaging applications. The device includes an on-chip oscillator, microphone preamplifier, AGC, anti-aliasing filter, smoothing filter, and speaker amplifier. A minimum system can be configured with a microphone, a speaker, a few passive components, two push-button switches and a power source. Recordings are stored in non-volatile memory cells requiring no power. This unique solution is made possible through new technology whereby voice and audio signals are stored directly, in their natural analogue form, into an EEPROM memory. Such direct analogue storage allows natural voice reproduction in a single IC. The device is supplied in a 28-pin DIL package.

Specification

Supply voltage:	7V max.
Supply current:	30mA max., operating 2µA max., standby
Output load impedance:	16Ω min.
Output power:	12.2mW into 16Ω
Harmonic distortion:	1%
Mic. input level:	20mV pk-pk
Mic. input impedance:	10kΩ
AGC output impedance:	5kΩ
Sampling frequency:	6.4kHz max.
Bandwidth:	2.7kHz max.

Order

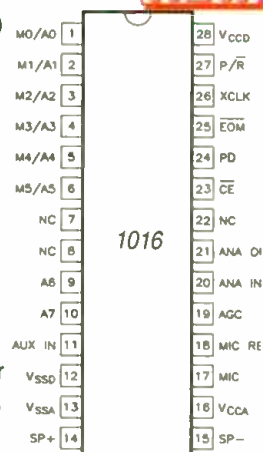
Code	Type	Price each
KU92A	ISD1110P	£12.99

ISD1016A/20A Single-Chip Voice Record/Playback

ISD

NEW

The ISD1016 and ISD1020 devices are designed to record and playback audio and voice information entirely on the one chip, with a minimum of added circuitry. A non-volatile analogue array consists of 128K cells, the equivalent of 1M-bits of storage. The devices eliminate the need for complex digital conversion, compression or voice synthesis techniques, which often compromise voice quality and are more complicated to use. Signal conditioning circuits are included, and control functions which enable a complete, high-quality recording and playback system to be realised in a single device. The two versions offer total recording times of 16 or 20 seconds respectively.



A noise cancelling microphone preamplifier with AGC can record both low and high volume sounds. A fifth order anti-aliasing filter in the output path ensures all digital components are removed, and the device is able to drive an 8 or 16Ω speaker directly through differential outputs. This boosts power output by four times compared with single ended operation, and eliminates the need for a series blocking capacitor or an output amplifier. The device will operate from a single 5V supply or from batteries, and includes a power down function for applications where minimum power consumption is critical.

Digital addresses are provided for more sophisticated message addressing and control. The storage arrays are organised into 160 segments, and addresses A0 to A7 provide access to each segment, providing the capability to construct messages by linking stored phrases and sounds.

Specification

Supply voltage:	7V max.
Supply current:	30mA max., operating 10µA max., standby
Output load impedance:	8 to 16Ω
Output power:	50mW into 16Ω
Harmonic distortion:	1%
Mic. input level:	20mV pk-pk
Mic. input impedance:	10kΩ
AGC output impedance:	5kΩ
Sampling frequency:	8kHz, ISD1016A 6.4kHz, ISD1020A
Bandwidth:	3.4kHz, ISD1016A 2.7kHz, ISD1020A

The devices are available in a 28-pin DIL package (suffix P) or as 28-pin SMD (suffix G).

Order

Code	Type	Price each
KU63T	ISD1016AP	£14.99
KU64U	ISD1016AG	£15.99
KU66W	ISD1020AP	£14.99
KU68Y	ISD1020AG	£15.99

Voice Record/Playback Evaluation Systems

ISD

ISD-ES001

NEW



A multi-purpose evaluation and development tool for use with ISD single chip voice record/playback devices. As an evaluation tool, the ISD-ES001 enables designers to record and playback recordings using simple front-end controls. The system's easy to use features facilitate comparisons of speech and sound quality relative to the record time duration of the device tested.

Used as a development tool, the system supports a wide range of features, including addressing, fast forwarding, message-indexing mode configuration and looping. The system has a built-in socket to allow the archiving of different messages on devices. A cable connector is included for microprocessor and micro-controller based applications.

Documentation includes a system schematic diagram, application design manual, instructions, and explanations of operational modes. The unit uses a standard telephone microphone/speaker interface.

ISD-ES002

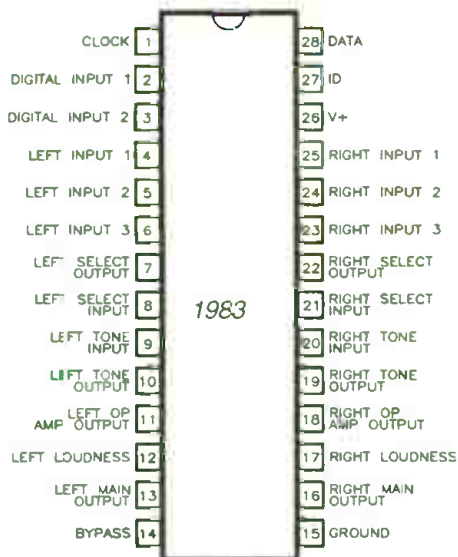


A hand-held demonstration board with a built-in socket allowing easy and immediate record and playback of ISD devices. Messages can be recorded on the ICs and saved, due to the non-volatile storage of the devices. A library of recordings can be created using either of the ISD devices. Simple operation is assured through just three switches: On/Off, Play/Record and Start/Stop. Push-button play and automatic power down are also supported. The system includes a speaker, a 9V battery with supply regulation and an ISD1016A DIL IC.

Order Code	Type	Price each
KU69A	ISDES001	£249.99
KU70M	ISDES002	£139.99

LMC1983 Digitally Controlled Stereo Selector, Tone and Volume Block

National Semiconductor



The LMC1983 is a 28-pin DIL, CMOS/bipolar building block IC intended for Hi-Fi audio that provides volume, balance, tone (bass and treble) and loudness controls with a 3-way stereo input selector between three pairs of stereo inputs, and a mute function. These functions are digitally controlled through an INTERMETAL bus 3-wire communication interface from a microprocessor or similar controlling logic. There are in addition two digital inputs for easy interfacing to other audio peripherals such as stereo decoders. The IC is designed for line level input signals (300mV to 2V) and has a maximum gain of -0.5dB. Volume is set at minimum and tone controls are set flat when supply voltage is first applied.

Low noise and distortion performance results from the use of analogue switches and polysilicon resistor networks in the signal path, and, while the chip is basically manufactured in CMOS, NPN transistors are added to build low noise opamps. The combination of CMOS switches, bipolar op amps and polysilicon resistors make it possible for the IC to achieve a quality of reproduction which is substantially superior to other bipolar circuits that use analogue multipliers to accomplish gain

adjustment. In fact the noise floor is low enough for DNR and Dolby processed signals to retain maximum effect. The volume controls are adjustable in 40 steps and left and right volume levels can be separately programmed to achieve the balance function.

The device has internal decoding logic that allows a microprocessor or microcontroller to communicate directly with the audio control circuitry via a standard INTERMETAL bus interface. This consists of a bidirectional, serial data line (DATA), a clock input line (CLK) and an identity line (ID). Address and function selection data bytes, each 8 bits long, are serially shifted into the LMC1983. Data present in the internal shift register is latched and the instruction executed.

Specification

Supply voltage:	15V
Power dissipation:	500mW
Signal input voltage:	2V rms max.
Total harmonic distortion:	
$V_{IN} = 300mV @ 100Hz,$	
1kHz, 10kHz:	0.008%
$V_{IN} = 2V @ 100Hz, 1kHz:$	<0.5%
Input impedance:	50k Ω
Selector stage output impedance (pins 7, 22):	150 Ω
Main outputs impedance (pins 13, 16):	26 Ω
Volume attenuator range:	-0dB to -80dB
Total volume steps:	40
Volume step size:	2dB
Channel balance, all volume settings:	0.2dB
Mute attenuation:	-105dB
Bass gain range @ 100Hz:	$\pm 12dB$
Total bass steps:	± 6
Bass step size:	2dB
Treble gain range @ 10kHz:	$\pm 12dB$
Total treble steps:	± 6
Treble step size:	2dB
Channel-to-channel tracking error, all functions:	$\pm 0.1%$
Loudness boost:	11.5dB @ 100Hz, 6.5dB @ 10kHz
Frequency response:	$\pm 0.1dB @ 20Hz$ to 20kHz
Signal to noise ratio:	95dB
Channel separation:	80dB
Between inputs isolation:	95dB
Supply rejection ratio:	32dB
Clock frequency:	1MHz

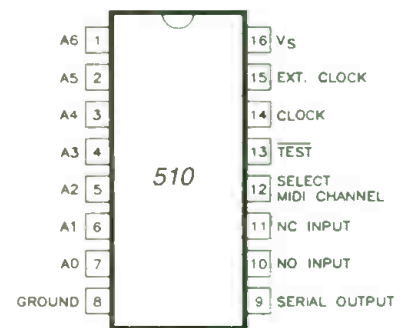
Order Code	Type	Price each
GX48C	LMT1983	£19.95

E510 Keyboard Scanner for Touch Sensitive Keyboards

A fully polyphonic, fast keyboard scanner with serial data output to MIDI specifications. Up to 128 keys (>10 octaves) can be scanned, each touch sensitive with a resolution of 128 μs (256 μs with a 4MHz clock). The speed is measured on pressing or releasing each key and the chip incorporates debounce circuitry. The IC is HCMOS compatible, has integrated oscillator, FIFO, and can select MIDI channel number, and only a few external components are required. With a clock rate of 4MHz, the output baud rate is 31250 baud.

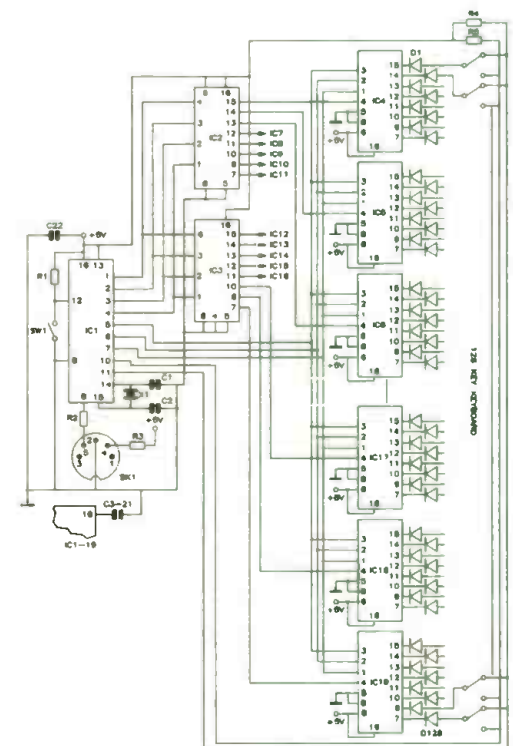
Every time a key is pressed or released, the velocity is calculated by measuring the time with a 7-bit reverse-counting counter. At the same time every press and release is tested for validity. The key is only recognised if it goes from pin 10 to pin 11 or vice versa and thus key bounce is eliminated. An internal FIFO register allows fully polyphonic playing and thus several keys can be pressed simultaneously. The output transmits according to the MIDI specification, the key number, the key velocity, whether the key is on or off and which MIDI channel it is to go to. Close SW1 to transmit to channel 1.

An external clock between 4MHz and 8MHz can be connected to pin 15, in which case pin 14 is left open circuit. If an 8MHz crystal is used, the output rate will be 62500 baud.



Specification

Supply voltage:	5V $\pm 5%$
Supply current:	5mA
Max clock rate:	8MHz



Parts List

R1	Min Res 1k Ω	(M1K)
R2,3	Min Res 200 Ω	(M200R)
R4,5	Min Res 470 Ω	(M470R)
C1,2	Ceramic 22pF	(WX48C)
C3-22	Minidisc 0.1 μF 16V	(YR75S)
X1	Crystal 4MHz	(FY82D)
D1-128	1N4148	(QL80B)
IC1	E510	(KU41U)
IC2-19	74HC138	(UB33L)
SK1	DIN Socket 5-pin A	(HH34M)
SW1	As required	

Order Code	Type	Price each
KU41U	E510	£33.50



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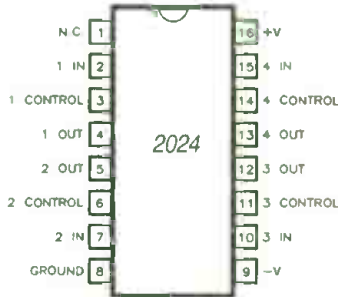
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SSM2024P Quad Current Controlled Amplifier

Analog Devices

A quad class A current controlled amplifier with signal to noise better than 82dB at 0.3% distortion. The four VCA's are completely independent and the control lines are ground referenced linear current inputs for easy and direct interfacing. In most applications, few external components are required.



Specification (typical at 25°C, Vs = ±15V)

Supply voltage: ±9V to ±18V
 Positive supply current: 2.5mA
 Negative supply current: 1mA
 Gain: 4085μS
 Input offset voltage: ±0.4mV
 Output leakage: 0.1nA
 Control rejection (untrimmed): 41.5dB

Order Code	Type	Price each
UL18U	SSM2024P	£6.80

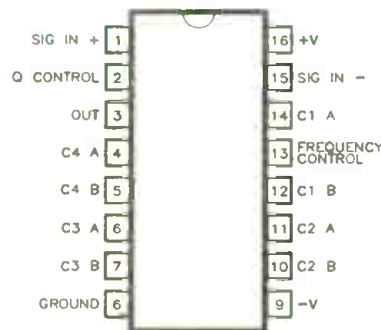
Specifications

Supply voltage: 12V C
 Corner frequency range
 MAX293: 0.1Hz to 25kHz
 MAX297: 0.1Hz to 50kHz
 Clock to corner frequency ratio,
 MAX293: 100:1
 MAX297: 50:1
 Clock to corner frequency temperature coefficient
 MAX293: 8ppm/°C
 MAX297: 4ppm/°C

Order Code	Type	Price each
AY41U	MAX293	£6.25
AY42V	MAX297	£6.25

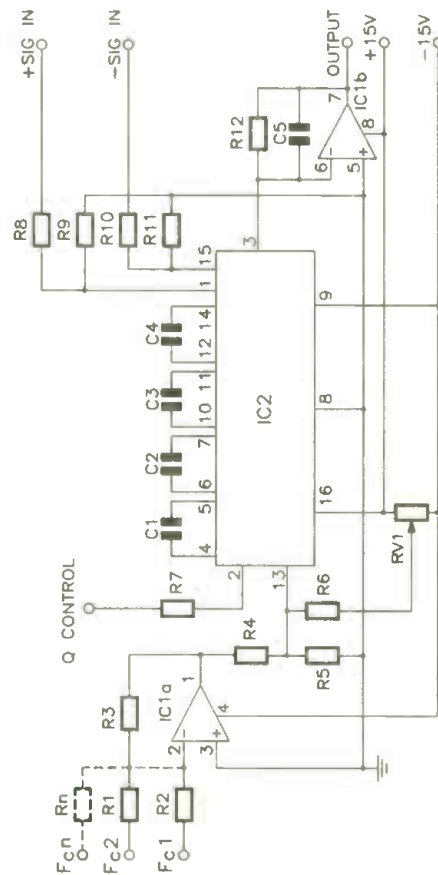
SSM2044P Voltage Controlled Filter

Analog Devices



2044

A 4-pole voltage controlled filter designed for electronic music applications. On-chip voltage control of resonance allows direct and easy interfacing with programmers and controllers. The IC features extended control range, low noise, and high control rejection. The filter can also be used as a low distortion sine wave oscillator. No external ladder network is required making the device ideal in polyphonic applications.



Specification (typical at 25°C, Vs = ±15V)

Supply voltage: ±5V to ±18V
 Positive supply current: 1.4mA

Negative supply current: 6.2mA
 Frequency control range: 50,000
 Frequency control feedthrough: -36dB
 Q Control input impedance: 900Ω
 Q current at oscillation: 500μA
 Q Control feedthrough: -30dB
 Q Control threshold voltage: 500mV
 Max available control current: 1.7mA (V_{PIN 13} = -120mV)
 Freq control input range: -120 to +180mV
 Max output signal current: ±400μA
 Signal to noise ratio: 70dB
 Dynamic range: 90dB

Parts List

R1,2,n.10	Min Res 100k	(M100K)
R3	Min Res 300k	(M300K)
R4	Min Res 150k	(M150K)
R5	Min Res 1k	(M1K)
R6	Min Res 470k	(M470K)
R7	Min Res 13k	(M13K)
R8	Min Res 68k	(M68K)
R9,11	Min Res 200Ω	(M200R)
R12	Min Res 47k	(M47K)
RV1	Cermet 50k	(WR50E)
C1	Ceramic 820pF	(WX67X)
C2,3,4	Poly Layer 0.01μF	(WW29G)
C5	Ceramic 15pF	(WX46A)
IC1	TL082CN	(RA71N)
IC2	SSM2044P	(UL19V)

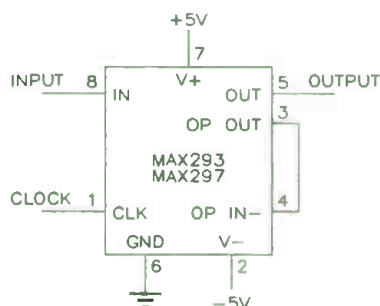
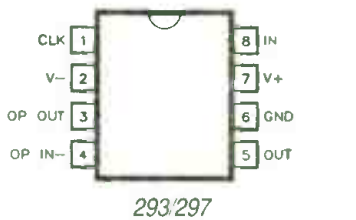
Order Code	Type	Price each
UL19V	SSM2044P	£5.25

MAX293/7

Maxim

The MAX293/297 8th-order, low-pass, elliptic, switched-capacitor filters are easy to use and can be set up with corner frequencies from 0.1Hz to 25kHz in the case of the MAX293, or from 0.1Hz to 50kHz for the MAX297.

The transmission ratio of both is 1.5:1 and provides a sharp roll-off and a -80dB of stopband rejection. These filters have fixed responses, so the design task is limited to selecting the clock frequency that controls the filter's corner frequency.

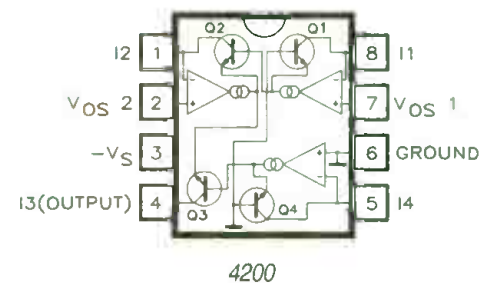


An external capacitor is used to generate a clock using the internal oscillator, or an external clock signal can be used. An uncommitted op amp, with non-inverting input grounded, is provided for building a continuous time low-pass filter for post-filtering or anti-aliasing. Steep roll-off and high-order make these filters ideal for anti-aliasing applications that require maximum bandwidth, and for communication applications that require filtering signals in close proximity within the frequency domain.

Both devices are packaged in 8-pin DIL with the same pin numbering.

RC4200N Analogue Multiplier

Raytheon



An analogue multiplier combining three op-amps specially designed for multiplier logging circuits and offering complete compensation for non-linearity. As a result, four quadrant multiplication, two quadrant division, square rooting, squaring and rms conversion can all be implemented with predictable accuracy. The nominal relationship between the three inputs and the output is I3 = I1 x I2 ÷ I4.

The circuit is ideal for use in low distortion audio modulation circuits, voltage controlled active filters, and precision oscillators.

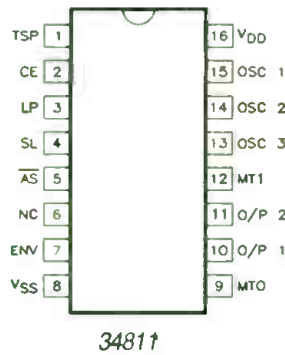
Specification (typical at V_s = -15V)

Supply voltage: -9V to -18V
 Supply current: <4mA
 Input current range: 1μA to 1mA
 Input offset voltage: <±10mV
 Input bias current: <500nA
 Output current range: 1μA to 1mA
 Frequency response: 4MHz
 Total error as multiplier:
 with external trim: ±0.2%
 Non-linearity: <±0.3%

Order Code	Type	Price each
UR16S	RC4200N	£4.65

UM34811A Multi-Instrument Melody Generator

UMC

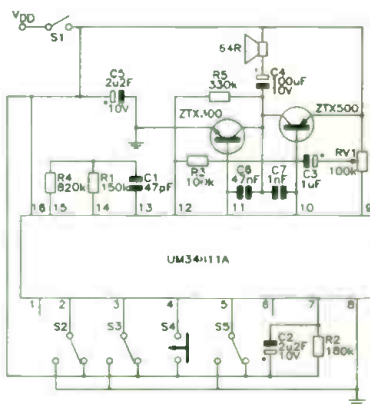


34811

A pre-programmed multi-instrument melody generator containing a 512-note memory capable of generating 16 tunes. The comprehensive control facilities enable playing – all tunes repeatedly or stopping at the end – or one tune repeatedly or stopping at the end. Tunes are preprogrammed with one of three instruments' sounds: the piano, mandolin or organ using the on-chip envelope generator.

Pin Functions

- 1 TSP Melody auto-stop flag, not normally connected.
- 2 CE Chip enabled if connected to V_{DD} , in standby mode if connected to V_{SS} .
- 3 LP If connected to V_{DD} only one tune plays, and if connected to V_{SS} all tunes play.
- 4 SL A positive-going transition on this pin makes the chip jump to the next tune.
- 5 AS If connected to V_{DD} the tune(s) repeat continuously and if connected to V_{SS} the tune(s) stop at the end (whether it is one tune or all tunes depends on pin 3).
- 6 NC No connection.
- 7 ENV Envelope circuit. Capacitor/resistor network connected between here and V_{DD} can alter the charge/discharge time of the pre-programmed envelope.
- 8 V_{SS} Negative of battery/power supply.
- 9 MTO Modulated tone signal output.
- 10 OP1 Pre-amplifier output 1.
- 11 OP2 Pre-amplifier output 2.
- 12 MT1 Pre-amplifier input. Pins 10, 11 and 12 form a completely separate pre-amplifier.
- 13 OSC3 See 14.
- 14 OSC2 Connect a series resistor and capacitor between here and pin 13 to set internal oscillator to 100kHz.



- 15 OSC1 An external oscillator can be connected here (pins 13 & 14 open), or connecting a resistor from here to junction of RC on pins 13 & 14 makes the internal oscillator less sensitive to psu voltage fluctuations.
- 16 V_{DD} Positive of battery/power supply.

Specification ($V_{DD} = 1.5V$, $V_{SS} = 0V$)

Supply voltage	1.5V (1.35V to 3V)
Standby current	<12µA (0.1µA min)
Input current high	3µA
Input current low	<0.1µA
ENV pin drive current	>500µA (0.8V)
Output current (OP1)	>200µA, <1.2mA
Output current (OP2)	>200µA, <1.2mA

Tunes List

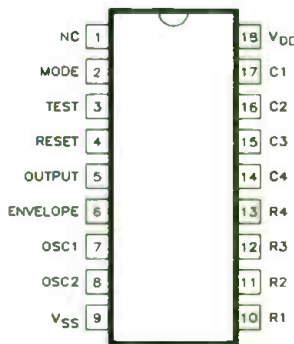
- 1 Twinkle, Twinkle, Little Star
- 2 Cuckoo Waltz (1)
- 3 Eency Weency Spider
- 4 Lullaby
- 5 Santa Lucia
- 6 Oh My Darling Clementine
- 7 Are You Sleeping
- 8 Rock-A-Bye Baby
- 9 London Bridge Is Falling Down
- 10 Little Brown Jug
- 11 Butterfly
- 12 Long Long Ago
- 13 Cuckoo Waltz (2)
- 14 Mary Had A Little Lamb
- 15 The Train Is Running Fast
- 16 Dream of Home and Mother

Order

Code	Type	Price each
UJ44X	UM34811A	£1.10

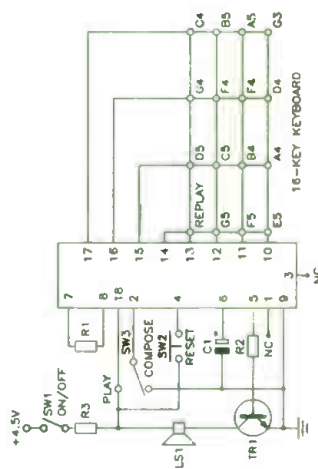
UM3511A Organ with Memory

UMC



3511

An organ that can play 15 notes G3 to G5, has 15 songs pre-recorded in its 512-note ROM, and can replay up to 47 notes from RAM. When in "play" mode, pressing one of the 16 keys (except replay) initiates one of the 15 pre-recorded tunes. The replay key plays all the tunes from 1 to 15 in sequence. In "compose" mode, up to 47 notes can be stored in memory and replayed later. A single tone is generated whilst the user is pressing a key. The interval between two keys is memorised up to a maximum interval of 4 seconds.



The pre-recorded songs are:

- Hush Little Baby
- Twinkle Twinkle Little Star
- London Bridge is Falling Down
- Dream of Home and Mother
- Christmas Carol
- Are You Sleeping
- Farmer in the Dell
- In a Persian Market
- Mary Had a Little Lamb
- Long Long Ago
- Santa Lucia
- Little Brown Jug
- Butterfly
- The Train is Running East
- Close Encounters of the Third Kind

Specification (typical at $V_s = 3V$)

Supply voltage:	2.4V to 5V
Standby current:	<10µA
Output current:	>200µA (at 0.8V)

Parts List

R1	Min Res 750kΩ	(M750K)
R2	Min Res 1kΩ	(M1K)
R3	Min Res 220Ω	(M220R)
C1	Minelect 4.7µF 35V	(YY33L)
TR1	2N3706	(QR30H)
SW1,3	SP Slide	(FF77J)
SW2	Push Switch	(FH59P)
LS1	64Ω Miniature Speaker	(YT29G)

Order

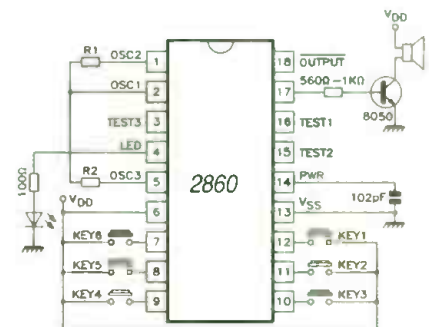
Code	Type	Price each
UR05F	UM3511A	£2.25

HT-2860 Alarm Sounds Generator

NEW

A versatile sound chip capable of six different alarm sounds, including 4 various alarm tones, a horn and an ambulance. Each of the six sounds can be triggered by pressing the corresponding switch. The device can directly drive a piezo transducer, or can be modified for loudspeaker output. Only two other components are needed to produce a working design. Simply connect a 120kΩ resistor between pins 16 & 17, and a 560kΩ resistor between pins 17 and 2. Similarly connect a 1000pF capacitor between pins 10 and 11. Pins 4 to 9 trigger the different alarm sounds, with power to pin 3 and ground to pin 10.

A suitable piezo sounder can now be connected between pins 14 and 15 for sound output. In addition pin 1 sources enough current to drive an LED, with a suitable series resistor.



Order

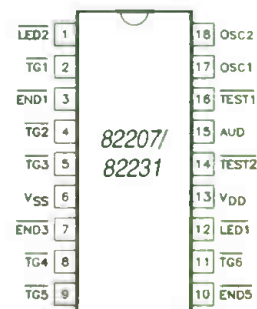
Code	Type	Price each
AE15R	HT2860B	£2.49

HT82207 & HT82231 Sound Effects Generators

Holtek

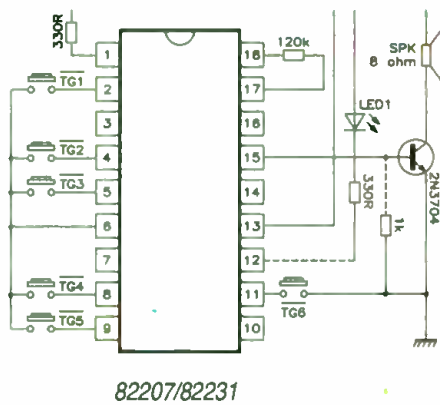
NEW

Two PCM speech synthesis chips with a variety of programmed sound effects. The 82207 comprises various 'American Western' type sounds, ie. Bugle, Horse Neigh, Horse Running, Pistol, Rifle and Cannon. The 82231 IC contains various animal and farmyard sounds including elephant, cock, hen, frog, dog, sheep, cat, horse, duck, bird, pig and cow. Outputs are also provided for two LEDs for indicating audio output level and a 2Hz flash signal while in the busy state. Many applications in novelty and children's toys, etc. Other features include low stand-by current of 1µA, minimum of external components and simple operation.



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82207/82231

Specification

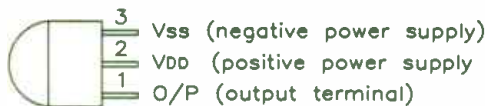
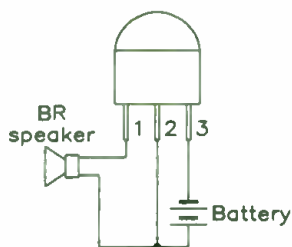
Operating voltage, V_{CC} : 2.4V to 5V, 3V typ
 Operating current (No load), I_{op} : 100 μ A to 300 μ A
 (at $V_{CC}=3V$)
 Audio output, I_o : 2mA typ
 High-input voltage, V_{IH} : 0.7V
 Low-input voltage, V_{IL} : 0.3V
 Active-low input pulse width: 200 μ s min
 Operating temperature, T_A : 0°C to 70°C

Order Code	Type	Price each
AE11M	HT82207	£3.99
AE12N	HT82231	£3.99

M66T Simple Melody Generator

Micro-E

A low power CMOS LSI device for generating tunes for melody cards, toys and other novelty devices. The built-in oscillator and powerful driving capability minimises the number of external components required, in fact, all that is additionally needed is a 1.5V battery, a switch and an 8 Ω speaker. Up to 128 notes can be programmed and the device can be powered from a wide range of supply voltages from 1.2V to 3.6V with low power consumption (note that the internal oscillator needs 1.3V to start).



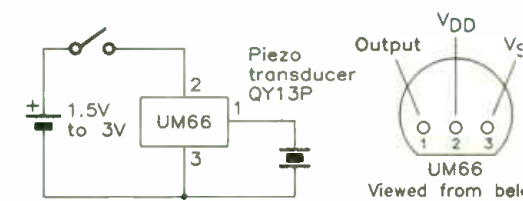
One of six different tunes or tune combinations are available in a single device, as follows:

Type	Tune	Duration, seconds
M66T-02B	Twinkle Twinkle Little Star	16.4
M66T-11	Rock-a-Bye Baby	12.5
M66T-36	Old McDonald Had a Farm	24.8
M66T-205	I'd Like To Teach The World To Sing	20.4
M66T-214	White Christmas	49.5
M66T-215	Warning Tone	10.8

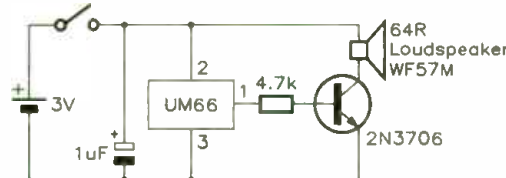
Order Code	Type	Price each
GX55K	M66T-02B	48p
GX56L	M66T-11	48p
GX57M	M66T-36	48p
GX58N	M66T-205	48p
GX59P	M66T-214	48p
GX60Q	M66T-215	48p

UM66 Melody Generator

UMC



A simple melody generator IC as used in musical greetings cards. The internal ROM can hold 64 notes and four pre-programmed melodies are available. A complete melody generator can be made by adding just a piezo transducer and a 1.5V battery. After connecting the battery, the tune will play once and stop. The voltage must be disconnected then reconnected to retrigger the IC.



Specification ($V_{SS} = 0V$)

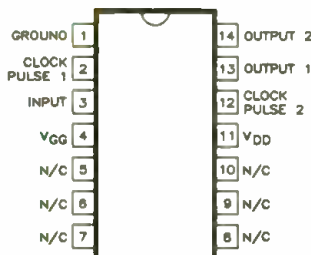
Operating voltage (V_{DD}): 1.3V to 3.3V
 Standby current: <1 μ A
 Operating current: <60 μ A (no load)
 Output current: $\pm 1.5mA$

Type	Tune
UM66T01S	A medley of Jingle Bells, Santa Claus is Coming to Town, and We Wish You A Merry Christmas
UM66T08	Happy Birthday to You
UM66T09	Wedding March
UM66T11S	Love Me Tender, Love Me True

Order Code	Type	Price each
UJ40T	UM66T01S	68p
UJ41U	UM66T08	68p
UJ42V	UM66T09	68p
UJ43W	UM66T11S	68p

MN3004 512-Stage BBD

Panasonic



A 512-stage bucket-brigade delay line (BBD) that can delay audio signals by up to 25.6ms. Applications include reverberation and echo effects, tremelo, vibrato and chorus effects.

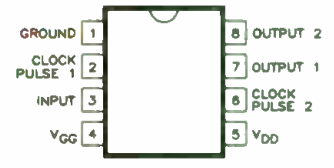
Specification (typical)

Drain supply voltage (V_{DD}): -15V (-14V to -16V)
 Gate supply voltage (V_{GG}): -14V ($V_{DD} + 1V$)
 Clock high voltage: 0V (max -1V)
 Clock low voltage: V_{DD}
 Clock input capacitance: <350pF
 Clock frequency: 10kHz to 100kHz
 Signal delay time: 2.56 to 25.6ms
 Input signal frequency: $0.3 \times f_c$ (e.g. 12kHz at $f_c = 40kHz$)
 Input voltage swing: >1.8V rms
 Insertion loss: 1.5dB
 Input DC bias: -5 to -10V
 Total harmonic distortion: 0.4%
 Noise voltage: 0.21mV rms
 Signal to noise ratio: 85dB

Order Code	Type	Price each
UM64U	MN3004	£7.85

MN3207 1024-Stage Low Voltage BBD

Panasonic



3207

A 1024-stage bucket-brigade delay line that can provide an audio delay of up to 51.2ms. Applications include reverberation and echo effects in portable radios etc. and for echo microphones and karaoke units.

Specification (typical)

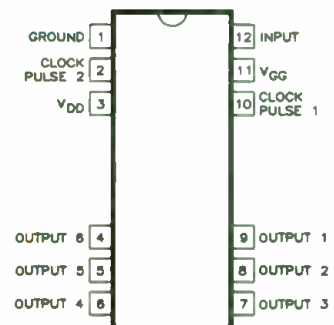
Drain supply voltage (V_{DD}): +5V (+4 to +10V)
 Gate supply voltage (V_{GG}): $V_{DD} \times 14/15$
 Clock high voltage: V_{DD}
 Clock low voltage: 0V (max +1V)
 Clock input capacitance: <700pF
 Clock frequency: 10kHz to 200kHz
 Signal delay time: 2.56 to 51.2ms

Input signal frequency: $0.25 \times f_c$ (e.g. 10kHz at $f_c = 40kHz$)
 Input voltage swing: >0.36V rms
 Insertion loss: 0dB
 Total harmonic distortion: 0.4%
 Noise voltage: <0.25mV rms
 Signal to noise ratio: 73dB

Order Code	Type	Price each
UR67X	MN3207	£8.50

MN3011 3328-Stage BBD with 6 Taps

Panasonic



3011

A 3328-stage bucket-brigade delay line (BBD) that can delay audio signals by up to 166.4ms. Six outputs are available with different non-related delay times so that a natural reverberation effect can be achieved by mixing these signals. Can be used to create a chorus effect in electronic musical instruments.

Specification (typical)

Drain supply voltage (V_{DD}): -15V
 Gate supply voltage (V_{GG}): -14V ($V_{DD} + 1V$)
 Clock high voltage: 0V (max -1.3V)
 Clock low voltage: V_{DD}
 Clock input capacitance: <2300pF
 Clock frequency: 10kHz to 100kHz
 Input DC bias: -5V to -10V
 Signal delay time (pin 9): 1.98 to 19.8ms
 (pin 8): 3.31 to 33.1ms
 (pin 7): 5.97 to 59.7ms
 (pin 6): 8.63 to 86.3ms
 (pin 5): 13.95 to 139.5ms
 (pin 4): 16.64 to 166.4ms

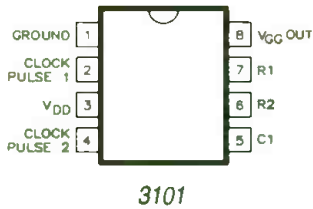
Input signal frequency: $0.25 \times f_c$ (e.g. 10kHz at $f_c = 40kHz$)
 Input voltage swing: >1V rms
 Insertion loss: 0dB
 Total harmonic distortion: 0.4%
 Noise voltage: <0.4mV rms
 Signal to noise ratio: 76dB

Order Code	Type	Price each
UM65V	MN3011	£32.99

MN3101 Clock Generator/Driver for BBDs

Panasonic

Suitable for driving the 3004 and 3011 BBDs, this IC generates a two phase low impedance clock and the most suitable V_{GG} when driven from the same V_{DD} as the BBD. The chip can drive up to 8192 stages and operates from a single power supply.

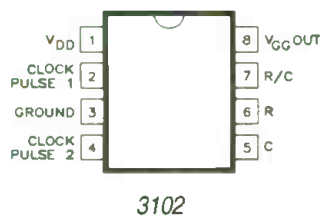


Specification (typical at $V_{DD} = -15V$)
 Drain supply voltage (V_{DD}): -8V to -16V
 Drain current: 3mA
 Power dissipation: 45mW

Order Code	Type	Price each
UM66W	MN3101	£1.32

MN3102 Clock Generator/Driver for Low Voltage BBDs

Panasonic



Suitable for driving the MN3207 BBD, this IC generates a two phase low impedance clock and the most suitable V_{GG} when driven from the same V_{DD} as the BBD. The chip can drive up to 4096 stages of low voltage BBDs and operates from a single power supply.

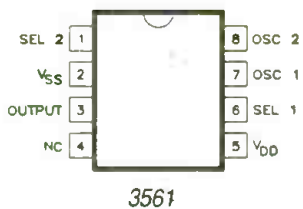
Specification (typical at $V_{DD} = +5V$)
 Drain supply voltage: +4V to +10V
 Drain current: 0.5mA
 Power dissipation: 2.5mW

Order Code	Type	Price each
UR68Y	MN3102	£2.25

UM3561 Sound Effects Generator

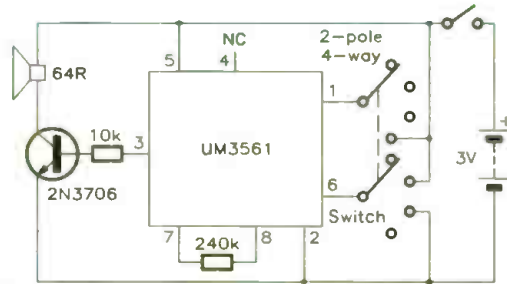
UMC

A simple sound generator IC that can produce four sound effects. Designed for use in toys, the effects are selected by varying the connections to pins 1 and 6 as follows:



Pin 1	Pin 6	Sound effect
No connection	No connection	Police siren
No connection	V_{DD}	Fire engine siren
No connection	V_{SS}	Ambulance siren
V_{DD}	Anything	Machine gun

Specification
 Supply voltage: 3V (2.4V to 3.6V)
 Operating current: <150µA
 Output current: >3mA

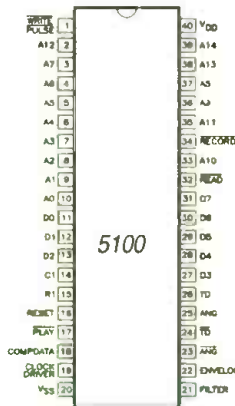


Order Code	Type	Price each
UJ45Y	UM3561	92p

UM5100 Digital Voice Recorder and Playback

UMC

The IC can record speech into a digital memory and then play it back. The device is designed to be used directly with static RAM's up to 256K bits, or with EPROM's or ROM's for playback only. High quality voice reproduction is possible and note that it is not a "computer-voice", it is the original speaker's voice played back. The bit rate is adjustable from 10kbs to 28kbs with higher quality at faster bit rates. Thus the maximum length of recording can be between about 9 and 26 seconds. At low frequencies the auxiliary outputs should be used to avoid distortion, whilst for high frequencies, an internal amplifier intensifies the voice loudness.

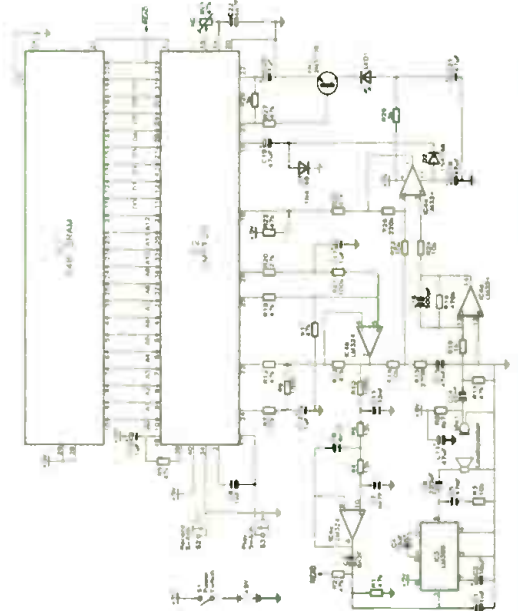


Specification
 Supply voltage: 3V to 6V
 Standby current: 1µA
 Clock drive current: ±16mA min.
 Input voltage high: 3.5V to 5V
 low: 0V to 1.5V
 Output current: ±4mA
 Reset pulse: >1µs
 Write pulse width: 200ns to 10µs

Pin Functions

1 WRITE PULSE	Active low output. Generates a pulse each time the clock advances eight cycles in "record" mode. 2-10 Address bus (part of). Data bus (part of).
11-13	C1 R1 Connect a resistor between the pins and a capacitor from pin 14 to ground to set clock rate. For example with a 7.2kΩ resistor and a 4700pF capacitor, the internal oscillator will run at 40kHz (10kbs).
14,15	
16 RESET	Active high input. When activated, all internal counters are cleared and the chip is disabled.
17 PLAY	Active low input. Trigger this pin to enter "playback" mode.
18 COMPDATA	Input. Detects the delta slope which is generated from the comparison of the input and feedback signals.
19 CLOCK DRIVER	Negative voltage generator.
20 V_{SS}	Ground.
21 FILTER	Output. Produces envelope waveform with external integrator circuit.
22 ENVELOPE	Input. Envelope signal goes in here to modulate voice.
23 ANG	Analogue voice output with opposite phase to pin 25.
24 TD	Auxiliary output with opposite phase to pin 26.

25 ANG	See pin 23.
26 TD	See pin 24.
27-31	Data bus (part of).
32 READ	Active low output. Provides an output control signal for the external memory and is active only in "playback" mode.
33	Address bus (part of).
34 RECORD	Active low input. Trigger this pin to enter "record" mode.
35-39	Address bus (part of).
40 V_{DD}	+5V supply.

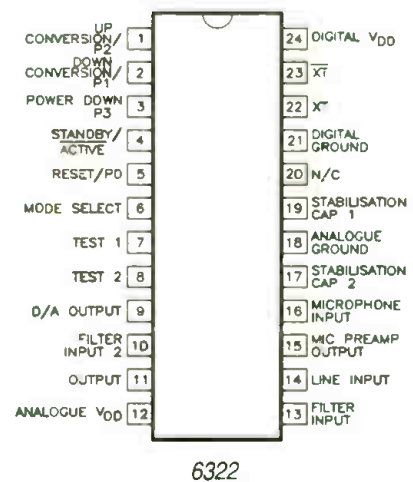


Applications include voice message pads, security systems, telecommunications, etc.

Order Code	Type	Price each
UJ48C	UM5100	£3.78

MSM6322GSK Speech Pitch Controller

OKI



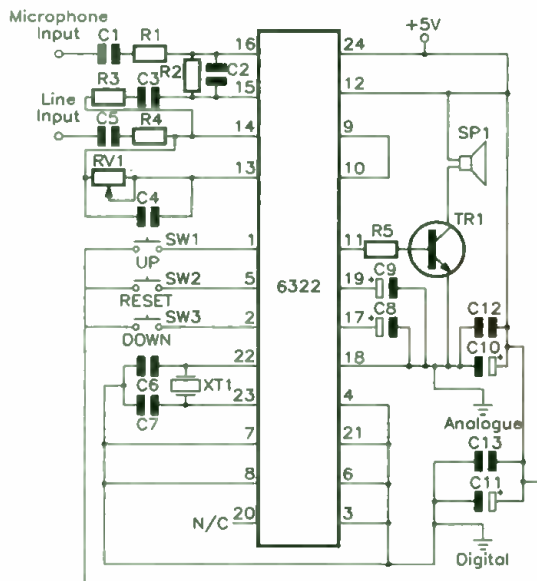
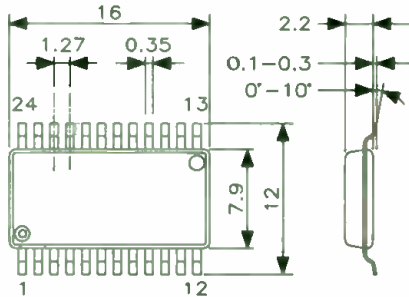
Note: This device is only available in small outline 24 pin plastic SOP style package. A speech pitch converter IC that operates in real time and requires very few external components. It has a microphone preamplifier and line level input and the output requires only a single transistor to directly drive a loudspeaker. As well as the microphone preamplifier, the IC contains a 4th order low pass filter on input and a 3rd order low pass filter on output. In addition there is a built-in 8-bit A/D converter and 9-bit D/A converter. The pitch of the speech is alterable in 17 steps over a range of one octave up and one octave down, and there are two modes of operation. In the 'up/down' mode two inputs are provided which when pulsed, move the pitch up or down sequentially through the pitches available. In the 'binary' mode four inputs are

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provided from which 16 of the available pitches can be directly selected.

In the example circuit, an application using the 'up/down' mode is shown. Note that pins 1 and/or 2 could be continuously cycled using an electronic counter to produce an interesting effect. The following table shows the pitches available.



Pin functions (high = +5V, low = 0V digital)

- Pin 1. In "up/down" mode, pulse high to move the pitch up one step. In "binary" mode, taking this pin high sets bit 3.
- Pin 2. In "up/down" mode, pulse high to move the pitch down one step. In "binary" mode, taking this pin high sets bit 2.
- Pin 3. In "up/down" mode, setting this pin high initiates power down, where all internal clocks are stopped and pin 9 goes low. On reverting to low on pin 3, the clocks take 10ms to restabilise. In "binary" mode, taking this pin high sets bit 4, the most significant bit.
- Pin 4. When taken high, all internal clocks are stopped except the main 4MHz oscillator. On reverting to low, pin 9 outputs a 2.5V ($\frac{1}{2}$ of V_{DD}) level for about 15ms.
- Pin 5. In "up/down" mode, pulse high to set the pitch to stage 8, no pitch change. In "binary" mode, taking this pin high sets bit 1, the least significant bit.
- Pin 6. Set high to select "binary" mode; set low to select "up/down" mode.
- Pin 7. Manufacturers test pin. Must be fixed low.
- Pin 8. Manufacturers test pin. Must be fixed low.
- Pin 9. Output of the digital to analogue converter.
- Pin 10. Input to the output stage's low-pass filter.
- Pin 11. Final output.
- Pin 12. Analogue supply +5V.
- Pin 13. Output of the line amplifier and input to the input stage's low-pass filter. The gain of this amplifier is set by the value of resistance between here and pin 14.
- Pin 14. Input to the line amplifier. Must be capacitively coupled to input signals.
- Pin 15. Output of the microphone preamplifier.

- Pin 16. Input to the microphone preamplifier. Must be capacitively coupled to the microphone.
- Pin 17. Stabilisation capacitor for the internal analogue reference voltage +2.5V ($\frac{1}{2}$ of V_{DD}).
- Pin 18. Analogue ground. Microphone and line inputs and the output must be referenced to this ground.
- Pin 19. Stabilisation capacitor for the internal analogue reference voltage +2.5V ($\frac{1}{2}$ of V_{DD}).
- Pin 20. No connection.
- Pin 21. Digital ground. Logic low.
- Pin 22. Crystal oscillator. If using an external clock, it should be connected here.
- Pin 23. Crystal oscillator. If using an external clock, leave this pin open.
- Pin 24. Digital supply +5V. Logic high.

Specification

Supply voltages:	4V to 6V (7V max)
Supply current:	<10mA
Standby current:	<7mA
Power down current:	<1mA
Logic high:	>3.6V
Logic low:	<0.8V
Logic input current:	$\pm 10\mu\text{A}$ max.
Output impedance	pin 15: 5k Ω
	pin 9: 10k Ω
	pin 11: 15k Ω
	pin 13: 15k Ω
Input impedance	pin 16: 100M Ω
	pin 14: 100M Ω
	pin 10: 30M Ω
Max. frequency pins 1,2,5 in "up/down" mode:	16Hz
Max. operating frequency pin 22:	4.5MHz
Low pass filters characteristics:	
Gain 300Hz to f_c :	$\pm 3\text{dB}$ at worst
Gain at f_c :	-3dB
Gain at $2 \times f_c$:	-20dB

f_c is the cut-off frequency.

Parts List

R1,3,4,5	Min Res 10k	(M10K)
R2	Min Res 100k	(M100K)
RV1	Pot Log 100k	(FW25C)
C1,3,5	Mylar 0.22 μF	(WW83E)
C2,4,5,7	Ceramic 33pF	(WX50E)
C8,9	PC Elect 47 μF 25V	(FF08J)
C10,11	PC Elect 10 μF 50V	(FF04E)
C12,13	Minidisc 0.1 μF 16V	(YR75S)
TR1	BC338	(QB69A)
XT1	Crystal 4MHz	(FY82D)
SW1,2,3	Tact Switch	(JR89W)
SP1	64 Ω Loudspeaker	(YT29G)

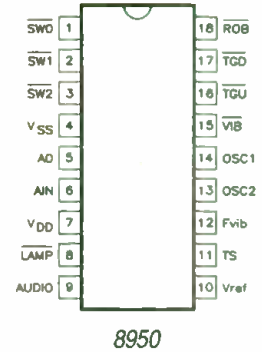
Order Code	Type	Price each
UL76H	MSM6322GSK	£9.49

HT8950 Voice Modulator

Holtek



A single chip voice modulator used for pitch shifting. This chip integrates a built-in microphone preamplifier with internal biasing, an 8-bit A/D converter, internal SRAM, an 8-bit D/A converter, and all operating from a single rail power supply. Pitch shifting is selected by either momentarily connecting one of four pins (with a push-button, etc.), signifying Pitch UP, Pitch DN, Robot or Vibrator, or according to the state of three pins on the device specifically designed for interfacing to electronic equipment. Altering the inputs selects between normal and either higher or lower pitches. In addition the 'Robot' and 'Vibrato' functions can be used to dramatically alter the nature of the output. Due to the high level of integration, very few external components are necessary to produce a working design. Applications include toys, mixers, voice recorders, audio systems and other forms of speech systems.



Specification

Operating voltage, V_{CC} :	2.4V to 4V, 3V typ (5.5V abs max)
Operating current (No load), I_{op} :	2mA typ (10mA max), at 3V
Input signal level, V_{in} :	580mV max at 3V
Lamp sink current, I_{lamp} :	5mA min, 9.5mA typ
OPA gain value, A_v :	2000 typ
High-input voltage, V_{IH} :	0.7V
Low-input voltage, V_{IL} :	0.3V
System operation frequency:	512kHz typ

Order

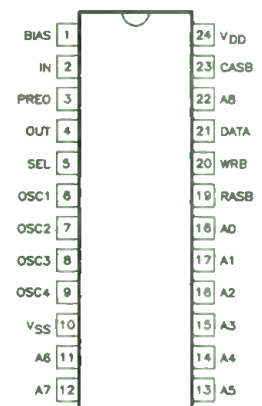
Code	Type	Price each
AE13P	HT8950	£3.99

HT8955A Voice Echo

Holtek



The HT8955A is a CMOS digital audio signal delay processor designed for applications such as voice echo generators, Karaoke systems and sound effect generators. This device contains a built-in preamplifier, an on-chip oscillator, a DRAM interface, a 10-bit A/D converter, a 10-bit D/A converter and all the necessary control logic. Designed for use with 41256 and 4164 DRAMs, a delay time of up to 0.8s and 0.2s, respectively, is possible. When comparing the HT8955 with conventional BBD units, the HT8955 exhibits low distortion, high S/N ratio and long delay times. Due to the high sampling rate (25kHz or 50kHz, depending on the DRAM used), sophisticated low-pass filtering is not required. Other features of the device are 5V working voltage, a wide frequency response and continuously variable delay time.



Specification

Operating voltage, V_{CC} :	4.5V to 5.5V, 5V typ (6V abs max)
Operating current, I_{op} :	2.5mA typ at $V_{CC}=5\text{V}$ (max 8mA)
Preamplifier voltage gain, A_v :	2000 typ at $V_{CC}=5\text{V}$
High-input voltage, V_{IH} :	0.3V
Low-input voltage, V_{IL} :	0.7V
Maximum output voltage, V_{omax} :	1.5V typ (min 1V) at $V_{CC}=5\text{V}$
Signal to noise ratio, S/N:	55dB

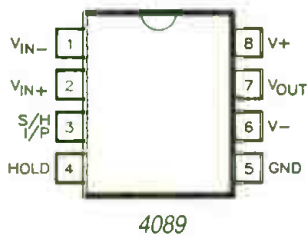
Order

Code	Type	Price each
AE14Q	HT8955A	£6.49

SUBSECTION 61 RADIO AND TV IC's EL4089CN Low Power DC Restore Amplifier

Elantec

A complete monolithic, DC-restored video amplifier sub-system containing a high quality video amplifier and a nulling, sample-and-hold amplifier specifically designed to stabilise video performance. When the HOLD logic level input is set to a TTL/CMOS logic 0 during a horizontal synchronisation pulse, the sample-and-hold amplifier can be used to null the DC offset of the video amplifier.



When the HOLD input goes to a TTL/CMOS logic 1, the correcting voltage is stored on the video amplifier's input coupling capacitor. The correction voltage can be further corrected as need be, at the sync pulse of each line.

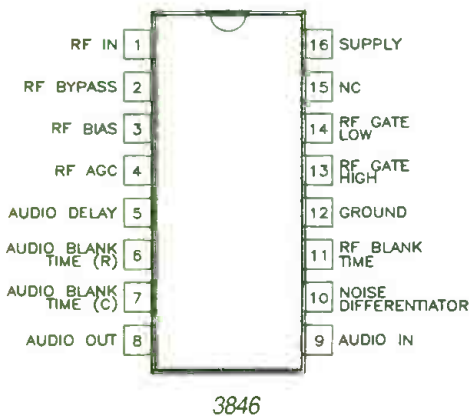
The device is optimised for video performance and low power consumption and its current feedback design allows essentially the same bandwidth over a gain range of nearly 10:1 to be maintained. It is capable of driving back-terminated 75Ω lines.

Order Code	Type	Price each
AJ59P	EL4089CN	£9.95

ULN3846A AM Noise Blankers

Allegro

This single channel noise blanker IC contains all the necessary circuitry for adding an extremely efficient noise blanking technique to any type of AM tuner or receiver with RF input frequencies (or first IF) up to 30MHz.



A high input impedance, high gain, broadband RF amplifier permits this device to be directly connected to the RF stage of a tuner. The internal automatic gain control circuitry insures that the noise detection threshold remains constant with changes in input level. The response time of the RF gate is sufficiently fast to blank the noise pulse at the output of the mixer before the IF filter. Very short blanking times will effectively suppress most of the interfering noise. Residual audio noise is removed by an audio sample-and-hold gate. The RF blanking time, audio delay time and audio gate blanking time can all be independently adjusted to suit the particular application.

Blanking in the RF or mixer sections of the receiver removes most of the noise pulse, but a small amount still remains due to the 'hole punched' in the carrier. This residual noise is theoretically somewhere between the peak audio and 100% negative modulation, but is significantly smaller and narrower than that which the impulse would normally produce

without blanking. An audio delay, 'one-shot' and audio gate(s) are included to eliminate this residual signal.

The MOSFET audio gates also include charge-balancing circuits to eliminate switching transients. The device can also be used in dual conversion AM receivers. The blanker RF input would then be connected at the first IF amplifier input and the blanker RF gate connected at the second mixer output. Since the first IF bandwidth is usually relatively wide, the noise pulses are narrower, and the RF blanking time will be correspondingly less.

Specification

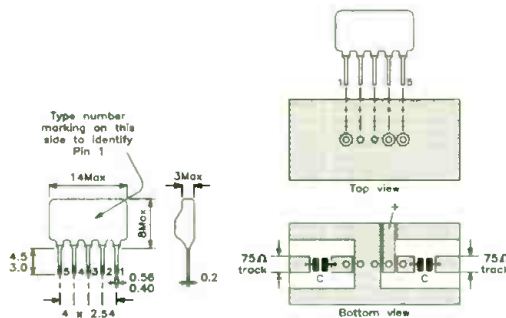
Supply voltage range:	7.5 to 12V
Quiescent supply current:	12 to 20mA
RF input amplifier, trigger threshold:	100μV
modulation threshold:	85%
detector risetime:	500ns
RF switch, 'on' resistance:	50Ω
'off' resistance:	100kΩ
time delay:	1.5μs
Audio switches, attenuation:	80dB
noise:	1.5 to 6mV pk-pk
crosstalk:	60dB
gain:	-0.5dB
total harmonic distortion:	<0.1%
input impedance:	100kΩ
output impedance:	1kΩ
Blanking timers, RF blanking:	55μs
audio delay:	50μs
audio blanking:	290μs

Order Code	Type	Price each
GX54J	ULN3846A	£2.95

OM2045 Wideband VHF/UHF Amp

Philips

A one-stage hybrid wideband amplifier for aerial amplifiers for FM radios and UHF TV's. It is ideal for overcoming losses when more than one TV is operated from one antenna (MATV).



Supply voltage:	12V±10% (15V max.)
Frequency range:	40 to 860MHz
Gain:	12dB
Frequency response within band:	±1dB
Source and load impedance:	75Ω

Input VSWR:	2.0
Output VSWR:	1.4
Back attenuation @ 100MHz:	22dB
@ 860MHz:	19dB
Output voltage:	99dBμV
Noise figure:	3.6dB
Supply current:	11.5mA

Pin Connections

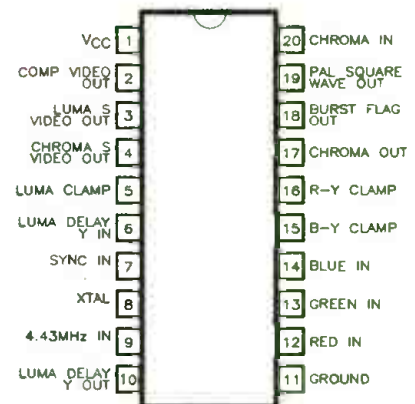
Pin 1:	Input 75Ω
Pins 2,3:	Common
Pin 4:	+12V supply
Pin 5:	Output 75Ω

The module should be mounted on double-sided pcb with a ground plane on the top as shown in the diagram. The connections to the common pins must be as close to the 'seating plane' as possible.

Order Code	Type	Price each
UL77J	OM2045	£5.65

MC13077P Advanced PAL/NTSC Encoder

Motorola



13077

The MC13077P is an economical, high quality, RGB to composite video encoder for PAL or NTSC protocols. Useful where video signal conversion is required, and especially for recombining separate RGB video signals which are best processed individually (by digital means, for example) in a video editing environment or studio. It accepts red, green, blue and composite sync inputs and delivers either composite PAL or NTSC standard video complete with luminance and chrominance components incorporating all the synchronisation and chroma regeneration signals. The device is manufactured using a high density bipolar process and is contained in a single 28-pin DIL package.

Features include a single 5V supply, PAL or NTSC switchable composite output, PAL square wave output, PAL sequence resettable, internal or external colour burst flag, digitally determined modular angles, and a selectable subcarrier reference drive.

Order Code	Type	Price each
AY33L	MC13077	£5.25

Maplin

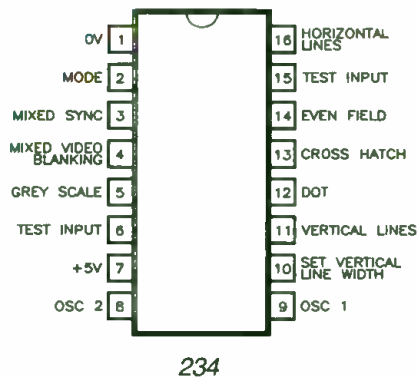
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01702 553935

ZNA234E TV Pattern Generator

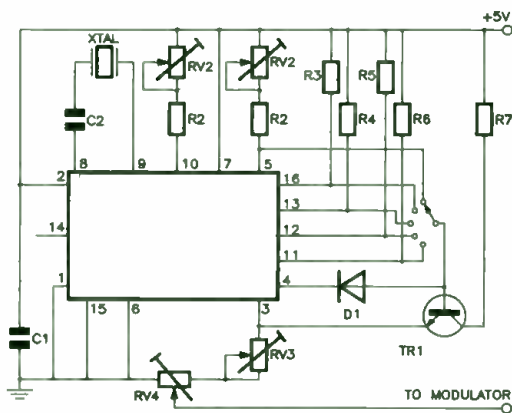
GEC-Plessey



234

The IC makes available all the waveforms necessary to produce the crosshatch, dot and greyscale test patterns on a television screen. The composite video output can be injected directly into the video input of a receiver or used to drive a modulator for connection to the aerial socket. The circuit shown can be connected to a standard UHF TV set with 625 lines (CCIR standard), but by connecting pin 2 to ground instead of +5V, the output will produce 525 lines (EIA standard)*. In the circuit shown RV1 sets the vertical line width, RV2 sets the grey scale, RV3 sets the video/sync ratio, and RV4 sets the modulation depth.

*Note that the crystal needs to be 2.52MHz which we cannot supply.



Specification (typical)

Supply voltage:	5V
Supply current:	135mA
Clock frequency:	2.5MHz (for 625 lines) 2.52MHz (for 525 lines)

Parts List

R1	Min Res 10k	(M10K)
R2	Min Res 3k3	(M3K3)
R3,4,5,6	Min Res 1k	(M1K)
R7	Min Res 330Ω	(M330R)
RV1	Hor Encl Preset 100k	(UH06G)
RV2	Hor Encl Preset 4k7	(UH02C)
RV3,4	Hor Encl Preset 1k	(UH00A)
C1	Poly Layer 0.033μF	(WW35Q)
C2	Ceramic 22pF	(WX48C)
XTAL	Crystal 2.5MHz	(UK82D)
D1	1N4148	(QL80B)
TR1	2N2369A	(QR12N)
Mod	UHF ModulatorUM1233	(FT30H)

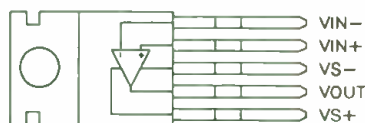
Order Code	Type	Price each
UK83E	ZNA234E	£14.95

EL2099CT Video Distribution Amplifier

Elantec

The EL2099C is a high-speed, monolithic operational amplifier featuring excellent video performance and high output current capability. Built using a dielectric isolation process, it uses current mode feedback to achieve wide bandwidth, and is stable in a unity gain configuration.

The device can deliver ±12.5V into a 25Ω load at slew rates of 900V/μs. Its speed and output current make it ideal for line driver and automatic test applications. Operation from power supplies ranging from ±5V to ±15V makes the EL2099C extremely versatile. Case style is 5-pin TO220.



2099

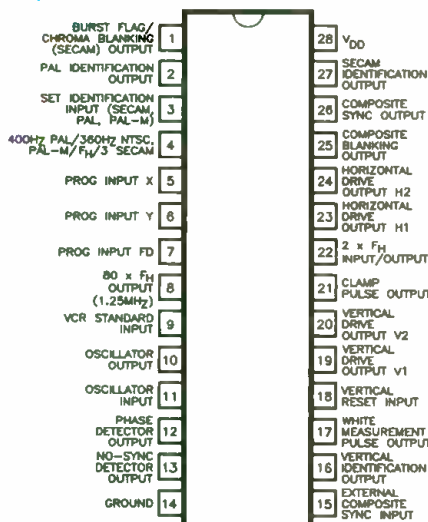
Specification

Bandwidth:	20MHz -0.1dB, 70MHz -3dB
Differential gain:	0.02%
Differential phase:	0.03°
Output short-circuit current:	1A
Fan-out:	Up to 6 x 75Ω double-terminated cables in parallel @ ±12.5V
Slew rate:	900V/μs
Supply voltage:	±5V to ±15V

Order Code	Type	Price each
AY89W	EL2099CT	£8.15

SAA1043P Universal Sync Generator

Philips



1043

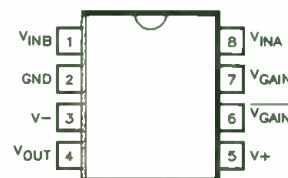
This IC generates the synchronising waveforms required in all types of video source equipment e.g. video cameras, film scanners, video games, computer displays etc. The device is programmable to suit standards SECAM1, SECAM2, PAL/CCIR, NTSC1, NTSC2 and PAL-M; the video game 624 and 524 line standards; and can be synchronised to an external sync signal.

Specification	
Supply voltage:	5.7 to 7.5V
Supply current:	<10μA
Load resistance at V _{DD} = 5.7V:	1.4kΩ min
at V _{DD} = 7.5V:	820Ω min
Oscillator frequency:	>5.1MHz (5MHz for PAL)

Order Code	Type	Price each
UK85G	SAA1043P	£11.99

EL4094CN 8-Pin Video Fader/Gain Control

Elantec



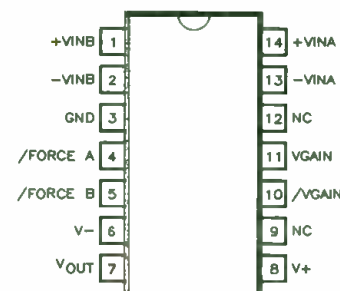
4094

A complete two-input video gain control/fader IC which combines its two inputs according to the equation $V_{OUT} = V_{INA} (0.5V + V_g) + V_{INB} (0.5V - V_g)$, and where V_g is the difference between the non-inverting and inverting V_{GAIN} pin voltages, which can range from -0.5V to +0.5V. The device has a wide 65MHz bandwidth at -3dB, and is designed for excellent video distortion performance. The EL4094CN is the same circuit as that of the EL4095CN, but with feedback resistors included on-chip to implement unity-gain connection. An output buffer is included and the gain control input is also very fast with a 30MHz small-signal bandwidth and 100ns recovery time. The device is compatible with power supplies from ±5V to ±15V and a supply current of 14mA.

Order Code	Type	Price each
AJ60Q	EL4094CN	£13.95

EL4095CN Fader Gain Control with Switches

Elantec



4095

A versatile video gain control/fader/multiplexer block with at its core a fader which can variably blend two inputs together, and an output amplifier that can drive heavy loads. Each input appears as the input of a current-feedback amplifier, and with external resistors, can separately provide any gain required. The output is defined as $V_{OUT} = A \times V_{INA} (0.5V + V_{GAIN}) + B \times V_{INB} (0.5V - V_{GAIN})$, where A and B are the feedback gains of each channel. Additionally, two logic inputs are provided each of which overrides the analogue V_{GAIN} control, and forces 100% gain for one input and 0% for the other. The logic inputs switch in only 20ns and provide high attenuation to the 'off' channel, while generating very small glitches. Signal bandwidth is 65MHz and gain-control bandwidth is 30MHz. The gain control recovers from overdrive in only 100ns. The device can operate from a ±5V to ±15V supply with a current drain of only 16mA typical.

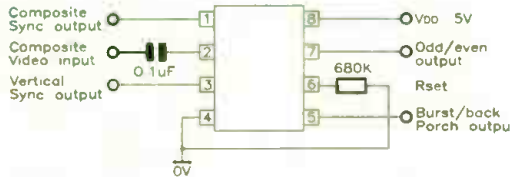
Order Code	Type	Price each
AJ61R	EL4095CN	£13.95

Fax your orders to:
01702 553935

EL4581CN Video Sync Separator

Elantec

A video sync separator which extracts timing information, including composite sync, burst/back porch timing and odd/even field information from standard negative going sync NTSC, PAL and SECAM video signals. It will detect video signals from 0.5 to 2V pk-to-pk. The 50% slicing feature provides precise sync edge detection even in the presence of noise and variable signal amplitudes.



A built-in linear phase, third order, colour burst filter minimises spurious timing information and reduces external components. The device is also capable of providing sync separation for non-standard, faster horizontal rate video signals by changing an external horizontal scan rate setting resistor. The vertical output is produced on the rising edge of the first serration in the vertical sync period. A default vertical output is produced after an internally generated time delay in the event that serration pulses may be missing, for example, in the case of a non-standard video signal. All outputs are active low. The device is packaged in 8-pin DIL and is an improved version of the LM1881.

Specification

Supply voltage:	7V DC
Supply current:	1.5mA
Pin 2 clamp voltage:	1.5V
Pin 2 discharge current:	10µA
Pin 2 clamp charge current:	500µA
Pin 6 reference voltage:	1.7V
Video output voltage swing:	800mV min., 4V max. dependent on load
Vertical sync width:	230µs
Burst gate width:	3.2µs
Vertical default time:	60µs
Filter attenuation:	24dB
Propagation delay:	400ns
Input signal dynamic range:	2V
Sync slice level:	60% typical
Operating temperature range:	0°C to +75°C

Order Code	Type	Price each
AJ62S	EL4581CN	£4.98

LM1881N Video Sync Separator

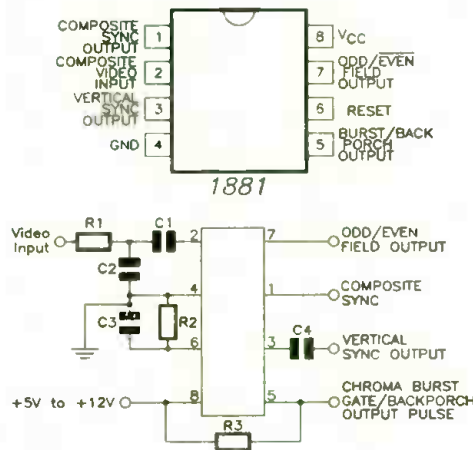
National Semiconductor

The IC can extract the timing information from PAL, SECAM or NTSC encoded video signals having standard negative going sync and amplitudes from 0.5V to 2V. The IC outputs the composite sync, vertical sync, burst/back porch timing and an odd/even field identifier. By changing the value of R2, non-standard faster horizontal rate video signals can also be stripped. The vertical sync output is produced on the rising edge of the first serration in the vertical sync period, but if the rising edge does not occur within the internally set period, a default vertical output is produced, permitting use with video games and home computers. The IC can be used as a master gen-lock; to providing timing references for the extraction of data on specific scan lines; to restore the original video waveform for remodulation or retrieve the colour burst and decode into R.G.B. components; or to identify individual scan lines in the video signal.

Parts List

R1	Min Res 620Ω	(M620R)
R2	Min Res 680kΩ	(M620K)
R3	Min Res 2k7	(M2K7)
C1,3	Poly Layer 0.1µF	(WW41U)
C2	Ceramic 330pF and 180pF in parallel	(WX59P/WX62S)
C4	Mylar 0.001µF	(WW15R)
C5	Minidisc 0.1µF 16V	(YR75S)

C5 is connected between pins 4 and 8.



Specification (typical)

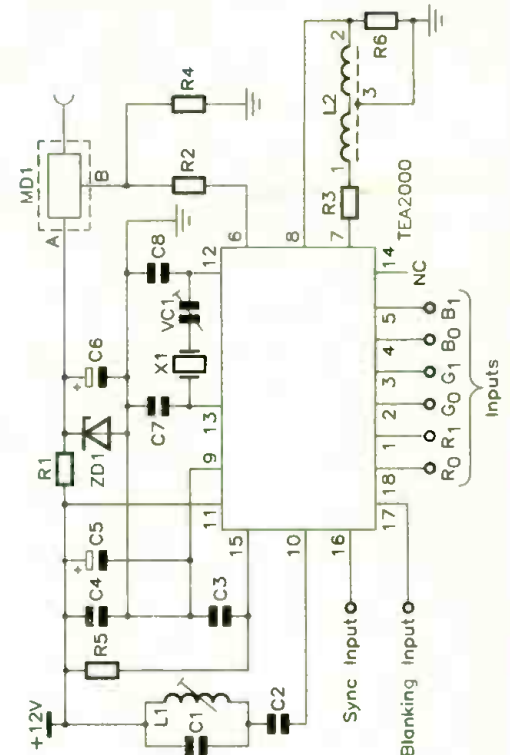
Supply voltage:	5V to 12V (13.2V max.)
Supply current:	5.5mA
DC input voltage:	1.5V
Input threshold voltage:	70mV
Sync outputs (pins 1 & 3):	Logic 1:4.5V @ 40µA (V _{CC} = +5V) Logic 1:3.6V @ 1.6mA (V _{CC} = +5V) Logic 0:0.2V @ -1.6mA (V _{CC} = +12V) Logic 1:>11V @ 40µA (V _{CC} = +12V) Logic 1:>10V @ 1.6mA (V _{CC} = +12V)
Outputs (pins 5 & 7):	Logic 1:4.5V @ 40µA (V _{CC} = +5V) Logic 1:>11V @ 40µA (V _{CC} = +12V) Logic 0:0.2V @ -1.6mA (V _{CC} = +12V)
Vertical sync width:	230µs
Burst gate width:	4µs (with R3 = 2k7)
Vertical default time:	65µs

Order Code	Type	Price each
UL75S	LM1881N	£5.85

TEA2000-V1 PAL Colour Encoder

Philips

A PAL colour encoder and video summer which requires just composite sync and composite blanking inputs, and a 6-bit binary coded input giving the colour information. The inputs are organised as 2 bits per primary colour with gamma correction automatically applied to the resultant luminance and chrominance levels. Each of the equally spaced intensity levels for each primary colour is combined with those of the other primary colours. This produces 64 output colours comprising a wide range of saturated and desaturated colours, black, white and two levels of grey. The output is a composite video signal with PAL standards. The composite sync input, pin 16, requires a negative logic signal (TTL format) and must include field and line sync information. The blanking input (TTL format) must be high during sync and colour burst, unless all colour inputs are low at this time. The colour inputs are also TTL compatible. A +12V supply ±10% is required on pin 11. If pin 14 is connected to ground an NTSC signal is produced, but different external components would be required. Leave pin 14 open for normal PAL operation.



Adjust VC1 and L1 for best picture.

Parts List

R1	Min Res 680Ω	(M680R)
R2	Min Res 510Ω	(M510R)
R3	Min Res 1k	(M1K)
R4	Min Res 430Ω	(M430R)
R5	Min Res 36k	(M36K)
R6	Min Res 910Ω	(M910R)
C1	Ceramic 82pF	(WX55K)
C2	Polyester 0.01µF	(BX70M)
C3	Ceramic 330pF	(WX62S)
C4	Disc 0.1µF	(BX03D)
C5	PC Elect 220µF 16V	(FF13P)
C6	PC Elect 100µF 10V	(FF10L)
C7,8	Ceramic 5.6pF	(WX41U)
VC1	Trimmer 22pF	(WL70M)
X1	Crystal 8.867238MHz	(UH85G)
L1	15µH adjustable coil	(UH86T)
L2	Delay line DL270	(UH84F)
ZD1	BZY88C5V1	(QH07H)
MD1	Modulator UM1233	(FT30H)

Order Code	Type	Price each
UH66W	TEA2000-V1	£6.85

LM1044N Analogue Video Switch

National Semiconductor

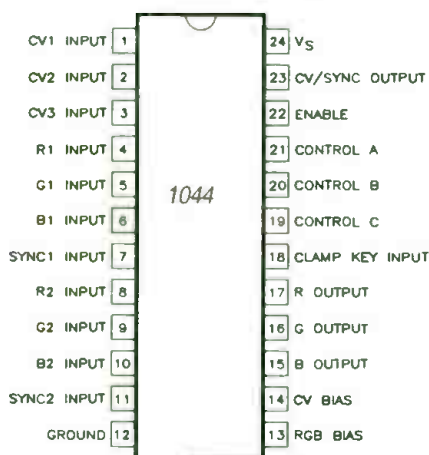
The IC can switch up to five inputs to one output. Up to three inputs can be composite video and up to two can be RGB and sync. Channel selection is via three latched TTL compatible logic inputs and a similar chip enable input. To select a different input, pin 22 must be at logic high. The composite video amps have a 5MHz bandwidth and 6dB gain, whilst the RGB and sync amps have a 30MHz bandwidth and 0dB gain. The RGB inputs can be used for composite video and with two chips it is possible to devise a video switcher for security applications where up to 12 cameras can be sequentially switched to one monitor. Composite video and sync inputs, and the four outputs should be connected via 470µF 16V capacitors (+ve to chip). RGB inputs should be connected via 0.33µF Poly Layer capacitors. Pins 13 and 14 should each be connected via separate 100µF 25V capacitors to ground (-ve to ground). A positive going pulse on pin 18 activates the RGB input bias clamps. The pulse (>3µs) is applied when all six RGB inputs are at black reference level. Use a Disc 0.1µF to decouple the supply voltage close to pin 24.

Continued on next page.

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The following table shows the logic levels are required on pins 19, 20, 21 and 22 to select the input required.

22	19	20	21	Channel selected
1	0	0	0	CV1, RGB outputs muted
1	0	0	1	CV2, RGB outputs muted
1	0	1	0	CV3, RGB outputs muted
1	0	1	1	RGB1 with Sync 1
1	1	1	1	RGB2 with Sync 2
1	1	1	0	Mute
1	1	0	1	Mute
1	1	0	0	Mute
0	X	X	X	Previous selection retained



Specification (typical at $V_s = 12V$)

Supply voltage: 8V to 16V
 Supply current: 42mA
 Logic high: >2V
 Logic low: <0.8V

Composite video channels

Max. input voltage: 1.2Vp-p
 Input impedance: 1.5k Ω
 Voltage gain: 5.8dB
 Bandwidth: 5MHz
 Signal to noise ratio: 60dB
 Channel isolation: 60dB
 Crosstalk: -60dB

RGB channels

Clamp on voltage (pin 18): >9V
 Clamp off voltage (pin 18): <5V
 Max input voltage: 3Vp-p
 Voltage gain: 0dB
 Bandwidth: 30MHz
 Signal to noise ratio: 60dB
 Channel isolation: 60dB
 Crosstalk: -50dB

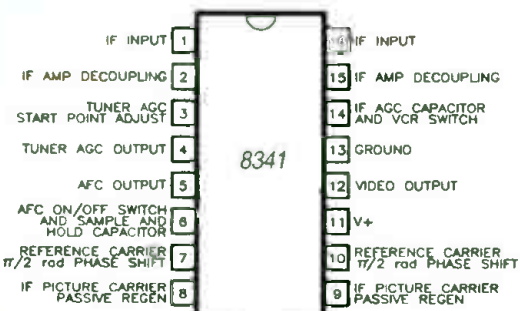
Sync channels

Max input voltage: 3Vp-p
 Input impedance: 2.3k Ω
 Voltage gain: -0.4dB
 Bandwidth: 24MHz

Order Code	Type	Price each
UM56L	LM1044N	£7.85

TDA8341-N6 TV IF Amp and Demodulator

Philips



An integrated IF amplifier and demodulator for colour and black and white TV sets, with wide bandwidth and excellent intermodulation performance making it suitable for use in teletext and NICAM applications.

The IC is designed for use with tuners requiring a decreasing positive bias (a.g.c.) with increasing signal strength. The IC contains a full range, gain-controlled, wide band IF amp, a linear synchronous demodulator, white spot inverter, wide band video amp with noise protection, AFC with on/off switching and sample and hold function, AGC with noise gating, external video switch for switching off video output, and an integrated filter to limit second harmonic IF signals. A typical circuit is shown in Maplin Magazine issue 36.

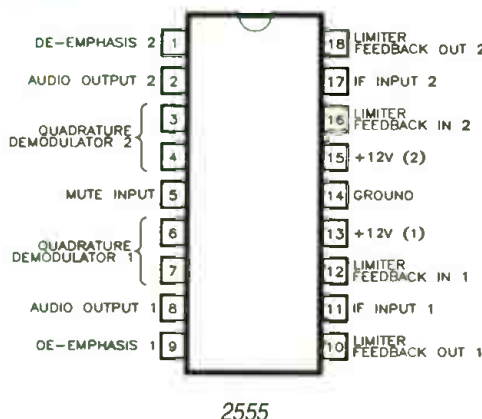
Specification (typical)

Supply voltage: 12V (9.4 to 13.2V)
 Supply current: 42mA
 IF input sensitivity: 40 μ V rms
 IF gain control range: 67dB
 Video output voltage: 2.7Vp-p
 Signal to noise ratio: 58dB
 AFC output voltage swing: 10Vp-p
 Bandwidth of output: 7.5MHz
 Intermodulation: -60dB

Order Code	Type	Price each
UL27E	TDA8341-N6	£2.25

TDA2555-V2 Dual TV Sound Demodulator

Philips



The IC contains two FM sound demodulators and is primarily designed to demodulate the stereo sound broadcast with TV in some European countries (not UK). However it can be used to demodulate standard mono UK sound on one channel, and European mono sound on the other (from countries using PAL but with different sound carriers e.g. Holland). The IC contains an eight-stage limiting amplifier, quadrature demodulator, de-emphasis stage, output amplifier, and mute function. For typical circuit see Maplin Magazine issue 36.

Specification (typical)

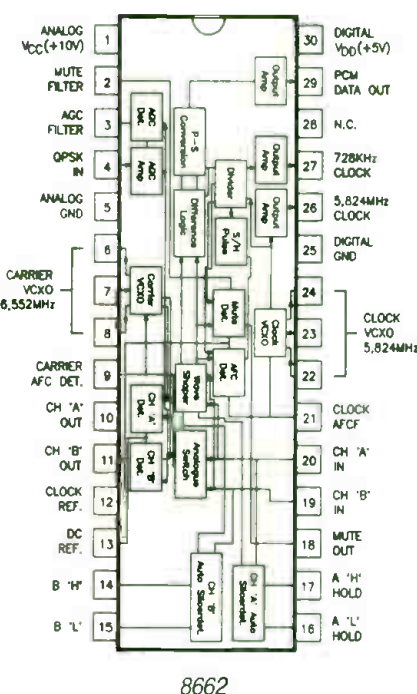
Supply voltage: 12V
 Supply current: 24.5mA
 Audio output: 600mV rms
 Total harmonic distortion: <0.1%
 Signal to weighted noise: 70dB
 Input voltage for start of limiting: 50 μ V
 AM suppression: >50dB

Order Code	Type	Price each
UL28F	TDA2555-V2	£3.25

TA8662N, TC6011N, TD6710N NICAM Decoder Chip Set

Toshiba

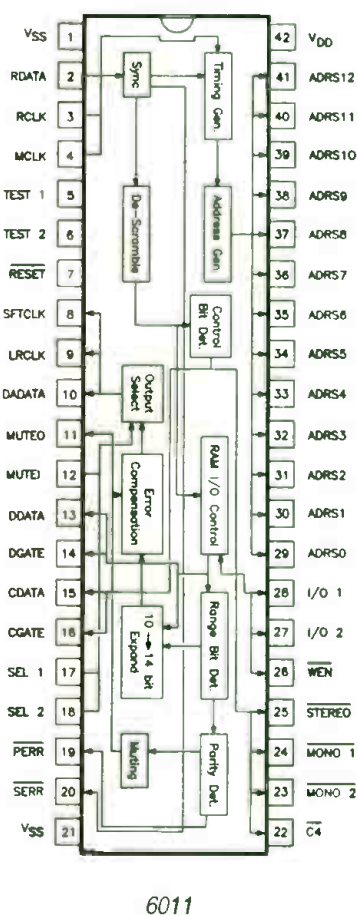
The NICAM decoder chip set used in the NICAM receiver project published in the Maplin Magazine issue 35. The TA8662 is a Quadrant Phase Shift Keying (QPSK) decoder that demodulates the data in the 6.552MHz sub-carrier and provides all the necessary timing information. It is supplied in a 30-pin shrink DIP package with pin spacing 0.07in. x 0.4in.



TA8662N
 Analogue supply voltage: 10V (9V to 11V)
 Analogue supply current: 40mA
 Digital supply voltage: 5V (4.5V to 5.5V)
 Digital supply current: 24mA

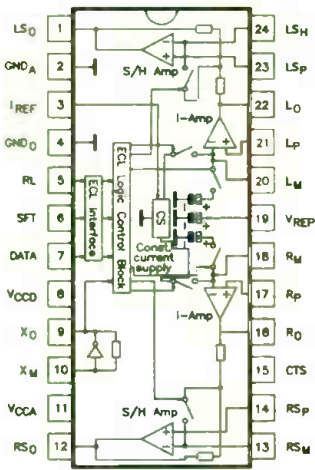
TC6011N
 Supply voltage: 5V (4.75V to 5.25V)
 Supply current: 35mA

The TC6011N converts the demodulated data into a 14-bit serial data stream for input to the D/A converter. It is supplied in a 42-pin shrink DIP package with pin spacing 0.07in. x 0.6in. The TD6710AN is a 14-bit D/A converter with stereo outputs. It is supplied in a 24-pin non-standard shrink DIP package with pin spacing 0.07in. x 0.3in.



TD6710AN
 Supply voltage: 5V (4.5V to 7V)
 Analogue supply current: 10mA
 Digital supply current: 8.5mA
 Total harmonic distortion: -82dB
 Signal to noise ratio: 83.5dB
 Crosstalk: 83dB
 Operating frequency: 16.9MHz

Please note that these IC's are only available in sets of three.



6710

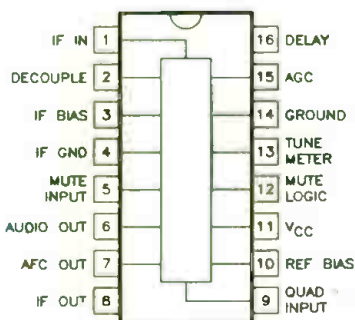
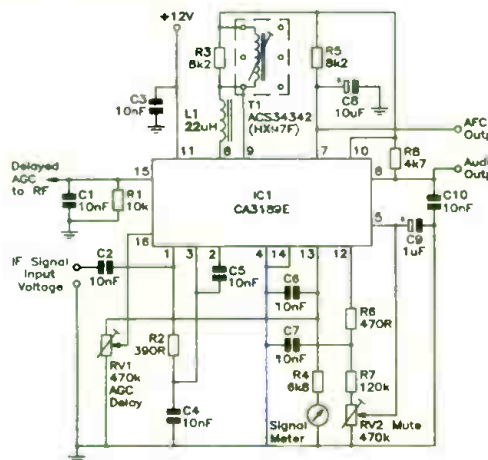
Order Code	Type	Price each
UK95D	Nicam Chip Set	£29.95

CA3189E FM IF Subsystem

Harris

Features

- ★ Exceptional limiting sensitivity: 10µV (typical) at -3dB
- ★ Low distortion: 0.1% (with double-tuned coil) typical
- ★ Single-coil tuning capability
- ★ High recovered audio: 500mV (typical)
- ★ Internal supply-voltage regulators
- ★ AGC threshold controlled externally
- ★ Low signal or frequency changed muting option
- ★ Mute - centre channel detect



CA3189E

The CA3189E is a comprehensive FM-IF system designed for high fidelity FM tuners. It includes a three stage FM-IF amplifier/limiter configuration with level detectors for each stage, a double-balanced quadrature FM detector and an audio amplifier that features the optional use of a muting circuit. The advanced circuit design includes desirable special features such as delayed AGC for the RF tuner, an AFC drive circuit, and an output signal to drive a tuning meter and/or provide stereo switching logic. In addition, internal power supply regulators maintain a nearly constant current drain over the voltage supply range of +8V to +16V. Distortion is primarily a function of the phase linearity characteristic of the external detector coil.

Absolute maximum ratings
 Supply voltage (Pin 11 to 4/14) 18V
 DC current out of pin 15 2mA
 Max dissipation 600mW

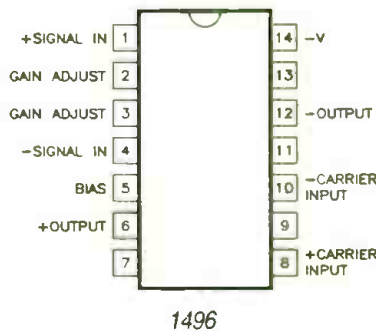
Characteristics (typical at V+ = 12V)
 Quiescent current drain: 28mA
 DC voltage at pin 1 (IF input): 1.9V
 at pin 2 (AC return to input): 1.9V
 at pin 3 (DC bias to input): 1.9V
 at pin 7 (AFC): 5.6V
 at pin 10 (DC reference): 5.6V

Order Code	Type	Price each
WQ20W	CA3189E	£1.05

MC1496P Double-Balanced Modulator

Motorola

The MC1496P is a double-balanced modulator/demodulator. The circuit produces an output voltage which is the product of an input voltage (signal) and a switching function (carrier). Communications applications include modulation and demodulation of AM, SSB, DSB, FSK, FM and phase encoded signals. Signal conditioning techniques possible include frequency doubling and halving, linear mixing and chopping, with additional uses as phase detectors in phase locked loops and as differentiators in NRZ and phase encoded digital tape and disk memories.

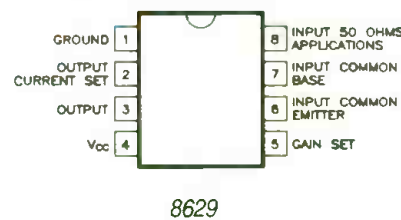


1496

Order Code	Type	Price each
QH47B	MC1496P	92p

SL560CDP 300MHz Low Noise Amplifier

GEC-Plessey



8629

A monolithic IC that contains three very high performance transistors, and associated biasing components, to form a 300MHz low noise amplifier. The device is suitable for radar IF preamplifiers, low power wideband amplifiers, 50Ω line drivers, aerial preamplifiers for FM radio, instrumentation preamplifiers etc.

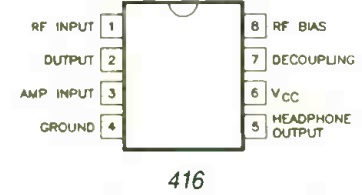
Specification
 Supply voltage: +15V maximum
 Supply current: 20mA approx. with 6V supply voltage
 Small signal voltage gain: 14dB typical
 Typical noise figure
 R_s=200Ω: 1.8dB
 R_s=50Ω: 3.5dB

Order Code	Type	Price each
DB46A	SL560CDP	£2.35

ZN416E AM Radio With Amplifier

GEC-Plessey

The ZN416E is a higher audio output version of the ZN414E in an 8-pin DIL package. Connect pin 6 to 1.3V approx., and between pin 1 and 8 connect as close as possible the two AM gangs in parallel of our AM/FM Varitone. In parallel with this connect a 5cm



416

ferrite rod aerial with about 80 turns of 30swg enamelled copper wire wound on it. Connect 0.01µF disc capacitors between pins 8 and 4, and pins 7 and 4. Connect 0.1µF disc capacitors between pins 2 and 4 and pins 2 and 3. Connect the battery negative to pin 4. This will form a complete AM radio. The output, pin 5, may be connected to the tip of our Personal Stereo Headphones and pin 4 to the ring (leave the sleeve unconnected) to provide the required 64Ω load.

Characteristics (typical where different from ZN414)
 Supply current 4mA (5mA with strong signal)
 Voltage gain of output stage 18dB
 Output >170mV rms into 64Ω load

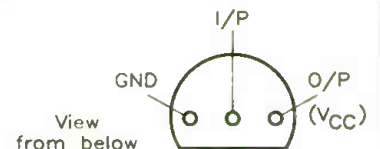
Order Code	Type	Price each
UR70M	ZN416E	£2.36

ZN414Z AM Radio

GEC-Plessey

A 10-transistor TRF receiver in a 3-pin TO18 package. The IC contains an RF amplifier, detector and AGC circuit and requires only a few external components to form a complete high quality AM radio. Excellent audio quality can be achieved and current consumption is extremely low. No setting-up is required and the circuit is completely stable in use.

ZN414Z



Characteristics (typical)
 Supply voltage: 1.2 to 1.6V (1.3V recommended)
 Supply current: 300µA (500µA with strong input signal)
 Frequency range: 150kHz to 3MHz
 Input resistance: 4MΩ
 Threshold sensitivity: 50µV
 Audio distortion: <2% THD
 Selectivity: 4kHz bandwidth can be achieved
 Power gain: 72dB
 AGC range: 20dB
 Output: >30mV rms under correct operating conditions

Layout Requirements

- As with any high gain RF device, certain basic layout rules must be adhered to if stable and reliable operation is to be obtained. These are listed below:
1. The output decoupling capacitor must be soldered as close as possible to the output and ground pins on the IC. Its value and that of R_{AGC} should be calculated from the formula C(µF) = 40/R_{AGC}.
 2. All leads should be kept as short as possible, especially those near the IC.
 3. Keep the tuning assembly some distance from the battery, loudspeaker and their associated leads.
 4. Connect the 'earthy' side of the tuning capacitor to the junction of the 100k resistor and the 0.01µF capacitor.

Order Code	Type	Price each
QL41U	ZN414Z	£1.28

TDA7000 FM Radio

Philips

An FM radio on a single chip requiring only a few simple peripheral components. In particular the chip requires only one simple coil and alignment is very easy. The chip includes an RF input stage, mixer, local oscillator, IF amplifier/limiter, phase demodulator, mute detector and mute switch. The output will directly drive a crystal earpiece or could be used with a TBA820M to form a complete portable FM radio.

Specification

Supply voltage:	2.7V to 10V (4.5V typical)
Supply current:	8mA at 4.5V
Frequency range:	1.5MHz to 110MHz (The part of this range attainable on any finished design is determined by the components on pins 5/6)
Sensitivity:	1.5µV (for -3dB limiting, muting disabled) 6µV (for -3dB muting) 5.5µV (for 26dB signal to noise ratio)
Signal handling:	200mV
Signal to noise ratio:	60dB
Total harmonic distortion:	0.7% (±22.5kHz modulation) 2.3% (±75kHz modulation)
AM suppression:	50dB
Oscillator voltage pin 6:	250mV rms
Variation of oscillator frequency with supply voltage:	60kHz/V
Selectivity:	45dB
AFC range:	±300kHz
Audio bandwidth:	10kHz
AF output voltage:	75mV rms
Load resistance at:	
$V_s = 4.5V$:	≥22kΩ
$V_s = 9V$:	≥47kΩ

Note that the muting system can be disabled by feeding 20µA into pin 1. The interstation noise level can be decreased by choosing a low-value capacitor at pin 3. Omit this capacitor to achieve silent tuning.

Order Code	Type	Price each
YH87U	TDA7000	£2.64

TDA1072A AM Receiver

Telefunken

A complete AM receiver on a chip, the TDA1072A only requires comparatively few peripheral components to complete a high quality AM radio circuit. Unlike some other AM radio ICs, a minimum number of external tuned inductors are used to preserve reasonable performance, selectivity and quality of output. Only two of these, an RF input transformer and a single winding oscillator coil need be tuned either capacitively or inductively. The device includes a controlled RF preamplifier, multiplicative balanced mixer, separate local oscillator with gain control, a balanced full-wave detector, an audio preamplifier, internally linked AGC drive to RF and IF stages, a display amplifier for a field-strength indicator meter, and an electronic stand-by on/off switching input. The device is encapsulated in a single 16-pin DIL package.

Specification

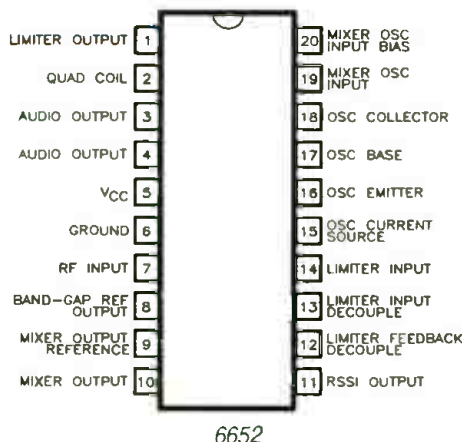
Supply voltage range:	7.5 min. to 18V typical
Supply current, no load:	23mA
RF DC bias input:	+ $V_s/2$
RF input impedances:	5.5kΩ (pins 14, 15)
Maximum RF input voltage:	2.5V pk-pk
Mixer output impedance:	500kΩ min. (pin 1)
Maximum conversion conductance:	6.5mA/V

Mixer output current:	1.2mA
Oscillator frequency range:	600kHz to 60MHz
Oscillator circuit impedance:	0.5kΩ to 200kΩ
Controlled oscillator amplitude:	130mV typical
Oscillator output DC:	6V
Oscillator output load current:	20mA max.
Oscillator output impedance:	25kΩ typical
IF amplifier DC input voltages:	2V (pins 3, 4)
IF amplifier input impedance:	3kΩ (pin 3)
Maximum IF input voltage:	90mV (pin 3)
IF amp. gain control range:	61dB
Audio output voltage:	310mV (pin 6)
Audio output impedance:	3.5kΩ
Meter driver output:	140mV max. (pin 9)
Meter driver current:	2mA min. (pin 9)
RF input for signal noise ratio	
= 6dB:	1.5µV
= 26dB:	15µV
= 46dB:	150µV
RF input for AGC operation:	30µV
Maximum RF input for 3% distortion:	500mV @ 80% modulation
Total distortion of recovered audio @ RF in = 1mV:	0.5%, 80% modulation
Signal to noise ratio of recovered audio @ RF in = 1mV:	50dB
IF bandwidth:	4.6kHz (-3dB)
IF selectivity:	60dB @ $\Delta f = \pm 36kHz$

Order Code	Type	Price each
AH45Y	TDA1072A	£2.53

SL6652CDE Low Power IF Stage for FM Cellular Radio

GEC-Plessey



A very low power, high performance IC for IF amplification and demodulation in FM radio receivers, particularly FM cellular radios, cordless telephones etc. The device features a mixer stage for use up to 100MHz, a quadrature detector with differential AF output, and a very stable 'received signal strength indicator' (RSSI). The device will work with a supply as low as 2.5V and draws less than 2mA.

Specification

Supply voltage:	2.5V to 7.5V DC
Typical sensitivity:	5µV (20dB SINAD)
AM rejection:	40dB (rf input <500µV)
Mixer osc. frequency:	100MHz
IF amplifier gain:	90dB

IF frequency:	455kHz to 1500kHz
Detector audio output level:	75mV to 125mV
Ultimate S/N ratio:	60dB
Typical THD:	0.5%

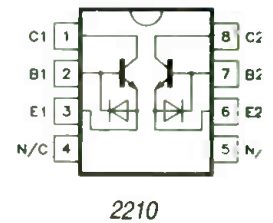
Order Code	Type	Price each
DB49D	SL6652CDE	£7.81

SUBSECTION 62 TRANSISTOR ARRAYS

SSM 2210P Audio Dual Matched NPN Transistors

Analog Devices

An ultra low noise, matched dual monolithic transistor for use in input stages of high quality amplifiers. The electrical characteristics approach those of an ideal transistor when operated over a collector current range of 1µA to 10mA.



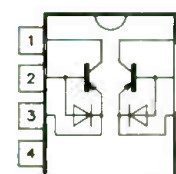
Specification (typical at 25°C, $V_{CE} = 15V$, $I_C = 10\mu A$)

Collector-emitter voltage:	40V max
Collector-base voltage:	40V max
Collector-collector voltage:	40V max
Emitter-emitter voltage:	40V max
Collector current:	20mA max
Total power dissipation:	500mW
Current gain (h_{FE}):	550 @ 10µA
Current gain matching:	0.5%
Gain-bandwidth product (f_T):	200MHz
Offset voltage:	10µV
Bulk resistance:	0.3Ω
Noise density:	0.85nV/√Hz at 1kHz ($I_C = 1mA$)

Order Code	Type	Price each
UL79L	SSM2210P	£3.70

SSM2220P Audio Dual Matched PNP Transistors

Analog Devices



An ultra low noise, matched dual monolithic transistor for use in input stages of high quality amplifiers. The device features outstanding parametric matching and high frequency performance.

Specification (typical at 25°C, $V_{CE} = 15V$, $I_C = 10\mu A$)

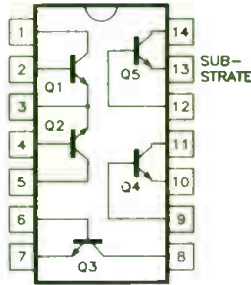
Collector-emitter voltage:	36V max
Collector-base voltage:	36V max
Collector-collector voltage:	36V max
Emitter-emitter voltage:	36V max
Collector current:	20mA max
Total power dissipation:	500mW
Current gain (h_{FE}):	120 @ 10µA
Current gain matching:	0.5%
Gain-bandwidth product (f_T):	150MHz
Offset voltage:	40µV
Bulk resistance:	0.3Ω
Noise density:	0.7nV/√Hz at 1kHz ($I_C = 1mA$)

Order Code	Type	Price each
UL80B	SSM2220P	£4.85

CA3046 Five Transistor Array

SGS Thomson

The 3046 consists of five silicon NPN transistors on a common monolithic substrate in a 14-lead dual in-line plastic package. Two transistors are internally connected to form a differential amp. The transistors of the 3046 are well suited to low noise general purposes and to a wide variety of applications in low power systems in the DC through VHF range. They may be used as discrete components in conventional circuits, in addition they provide the very significant inherent integrated circuit advantages of close electrical and thermal matching.



3046

Absolute Maximum Ratings

Each transistor

V_{CE0} max:	15V
V_{CBO} max:	20V
C_{CIO} max:	20V
V_{EBO} max:	5V
I_C max:	50mA
Total power dissipation: @ $T_A = 55^\circ\text{C}$:	300mW (750mW total package)
h_{FE} :	100 @ 10mA
f_T :	550MHz

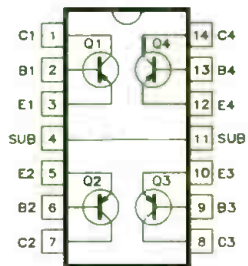
*The collector of each transistor of the CA3046 is isolated from the substrate by an integral diode. The substrate (terminal 13) must be connected to the most negative point in the external circuit to maintain isolation between transistors and to provide for normal transistor action.

Order Code	Type	Price each
QH26D	CA3046	61p

EP2015CN Fast Quad PNP Array

Elantec

Four monolithic PNP transistors with excellent matching and a high speed performance. The transistors are similar to 2N3906 devices. There is a complete DC isolation so no substrate connection is required, but for optimum high speed performance, the substrate can be grounded.



2015

Specification

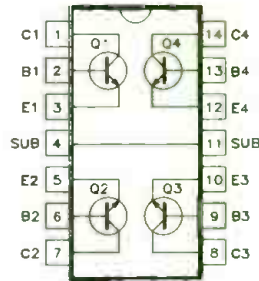
V_{CE0} max:	40V
V_{CBO} max:	40V
V_{EBO} max:	5V
I_C max:	50mA
P_{TOT} max:	500mW each transistor (1.25W total package)
h_{FE} :	>75 at 10mA

Order Code	Type	Price each
UR12N	EP2015CN	£2.40

EN2016CN Fast Quad NPN Array

Elantec

Four monolithic NPN transistors with excellent matching and a high speed performance. The transistors are similar to 2N3904 devices. There is complete DC isolation so no substrate connection is required, but for optimum high speed performance, the substrate can be grounded.



2016

Specification

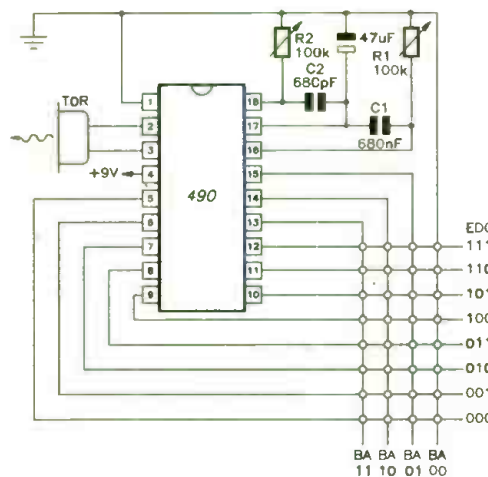
V_{CE0} max:	40V
V_{CBO} max:	40V
V_{EBO} max:	5V
I_C max:	50mA
P_{TOT} max:	500mW each transistor (1.25W total package)
h_{FE} :	>75 at 10mA

Order Code	Type	Price each
UR13P	EN2016A	£2.40

SUBSECTION 63 MODEL AND REMOTE CONTROL IC's SL490 Transmitter

GEC-Plessey

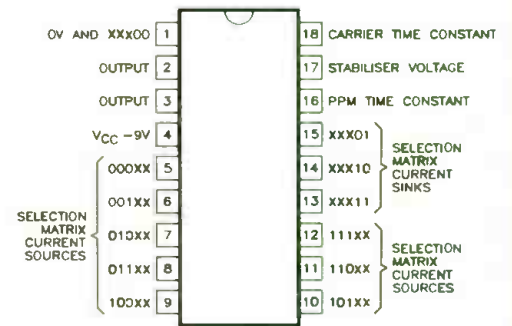
A 32-channel pulse position modulation transmitter for use with ultrasonic, infra-red, cable or radio links. Applications include remote control of toys and models, radios, tuners, tape and record decks, lamps and lighting, TV's, industrial control etc. The IC is ideally driven from a PP3 9V battery and can generate carrier frequencies of up to 200kHz so that for example an ultrasonic transmitter may be directly driven. Alternatively transmission may be achieved without a carrier for example for infra-red. Each of the 32 channels is initiated by one of 32 simple push-to-make switches directly connected to the IC in a 4 by 8 matrix. Only four or five external components are required to complete the circuit.



Specification (typical)

Supply current (operating)	8mA
Supply current (standby)	6µA
Supply voltage	+7V to +9.5V
Output current	1mA

An application circuit is shown for an ultrasonic transmitter. If an infra-red link is required make C1 a Carbonate 0.22µF remove C2 and R2 and connect pin 18 via a Min Res 2k2 to ground. Connect pin 3 to the input of the infra-red driver circuit and leave pin 2



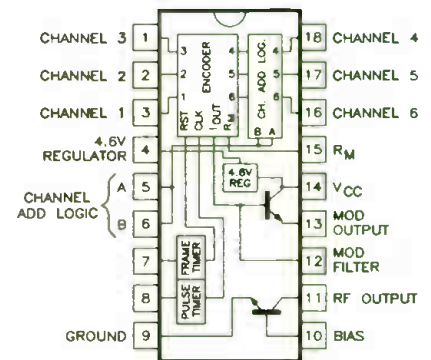
unconnected.

Order Code	Type	Price each
YH66W	SL490	£2.39

LM1872N Radio Control Receiver Decoder

National Semiconductor

A complete RF receiver decoder for radio control applications. The device is suitable for use in the 27MHz band. The crystal controlled superhet design offers both good sensitivity and selectivity. When used in conjunction with 1871 it provides four independent outputs, two are analogue pulse width modulated suitable for driving a 544 servo driver and two are simple on/off digital channels with 100mA drive capability.



1872

Specification

Supply voltage:	2.5V to 7V (6V recommended)
Supply current:	(chan A & B off): 13mA (chan A & B on): 27mA
V_{BIAS} (pin 4):	2.1V
RF sensitivity:	22µV
Bandwidth:	3.2kHz

Order Code	Type	Price each
YY72P	LM1872N	£3.05



Maplin

Stockist of Assessed Capability

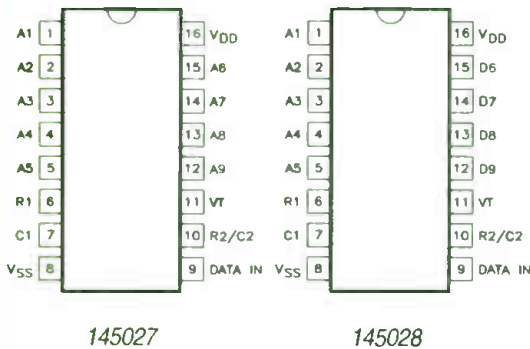
BS 5750 Part 2 1987 Level B: Quality Assurance RS12750

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M145027/8B-1 Remote Control Decoders

SGS-Thomson

The 145027 receives the data from the 145026 and checks it for errors by comparing the two words which should be identical. If the first five bits match the address set up on pins 1 to 5, then the data contained in the last four bits is latched on pins 12 to 15, and pin 11 goes high to indicate that a valid transmission has been received. Note that pin 11 goes high on the rising edge of the second pulse in the ninth bit of the second word. The data bits must be either 1 or 0. If an open circuit is transmitted it will be decoded as a 1. Thus data could be sent to up to 243 different receivers simultaneously, but will only be received by the one designated by the address.



The 145028 is the same but all the received data is regarded as address and the only output is the valid transmission pin 11 going high. Since pin 11 goes high before the second pulse in the ninth bit of the second word is completed, only a 1 or 0 can be received here, so the number of codes which can be detected is reduced to 13,122.

The system with the 145027 is suitable for use in remote controlled toys, low-speed data transmissions, paging systems, and the M145028 is for use in garage door openers, security monitoring, anti-theft devices etc.

Parts List

f _{osc} kHz	RTC	CTC	RS
362	10kΩ	120pF	20kΩ
181	10kΩ	240pF	20kΩ
88.7	10kΩ	490pF	20kΩ
42.6	10kΩ	1020pF	20kΩ
21.5	10kΩ	2020pF	20kΩ
8.53	10kΩ	5100pF	20kΩ
1.71	51kΩ	5100pF	100kΩ

f _{osc} kHz	R1	C1	R2	C2
362	10kΩ	470pF	100kΩ	910pF
181	10kΩ	910pF	100kΩ	1800pF
88.7	10kΩ	2000pF	100kΩ	3900pF
42.6	10kΩ	3900pF	100kΩ	7500pF
21.5	10kΩ	8200pF	100kΩ	0.015μF
8.53	10kΩ	0.02μF	100kΩ	0.02μF
1.71	51kΩ	0.02μF	100kΩ	0.1μF

Use 1% polystyrene capacitors in series or parallel to get to within ±5% of value shown, and for 0.1μF use a Poly Layer capacitor. All resistors are Min Res.

Specification

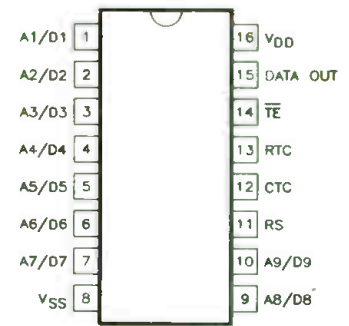
As 145026 except:

Max decoder frequency	240kHz at 5V, 410kHz at 10V, 450kHz at 15V
Quiescent current	30μA at 5V, 60μA at 10V, 90μA at 15V
Operating current	200μA at 5V, 400μA at 10V, 600μA at 15V

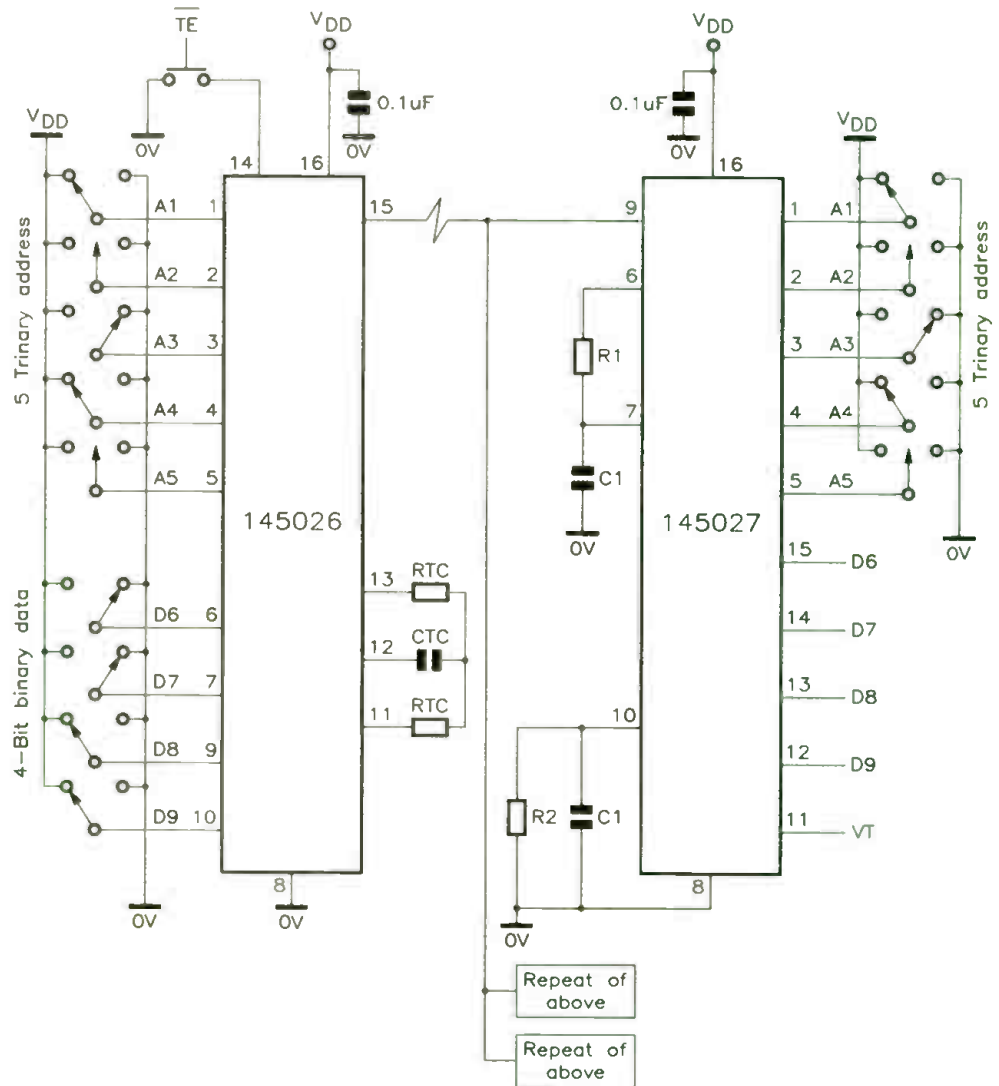
M145026B-1 Remote Control Encoder

SGS-Thomson

An encoder which can generate up to 19,683 codes from 9 address lines by detecting 1, 0, or open circuit. To initiate the transmit sequence, pin 14 should be pulsed low. The encoder will now output on pin 15 a data stream representing the condition on each of the address/data pins in turn and then repeat the operation, so that two complete identical words are transmitted. If pin 14 is held low, the output will be continuous, otherwise two identical words are output for each pulse on pin 14. A 1 is transmitted as two long pulses, a 0 as two short pulses, and an open circuit as a long pulse followed by a short pulse. The device is constructed in CMOS and all characteristics are as the standard 4000B devices. If an external oscillator is used, it should be connected to pin 11 and pins 12 and 13 left open. The output can drive rf, ultrasonic or infra-red transmitters.



145026



Specification

Supply voltage	4.5V to 15V (18V absolute max.)
Clock frequency	2MHz max at 5V, 5MHz max over 10V

Overall system propagation delay	182 clock cycles
Tolerance on timing components	±25%

Quiescent current	5nA at 5V, 10nA at 10V, 15nA at 15V
Operating current	100μA at 5V, 200μA at 10V, 300μA at 15V

Order

Code	Type	Price each
UJ49D	M145026B-1	£1.85

2648

Order Code	Type	Price each
UJ50E	M145027B-1	£2.30
UJ51F	M14502813-1	£2.30

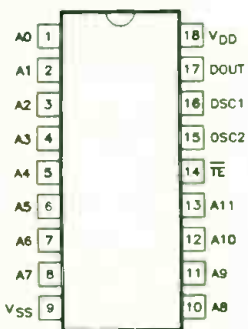
Maplin
FOR TOP QUALITY & VALUE!

HT12E, HT12D & HT12F Remote Control Encoder/Decoders

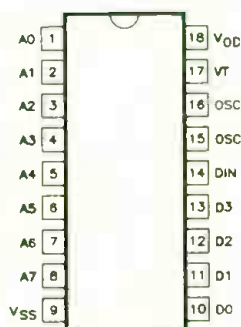
Holtek

NEW!

The HT12E encodes 12 bits of information and then serially transmits it upon receipt of a transmit enable signal to its active low TE pin. The data is transmitted on the pin marked DOUT, and can be easily interfaced to work with RF or infra-red transmission networks. Complementing the encoder are two decoder ICs, the HT12F and HT12D. The HT12F takes the encoded signal and decodes the whole of the 12 bits as being address data. If the received address matches with the address preset on the decoder IC then the decoder IC will make its valid transmission pin go high (VT). Using the HT12D device is very similar with the single exception that it decodes the first 8 bits of information and checks them against the first 8 bits of address preset on its pins. When both addresses match it makes available the last 4 bits of the received data word, on its four output pins. At the same time the decoder IC will send high its VT pin. This means that data can be sent from the encoder IC and only be decoded and therefore received by those decoder ICs with a matching 8-bit address. Features of the devices are low power, high noise immunity, low stand-by current of 1µA, wide operating voltage, 2¹² address code (2⁸ for the HT12D), built-in oscillator requiring only a 5% resistor, four times transmission with three times receive check, and a minimum of external components. Applications include burglar alarm systems, smoke and fire alarm systems, car door controllers, car alarm systems, security systems, cordless telephones, and many remote control systems.



12E



12D



12F

Specification

Operating voltage, V_{DD}: 2.4V to 12V, 5V typ (13V abs max)

Output drive current

(sink), I_O: 1.6mA typ, 1mA min (V_{DD}=5V)

(source): 5mA typ, 2mA min (V_{DD}=10V)

Stand-by current, I_{STB}: 0.1µA typ, 1µA max (at V_{DD}=3V)

0.1µA typ, 1µA max (at V_{DD}=5V)

1µA typ, 2µA max (at V_{DD}=10V)

2µA typ, 4µA max (at V_{DD}=12V)

Operating current, I_{DD}

HT12E, (F_{osc}=3kHz): 40µA typ, 80µA max (at V_{DD}=5V)

100µA typ, 200µA max (at V_{DD}=10V)

HT12D & HT12F,

(F_{osc}=200kHz): 200µA typ, 400µA max (at V_{DD}=5V)

400µA typ, 800µA max (at V_{DD}=10V)

Recommended oscillator parameters:

HT12E HT12D & HT12F

1.1MΩ (3kHz) 62kΩ (150kHz)

750kΩ (4.3kHz) 33kΩ (240kHz)

NB. Recommend F_{osc} (HT12D & HT12F)=F_{osc} (HT12E)

Operating temperature,

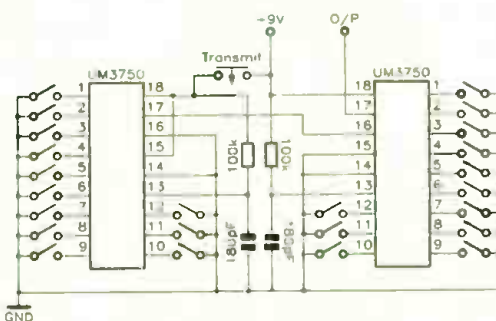
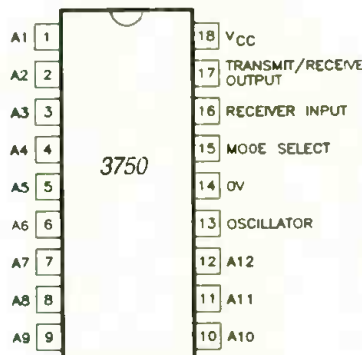
T_A: 0°C to 70°C

Order

Code	Type	Price each
AE17T	HT12E	£1.49
AE18U	HT12E	£1.49
AE19V	HT12F	£1.49

UM3750 Encoder/Decoder

UMC



A single chip which includes both the encoder and decoder for a coded transmission system. When the code preset on the decoder matches the code transmitted from the encoder pin 17 goes low for 128ms. If a further match is received within that time, the output stays low for a further 128ms and so on. A total of 4096 different codes are possible making the device suitable for use in alarm control systems, security systems, garage door openers, and remote control. The system is protected against false transmissions because it only switches after receiving four valid codes and each valid one must be received within 64ms of the previous one. The system can be used with rf, ultrasonic or infra-red modulators and demodulators. A Min Res 100k and Ceramic 180pF are required with each chip.

Specification

Supply voltage: 3V to 11V

Receive output: Active low, can sink 2mA

Clock frequency: 100kHz with components shown
f ≈ 2/RC

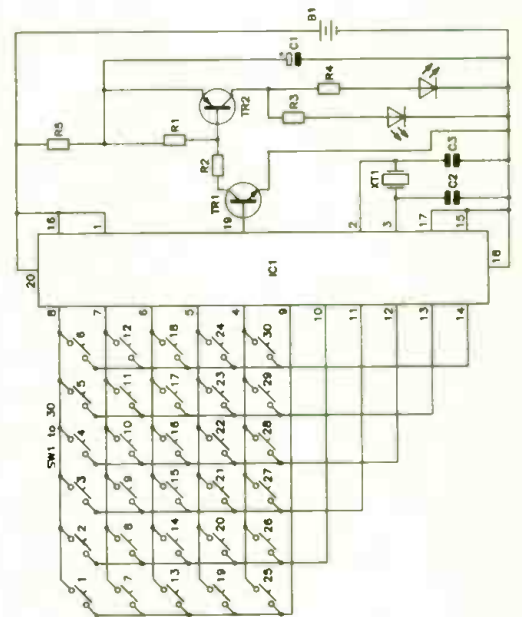
Order

Code	Type	Price each
UK77J	UM3750	£1.75

M708L PCM Remote Control Transmitter

SGS-Thomson

A remote control encoder that can generate 30 different codes and four different addresses. The transmission code has a capacity of 1024 different bit streams, but this IC can only encode 120 of them. Primarily designed for use with the M491B, in which case 30 different codes are used and the address lines locked to address 9 (pin 16 high, pin 17 low). The receiver accepts the decoded command only if the address matches. The complete transmitted code is made up of four address bits and six command bits. Using a 455kHz resonator, the output pulses are about 11µs long and the time between each pulse determines the transmitted code. After operating a key (SW1630) there is a debounce pause of about 27.5ms then a preliminary pulse is transmitted, followed 400µs later by a start pulse and 110µs after that by the first pulse of the address. In the receiver the time between these last two pulses is stored and used as the reference to decode the remaining bits.



Thus the transmitter and receiver do not have to be synchronised allowing the use of cheap master timing components instead of crystals. However the chip can be used in 'carrier' mode by connecting pin 1 to pin 18 instead of pin 20, when a 38.43kHz is transmitted to synchronise the receiver.

The code itself is now transmitted with logic 0's causing a 110µs pause between pulses and logic 1's causing a 220µs pause when they occur in odd numbered positions in the code and a 330µs pause when they occur in even numbered positions in the code. After the tenth pulse, a parity pulse is transmitted 110µs later if the number of 1's transmitted is an even number. There is then a delay of 440µs before there is a stop pulse. Thus when used with the 491 the transmission time can vary between 2.65ms and 3.41ms.

Continued on next page.



BS 5750 Part 2 1987

Level B: Quality Assurance RS12750

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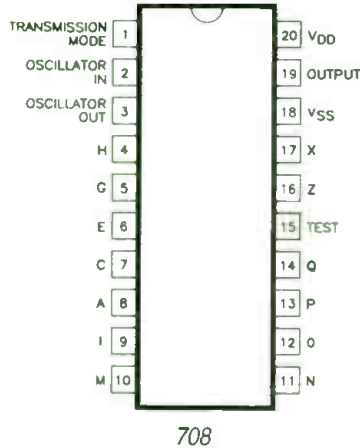


PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

Continued from previous page.

This data stream is transmitted every 112ms whilst the key is held pressed. When it is released there is a delay of 19.8ms and then an end of transmission code is sent which comprises six 0's in the command bits position. This encoding system provides a high degree



of immunity from errors.

Parts List

R1	Min Res 10kΩ	(M10K)
R2	Min Res 2.7kΩ	(M2R7)
R3,4	W/W Min 0.22Ω	(WO.22)
R5	Min Res 33kΩ	(M33R)
C1	Minelect 220µF 10V	(FB60Q)
C2,3	Ceramic 100pF	(WX44X)
XT1	Resonator 455kHz	(UL61R)
TR1	2N2222A	(UH54J)
TR2	BC461	(QB72B)
LED1,2	IR Emitter	(YH70M)
Battery:	2 x 1.5V cells	(FK55K)
SW1 to 30:	Tact Switch	(JR89W)
IC1:	M708L	

Specification (typical)

Supply voltage:	3V (2.2V to 5V)
Output current:	2.5mA max.
Reference frequency:	445kHz to 510kHz
Max. resistance of operated key:	2.5kΩ
Min. resistance of open keys:	2.2M

Order Code	Type	Price each
UL67X	M708L	£6.25

M491BB1 Voltage Synthesis Tuning System

SGS-Thomson

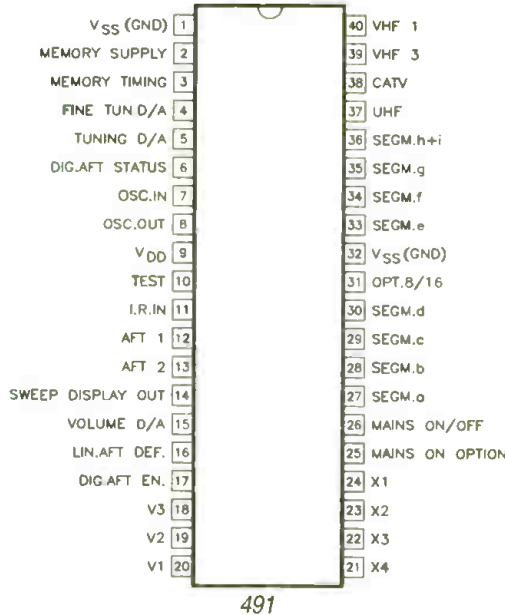
A tuning IC for TV sets that can memorise up to 16 stations in the internal non-volatile memory. The tuning voltage is synthesised by an internal 13-bit (8192-step) D/A converter, and a further 4-bit (16-step) D/A converter for fine tuning. Alternatively this second D/A can be used to control brightness for example. In addition there is a 6-bit D/A converter to control the sound volume. The IC can decode the information transmitted via infra-red from the M708L.

The non-volatile memory has a guaranteed 10-year data retention specification and is 304 bits organised as 16 words of 19 bits each. The IC can directly drive common anode 7-segment LED displays for displaying the station number from 1 to 16. Direct memory addressing is only possible from remote control, but up/down scanning is possible on the IC itself. A typical application is shown in the NICAM receiver project in Maplin Magazine issue 38. Automatic station search is possible with additional circuitry and the memory can be divided into four bands to cover for example Band I, Band III, UHF and CATV which would be required in some countries.

Specification (typical)

Supply voltage:	+5V (4.75 to 5.25V)
Supply current:	<100mA

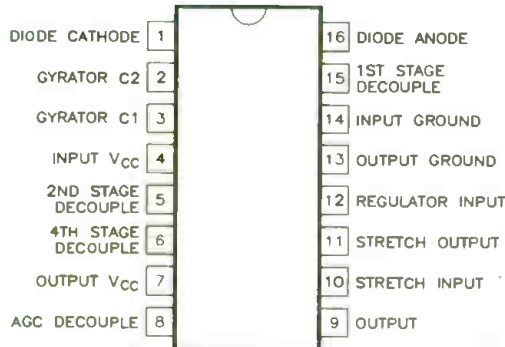
Memory supply voltage:	+25mA (24V to 26V)
Memory supply current:	<12mA average (write) <5mA average (erase) <2.5mA average (read)
IR input:	0.5 V to 13.2Vp-p
Display drive:	15mA at 1.2V pin 36 : 30mA at 1.5V



Order Code	Type	Price each
UL60Q	M491BB1	£9.95

SL486 I/R Remote Control Pre-amp

GEC Plessey



SL486

A high gain preamplifier designed to interface an infra-red receiving diode with the digital input of a remote control receiver. The device contains two other elements, one to provide a stretched output pulse facility, and a voltage regulator to allow operation from a wide range of supply voltage levels.

The receiving diode is simply connected in reversed bias mode between pins 1 and 16, which are provided with common mode input rejection to improve the stability of the device and greatly reduces sensitivity to electrical noise. The diode bias is 'dynamic', a DC feedback loop being employed to find the optimum current according to the ambient light level. Gyrator based filtering is included to provide LF roll-off to keep this loop stable. For the AC (signal) component, AGC is included having a fast initial response time and a long decay, so that immediately I/R pulses are detected the gain is reduced to exclude any weaker noise pulses. This allows data to be received more accurately in noisy environments. The slow decay keeps the AGC level intact during data reception, and provides a delay before any received noise may become present at the output when transmission ceases. The stretched pulse output capability is provided for the benefit of microprocessor based decoder

systems which often require pulse lengths greater than 15µs. Stretched pulse output is taken from pin 11 instead of the normal output pin 9, with a capacitor connected between pins 9 and 10. It is normally high, pulsing low for each received I/R pulse.

The SL486 can be operated from supplies of between 4.5V and 9V directly, connected between input/output ground pins 13 and 14, and input/output supply pins 4 and 7. For supply rails in excess of 9V can be catered for by utilising the on-chip regulator. The main supply (9V minimum) is connected to pin 12, a 6-4V output appears at the output stage supply pin 7.

Specification

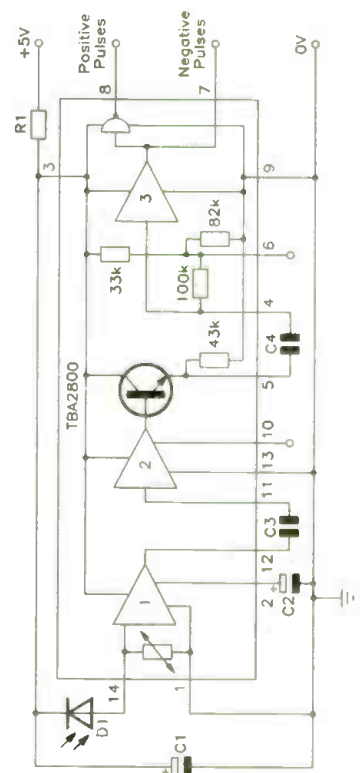
Supply voltage:	4.5V min. to 9.5V max.
Supply current:	6.5 to 8.5mA
Internal regulator voltage:	6.2V typical
Differential input sensitivity:	168nA, I _{DIODE} = 0.5mA, min.
Common mode rejection:	35dB
Maximum signal input:	4mA peak
AGC range:	68dB
Stretched output pulse width:	2.4ms, 10nF between pins 9 & 10.
Output low, pin 9:	0.35mV, 0.2mA sink max.
pin 11:	0.35mV, 1.6mA sink, max.
Output high, pin 9:	V _{CC} -0.5V, 5µA source
pin 11:	V _{CC} -0.1V, 5µA source
Internal output pullups:	55kΩ nominal
Supply ripple rejection:	0.8V peak, pins 13 & 14 grounded

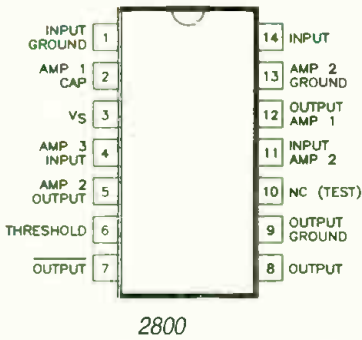
Order Code	Type	Price each
KU71N	SL486DP	£1.99

TBA2800 Infrared Preamplifier

ITT Semiconductor

An infrared preamplifier consisting of a first gain-controlled amplifier featuring a wide dynamic range to ensure interference-free operation even with bright ambient light from the sun or 50Hz lamps including fluorescents. This amplifier can also reject other intense infra-red transmissions, yet is it possible to bring the infra-red transmitter close to the receiver TBA2800 without malfunction from receiver overdrive.





Amplifier 2 provides further amplification, whilst amplifier 3 separates the pulse-shaped signal from any noise and other unwanted signals. A final inverter provides both a positive and negative pulse output for ease of use. A resistor can be inserted between pin 6 and 0V to increase the sensitivity, but the input sensitivity is reduced.

Specification (typical)

Supply voltage: +5V (4.5V to 5.5V)
 Supply current: 1mA
 Gain: >70dB
 Output pins 7 and 8: 1.6mA at 0.4V

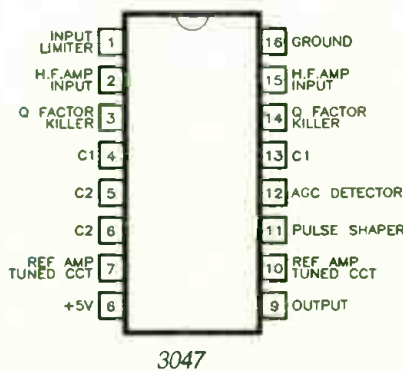
Parts List

R1	Min Res 100Ω	(M100R)
C1	PC Elect 22μF 25V	(FF06G)
C2	PC Elect 2.2μF 100V	(FF02C)
C3	1% Polystyrene 1200pF	(BX57M)
C4	Poly Layer 0.01μF	(WW29G)
D1	Infra-red Photodiode	(YH71N)

Order Code	Type	Price each
JU36P	TBA2800	£3.35

TDA3047/N4 Infrared Receiver

Philips

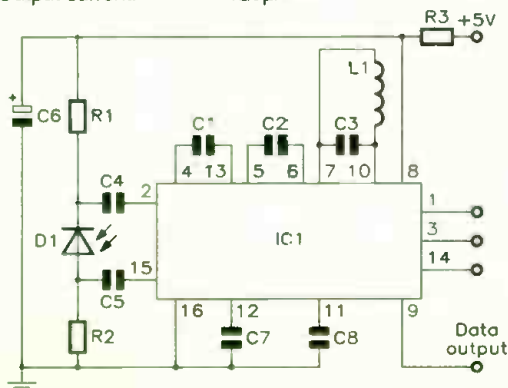


Infrared receiver IC featuring low power consumption and an HF amplifier with 66dB control range. In addition the IC contains a synchronous demodulator and reference amplifier, an AGC detector, pulse shaper, input voltage limiter, and a Q factor killer controlled by the AGC.

The output from pin 9 is active high.

Specification (typical at 25°C, V_s = +5V)

Supply voltage: 4.65 to 5.35V
 Supply current: 2.1mA
 Min input signal: 15μVp-p
 Max input signal: 200mVp-p
 Output current: 120μA



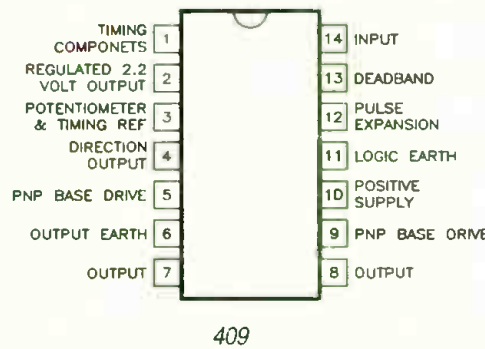
Parts List

R1,2	Min Res 12k	(M12K)
R3	Min Res 22Ω	(M22R)
C1	Poly Layer 0.047μF	(WW37S)
C2,4,5	Poly Layer 0.022μF	(WW33L)
C3	Poly Layer 0.0047μF	(WW26D)
C6	PC Elect 100μF 10V	(FF10L)
C7	Poly Layer 0.022μF	(WW37S)
C8	Poly Layer 0.0068μF	(WW27E)
L1	Choke 4.7mH	(UK80B)
D1	Photodiode 357PD	(YH71N)
IC1	TDA3047	(UL25C)

Order Code	Type	Price each
UL25C	TDA3047-N4	£2.20

ZN409CE Precision Servo

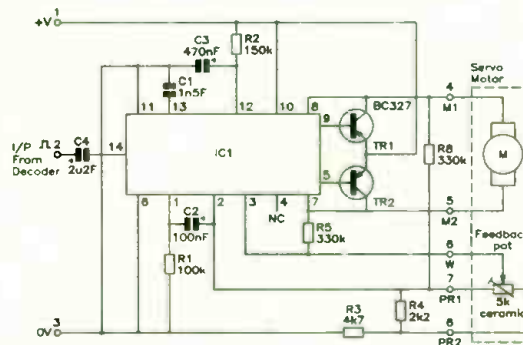
GEC-Plessey



Designed for use in pulse-width position servo mechanisms, its low power consumption and low number of external components make it ideal for use in model aircraft, boats and cars where space, weight and battery life are at a premium. The IC can also be used for motor speed control and has additional circuitry which performs the motor reversing function.

Parts List

R1	Min Res 100k	(M100K)
R2	Min Res 150k	(M150K)
R3	Min Res 4k7	(M4K7)
R4	Min Res 2k2	(M2K2)
R5,6	Min Res 330k	(M330K)
C1	Ceramic 1500pF	(WX70M)
C2	Tantalum 0.1μF 35V	(WW54J)
C3	Tantalum 0.47μF 35V	(WW58N)
C4	Tantalum 2.2μF 35V	(WW62S)
TR1,2	BC327	(QB66W)
IC1	ZN409CE	(YH92A)
1pk	Pins 2145	(FL24B)



Specification

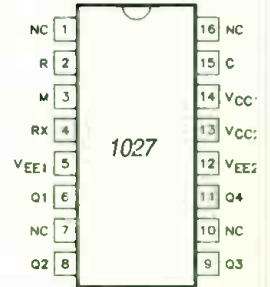
Supply voltage: 3.5V min, 6.5V max.
 Supply current: 6.7mA typical quiescent
 Input resistance: 27kΩ typical
 Input current: 500μA typical
 Regulator voltage: 2.2V typical with 1.3mA load current
 PNP drive: 55mA typical at 25°C

Order Code	Type	Price each
YH92A	ZN409CE	£1.68

SAA1027 Stepper Motor Driver

Philips

A 16-pin IC designed to drive 4-phase unipolar stepping motors. The IC has a bi-directional 4-state counter, and a code converter so that the four outputs switch in the right order. Supply voltage 9.5V to 18V (typically 4.5mA at 12V). Output current possible is 350mA per output (500mA absolute max. at 25°C).



The motor will run clockwise when pin 3 is low (<4.5V), and counter-clockwise when pin 3 is high (>7.5V). The motor will step once for each low to high transition on pin 15. Pin 2 should be connected to pin 13 unless a reset function is required. Taking pin 2 low sets output

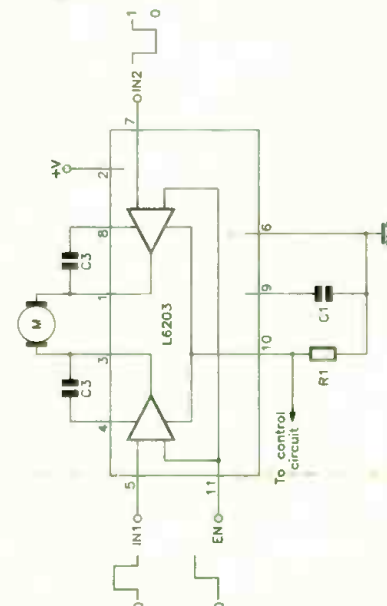
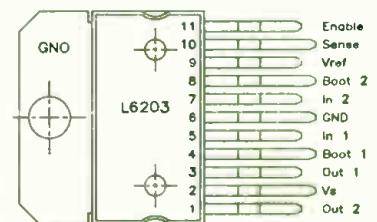
Order Code	Type	Price each
QY76H	SAA1027	£5.75

L6203 DMOS Full Bridge Driver

SGS-Thomson

An 11-pin flat package IC with mixed bipolar, CMOS and DMOS technology. The IC can deliver 3A output current at supply voltages up to 52V with very high efficiency and fast switching speed. Each side of the bridge is controlled by a separate logic input, while a common enable input controls both sides. All inputs are TTL and CMOS compatible. The motor current can be controlled from pin 10. The other input pins control the motor according to the following table:

Pin	11	5	7	Function
1	1	0	0	Turn right
1	0	1	1	Turn left
1	1	1	1	Fast motor stop
1	0	0	0	Fast motor stop
0	1	1	1	Free running motor stop
0	0	0	0	Free running motor stop
0	1	0	0	No function



Continued on next page.

Continued from previous page.

Specification

Supply voltage:	12V to 52V
Reference voltage:	10.5V
Quiescent supply voltage:	7mA
$R_{DS\ on}$:	0.3 Ω
Saturation voltage at 1A:	0.3V
at 3A:	0.9V
Commutation frequency:	50kHz

Parts List

R1	WW Min 0.22 Ω	(W22R)
C1	Minidisc 0.1 μ F	(YR75S)
C2,3	HV Disc 10,000pF	(BX15R)

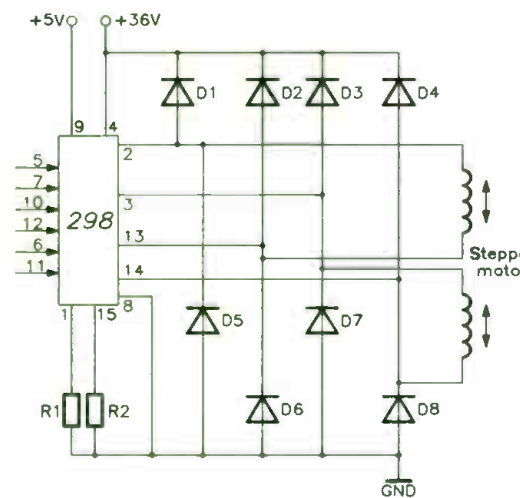
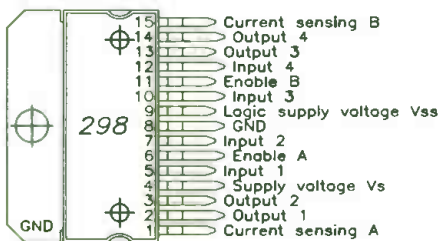
Order

Code	Type	Price each
UK70M	L6203	£7.99

L298N Dual Full Bridge Driver

SGS-Thomson

A 15-lead flat package IC designed to accept TTL logic levels and drive inductive loads such as relays, solenoids, DC motors and stepping motors. Two inhibit inputs are provided to disable the device independently of the input signals.



Specification

Pin 4 supply voltage:	7.5V to 46V
Pin 9 supply voltage:	5V (7V max)
Quiescent supply current pin 4:	15mA
pin 9:	5mA
Source saturation voltage at 1A:	1.2V
at 2A:	1.8V
Sink saturation voltage at 1A:	1.2V
at 2A:	1.7V
Total drop at 1A:	<3.4V
at 2A:	<5.2V
Commutation frequency:	25kHz

Parts List

R1,2	WW Min 0.47 Ω	(W47R)
R3	Min Res 22k	(M22K)
C1	Polystyrene 3300pF	(BX31J)
D1-8	BYW98-150	(UK65V)

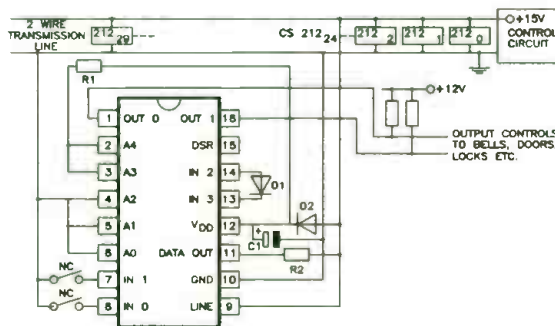
Order

Code	Type	Price each
UK72P	L298N	£6.15

CS212 Security Detector

Cherry Semiconductor

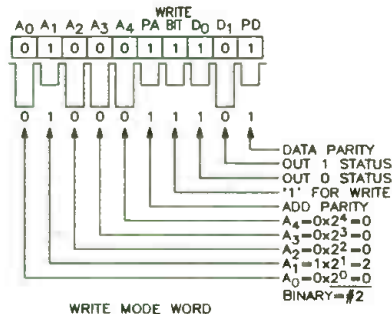
A 16-pin IC designed for data transmission over a simple 2-wire circuit. The IC is particularly suited to alarm systems but could have other applications. Up to 30 IC's can be used on one circuit and any one can look after two detectors (magnetic sensors, smoke alarms, movement detectors, pressure mats etc.) or one detector and its anti-tamper loop (or the loop could be a window foil etc.) Thus between 30 and 60 detectors are possible on one circuit. Each IC also has two outputs which (via relays etc) can operate the main alarm bell or siren, or door locks and so on. The controller must supply 15V to the circuit and the total maximum current which a full complement of 212's would draw from the circuit at any one time is about 20mA. The resistance of the line (which could



be very long) must be taken into account and the IC's will function correctly from line voltages between 18V and 10V, which effectively sets the line length limit. Each IC on one circuit must have its pins 2 to 6 connected differently from every other IC in the range 0 to 29. Pin 2 is binary 16 down to pin 6 which is binary 1. Used pins (for example if IC is 24th in the chain then pins 2 and 3) should be connected via a 10k resistor (R1) to the positive side of the circuit and all unused address pins must be connected to the ground side of the circuit.

If the IC is being used to look after two sensors, then they should be connected between pin 7 and ground and pin 8 and ground. Sensors can be normally open or normally closed provided the control circuit can interpret the returned data correctly. If pin 7 is being used then pins 13 and 14 should be left open circuit. If the anti-tamper loop is being used then pin 7 should be connected to pin 9 and the anti-tamper loop connected in parallel with a diode (D1) if loop normally open, or in series with D1 if loop normally closed. Note that the IC must be close to the detector and particularly the anti-tamper wires must be short.

The two outputs pins 1 and 16 can also be controlled from the control circuit giving a maximum possibility of 60 outputs from a fully equipped loop. In security applications they could be used to set off the main bell, open door locks or whatever.

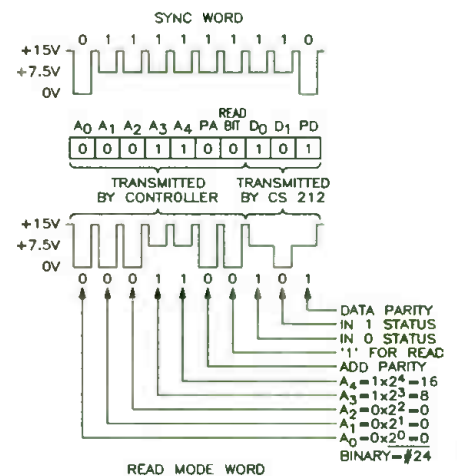


These items will need a power source to run them. Pin 15 could be used in conjunction with the outputs so that up to four possible functions could be implemented depending on the state of the two outputs. Pin 15 provides a strobe pulse in turn when each output is updated and it too can sink about 1mA. All three pins are Darlington type open collector outputs.

Data is transmitted over the line by pulling the voltage down to half rail (7.5V) to indicate a logic 1 and to 0V to indicate a logic 0. The controller must first send a

synchronisation word which consists of ten bits, a 0 followed by eight 1's followed by a 0. The clock rate can be anything up to 20kHz. The next five bits transmitted by the controller are the address bits, with the least significant bit first. The IC whose code on its pins 2 to 6 matches the received address now becomes active. The next bit sent by the controller is a parity bit. Odd numbered IC's expect to see a 1, even numbered IC's expect to see a 0. If the seventh bit transmitted by the controller is a 0 (read mode) then the IC reads the conditions on its pins 7,8,13 and 14. After transmitting this seventh bit, the controller must pull the line down to 7.5V and hold it there for three cycles.

The active 212 now transmits to the controller during these three cycles. If the 212 pulls the line down to 0V the controller interprets this as a 0 and if there is no change on the line, this indicates a 1. The first bit transmitted by the 212 will be a 1 if pin 8 is open circuit and a 0 if pin 8 is connected to ground. The second bit transmitted will be a 1 if pin 7 is open or connected to pin 9 and the anti-tamper loop is open or short circuit, and a 0 if pin 7 is grounded or there is a diode between pins 13 and 14. The third bit is a parity bit which is a 1 if either of the preceding two bits were 1 or a 0 if both were 1 or both were 0. If the 212 had received an incorrect parity bit at bit 6 it would not read its input lines and transmit three 1's during its three cycle transmission slot. Thus if two 212's switch together, the controller simply will not see the incorrect one, but if only one switched, the controller must interpret the three 1's (i.e. no response) as a fault and repeat the address after a synchronisation word. The system is thus tolerant to a one bit fault in any address or data transmission.

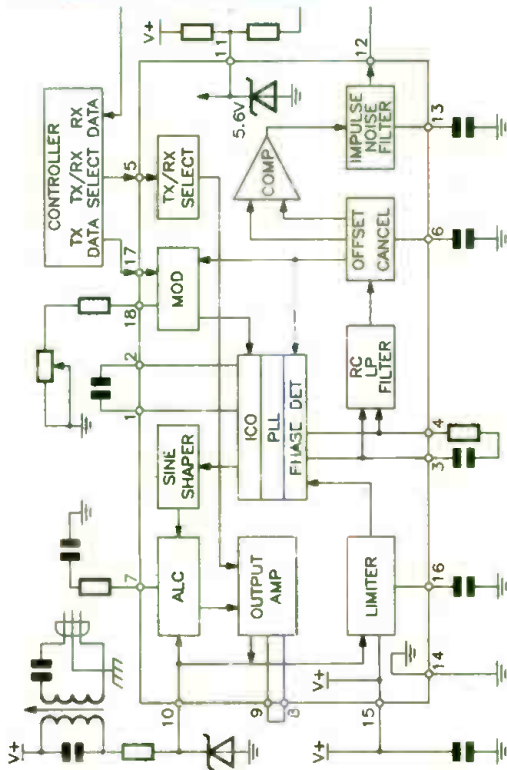


After the three cycle slot for the 212, the controller must pull the voltage back up to 15V and then send a synchronisation word and then continue as before. If the controller wishes to talk to the outputs of a particular 212, then it must send a 1 as its seventh bit (write mode). If the 212 activated by the preceding address in bits 1 to 5 of this word, sees a 1 in bit 7 and assuming the parity bit 6 was correct, it prepares to accept three more bits from the controller. The first of these bits will turn pin 1 on if it is a 1 (or off if it's a 0) and the second controls pin 16 in the same way. The third bit again is a parity bit, 1 if either of the preceding two bits were 1, and 0 if both were 1 or both were 0. If the 212 detects a wrong parity at any time, it will not update pins 1 or 16 and it will not be possible to activate it again until it has received a signal with correct parity in bit 6 and a 0 in bit 7. After a few retries, the fault should be interpreted as an alarm condition as it may mean the line has been cut. The IC will function correctly from line voltages up to 28V during fault conditions.

Order

Code	Type	Price each
UH60Q	CS212	£5.49

LM1893N Mains Carrier Transceiver National Semiconductor



A chip designed to transfer data over the mains between remote locations within one site on the same phase. The chip performs as a power line interface for half duplex (bi-directional) communication of serial bit stream. In transmission mode a sinusoidal carrier is FSK modulated and impressed on almost any power line via a rugged on-chip driver. In reception mode a PLL-based demodulator and impulse noise filter combine to give maximum range. Data speeds up to 4800 baud are possible with carrier frequencies in the range 50 to 300kHz. A full data sheet is available.

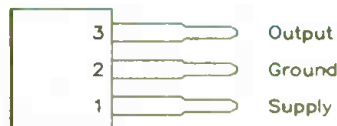
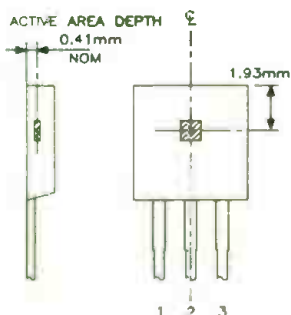
Order Code	Type	Price each
UF50E	LM1893N	£6.99

SUBSECTION 64 SENSOR IC's

UGN3503U Ratiometric Linear Hall Effect Sensors

Allegro

A Hall effect sensor which accurately tracks extremely small changes in magnetic flux density, changes generally too small to operate Hall effect switches. As a motion detector, gear tooth sensor and proximity detector, it is a magnetically driven mirror of mechanical events. It can effectively measure a system's performance with negligible system loading while providing isolation from contaminated and electrically noisy environments. The device contains a Hall sensing element, linear amplifier and emitter follower output stage. Problems associated with handling tiny analogue signals are minimised by having the Hall cell and amplifier on the same chip.



Specification
Supply voltage range: 4.5 to 6V (8V absolute max.)
Magnetic flux density: Unlimited
System frequency response: Flat to 23kHz
Operating temperature range: -20°C to +85°C

Order Code	Type	Price each
GX09K	UGN3503U	96p

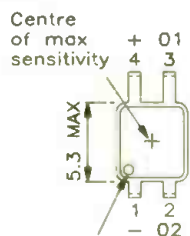
634SS2 Linear Output Hall-Effect Device

A 4-lead IC whose output voltage varies in response to a change in magnetic flux in a linear fashion. The IC has two outputs, one of which increases in voltage with increasing gauss and one of which decreases in voltage with increasing gauss. The sensitivity is fairly



linear over the range -400 to +400 gauss at between 0.75mV to 1.06mV per gauss, but non linear outside this range as shown in the table.

Note that positive gauss represents the South pole of the magnet facing the sensing area and negative gauss represents the North pole of the magnet facing the sensing area.



Terminal identification mark

Field Intensity (Gauss)	Output voltage (Volts) at 25°C			
	V _s = 5V		V _s = 7V	
	O/P1	O/P2	O/P1	O/P2
+1000	2.84	1.14	4.4	1.9
+800	2.66	1.34	4.15	2.15
+600	2.47	1.52	3.9	2.4
+400	2.28	1.72	3.6	2.65
+200	2.10	1.91	3.25	2.95
0	1.92	2.10	2.9	3.3
-200	1.74	2.28	2.6	3.6
-400	1.55	2.48	2.2	3.9
-600	1.35	2.66	1.9	4.2
-800	1.15	2.84	1.7	4.4
-1000	0.94	3.04	1.65	4.5

Field Intensity (Gauss)	Output voltage (Volts) at 25°C	
	V _s = 10V	
	O/P1	O/P2
+1000	6.5	3.15
+800	6.4	3.25
+600	6.1	3.6
+400	5.6	4.0
+200	5.05	4.5
0	4.45	5.0
-200	3.9	5.6
-400	3.25	6.15
-600	3.1	6.3
-800	3.1	6.3
-1000	3.05	6.35

Terminal Designations

Pin 1: 0V; Pin 2: output 2; Pin 3: output 1; Pin 4, +4V to +10V.

Characteristics

Supply voltage range: 4V to 10V
Supply current: 3.5mA
Recommended load: 2kΩ

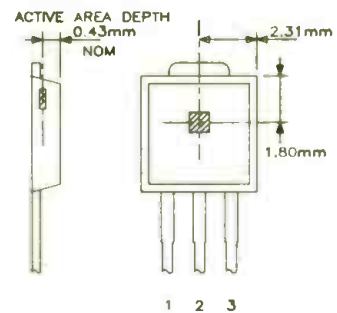
Order

Code	Type	Price each
QR55K	634SS2	£13.99

UGN3132U/UGN3133U Ultra-Sensitivity Bipolar Hall Effect Switches

Allegro

These Hall effect switches are designed for magnetic actuation using a bipolar magnetic field, i.e., a north-south alternating field. They combine extreme magnetic sensitivity with excellent stability over varying temperatures and supply voltages. The high sensitivity permits their use with multipole ring magnets over relatively large distances. Each device includes a voltage regulator, reversed supply protection, quadratic Hall voltage generator, temperature stability circuit, signal amplifier, Schmitt trigger and open-collector output on a single chip. The on-chip regulator permits operation with supply voltages of 4.5 to 24V. The switch output can sink up to 25mA. With suitable output pull-up, they can be used directly with TTL or MOS logic.



Specification

Supply voltage range: 4.5 to 24V DC
Output on saturation voltage: 145mV @ 20mA
Output off leakage current: <1µA
Supply current: 4.3mA @ 24V
Output risetime: 0.04µs (V_{CC} = 12V, R_L = 820Ω)

Magnetic characteristics

Operate point: 32G, 95 max. 3132, 75 max. 3133
Release point: -20G, 95 min. 3132, 75 min. 3133

Order

Code	Type	Price each
GX07H	UGN3132U	£1.99
GX50E	UGN3133U	£1.65

MAPLIN KEY CALL

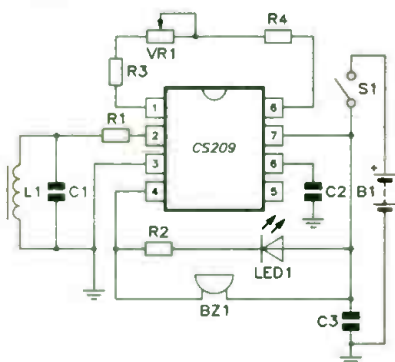
Phone 01702 556751

CS209A Proximity Detector

Cherry Semiconductor

An electro-magnetic proximity sensor IC which could be used to detect metal pipes, nails, conduit etc. in walls, floors etc. The IC contains an on-chip regulated supply, oscillator, demodulator, level detector and output stages. The oscillator with its external LC network, provides controlled oscillations where the amplitude is highly dependent on the Q of the LC network. During low Q conditions, a variable low-level feedback is applied to maintain oscillation. The peak demodulator detects the negative portion of the oscillator envelope and the demodulated waveform is then compared to an internal reference by the level detector. Two outputs are provided, one normally high (pin 4) and one normally low (pin 5) both of which can supply up to about 120mA.

In the circuit shown, if the search coil is passed over a wall surface, nails or screws under the surface change the Q of the coil and the device detects this and lights the LED and sounds the buzzer. To set up, adjust VR1 till the LED is on when the coil is clear of any metal objects. Now back off VR1 until the LED is just extinguished. Repeat the adjustment until metal moved toward and away from the coil does not cause the LED to lock on.



Parts List

R1	Min Res 220Ω	(M220R)
R2	Min Res 750Ω	(M750R)
R3,4	Min Res 4k7	(M4K7)
VR1	18-turn Cermet 10k	(WR49D)
C1	Monores Cap 2200pF	(RA40T)
C2	Ceramic 2200pF	(WX72P)
C3	Minidisc 0.01μF	(BX00A)
L1	Choke 100μH	(JC25C)
LED1	Red LED	(WL27E)
BZ1	Min Piezo Sounder	(JH24B)
S1	Push Switch	(FH59P)
B1	PP3 Battery	(JY60Q)

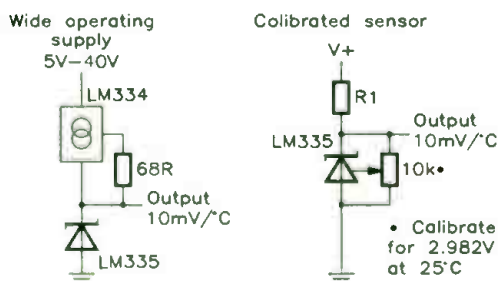
The IC requires a 4V to 24V power supply and draws about 4.5mA

Order Code	Type	Price each
UH59P	CS209A	£1.90

LM35Z Precision Temperature Sensor

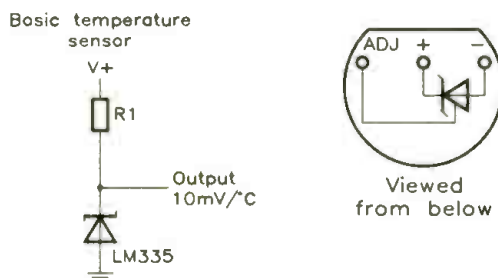
SGS-Thomson

An easily calibrated, precision temperature sensor whose operation is similar to a zener diode. The device has a breakdown voltage directly proportional to absolute temperature and has a linear output equal to 10mV/°C. The device operates over a current range of 400μA to 5mA (1mA recommended) and even when uncalibrated has a typical temperature error of only 2°C over its operating range. When calibrated the error is 1°C.



Characteristics

Output voltage at 25°C:	2.98V
Dynamic impedance:	0.6Ω
Time constant in still air:	80 secs
in 100ft/min air:	10 secs
in stirred oil:	1 sec
Operating range:	-10°C to 100°C extending to 125°C intermittently.

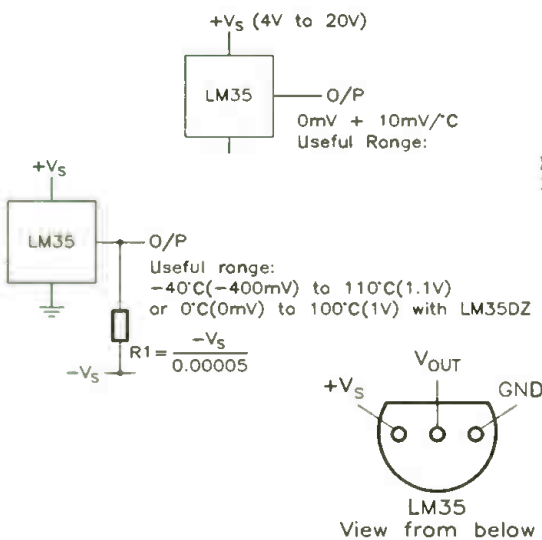


Order Code	Type	Price each
YY73Q	LM335Z	£1.49

LM35 Precision Centigrade Temperature Sensors

National Semiconductor

Precision integrated circuits whose output voltage is linearly proportional to the Centigrade temperature. The advantage over the LM35Z is that it is not necessary to subtract a large constant voltage from the output to obtain the Centigrade scale. The chip does not require any external calibration to achieve accuracies of ±4/10 °C at room temperature and ±8/10 °C over full temperature range. The device draws only 56μA from voltage supplies in the range 4V to 30V so it has very low self-heating <0.1°C in still air. The LM35CZ will operate in the range -40°C to +110°C whilst the LM35DZ operates in the range 0°C to 100°C.



Characteristics (typical)

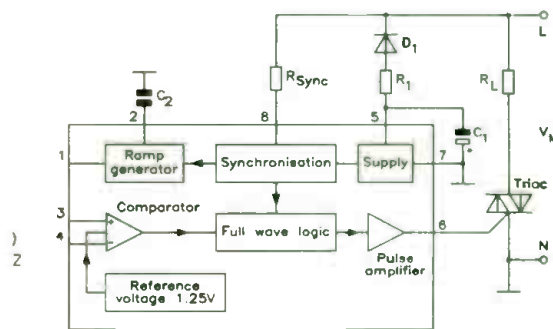
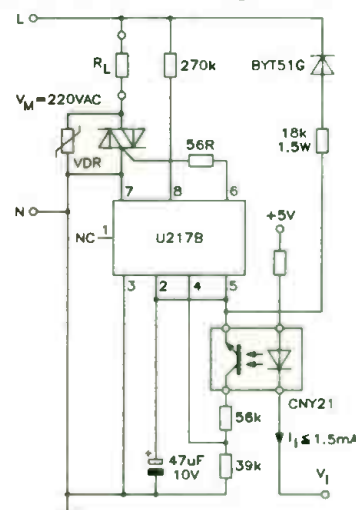
Accuracy at +25°C	±0.4°C (CZ), ±0.6°C (DZ)
-40°C to +110°C	±0.8°C (CZ) ±0.9°C (DZ)
0°C to +100°C	±0.9°C (DZ)
Non-linearity	0.2°C
Sensor slope	+10mV/°C
Load regulation	0.4mV/mA
Line regulation	0.01mV/mA
Quiescent current	56μA at V _s = 5V 56.2μA at V _s = 30V
Temperature co-efficient of quiescent current	+0.39μA/°C
Output impedance	0.1μ with 1mA load

Order Code	Type	Price each
UF51F	LM35CZ	£5.99
UF52G	LM35DZ	£3.49

U217B Temperature Controller

Telefunken

A triac controller for switching resistive loads directly from the mains supply using the zero crossing technique. The device is powered directly from the mains via a diode and dropper resistor, and the IC has its own regulator to limit its supply to 9.25V. To ensure that no switching occurs outside of the zero crossing point, full-wave logic is employed to guarantee that complete mains cycles only are switched to the load. A ramp generator with a freely selectable ramp duration (as determined by a timing capacitor), together with the full-wave logic block, synchronised to the AC supply at pin 8 via a dropper resistor (R_{sync}). The ramp generator not only provides symmetrical trigger pulse control by itself but can have proportional offsets added to it by additional external components, for example for temperature control with monitoring thermistor.



To obtain a 'flicker-free' output, the ramp duration is adjusted according to the load control required. In practice interference generation should be avoided for temperature control applications, therefore in such cases a straight on-off control is preferred to proportional control. The internal reference voltage can be used instead of the ramp generator output for simple applications. The value of R_{sync} controls the trigger pulse width to a large extent; the higher the value the greater the width. This should be chosen according to the TRIAC used.

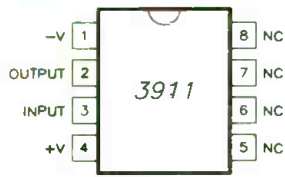
Specification

Supply voltage (pin 5):	Limited to 9.25V nominal
Supply current drawn:	500μA
Supply current input:	30mA absolute max.
Sync. current input (pin 8):	0.12mA min., 5mA absolute max.
Ramp generator output current (pin 1):	3mA max.
Ramp generator charge current (pin 2):	17μA nominal
Maximum power dissipation:	400mW @ 45°C

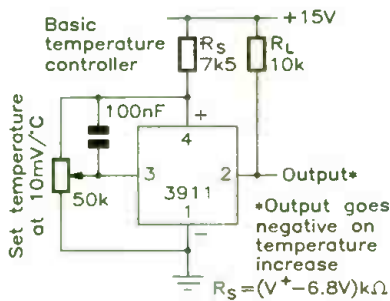
Order Code	Type	Price each
AH39N	U217B	£1.49

LM3911N Temperature Controller

National Semiconductor



This IC is a highly accurate temperature measurement and/or control system having a temperature sensor, stable voltage reference and an op-amp all on the chip. The output voltage is directly proportional to the temperature at the rate of 10mV/°C. Using the op-amp with external resistors, any temperature scale factor is easily obtained. By connecting the op-amp as a comparator, the output will switch as the temperature transverses the set-point making the device useful as an on/off temperature controller.

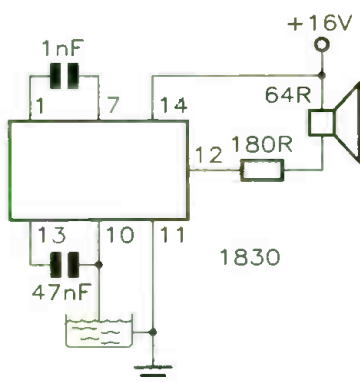
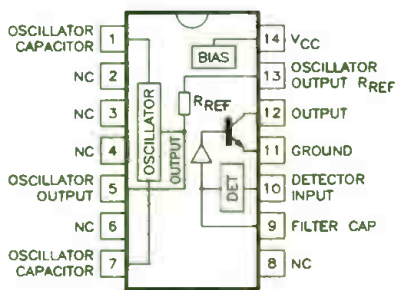


Order Code	Type	Price each
WQ40T	LM3911N	£1.99

LM1830N Fluid Level Detector

National Semiconductor

The IC is ideal for detecting the presence, absence or level of water or other conducting liquids. A detector determines the presence or absence of fluid by comparing the resistance of the fluid with the IC's internal reference resistance. An AC signal is used to prevent plating of the probe. When the probe resistance increases the loudspeaker will emit a 500Hz tone. Alternatively an LED could be connected.



Supply voltage range: +9V to +25V
 Supply current: 5.5mA (at 16V)
 Output sink current: 20mA max
 Internal ref resistor: 13kΩ

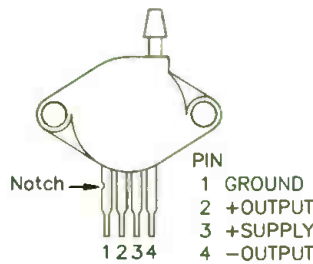
Order Code	Type	Price each
YY99H	LM1830N	£4.49

MPX100AP Pressure Sensor

Motorola

A low-cost silicon piezoresistive pressure sensor providing a very accurate and linear voltage output, directly proportional to the applied pressure. The unit has a built-in reference vacuum of approximately 0kPa. The output voltage increases with increasing pressure relative to ambient pressure (approx 100kPa) applied to the pressure side. Care should be taken to limit positive pressure to about 300kPa relative to ambient so that the total differential overpressure range of 400kPa is not exceeded. Conversely the output voltage will decrease as vacuum, relative to ambient, is drawn. Vacuum down to the 0kPa reference can be measured.

Note: 1kPa = 0.145 PSI.



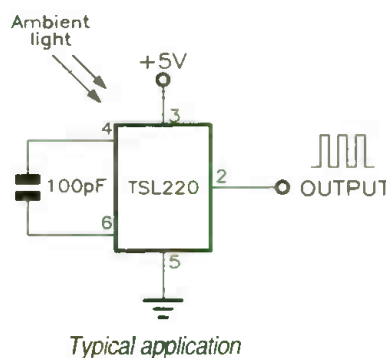
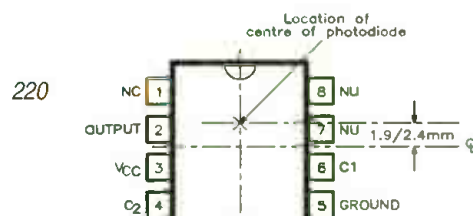
Characteristics

Supply voltage: 3V (6V max)
 Supply current: 6mA
 Full scale span: 60mV
 Zero pressure offset: 20mV
 Sensitivity: 0.6mV/kPa
 Linearity: ±0.05% of full scale
 Range: 0 to 100kPa
 Temperature hysteresis: ±0.5% of full scale
 Temperature coefficient of full scale span: -0.19%/°C
 Temperature coefficient of offset: ±15µV/°C
 Temperature coefficient of resistance: 0.24%/°C
 Input resistance: 400 to 550Ω
 Response time: 1ms (10% to 90%)

Order Code	Type	Price each
UH37S	MPX100AP	£17.49

TSL220 Light to Frequency Converter

Texas Instruments



A large area (4.13mm²) photodiode and current to frequency converter combined in a clear plastic 8-pin DIP package. The output is a pulse train whose

frequency is directly proportional to the light intensity. The output is CMOS compatible (use a 3k3 pulldown resistor to drive LS TTL) and the frequency can be measured by pulse counting, period timing, or integration techniques. The photodiode has a wide dynamic range, high sensitivity and high noise immunity. The output frequency range is determined by a capacitor in the range 10pF to 100µF, which permits the output frequency to fall within some suitable range for any given light intensity.

Specification (typical at V_s = 5V, 25°C)

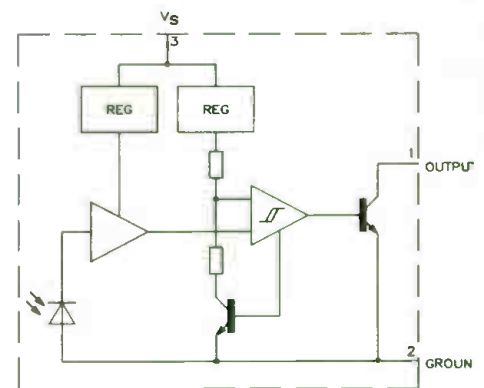
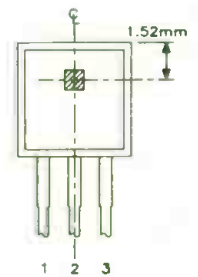
Supply voltage: 4V to 10V
 Max output frequency: 750kHz
 Operating temperature: -25°C to +70°C
 Peak output voltage: 4V (50kΩ load)
 Supply current: 7.5mA (when dark)
 Output frequency
 125µW/cm² (880nm), C=100pF: 50kHz (min), 150kHz (typical), 250kHz (max)
 no light, C = 100pF: 0Hz (min), 1Hz (typical), 50Hz (max)
 Output pulse duration: 1µs (C = 470pF)
 Output pulse rise time: 20ns (C = 100pF)
 Output pulse fall time: 120ns (C = 100pF)

Order Code	Type	Price each
CP93B	TSL220	£5.40

ULN3390T Twilight Switch

Allegro Microsystems

An optoelectronic switch specially designed for outdoor and emergency lighting. The output transistor turns on when illumination falls below 10µW/cm² at 880nm, and off again when illumination exceeds 20µW/cm². The special design includes temperature compensated trip points, protection against damage from direct sunlight and hysteresis suitable for outdoor lighting. It is more stable over time than cadmium sulphide cells, requires fewer components and has calibrated switching characteristics.



Specification (typical at V_s = 6V, 25°C)

Supply voltage: 4V to 16V
 Supply current: 3mA (output off)
 Saturation voltage: 300mV (I_{OUT} = 15mA)
 Output leakage current: 0.1µA
 Turn on threshold level: 10µW/cm²
 Turn off threshold level: 20µW/cm²

Order Code	Type	Price each
CP94C	ULN3390T	£1.20

SUBSECTION 65 DISPLAY DRIVER IC'S

ST6240 LCD Display Starter Kit

SGS-Thomson

The ST6240 Starter Kit can be used for evaluation, simulation and emulation and experimental purposes to demonstrate or develop applications for the ST62E40 microcontroller.

The ST62E40 is a member of the 8-bit HCMOS ST62xx family, a series of devices oriented to low or medium complexity applications. This is an EPROM version of the basic ST6240 ROM device and is suitable for product prototyping, low volume production and one-offs. The microcontroller is based on a building-block approach, a common core is associated with a combination of on-chip peripherals (macro-cells). The macro-cells of the ST6240 include a high performance LCD controller/driver with 45 segment outputs and 4 backplanes, able to drive up to 180 segments. Also included are two timers each including an 8-bit counter with a 7-bit software programmable prescaler, a digital watchdog timer, an 8-bit A/D converter with up to 12 analogue inputs, a power supply supervisor and an 8-bit synchronous serial peripheral interface. In addition 128 bytes of EEPROM is included for the storage of non-volatile data. Thanks to these many features the ST6240 is well suited to general purpose, automotive, security, appliance and industrial applications.

The ST62E40 has 8192 EPROM program memory, all of which is available to the user and which is ultra-violet erasable via the encapsulation top window. An additional mode is used to configure the chip for programming of the EPROM, set by applying +12.5V to the TEST/V_{pp} pin.

In use it is only necessary to connect the supply to the Starter Kit board and load the demonstration software provided with the kit into the ST62E40 sample provided; LCD and keypad interfacing can be immediately seen.

The same board can be used as a hardware interface to the software simulator when connected to a PC, allowing display values from the simulator to be displayed directly on the LCD. Analogue or digital values from the ST62E40 I/O pins can also be loaded directly to the simulator.

Once the program is successfully simulated, it can be loaded into the ST62E40 sample via the on-board programmer. The application environment can be connected to the Starter Kit via the I/O connector to perform a full evaluation of the user application. In addition, since the LCD is connected to the PCB via a socket, it can easily be removed and replaced by a customised LCD.

The ST62E40 microcontroller comes in an 80-pin, QFP (Quad Faced Plastic) surface mount encapsulation (QFP80) and these packages are difficult to handle manually, so an in-circuit programming facility is provided with the kit to enable programming, via the Starter Kit board, of any ST62Exx (EPROM) or ST62T4xx (OTP - One Time Programming) already soldered into an application board.

The kit PCB includes a QFP80 socket, a 16-key keyboard, a 32 segment x 4 LCD, an ST62E40 microcontroller chip and connecting cables for a host PC etc., and a power supply for operation from the UK mains. Pins are available for direct connection to an application circuit. The board is connected to the PC via the PC's parallel port.

The software is provided on a diskette and includes an enhanced simulator including control of the external LCD display and I/O read/write, an assembler, linker, debugger, EPROM/OTP ST6 programming facilities and demonstration examples. A full set of documentation is provided with the kit and includes the ST62 LCD drive data book, a kit guide and the ST62/63 Software Development Tools

user manual.

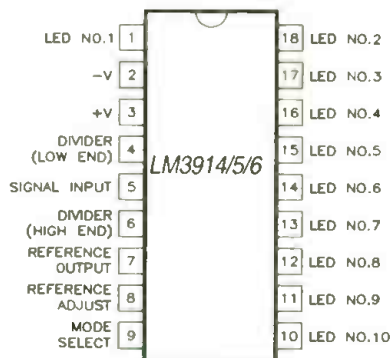
To operate the Starter Kit you will also need an IBM PC AT or compatible with a hard disk and 5¹/₄in. floppy drive, 640K of conventional memory, one parallel centronics port and MS-DOS version 3.10 or higher.

Order Code	Type	Price each
AH69A C	ST6240-Kit/UK	£293.75

LM3914/5/6N Bargraph Displays

National Semiconductor

An LED driver that will sequentially light ten LED's when a gradually increasing voltage is applied to pin 5, (dot mode) or in bar mode all LED's indicating voltages below input are lit. In dot mode there is a slight overlap so that at no point are all LED's extinguished. A brightness control will set LED current between 2mA and 30mA. The drivers are stackable and displays with 100 or more LED's are possible. Supply voltage 3V to 18V. The driver that sets the indication points can be referenced to a wide range of voltages.



Three different chips are available:

LM3914:	linear steps
LM3915:	3dB steps (logarithmic scale)
LM3916:	VU scale (e.g. -10dB, -7dB, -5dB, -3dB, -1dB, 0dB, 1dB, 2dB, 3dB)

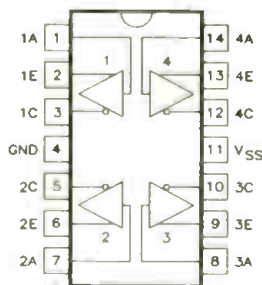
A pcb is available for use with these IC's and information on how to construct and set up this pcb along with circuits and applications can be found in the Maplin Best of Projects Book 4. See end of Projects and Modules section for details.

Order Code	Type	Price each
WQ41U	LM3914N	£3.79
YY96E	LM3915N	£3.79
YY97F	LM3916N	£3.79
YQ66W	LM3914 PCB	£1.28

DS75491N MOS to LED Driver

National Semiconductor

Four independent drivers designed to interface low current MOS outputs to LED's. Each output has up to 50mA source or sink capability.



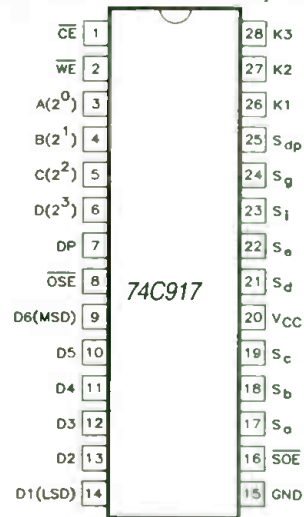
Characteristics (typical)		
Supply voltage	10V max	
Input voltage range	-5V to V _{SS}	
Input current	2.2mA	
Supply current	<1mA	75491

Order Code	Type	Price each
UF53H	DS75491N	88p

74C917 6-Digit Hex Display

National Semiconductor

A display controller interface element with memory that will directly drive six 8-segment LED displays (i.e. 7-segment and decimal point). The controller receives data information through 5 data inputs (A, B, C, D and DP) and digit information through 3 address inputs (K1, K2, K3). The input data is written into the register selected by the address information when "chip enable" (CE) and "write enable" (WE) are low and is latched when either (CE) or (WE) go high again. A self-contained oscillator sequentially presents the stored data to a decoder where four data bits control the displayed character and one bit controls the decimal point. The oscillator is normally operational and tied low (OSE), but at high level this input prevents the automatic refresh of the display. Segment outputs have up to 100mA capability and digit outputs have up to 20mA capability. Use three of our 2-digit common cathode displays with seven Min Res 68Ω in series with IC pins 17 to 19 and 21 to 25 for direct drive. The digit outputs (pins 9 to 14) require a BC337 connected to each; base to IC; collector to display; and emitters commoned to ground. The drivers are active when output enable (SOE) is low, and high impedance when SOE is high. This feature enables a brightness control to be used. Normally SOE and OSE are tied to ground. All inputs are TTL compatible and nominal supply voltage is 5V at 0.5mA with output off (SOE high). The registers are addressed like ordinary RAM.



Order Code	Type	Price each
YH30H	74C917	£19.99

74C925 4-Digit Counter Driver

National Semiconductor

A 4-digit counter with 7-segment multiplexed outputs capable of driving a 4-digit common cathode display. The multiplexing circuit has its own free-running oscillator and requires no external clock. The counters advance on the negative edge of the clock applied to pin 11. A high signal on pin 12 will reset the counter to zero. A low signal on pin 5 will latch the number in the counters into the internal output latches.

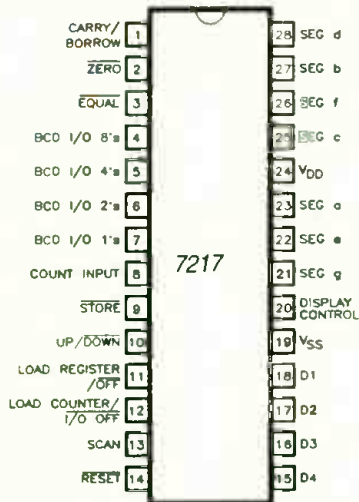
Characteristics (typical at 25°C)

Supply voltage pin 16:	5V (3V min, 6V max)
Supply current:	20μA
Max input frequency:	4MHz
Multiplex frequency:	1kHz
Logical '1' input voltage:	3.5V min
Absolute max:	15V
Logical '0' input voltage:	1.5V max
Logical '1' input current:	5nA
Logical '0' input current:	-5nA

Order Code	Type	Price each
QY08J	74C925	£19.99

ICM7217AIP1 4-Digit Programmable Counter Driver

Harris



An up/down counter containing a register that can be preset with thumbwheel switches. The register is continuously compared with the count and a signal generated when they are equal. The circuit will directly drive four common cathode 7-segment displays. The input frequency is guaranteed up to 2MHz, but will typically operate up to 5MHz. Counting and comparing will run at 750kHz maximum.

Specification (typical at $V_s = 5V, 25^\circ C$)

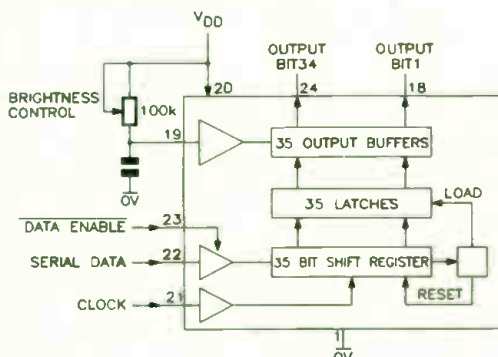
Supply voltage:	4.5V to 5.5V
Supply current:	300µA standby 100mA operating
Digit driver output:	35mA peak
Segment driver output:	-12.5mA peak
BCD I/O input high:	>4.4V
BCD I/O input low:	<3.2V
Count input frequency:	5MHz
Count input low:	<0.4V
Count input high:	>3.5V

Order Code	Type	Price each
CP95D	ICM7217AIP1	£8.99

M5450B7 LED Display Driver

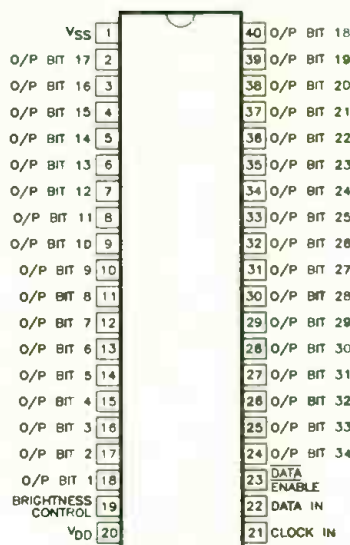
SGS-Thomson

An LED display driver that can drive up to 34 segments at up to 15mA without external resistors. Constant current sources in the IC control the segment current, and this can be set by adjusting the current into pin 19. Data is clocked into pin 22 (when pin 23 is low) by sending a 1 as the first bit, then the 34 data bits and ensuring that there is at least one further clock pulse. This 36th clock pulse loads the 34 bits of serial data into the segment latches, each logical 1 turning on the appropriate segment. The 36th clock pulse also generates a reset signal which clears the register ready to receive a further set of data following the next 1 detected on pin 22. Segments are directly driven and not multiplexed. Common anode displays are required with the anodes connected to V_{DC} .



Supply voltage	5V (4.75V to 13.2V)
Supply current	<7mA
Output sink current	15mA with 750µA in pin 19 2.7mA with 100µA in pin 19

Input clock frequency DC to 500kHz



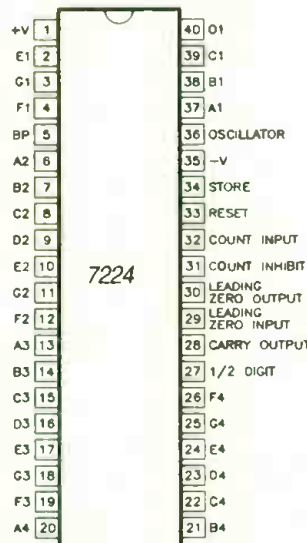
5450

Order Code	Type	Price each
UJ53H	M5450B7	£3.99

ICM72241PL 4 1/2-Digit Counter

Harris

A 4 1/2-digit counter capable of directly driving an LCD display. Applications data can be found in the Maplin Magazine 55. The maximum count is 19,999. The input frequency can be up to 25MHz typically. Chips can be cascaded to provide higher maximum counts.

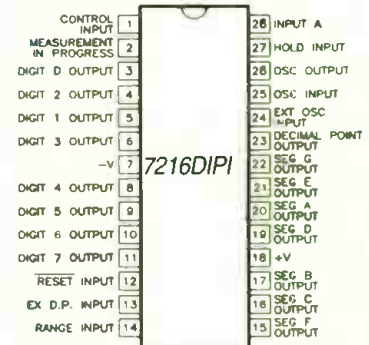


Supply voltage	5V (3V to 6V)
Operating current	10µA
Oscillator frequency	16kHz
Backplane frequency	125Hz
Count frequency	>15MHz

Order Code	Type	Price each
FP62S	ICM72241PL	£8.99

ICM7216DIPI 10MHz Frequency Counter

Harris



An 8-digit frequency counter IC operating from DC to 10MHz. Decimal point and leading zero blanking may be externally selected. The IC will directly drive two 4-digit multiplex common cathode displays, and requires only one +5V DC supply and a 1MHz or 10MHz crystal.

Specification

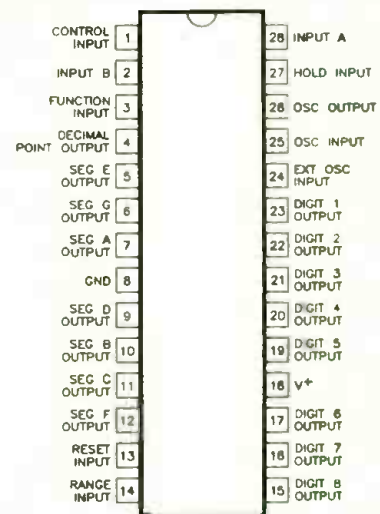
Supply voltage:	+5V at 2mA (display off)
Maximum frequency (pin 28):	10MHz
Time between measurements:	200ms
Digit driver output current:	75mA
Segment driver output current:	15mA
Input voltage low/high:	1V max/3.5V min

Order Code	Type	Price each
YY94C	ICM7216DIPI	£19.99

ICM7216AIJI 10MHz Universal Counter

Harris

An 8-digit universal counter IC operating from DC to 10MHz in frequency counter mode and DC to 2MHz in unit counter modes. The IC will directly drive 8 common anode seven-segment displays. It requires only one +5V supply and 10MHz or 1MHz crystal timebase. In addition to being a frequency counter, the IC can be used as a period counter, frequency ratio counter, time interval counter or as a totalising counter.



7216AIJI

Specification (typical)

Supply voltage:	+5V (4.75V to 6V)
Supply current:	2mA (display off)
Max. frequency (pin 28):	10MHz (frequency, ratio, unit) 2.5MHz (period, time interval)
Max. frequency (pin 2):	2.5MHz
Min. time interval:	250ns
Time between measurements:	200ms
Digit driver output current:	-180mA
Segment driver output current:	35mA
Input voltage low/high:	1V max/3.5V min

Order Code	Type	Price each
UL64U	ICM7216AIJI	£32.99

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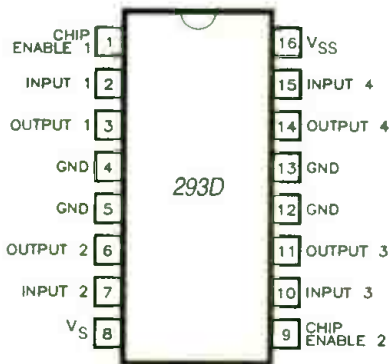
Fax your orders to: 01702 553935

SUBSECTION 66 POWER CONTROL AND VOLTAGE REFERENCE IC's

L293D Stepper Motor Driver SGS-Thomson

The L293D is a monolithic integrated high voltage, high current, 4-channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors, and for switching power transistors. To simplify use as two bridges, each pair of channels is equipped with an enable input. A separate supply input is provided for the control logic, allowing operation of this at a lower voltage than the output stage.

Inductive clamp diodes for the output stage are provided internally. This device is suitable for use in switching applications at frequencies up to 5kHz. It is encapsulated in a 16-pin DIL package.



Specification

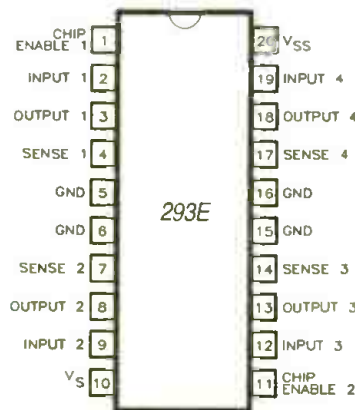
Output stage supply voltage:	Logic level supply (V_{SS}) to 36V
Control logic supply voltage:	4.5V to 36V
Total quiescent output supply current:	2mA inhibit low, 16mA inhibit high
Total quiescent logic supply current:	16mA
Input low voltage:	-0.3 to 1.5V
Input high voltage:	2.3 to V_{SS} , 7V abs. max.
Inhibit low voltage:	-0.3 to 1.5V
Inhibit high voltage:	2.3 to V_{SS} , 7V abs. max.
Low voltage inhibit current:	30 μ A
High voltage inhibit current:	10 μ A
Source output saturation voltage:	1.4V @ 1A out
Sink output saturation voltage:	1.2V @ 1A out
Clamp diode forward voltage drop:	1.3V
Rise and fall times:	250ns
Turn-on delay:	750ns
Turn-off delay:	200ns

Order Code	Type	Price each
AH80B	L293D	£2.99

L293E Stepper Motor Driver SGS-Thomson

The L293E is a quad push-pull driver capable of delivering output current up to 1A per channel. Each channel is controlled by a TTL compatible logic input, and each pair of drivers, making a full bridge, is equipped with an inhibit input which if low turns off all four transistors forcing the output to float, and if high, enables normal output. A separate supply input is provided for the logic so that it may be run from a lower voltage supply to reduce dissipation. Additionally, the L293E has external connections

for sensing resistors for switch-mode control by external measurement of resistor voltage drop. These comprise the 0V ends of all output stages (the emitters of the lower output switching transistors) being open-ended (not connected); these are pins 4, 7, 14, 17. The sensing resistors should be connected between these and 0V. If not required then connect pins 4, 7, 14, 17 directly to 0V. This device is suitable for use in switching applications at frequencies up to 5kHz. It is encapsulated in a 20-pin DIL package.

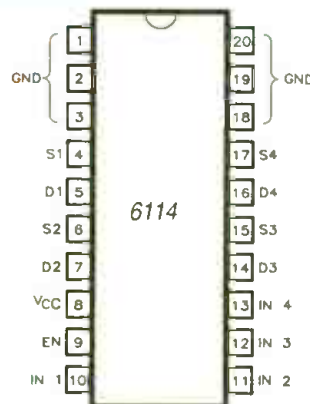


Specification

Output stages supply voltage:	Logic supply level (V_{SS}) to 36V max.
Control logic supply voltage:	4.5V to 36V max.
Total quiescent output supply current:	2mA inhibit low, 16mA inhibit high
Total quiescent logic supply current:	16mA
Input low voltage:	-0.3 to 1.5V
Input high voltage:	2.3 to V_{SS} , 7V abs. max.
Inhibit low voltage:	-0.3 to 1.5V
Inhibit high voltage:	2.3 to V_{SS} , 7V abs. max.
Low voltage inhibit current:	30 μ A
High voltage inhibit current:	10 μ A
Source output saturation voltage:	1.4V @ 1A out
Sink output saturation voltage:	1.2V @ 1A out
Sensing voltage (pins 4,7,14,17):	2V
Rise and fall times:	250ns
Turn-on delay:	750ns
Turn-off delay:	200ns

Order Code	Type	Price each
AH81C	L293E	£3.49

L6114 Stepper Motor Driver SGS-Thomson



Manufactured with the multi-power BCD mixed bipolar/CMOS/DMOS process, the L6114 is a monolithic, quad 100V DMOS switch designed for high current, high voltage switching applications. Each of the four switches is controlled by a logic input, and all four are further controlled by a common

enable input. All DMOS transistors have source as well as drain isolated and brought out to separate pins for sensing resistors if required, otherwise they should be connected to 0V. The common enable input, when taken to logic 0, will force all outputs off regardless of the state of the input control pins. Furthermore all DMOS transistors have parallel inductive clamping diodes provided internally. All inputs are TTL/CMOS compatible for direct connection to logic circuits. The device is encapsulated in a 20-pin DIL package.

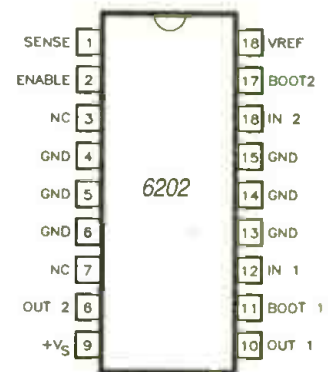
Specification

Drain-source breakdown voltage:	100V
Continuous drain current:	1.5A @ 90°C
Pulsed drain current:	5A
Continuous source-drain diode current:	1.5A
Pulsed source-drain diode current:	5A
Static drain-source on resistance:	0.7 Ω @ $V_{CC} \geq 14V, I_D = 1.5A$
Control logic supply voltage:	14 to 48V
Supply current:	9mA
Input low voltage:	-0.3 to 0.8V
Input high voltage:	2 to 7V max.
Turn-on delay time:	300ns
Rise and fall times:	100ns
Turn-off delay time:	400ns
Source-drain diode forward voltage drop:	1.5V max.
Source-drain forward voltage:	1.2V @ $I_{SD} = 1.5A$

Order Code	Type	Price each
AH82D	L6114	£3.49

L6202 Stepper Motor Driver

A push-pull DMOS full bridge driver for motor control applications realised in multi-power BCD technology which combines isolated DMOS power transistors with CMOS and bipolar circuits on the same chip. This makes it possible to optimise the logic circuitry and the power stages to achieve the best possible performance. The DMOS output transistors can operate at supply voltages up to 48V, and efficiently at high switching speeds, and have inductive clamp diodes supplied on-chip. All the logic inputs are TTL, CMOS and microcomputer compatible. Each channel (half bridge) of the device is controlled by a separate logic input, while a common enable input controls both channels, and will force both outputs floating if taken low. The device is encapsulated in a 20-pin DIL package and includes thermal shutdown.



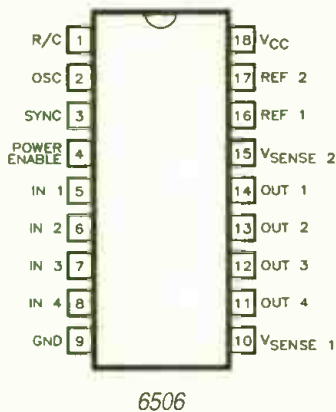
Specification

Supply voltage:	12V min. to 48V max.
Reference voltage:	13.5V
Quiescent supply current:	10mA
Cummutation frequency:	up to 30kHz (100kHz max.)
Thermal shutdown temperature:	150°C
Dead time protection:	100ns

Source-drain leakage current: 1mA max. @ $V_S = 42V$
 Source-drain on resistance: 0.3 Ω typical
 Sensing voltage: -1V to 4V
 Source-drain diode forward voltage drop: 0.9V @ $I_{DS} = 1.2A$
 Reverse recovery time: 300ns
 Forward recovery time: 200ns
 Input low voltage: -0.3 to 0.8V
 Input high voltage: 2 to 7V max.
 Turn-off delay: 300ns
 Turn-on delay: 400ns

Order Code	Type	Price each
AH83E	L6202	£5.49

L6506 Stepper Motor Driver



The L6506 is a linear IC designed to sense and control the current in stepping motors and similar devices. When used in conjunction with the L293 and L6114 etc. driver ICs, the chip set forms a constant current drive for an inductive load, and performs all the interface functions from the control logic through to the power stage.

Two or more devices may be synchronised using the 'sync' pin. In this mode of operation the oscillator in the master IC sets the operating frequency in all chips. The controller is intended for use with dual bridge drivers including quad DMOS arrays such as the 6114, or discrete power transistors. A common on-chip oscillator drives the dual chopper and sets the operating frequency for the pulse width modulated drive. An RC network on pin 1 sets the operating frequency.

The oscillator produces pulses to set two internal flip-flops which in turn cause the outputs to activate the drive. When the current in the load winding reaches the programmed peak value, the voltage across the sense resistor is equal to V_{ref} and the corresponding comparator resets its flip-flop, interrupting the drive current until the next oscillator pulse occurs. The peak current in each winding is programmed by selecting the value of the sense resistor and V_{ref} . Since separate inputs are provided for the chopper, each of the loads can have different settings.

Specification

Supply voltage range: 4.5 to 7V max.
 Quiescent supply current: 25mA max.
 V_{sense} input voltage range: $\pm 5.0mV$
 Input offset current: $\pm 200nA$
 Input bias current: 1 μA
 Response time: 0.8 μs , $V_{ref} = 1.4V$, $V_{sense} = 0$ to 5V
 Logic input high: 2V to supply level
 Logic input low: 0.8V max.
 Logic output high: 3.5V typical (2V min., $V_{CC} = 4.75V$)
 Logic output low: 0.25V ($V_{CC} = 4.75V$)
 Oscillator frequency range: 5kHz to 70kHz

Order Code	Type	Price each
AH84F	L6506	£2.90

High-Side Smart-Power Solid State Relays

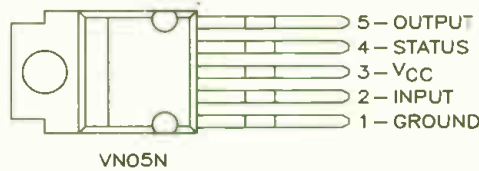
SGS-Thomson

★ 5V Logic level compatible input

★ Thermal and under-voltage shut-down

★ Load open-circuit warning

★ Very low stand-by power consumption



These monolithic devices are made using a 'Vertical Intelligent' Power MOS technology and are intended for driving resistive or inductive loads with one side grounded. They typically provide power switching for microprocessor controlled automotive applications for driving motors and lamps. Two versions are available; VN05N can switch 12A continuously, while VN20N can switch up to 28A. Built-in thermal shut-down protects the chip from over-temperature and short-circuit conditions, and the input control is 5V logic level compatible.

The device has a diagnostic output which indicates open circuit (no load) and over-temperature conditions, which is derived from internal logic. To protect the device against short-circuit and over-current conditions over the full range of supply voltages and temperatures, the thermal protection section turns off the MOS power output switch at a minimum junction temperature of 140°C. When the temperature falls to about 125°C the switch is automatically turned on again. For short-circuits the response time is virtually instantaneous as the sensor is located in the region of the die where the heat is generated. The 'status' or diagnostic output is of open drain configuration. The positive going control input is internally clamped to 6V max.; if the input exceeds this level a series resistor must be included to limit the input current to not more than 10mA. The input stage is a Schmitt trigger with a hysteresis of 0.5V. Case style is TO220 and the tab is electrically connected to V_{CC} and must be fitted with an insulating kit if bolted to a heatsink.

Specification	VN05N	VN20N
Continuous output current:	12A	28A
Power dissipation @ $T_C \leq 25^\circ C$:	52W	80W
On-state resistance @ $T_J = 25^\circ C$:	0.18 Ω	0.05 Ω
Junction operating temperature:	-40 to 150°C	
Drain-source breakdown voltage:	60V	
Supply voltage:	26V max.	
Supply current, off-state:	50 μA	
Supply current, on-state:	15mA	
Signal input low:	0.8V	
Signal input high:	5V max. (see above)	
Status output current:	10mA max.	

Order Code	Type	Price each
AY97F	VN20N	£4.99
AY98G	VN05N	£2.49

SLB0586A Electronic Dimmer

Siemens

A digital electronic dimmer IC which can turn lights etc. on and off and set the required brightness via a single sensor. Operation can also take place from remote sensors (or by infrared remote control with a suitable receiver circuit) or switched by an on/off switch connected between neutral and the "Remote Input".

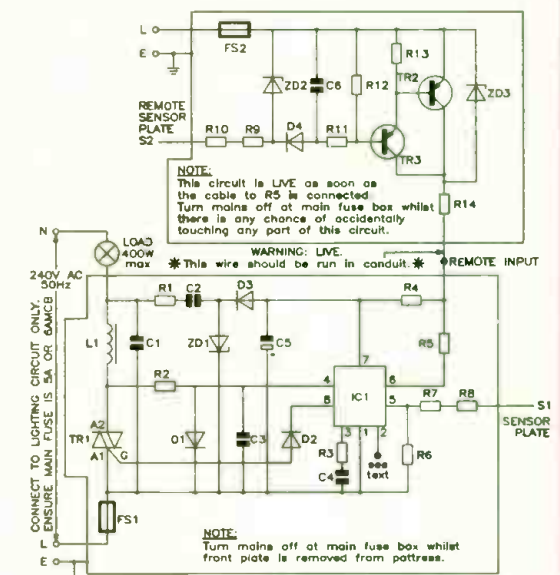
Parts List

R1	1W Res 1k	(C1K)
R2	Min Res 1M5	(M1M5)
R3	Min Res 100k	(M100K)
*R4	1W Res 120k	(C120K)
*R5	Min Res 470k	(M470K)
R6,7,8	Min Res 4M7	(M4M7)
*R9,10	Min Res 4M7	(M4M7)
*R11	Min Res 2M2	(M2M2)
*R12	Min Res 3M3	(M3M3)
*R13	Min Res 1M	(M1M)
*R14	1W Res 220 Ω	(C220R)
C1,2	IS Cap 0.1 μF	(JR34M)
C3	Poly Layer 0.0068 μF	(WW27E)
C4	Poly Layer 0.1 μF	(WW41U)
C5	Minelect 100 μF 10V	(RK50E)
*C6	Poly Layer 0.01 μF	(WW29G)
L1	RF Supp Choke 3A	HW06G
D1,2	1N4148	(QL80B)
D3	1N4007	(QL79L)
*D4	1N4007	(QL79L)
ZD1	BZY88C5V6	(QH08J)
*ZD2	BZY88C6V8	(QH10L)
*ZD3	BZX61C6V8	(QH10L)
TR1	C225M	(UR37S)
*TR2,3	BC557	(QC16S)
IC1	SLB0586	(UL43W)
FS1	Fuse 20mm 2A	(WR05F)
*FS2	Fuse 20mm 250mA	(WR01B)
S1	Touch Pad	(e.g. HY01B)
*S2	Touch Pad	(e.g. HY01B)
2	Fuse Clips	(KU27E)
*2	Fuse Clips	(KU27E)
1	Blanking Plate	(HL86T)
*1	Blanking Plate	(HL86T)

*Only required if remote unit is built.



If remote sensor or switch is not required R4 and R5 are omitted and pin 6 linked to pin 7. If the sensor is tapped (touched for between 50 and 400ms) the light will be switched on and off successively. Three different dimming modes are possible according to the connection of pin 2.



If pin 2 is left open circuit then at switch on, lamp brightness will be at same level as it was when last switched off. If the sensor is held, brightness will increase to maximum or decrease to minimum, then rise or fall cyclically until the sensor is released. On successive dimming operations the brightness will increase if it was previously decreasing and vice versa. If pin 2 is connected to pin 7 then at switch on (if the sensor is tapped), lamp brightness will be at maximum. If the sensor is held, the lamp switches to minimum brightness at switch on, and then starts to

Continued on next page.

Continued from previous page.

increase to maximum then fall again and will continue to cycle until sensor released. On successive dimming operations (providing it has not been switched off in the meantime) the brightness will continue to increase or decrease in the direction it was previously moving. If pin 2 is connected to pin 1, operation is the same as for connection to pin 7 except that on successive dimming operations, the brightness will move in the opposite direction from the way it was previously moving.

Caution. The circuit shown is at 240V potential. It should be built on a Blanking Plate and then used to replace conventional light switches. Always switch the mains off at the main fuse box before unscrewing any blanking plate or switch plate and do not switch on again until all plates have been screwed back in position.

Specification (typical at 25°C)

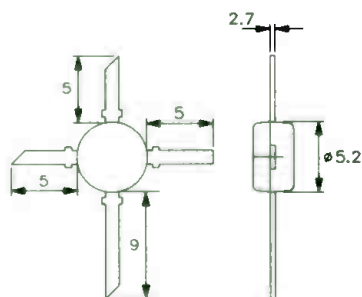
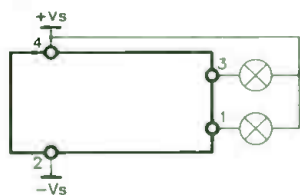
Supply voltage: -5.3V DC
 Supply current: 0.45mA
 Remote input current: 0.5µA
 Output current: >25mA

Order Code	Type	Price each
UL43W	SLB0586A	£4.85

U880B Double Flasher

Telefunken

The U880B is a double lamp flasher with its own internal oscillator followed by a frequency divider to produce a clock running at a nominal frequency of 3.3Hz. The 4-pin device flashes a pair of lamps alternately at this speed, operating from a supply in the range 4.75V to 20.4V maximum. Low current filament lamps or LEDs use the positive supply as a common connection, and the two polarity protected output stages can sink up to 55mA nominally.



No other external components are required as the device is entirely self-contained. An on-chip supply voltage monitor prevents normal operation until the supply is at least 4.2V, and the output stages are switched off when the supply falls to 3.8V. It is contained in a round, four-leaded encapsulation. To identify pin numbering, orient the device top-side up such that the longest lead points down. Pin 1 is then at the top and all others are numbered anti-clockwise (left = 2, bottom = 3, right = 4).

Specification

Supply voltage range: 4.75 to 20.4V
 Supply current range: 3.2 to 6.5mA depending on +V_S
 Output stage 'on' saturation: 700mV max. @ I_{out} = 25mA

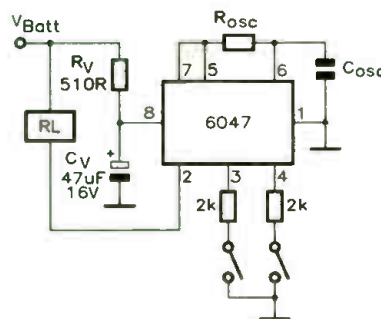
Order Code	Type	Price each
AH42V	U880B	£1.36

U6047B

Telefunken

A timer for motor vehicles with a wide ranging adjustable delay time from 3.7 seconds to up to 20 hours. From small value capacitors this is made possible by all time sequences being determined by an RC oscillator and a frequency divider. The relay driver is integrated and, with the corresponding external circuitry, the circuit is resistant to load dump and interference voltages in accordance with DIN40839.

To prevent interference and help protect the device the supply (pin 8) should be buffered with an RC filter, suggested values are 510Ω and 47µF. There is an internal 14V Zener diode between pins 8 and 1 (GND) as overvoltage protection, and with 510Ω in series the device can be operated over a wide supply range from 6V to 16V. It can also be supplied from a regulated 5V source, in which case the RC supply filter is not necessary.



A time function can be started or interrupted by the three inputs TOG, ON and OFF. If the time function is triggered the relay is active, the relay contact dropping out after expiry of the delay time. There are two possible applications, use of the toggle (TOG) input or of the ON or OFF inputs. When the TOG input is taken high for the first time the relay is switched on by pin 2 after a debounce period has elapsed. If triggered again the relay is switched off, and thereafter each actuation of the TOG input changes the state of the relay. If left on, it is switched off after the time delay period.

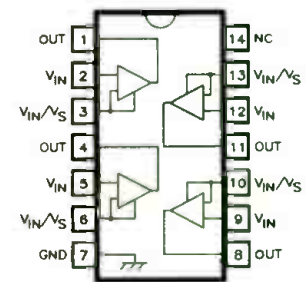
Alternatively ON and OFF controls can be realised as a rocker switch since both must not be activated simultaneously. ON leads to activation of the relay after the debounce period, while OFF immediately switches it off. If OFF is not activated, the relay is switched off after the time delay expires. In practice a common commercial application for this device is as a window demister heater control, which will 'switch itself off' after the chosen delay time (in minutes) should the driver forget.

All timing sequences are derived from an internal oscillator which uses external RC components R_{OSC} and C_{OSC} to set a fundamental frequency f₀. The oscillator not only produces the delay time but also the debounce time period. The delay time will be 73728 x 1/f₀ while the debounce period will be 6 x 1/f₀. R_{OSC} can range from 59kΩ to 650kΩ and C_{OSC} from 1nF to 4.7µF, giving oscillator frequencies from 20kHz down to 1Hz (delay times of 3.7s to 1,229m). The relay driver output is an open collector Darlington transistor with integral 23V Zener diode for limitation of the inductive pulse from the relay winding at switch-off. Maximum collector current must not exceed 300mA. The remainder of the IC is protected as described above, and all inputs are protected by a series resistor, integral Zener diode and RF capacitor.

Order Code	Type	Price each
AH44X	U6047B	£1.48

ULN2453M/ULN2455M

Automotive Lamp Monitors

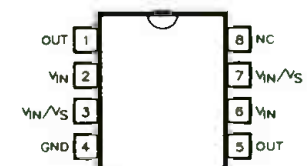


Allegro

2455

This range of devices is capable of monitoring all types of automotive (motor vehicle) lamps, providing multiple LED outputs to pinpoint the area in which a lamp has failed. Type 2455 is a quad version capable of monitoring eight individual lamps or groups of lamps. Type 2453 is a dual circuit comparator. All devices can be used to monitor lamps, multiple low-voltage power supplies, or, with appropriate sensors, industrial processes. Installation and operation of these lamp monitors has no effect on normal lamp operation and does not involve cutting any wires to insert resistors and such. The comparators sense the normal voltage drop in the supply wiring (approximately 20mV or so) for each of the lamps being monitored. Little additional wiring is necessary for installation because the system can be completely integral to the wiring assembly. No standby power is required as the operating voltage is obtained from the sensing leads of the device, which is only active when the lamp power is on.

In principle the operation of these monitors is similar to that of a simple bridge circuit, where the top two legs of the bridge are formed by the wiring assembly resistance or through the use of discrete low value resistors. The bottom legs of the bridge are the



monitored lamps.

2453

The two sensing inputs of each comparator are connected via separate connections to each end of the lamp's supply so that it can observe the voltage drop along the length of the lamp supply wire. Sense input #1 is attached to the supply source (as it is also the chip circuit supply) while sense input #2 connects to the lamp 'live side'. When the circuit detects a difference in voltage due to an open-filament, the appropriate open collector output driver is turned on. Both devices are designed for use in the severe automotive environment. Lateral PNP transistors provide high-frequency noise immunity and differential transient-voltage protection. Reverse polarity protection, internal regulators and temperature compensation are all embodied in the circuit designs. A device failure will not affect lamp operation. Type 2453 is 8-pin DIL while 2455 is a 14-pin DIL package.

Specification

Supply voltage: 30V absolute max., 80V for 100ms
 Peak reverse supply voltage: 30V
 Output switch current sink (ON): 35mA max.
 Output leakage current (OFF): 100µA max.
 Output saturation

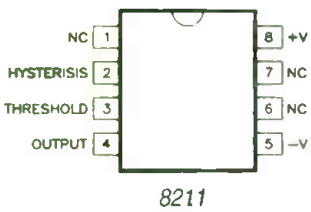
voltage: 0.8V @ IC = 5mA
 Differential switch voltage: 13mV typical
 Sense input #1 current + supply: 1.7mA
 Sense input #2 current: 300µA
 Operating temperature range: -40°C to +85°C

Order Code	Type	Price each
GX11M	ULN2453M	£1.97
GX53H	ULN2455M	£2.99

ICL8211CPA Voltage Detector

Harris

A highly accurate micropower integrated circuit intended primarily for precise voltage detection and generation. The IC provides a 7mA current limited output sink when the voltage applied to 'Threshold' is less than 1.15V – the internal reference. A low current output 'Hysteresis' is also turned on at this point and may be used to provide positive and noise free output switching using a simple feedback network.



Applications include low battery indicators, power supply malfunction detectors for volatile memory systems etc. Supply voltage 2V to 30V at 22µA supply current.

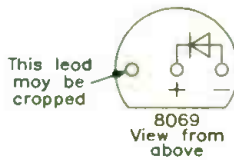
Order Code	Type	Price each
YH43W	ICL8211CPA	£1.75

ICL8069CCZR Voltage Reference

Harris

A 1.2V temperature compensated voltage reference with excellent stability and reverse currents down to 50µA.

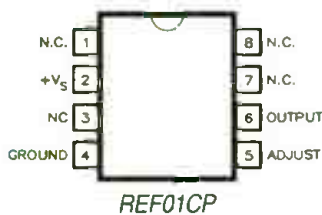
For use with A/D, D/A converters, threshold detectors etc. Stability of V_R with change in I_R from 50µA to 5mA is excellent, the change in V_R being <20mV. Reverse dynamic impedance is typically 1Ω. Temperature coefficient: 0.005%/°C.



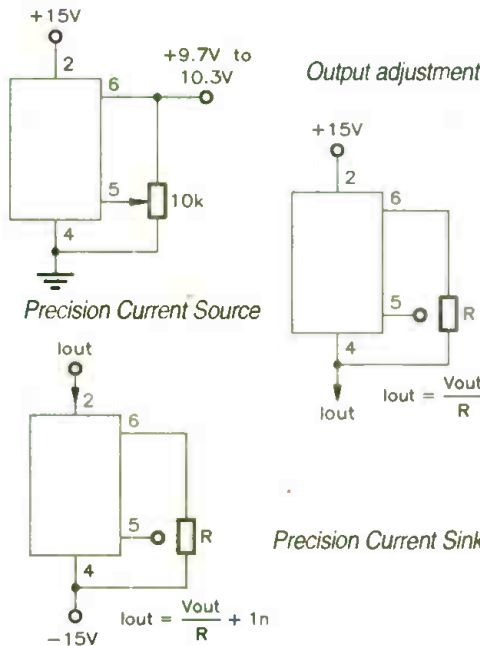
Order Code	Type	Price each
YH39N	ICL8069CCZR	£1.53

REF-01CP +10V Precision Reference

Analog Devices



A precision bandgap voltage reference giving 10V ±1%. The device has short circuit protection, an adjust pin for up to ±3% adjustment and excellent stability with large changes in temperature, load current and input voltage.



Specification (typical at 25°C)

Output voltage: 10V ±0.1V
 Adjustment range: ±3.3%
 Supply voltage: 12V to 30V
 Output voltage noise: 25µV peak-to-peak
 Line regulation: 0.009%/V
 Load regulation: 0.006%/mA
 Supply current: 1mA
 Load current: 21mA
 Sink current: -0.5mA
 Short circuit current: 30mA
 Temperature coefficient: 20ppm/°C

Order Code	Type	Price each
UL08J	REF-01CP	£3.95

REF-02CP +5V Precision Reference

Analog Devices

A precision bandgap reference giving 5V ±1%. The device has short circuit protection, an adjust pin for up to ±6% adjustment and excellent stability with large changes in temperature, load current and input voltage. The circuits shown for the 10V Ref can be



used with this device. In addition, this device has an output on pin 3 whose voltage changes linearly with temperature, from 577.5mV at 0°C to 724.5mV at 70°C. The current on this pin must not exceed 50nA and capacitance must be less than 30pF.

Specification (typical at 25°C)

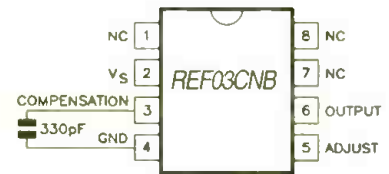
Output voltage: 5V ±0.05V
 Adjustment range: ±6%
 Supply voltage: 7V to 30V
 Output voltage noise: 12µV peak-to-peak
 Line regulation: 0.009%/V
 Load regulation: 0.006%/mA
 Supply current: 1mA
 Load current: 21mA
 Sink current: -0.5mA
 Short circuit current: 30mA
 Temperature coefficient: 20ppm/°C
 Tempco voltage output: 630mV at 25°C ±2.1mV/°C

Order Code	Type	Price each
UL09K	REF-02CP	£5.35

REF-03CNB +2.5V Precision Reference

Analog Devices

A precision bandgap reference giving 2.5V ±1%. The device has short circuit protection, an adjust pin for up to ±6% adjustment and excellent stability with large changes in temperature, load current and input voltage. The circuits shown for the 10V Ref can be used with this device except that in addition a 330pF capacitor must be connected between pins 3 and 4.



Specification (typical at 25°C)

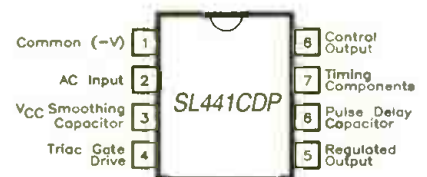
Output voltage: 2.5V ±0.025V
 Adjustment range: ±6%
 Supply voltage: 4.5V to 30V
 Output voltage noise: 5µV peak-to-peak
 Line regulation: 0.001%/V
 Load regulation: 0.01%/mA
 Supply current: 1mA
 Load current: 20mA
 Sink current: -0.5mA
 Short circuit current: 30mA
 Temperature coefficient: 0.7ppm/°C

Order Code	Type	Price each
RA84F	REF-03CNB	£4.35

SL441CDP Zero Voltage Switch

GEC-Plessey

A symmetrical burst control IC in an 8-pin DIL package for use with a triac in AC power control systems. When used with a triac, AC power may be regulated by varying the number of mains cycles applied to the load in a fixed timing period. The device features a 'balanced zero voltage point crossing detector',



spike filter and pulse generator for reliable triggering of the triac, and minimum radio frequency interference. A period pulse generator and bistable are arranged to provide symmetrical burst control and eliminate 1/2 wave firing. The period of the internal ramp generator is defined externally and may be chosen to limit 'lamp flicker'. The device is particularly suited to room temperature control applications, including panel heaters, fan heaters etc.

Specification

Shunt regulating voltage (pin 3 @ 16mA): 14.7V
 Supply voltage trip (pin 3): 12.2V
 Supply current: 7.5mA maximum
 Typical regulated voltage (pin 5): 8.5V
 Triac gate drive
 open circuit ON: 8.5V
 open circuit OFF: 0.1V
 output current: 200mA (into short circuit)
 Control input working voltage range: 0 to 12V

Order Code	Type	Price each
DB53H	SL441CDP	£2.49

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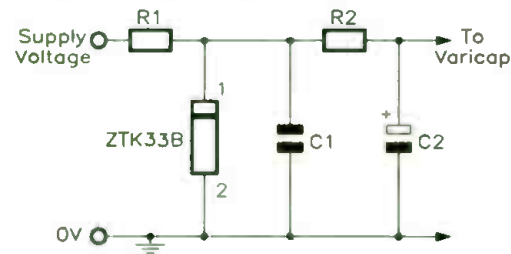
ZTK33B Varicap Voltage Stabiliser

ITT Semiconductor

A voltage stabiliser for varicap diodes. Stabilised voltage 33V ±1V. Pin 1 is connected to case.

Specification:

Temperature coefficient: -2.3mV/°C.
 Supply current: 5mA.
 Differential internal resistance: 9Ω.
 Supply voltage must be greater than 34V. In circuit R1 is equal to the supply voltage minus 33V divided by 0.005, in ohms. E.g. for supply V = 40V, R1 = 1k5, R2 = 22Ω, C1 = Ceramic 1000pF, C2 = 4.7µF 63V.



Order Code	Type	Price each
UF29G	ZTK33B	61p

LM334N Adjustable Current Source

SGS-Thomson



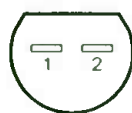
This IC in a TO92 package is a 3-terminal adjustable current source with a 10,000 to 1 range in operating current, excellent current regulation and a wide dynamic voltage regulation of 1V to 40V. Current is established with one resistor connected between pins 1 (R) and 3 (V), and no other parts are required. The current is equal to 0.0677V divided by the resistor in ohms (i.e. for 1mA, R = 68Ω) at 25°C. Currents may be set in the range 1µA to 10mA and regulation is 0.02% per volt. Initial current accuracy is ±3% typical. Reverse voltages of up to 20V will draw only a few microamps allowing the device to act as a rectifier and current source in AC applications. The current is also directly proportional to the temperature at the rate +0.33% per °C. Zero drift operation can be obtained by adding one resistor and one diode. Applications include bias networks, surge protection, low power reference, ramp generation, LED driver, and temperature sensing.

Order Code	Type	Price each
WQ32K	LM334N	£1.49

J511 Current Regulator Diode

Siliconix

VIEW FROM BELOW



1 ANODE
2 CATHODE

A 4.7mA current regulator diode utilising JFET technology that has been designed for use in demanding applications such as test equipment and instrumentation.

Specification

Peak operating voltage: 50V min., 100V typical
 Nominal regulator current: 4-70mA

Limiting voltage: 4.2V maximum, 2.1V typical
 Maximum forward current: 20mA
 Maximum reverse current: 50mA
 Power dissipation: 360mW
 Capacitance: 2-2pF

Order Code	Type	Price each
DB34M	J511	£1.55

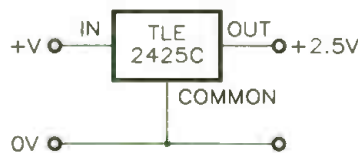
TLE2425CLP Precision Virtual Ground

Texas Instruments

Comprising a high performance precision op amp and precision micropower voltage reference, this IC eliminates the separate resistors, capacitors, op amps, and voltage references that have typically been used to provide the reference voltage in signal-conditioning circuits to terminate signal grounds and in interfacing A/D and D/A converters. The IC gives increased dynamic signal range, improved signal-to-noise ratio, lower distortion and improved signal accuracy. Both input and load regulation exceed 12-bits of accuracy on a single 5V system.



View from above



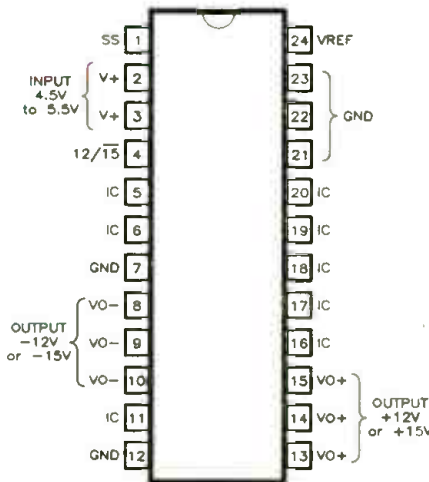
Specification (typical at V_{IN} = 5V, 25°C)

Input voltage: 4V to 40V
 Output voltage: 2.5V ±0.8%
 Output current: 20mA sink and source
 Bias current: 170µA
 Input regulation: 1.5µV/V
 Output impedance: 0.0075Ω
 Output regulation source: 45µV (0 to -10mA), 150µV (0 to -20mA), 15µV (0 to +10mA), 65µV (0 to +20mA)
 Sink: 55mA sink, -50mA source
 Short circuit output current: 80dB
 Ripple rejection: 80dB

Order Code	Type	Price each
GR12N	TLE2425CLP	£1.75

MAX1743/DC-DC Converter

Maxim



The MAX1743 converts +5V to ±12V or ±15V with no external components required. It supplies 125mA at ±12V or 100mA at ±15V. Pin strapping selects either ±12V or ±15V operation. If pin 4 is connected to pin 3 (+V) 12V is selected, otherwise if it is connected to 0V then 15V is selected. The device

regulates both its positive and negative outputs independently to within ±4% over all specified conditions of line voltage, load current and temperature. On-chip cycle-by-cycle current sensing, soft-start and under-voltage lock-out ensure reliable operation.

The device is encapsulated in a standard 24-pin DIL package.

Specification

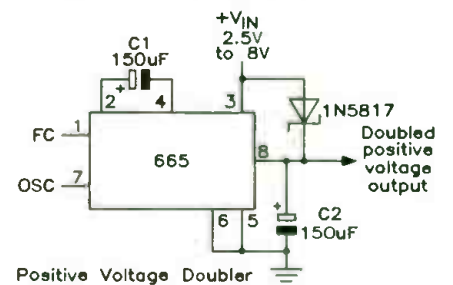
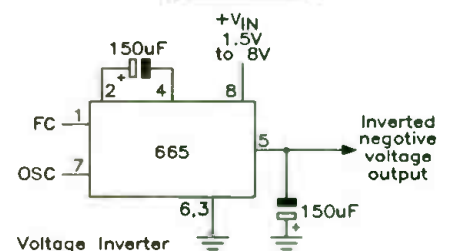
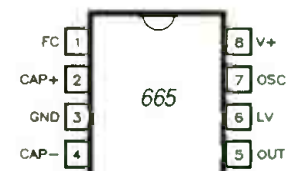
Input voltage range: 4.5 to 5.5V
 Output voltage: ±11.52 to ±12.48V or ±14.55 to ±15.45V @ 25°C
 Device supply current: <30mA
 Under-voltage lock-out: 3.8V min. to 4.2V max.
 Internal oscillator frequency: 200kHz
 Line regulation: 0.1%
 Load regulation: 0.5%
 Output ripple: 0.3%

Order Code	Type	Price each
AY35Q	MAX1743	£39.99

MAX665

Maxim

The MAX665 charge-pump inverter converts a +1.5V to +8V input to a corresponding -1.5V to -8V output. Using only two low-cost capacitors to produce 100mA, the MAX665 replaces switching regulators, eliminating inductors and their associated cost, size and EMI. Greater than 90% efficiency over most of its load-current range, combined with a 200µA typical operating current provides ideal performance for both battery-powered and PCB level voltage conversion applications. It can also double the output of an input power supply or battery, providing +9.35V at 100mA from a +5V input. A frequency control pin (FC) selects either 10kHz or 45kHz operation to optimise capacitor size and quiescent current. The oscillator frequency can also be adjusted with an external capacitor or driven with an external clock. The MAX665 is encapsulated in an 8-pin DIL package.



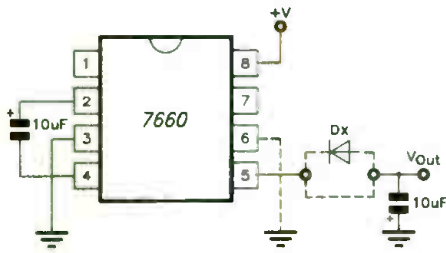
Order Code	Type	Price each
AY39N	MAX665	£7.99

SI7660CJ Voltage Converter

Siliconix

A voltage converter that will provide a negative voltage output numerically equal to the positive voltage input in the range 1.5V to 10V. Pin 6 should be tied to ground for supply voltages below 3.5V and for supply voltages in excess of 6.5V a diode should be connected in

series with the output. The output is like an ideal voltage source in series with 70Ω so for a load current of -10mA and a supply voltage of $+5\text{V}$, the output voltage will be -4.3V .



Simple Negative Converter

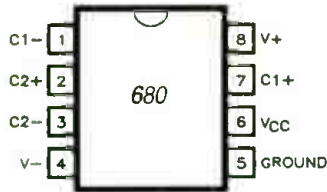
Specification

Supply current ($R_L = \infty$):	170µA
Supply voltage:	1.5V to 10V
Power dissipation:	300mW max
Max load current:	$\frac{V - \text{Min } V_{\text{out}}}{70} < 40\text{mA}$

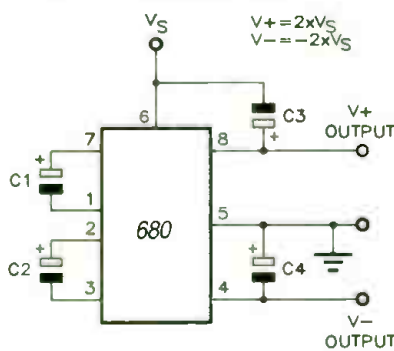
Order Code	Type	Price each
YY75S	SI7660CJ	£1.99

MAX680CPA Voltage Doubler

Maxim



A voltage converter that can provide $\pm 10\text{V}$ outputs from a single $+5\text{V}$ supply or $\pm 6\text{V}$ outputs from a $+3\text{V}$ lithium battery. The surrounding circuit requires just four low cost capacitors to provide positive and negative output voltages with both numerically equal to double the supply voltage. Output currents up to 10mA simultaneously are possible although the output voltage will be reduced as the source impedance is around 150Ω for V_+ and 90Ω for V_- . All four capacitors can be PC Elect $22\mu\text{F}$ 25V or Minelect $22\mu\text{F}$ 16V for space saving.



Positive and Negative Converter

The following equations show how to calculate the output voltage for different output currents and as an example, the values are shown if the supply voltage is $+5\text{V}$ and 10mA is drawn from both outputs.

$$V_{\text{DROPP-}} = I_{\text{L-}} \times R_{\text{S-}} = 0.01 \times 90 = 0.9\text{V}$$

$$V_{\text{DROPP+}} = (I_{\text{L+}} + I_{\text{L-}}) \times R_{\text{S+}} = (0.01 + 0.01) \times 150 = 3\text{V}$$

$$V_+ = 2V_{\text{S}} - V_{\text{DROPP+}} = (2 \times 5) - 3 = 7\text{V}$$

$$V_- = -(2V_{\text{S}} - V_{\text{DROPP+}} - V_{\text{DROPP-}}) = -((2 \times 5) - 3 - 0.9) = -6.1\text{V}$$

The output resistance can be reduced by paralleling devices (i.e. pins 4,5,6 and 8 are commoned). The effective output resistance is then 150Ω divided by the number of devices. Each device needs its own C1 and C2, but all can share a single set of C3 and C4.

Specification (typical 25°C)

Supply voltage:	2V to 6V
Supply current:	0.5mA ($V_{\text{S}} = 3\text{V}$), 1mA ($V_{\text{S}} = 5\text{V}$)

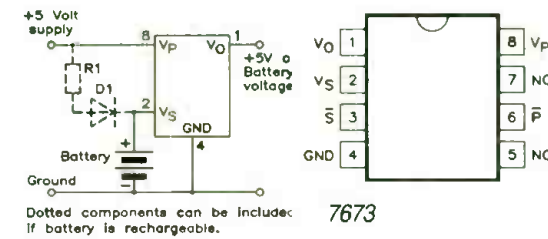
Positive output source resistance: 150Ω
 Negative output source resistance: 90Ω
 Oscillator frequency: 8kHz
 Power efficiency: 85%

Order Code	Type	Price each
CR00A	MAX680CPA	£3.05

ICL7673CPA Automatic Battery Back-up Switch

Harris

An 8-pin DIL IC designed to simplify the switching between two power supplies, main and battery back-up. Logic outputs are provided that can be used to indicate which supply is connected, and can also be used to increase the power switching capability of the circuit by driving external PNP transistors.



Characteristics

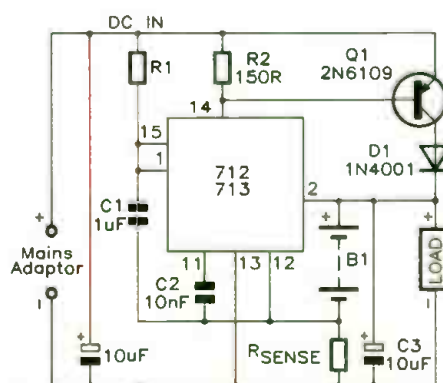
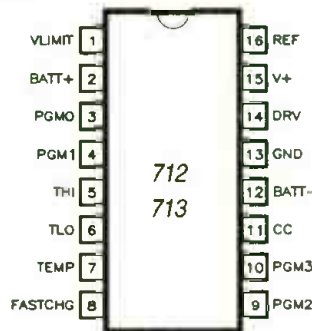
Input voltage:	2.5V to 15V
Quiescent supply current:	$1.5\mu\text{A}$
Switch resistance:	$8\Omega (V_{\text{S}} = 5\text{V}, I = 15\text{mA})$

Order Code	Type	Price each
UH36P	ICL7673CPA	£1.49

MAX712/3 Fast Charge Controllers

Maxim

The MAX712 and MAX713 are nickel cadmium (Ni-Cd) battery fast charge controllers which will fast charge batteries from a DC source at least 1V higher than the maximum battery voltage. 1 to 16 series cells can be charged at rates up to 4C . A voltage-slope detecting analogue-to-digital converter, timer, and temperature window comparator determine charge completion. The MAX712 or 713 are powered by the DC source via an on-chip $+5\text{V}$ shunt regulator, and draw a maximum of $5\mu\text{A}$ from the battery when not charging. A low-side current-sense resistor allows the battery charge current to be regulated while still supplying the power to the battery's load.



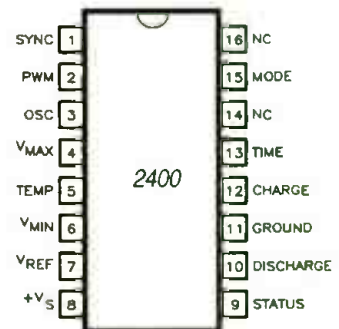
The MAX712 terminates fast charge by detecting zero voltage slope, while the MAX713 uses a negative voltage-slope detection scheme. Both devices are identically packaged as 16-pin DIL and share the same pin numbering and basic functions. An external power PNP transistor, blocking diode, three resistors and three capacitors are all the extra components required.

Order Code	Type	Price each
AY36P	MAX712	£5.99
AY37S	MAX713	£5.99

U2400B Battery Charger

Telefunken

A Ni-Cd battery charging and control device in a single 16-pin DIL package which particularly supports the fast charging of Ni-Cd cells. One of three charging times can be selected simply by connecting pin 13 to supply $+V$ for a 12 hour pulsed charge, to 0V for a 1 hour continuous charge, or left floating for a fast 0.5 hour charge. Before charging begins the device first discharges the cell completely to preserve long life for the cell. A central control block monitors time, temperature and voltage during charging, and switches the output off when the specified charge is attained. It includes an LED signal lamp driver and when switched on, a red LED connected between the display output pin 9 and $+V$



(via 330Ω) is lit if no battery is connected. When a battery is inserted, presenting a minimum voltage of 180mV approx. at pin 4 (after a potential divider as appropriate for multiple cells), the predischage phase is started with a 2 second delay. The positive going discharge output at pin 10 is activated for switching an NPN discharge transistor, accompanied by the red LED flashing. The discharge procedure is stopped when a voltage at pin 6 falls below 530mV . The charge phase follows with an output from pin 12 indicated by the flashing of a green LED between pin 9 and 0V (with 330Ω resistor). Battery temperature can be monitored by a thermistor based sensing network connected to pin 5. The display, charge and discharge outputs will be made inactive by overtemperature or overvoltage, and the timer clock interrupted during all three phases and in each mode, when the limits at pins 4 or 5 are exceeded.

Specification

Supply voltage range:	5 to 25V DC
Current consumption:	1.5 to 5mA without load
Discharge output drive current:	100mA min.
Charge output drive current:	100mA min.
Reference voltage output (pin 7):	3V nominal
Oscillator frequency:	200Hz with 15nF between pin 3 and 0V , and $430\text{k}\Omega$ between pins 3 and 7
Charge times, 200Hz oscillator:	12hrs, 1hr or 30m (set by pin 13)
LED (status) drive current:	15mA max. (8mA min.)

Order Code	Type	Price each
AH40T	U2400B	£3.49

U2401B Battery Charger

Telefunken

A Ni-Cd battery charger control IC in a single 8-pin DIL package which features charging time selection performed through the connection of pin 1 to either supply +V, 0V or floating. An internal divide by 32768 divider provides the fundamental time period from the internal oscillator, with extra divisions being added depending on pin 1. If pin 1 is connected to +V the fundamental time n is further divided by 60, if left floating n is divided by 36, and if connected to 0V the time is n (divided by 1). The clock oscillator frequency is set by a single capacitor between pins 5 and 6. The clock frequency can be derived by:

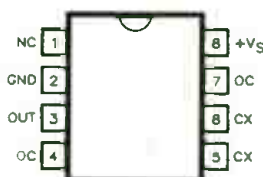
$$f_{osc}(Hz) \approx \frac{10^4}{2C_x(nF)}$$

Or the time delay T_d , and period duration, T , in seconds by:

$$t_d(s) \approx \frac{2 \times C_x(nF)}{10^4} K$$

Where $C_x \geq 100pF$ and $K = 32768 \times 1, 36$ or 60 .

The output from pin 3 is short circuit protected and limited to a current of typically 150mA and includes a Zener diode. The output pulse width is 1024 times the period duration, T , of the oscillator frequency. Pin 4 can be used to override the timer to reset it or start again. If open circuit (floating) the charger is enabled. If connected to +V the timer is reset and the output pulse is stopped, and if connected to 0V, the maximum time duration is $16 \times T$ of the oscillator frequency.



An internal power-up monitor allows the circuit to operate at up to 3.6V, but a 4.5V minimum supply is recommended against voltage fluctuations. It has an internal voltage limitation of typically 15V which allows +12V to be directly connected to the supply pin, although it is recommended that a series resistor be included with a decoupling capacitor.

Specification

DC supply current	
at 5V:	1.2mA
at 12V:	2mA
during output pulse	
5V:	2.6mA min.
during output pulse	
12V:	7.5mA min.
Minimum supply voltage:	4.5V
Supply voltage limitation:	13.2V min. to 16.3V max.
Voltage monitoring functions enabled:	@ 3.6V
all reset:	@ 2.4V

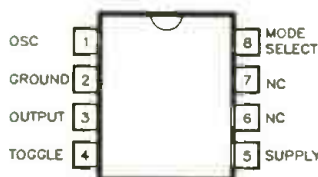
Order Code	Type	Price each
AH41U	U2401B	£1.36

ULQ2436M Countdown Power Timer

Allegro

A rugged, long duration countdown timer specifically designed to operate in an automotive or industrial environment. An internal RC oscillator is used to drive a digital countdown circuit for timing periods of typically $2\frac{1}{2}$ to 5 minutes, multiplying the oscillator period by 4064. Internal logic can automatically cause the time-out to be halved for successive time-outs. I²L technology is used for the countdown and logic circuitry, and conventional linear bipolar

devices for the oscillator and output functions. This combination results in a very economical power timer suitable for a wide range of applications. The Darlington connected, open collector output driver is capable of switching loads up to 400mA and is on during the timing period. The device is encapsulated in a standard 8-pin DIL package.



Specification

Regulator voltage:	8V
Output switch saturation voltage:	<2.5V @ $I_C = 400mA$
Output off leakage current:	<100µA @ $V_{CC} = 12V$
Toggle input threshold voltage:	1 to 5V with series 10kΩ resistor
Oscillator tolerance:	3%
Initial time-out count:	4064
Subsequent count:	2032

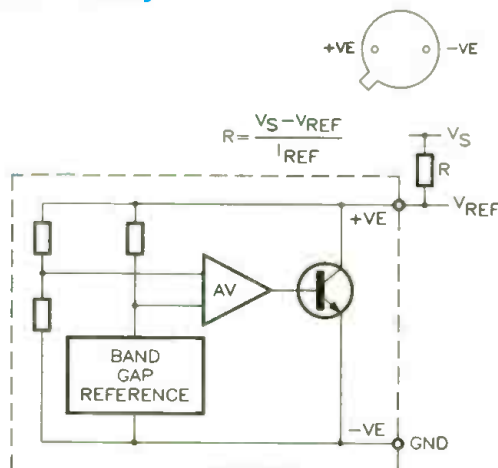
The timer has an integral Zener diode regulator between the supply pin 5 and ground, hence a current limiting resistor must be used at the supply input and the current must not exceed 15mA. A decoupling capacitor is also necessary between pins 5 and 2. An external resistor in the range 200kΩ to 2MΩ and an external capacitor in the range 1nF to 1µF determine the frequency of the internal oscillator with a cycle period of nominally $R_1 C_T$, giving an overall countdown time period of $t = 4064 \times R_1 C_T$. With the MODE SELECT pin 8 grounded, the first countdown will run for the initial time, and all subsequent counts for half of the initial time. This sequence will be repeated from the initial value again each time the supply is interrupted. With MODE SELECT connected to pin 5, the timer will repeat the full initial count every time it is activated. The TOGGLE input (pin 4) toggles the timer between the ON and OFF states. If the timer is OFF, the oscillator and countdown is restarted on the falling edge of TOGGLE. If the timer is ON and counting, it will be turned OFF on the rising edge of TOGGLE. Internal debounce is included.

Order Code	Type	Price each
GX10L	ULQ2436M	£1.65

SUBSECTION 67 VOLTAGE REGULATOR IC's

ZN458/B 2.45V Precision Reference Regulator

GEC-Plessey



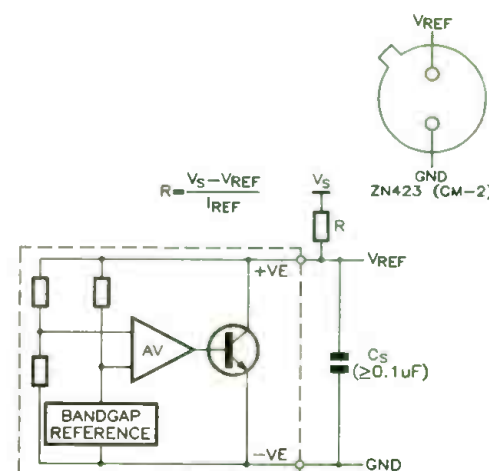
A monolithic IC that provides a stable reference source of 2.45V in a two lead package without the need for an external shaping capacitor. The device has excellent

long term stability (10ppm), low noise (10µV), and is available with a maximum change in reference voltage of either 17mV or 5mV.

Specification	ZN458	ZN458B
Maximum change in reference voltage:	17mV	5mV
Maximum dissipation:	300mW	300mW
Typical output voltage (2mA):	2.45V	2.45V
Maximum slope resistance:	0.2Ω	0.2Ω
Reference current:	2.0mA to 120mA	
Temperature coefficient (-20°C to +70°C):	99ppm/°C	29ppm/°C
RMS noise voltage:	10µV	10µV

Order Code	Type	Price each
DB54J	ZN458	£1.35
DB55K	ZN458B	£1.79

ZN423 Precision Voltage Reference Source



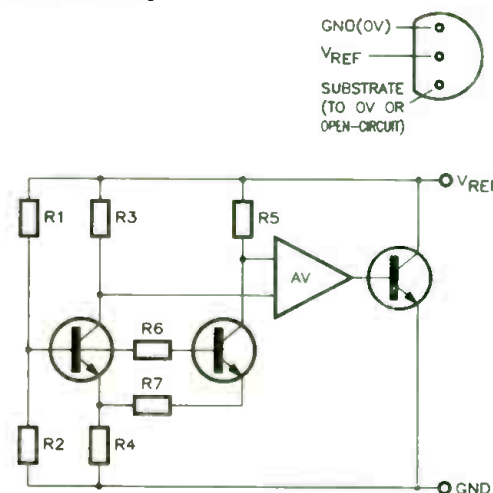
GEC-Plessey

A monolithic IC using the energy bandgap voltage of a

Order Code	Type	Price each
DB56L	ZN423	£1.56

Precision Reference ICs

GEC-Plessey



A range of ICs that use the bandgap principle to provide a precise stable reference voltage. Because of

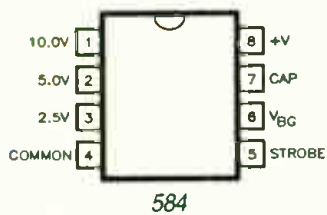
their low operating current range, the devices are suitable for all low power and battery applications.

Specification	REF12Z	REF25Z	REF50Z
Output voltage:	1.26V	2.5V	5.0V
Operating current range:	0.09 - 2.5mA	0.06 - 5.0mA	0.06 - 2.5mA
Typical slope resistance:	2.5Ω	1.2Ω	1.2Ω
Temperature coefficient:	40ppm/°C	35ppm/°C	35ppm/°C
RMS noise voltage:	1μV/√Hz	13μV	13μV

Order Code	Type	Price each
DB57M	REF12Z	£1.15
DB58N	REF25Z	£1.15
DB59P	REF50Z	£1.15

AD584JN Pin Programmable Precision Voltage Reference

Analog Devices



A precision voltage reference device that is pin-programmable to give four outputs: 10.000V, 7.500V, 5.000V and 2.500V. Other output voltages that can be above, between or below the four standard voltages are available by using external resistors. Programming (power is applied to pins 8 and 4 and output is between pins 1 and 4):

- 10.0V: All other pins open
- 7.5V: Join pins 2 and 3
- 5.0V: Join pin 2 to the output pin 1
- 2.5V: Join pin 3 to the output pin 1

By buffering each voltage programming pin with a unity gain non-inverting op-amp, multiple outputs are available.

The strobe pin can be used to turn the device off and on. When used as a power supply reference, the supply can be switched off with a single, low power signal. The output is configured to sink or source currents, so small reverse currents can be tolerated in circuits using the device without damage to the reference, and without disturbing the 10V, 7.5V and 5.0V outputs. Housed in an 8-pin DIP package.

Specification	
Output voltage tolerance	
10.000V:	±30mV maximum
7.500V:	±20mV maximum
5.000V:	±15mV maximum
2.500V:	±7.5mV maximum
Output voltage change:	30ppm/°C
Quiescent current:	0.75mA
Output current with $V_{in} > V_{out} + 2.5V$	
source @ +25°C:	10mA
source 0°C to +70°C:	5mA
sink 0°C to +70°C:	5mA

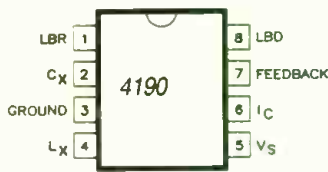
Order Code	Type	Price each
DC10L	AD584JN	£8.05

RC4190N Micropower Switching Regulator

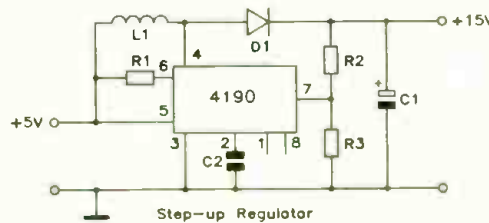
Raytheon

A versatile low power switch mode regulator for DC to DC conversions with load powers up to 400mW or 10W with external power transistor. Applications include on-card circuits where a non-standard voltage is needed or in battery operated instruments where the IC can be used to extend battery life. In the Step-up Regulator circuit, the output will deliver 15V at 25mA from a 5V supply. In the Battery Life

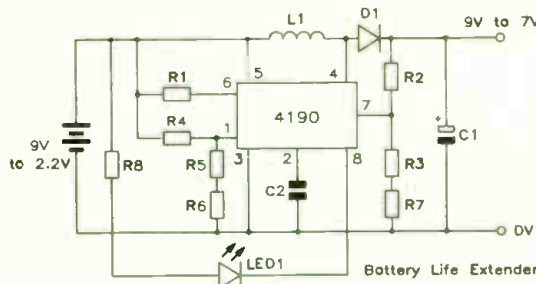
Extender circuit, the output falls to 7V as the battery runs down and is then held at 7V until the battery voltage reaches 2.2V, at which time pin 8 goes low and LED1 will light until the battery voltage reaches 1.8V.



Specification (typical at $V_s = 6V$)	
Supply voltage:	2.2V to 24V
Reference voltage:	1.31V
Switch current:	200mA
Supply current:	215μA
Efficiency:	85%
Line regulation:	0.04%
Load regulation:	0.2%
Operating frequency:	25kHz (100Hz to 75kHz)
Reference set current:	5μA
Low battery output current:	1.5mA



Parts List		
Step-up Regulator		
R1	Min Res 750k	(M750K)
R2	Min Res 180k	(M180K)
R3	Min Res 18k	(M18K)
C1	PC Elect 220μF 35V	(JL22Y)
C2	Ceramic 100pF	(WX56L)
D1	1N4148	(QL80B)
L1	Choke 1mH	(WH47B)



Battery Life Extender		
R1	Min Res 1M	(M1M)
R2	Min Res 110k	(M110K)
R3	Min Res 12k	(M12K)
R4	Min Res 910k	(M910K)
R5,6	Min Res 130k	(M130K)
R7	Min Res 13k	(M13K)
R8	Min Res 470Ω	(M470R)
C1	PC Elect 47μF 25V	(FF08J)
C2	Ceramic 47pF	(WX52Q)
D1	1N4148	(QL80B)
L1	Choke 1mH	(WH47B)
LED1	Low Current LED	(UK48C)

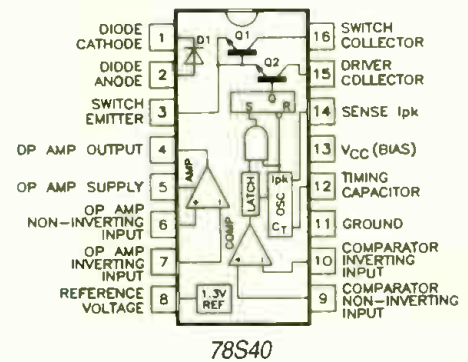
Order Code	Type	Price each
UR15R	RC4190N	£1.75

L78S40 Switching Regulator

National Semiconductor

A versatile switching regulator subsystem consisting of a temperature-compensated voltage reference, an oscillator whose duty-cycle is controllable and having an active current limit circuit, an error amplifier, a high current, high voltage output switch, a power diode and an uncommitted op-amp. It may be used to generate higher or lower regulated voltage supplies or even ones of opposite polarity from the power rail available. The output is adjustable from 1.3V to 40V and will

directly supply currents up to 1.5A or drive external transistors for larger currents.



Characteristics (typical)

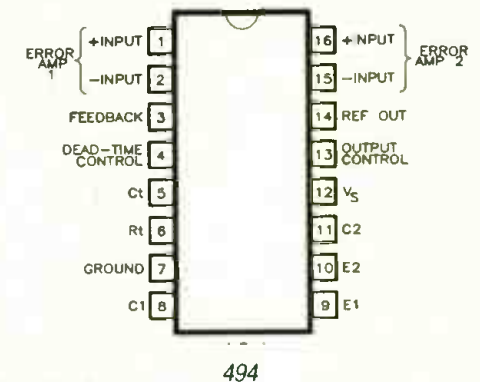
Supply voltage:	2.5V to 40V
Supply current:	1.8mA @ $V_{in} = 5V$ 2.3mA @ $V_{in} = 40V$
Op-amp supply current:	2.2mA max @ $V_{in} = 5V$ 3.2mA max @ $V_{in} = 40V$
Reference voltage:	1.245V
V_{REF} line regulation:	0.04mV/V
V_{REF} load regulation:	0.2mV/mA
Oscillator voltage swing:	0.5V
Oscillator max frequency:	75kHz
Current limit sense voltage:	250mV min/350mV max
Output transistor h_{FE} :	70
Power diode:	
forward voltage drop:	1.25V @ 1A
Comparator:	
input offset voltage:	1.5mV
input bias current:	35nA
input offset current:	5nA
Op-amp:	
input offset voltage:	4mV
input bias current:	30nA
input offset current:	5nA
voltage gain:	108dB
output source current:	150mA
output sink current:	35mA
slew rate:	0.6V/μs

Order Code	Type	Price each
UF37S	L78S40	£1.45

TL494CN Switch Mode Power Supply

Motorola

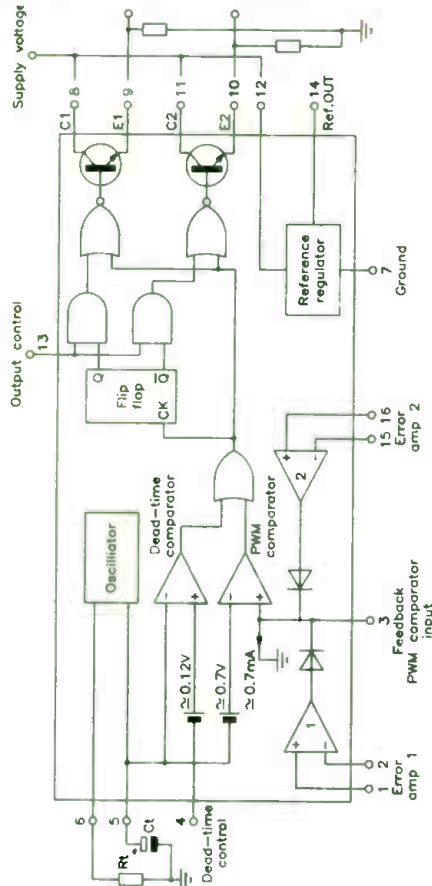
A fixed frequency, pulse width modulation control circuit designed primarily for switch mode power supply control. The chip contains two error amplifiers, an adjustable oscillator, a dead-time control comparator, pulse-steering control flip-flop, a 5V 1% precision regulator and output control circuits.



Specification	
Supply voltage:	7V to 40V
Collector output voltage:	40V max
Collector output current:	200mA each max
Current into pin 3:	0.3mA max
Timing capacitor C_t :	470pF to 10μF
Timing resistor R_t :	1.8kΩ
Oscillator frequency:	1kHz to 300kHz

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Characteristics (with $V_S = 15V$, $f = 10kHz$) typical

Reference section

Output voltage at 1mA:	5V
Input regulation 7 to 40V:	2mV
Output regulation 1 to 10mA:	1mV

Oscillator section

Frequency	
Ct = 0.01µF, Rt = 12kΩ:	10kHz

Amplifier sections

Input offset voltage:	2mV
Input offset current:	25nA
Input bias current:	0.2µA
Open-loop voltage gain:	95dB
Common mode input voltage:	-0.3V to $V_S - 2V$
Unity gain bandwidth:	800kHz
Output source current:	>-2mA

Output section

Collector-emitter saturation voltage (common emitter): $V_E = 0V$, $I_C = 200mA$:	1.1V
(emitter follower): $V_C = 15V$, $I_E = -200mA$:	1.5V
Output control input current ($V_{IN} = V_{REF}$):	3.5mA max

Dead-time control section

Input bias current ($V_{IN} = 0$ to 5.25V):	-2µA
Max duty cycle ($V_{IN} = 0V$):	>45%
Input threshold voltage (Zero duty cycle):	3V
(Max duty cycle):	0V

PWM comparator section

Input threshold voltage (Zero duty cycle):	4V
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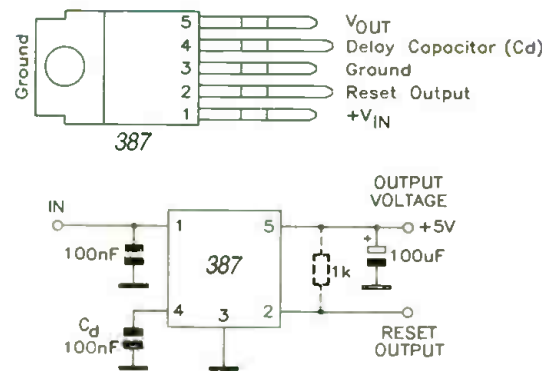
Whole device

Supply current:	7.5mA average
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Order Code	Type	Price each
RA85G	TL494CN	£1.15

L387A Voltage Regulator

SGS-Thomson



The L387A is a very low drop voltage regulator in a 5-pin TO220 package specially designed to provide stabilised 5V supplies in consumer and industrial applications. Due to its very low input/output voltage drop, this device is very useful in battery powered equipment, reducing consumption and prolonging battery life. A reset output makes the L387A particularly suitable for microprocessor systems. This output provides a reset signal when power is applied, after an external programmable delay, and goes low when power is removed, inhibiting the microprocessor. Hysteresis is built into the response to the reset delay capacitor which raises the immunity to ground noise.

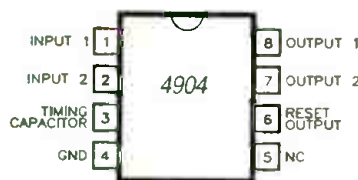
Specification

Output voltage:	5V nominal (4.8 min. to 5.2 max.)
Output current:	500mA max.
Maximum operating input voltage:	26V
Line regulation:	5mV @ $V_{in} = 6$ to 26V, $I_{out} = 5mA$
Load regulation:	15mV @ $I_{out} = 50$ to 500mA
Dropout voltage:	0.6 @ $I_{out} = 500mA$
Quiescent current:	100mA @ $I_{out} = 500mA$, $V_{in} = 6V$
Supply voltage rejection:	60dB @ $I_{out} = 350mA$ into 100µF
Output short-circuit current:	1.2A
Reset output low voltage:	0.8V max.
Reset output leakage current:	50µA
Reset delay time:	25ms, $C_d = 100nF$

Order Code	Type	Price each
AH85G	L387A	£2.99

L4904A

SGS-Thomson



The L4904A is a monolithic, low voltage drop, dual 5V regulator designed mainly for supplying microprocessor systems. Reset and data save functions during switch on and switch off can be used to generate appropriate signals for the microprocessor.

In the case of power supplies for such systems, it is necessary to provide power continuously to avoid loss of data in volatile memories and time-of-day clocks, or to save data when the primary supply is removed. The L4904A makes it very easy to supply such circuits as it provides two voltage regulators, both of which are high precision 5V types, with separate inputs, plus a reset output for the data save function.

Output V_{O1} features a 5V internal reference without the need for a voltage divider between the output and the error amplifier, a very low drop series regulator element utilising current mirrors, and permits high output impedance and then very low leakage current even in power-down conditions. This output may then be used to supply circuits continuously, such as volatile RAMs, allowing the use of a back-up battery. It also features low current consumption (0.6mA typical) to minimise battery drain.

The V_{O2} output can supply other non-essential 5V circuits which may be powered down when the system is inactive, or that must be powered down to prevent incorrect operation for supply voltages below the minimum value.

The reset output can be used as a 'power-down interrupt', permitting RAM access only in correct power conditions, or as a 'back-up enable' to transfer data into a non-volatile shadow memory when the supply is interrupted.

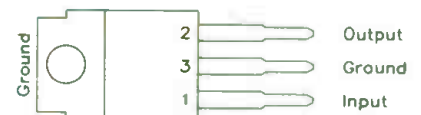
Specification

Input voltage range:	>6V to 20V max.
Input threshold voltage:	6.4V
Output voltage 1:	4.95 to 5.15V
Output current 1:	50mA
Output leakage current 1:	1µA
Output 1 drop-out voltage:	0.7V
Output voltage 2, high:	5V
Output voltage 2, low:	0.1V
Output current 2:	100mA
Line regulation, 1 & 2:	5 to 50mV
Load regulation 1:	5 to 20mV
Load regulation 2:	10 to 50mV
Supply voltage rejection:	84dB
Quiescent current 1:	0.6mA
Total quiescent current:	4.5mA
Reset threshold voltage:	4.9V
Reset pulse delay:	11ms max.
Thermal shutdown:	@ 150°C

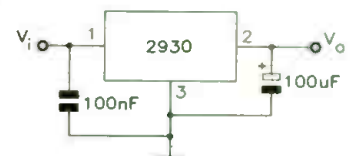
Order Code	Type	Price each
AH86T	L4904 A	£1.75

LM2930A

SGS-Thomson



A very low voltage drop 5V regulator which features an output current rating of 400mA with a dropout voltage of 0.4V typical. At 150mA the dropout voltage falls to 0.2V. Moreover, the device includes a ±40V input overvoltage protection, plus reverse polarity protection, thermal shutdown and foldback current limiting. It is designed primarily for automotive applications and protects both itself and the load from load dump field decays, transients and incorrect battery connection. The low voltage drop of this device allows correct operation even during starting, when the battery voltage can fall below 6V. The LM2930A is encapsulated in a TO220 3-pin package.



An output decoupling capacitor of 100µF minimum is required for stability, not allowing for actual value variations (larger values are preferred). However, output capacitors may be increased in size to any desired value above the minimum; one possible advantage of this would be to maintain the output voltages during brief conditions of negative input transients that might be characteristic of a particular system.

Specification

Maximum DC input voltage:	35V
Maximum reverse input voltage:	-18V
Load dump:	+40V for >5ms
Field decay:	-40V for >5ms
Output voltage:	5V
Line regulation:	5mV (50mV max.)
Load regulation:	15mV
Output impedance:	200mΩ
Quiescent current:	22mA, I _{out} = 150mA
Output noise voltage:	140μVrms
Long term stability:	20mV/1000hrs
Supply voltage rejection:	60dB
Dropout voltage:	0.4V @ I _{out} = 400mA
Output short circuit current:	230mA (foldback active)

Order Code	Type	Price each
AH87U	LM2930A	£1.39

Maximum output current

LM2574 series:	0.5A
LM2575 series:	1.0A
LM2576 series:	3.0A
ON/OFF pin input voltage (NB. operates active low):	V _{IL} < 0.8V, V _{IH} > 2.4V
Efficiency	
LM2574T5-0,	
LM2575T-5 & LM2576T-5:	77%
LM2575T-12, LM2576T-12,	
LM2575T-15:	88%

Order Code	Type	Price each
AD82D	Reg. LM2574T5-0	£3.99
AD83E	Reg. LM2575T-5	£5.99
AD84F	Reg. LM2575T-12	£5.99
AD85G	Reg. LM2575T-15	£5.99
AD86T	Reg. LM2575T-ADJ	£5.99
AD87U	Reg. LM2576T-5	£7.99
AD88V	Reg. LM2576T-12	£6.29
AD89W	Reg. LM2576T-ADJ	£8.29

LM2574/75/76 Step-Down Voltage Regulators

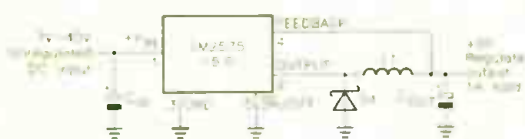
National Semiconductor



These three families of devices provide step-down regulation in a range of output currents to suit a great number of power supply and regulation applications. Providing 0.5A, 1.0A and 3.0A respectively, a realistic balance between cost and output power can be achieved. All devices are supplied in 5-pin straight lead TO220 packages and offer a high-efficiency replacement for popular three-terminal linear regulators. One of the main features of these devices is that they are very efficient and therefore most applications need no form of heatsink, as dissipated power is very low. The 2574 series comprises a single 5V fixed output device, while the 2575 series consists of a 5V, 12V, 15V and adjustable version (between ≈1.23V and 37V from a 40V supply). The 2576 series is essentially identical to the 2575 series except that it can deliver a higher output current of 3A. These devices also have a TTL active low control line so that the regulators may be switched between a low current 'Standby' mode, and the 'On' state. If remote control is not required the appropriate pin needs to be tied to ground. Only four other components are necessary in order to produce a working design, using widely available values of inductor.



2574/75/76



Parts list for a typical 5V regulated PSU using the 1A LM2575T-5 device

C _{IN} :	100μF Elect 63V	(FF12N or JL49D)
C _{OUT} :	330μF Elect 50V/25V	(JL24B or FB68Y)
L ₁ :	330μH Inductor	(AH23A or BU57M)
D ₁ :	1N5822 Schottky	(GX30H)

Specification

Supply voltage	
LM2574T5-0:	7V to 40V
LM2575T-5 & LM2576T-5:	8V to 40V
LM2575T-12 & LM2576T-12:	15V to 40V
LM2575T-15:	18V to 40V
LM2575T-ADJ & LM2576T-ADJ:	1.2V to 37V (typ from 40V supply)

LM2577 Step-Up Voltage Regulator

National Semiconductor



The 2577T is a step-up regulator device finding many applications in flyback and forward converter switching regulation. A typical arrangement requires only a few external components to realise a working design. Using existing value inductors and flyback transformers simplifies circuit design. Output currents up to 3A are possible with this device, from a wide range of input voltages (3-5V to 40V). Output voltages up to ≈60V can be developed, depending of the output current required. Step-up is achieved using the internal 52kHz fixed frequency oscillator and developing a voltage across an inductor or transformer. The current from the device charges the output capacitor and feedback maintains it at a constant voltage. A load can then be connected to the output, which is regulated to the desired voltage. Other features of the device are a soft start mode, internal protection against overcurrent limit, thermal limiting and undervoltage lock-out. Applications include simple boost regulators, flyback and forward regulators, and multiple output regulators.



2577

Parts list

C _{IN} :	0.1μF Ceramic	(BX03D or RA49D)
C _{OUT} :	470μF Elect	(FF15R or FF16S)
C ₁ :	0.47μF Monores	(RA52G)
R ₁ :	17.4k (15k+2k4)	(E15K & E2K4)
R ₂ :	Min Res 2k	(E2K or M2K)
R ₃ :	Min Res 2k2	(E2K2 or M2K2)
L ₁ :	100μH Inductor	(BU55K or AH32K at I _{OUT} < 0.5A)
D ₁ :	1N5820 Schottky	(GX29G or GX30H)

Specification

Supply voltage:	3-5V to 40V
Output switch voltage:	0V to 60V
Output switch current:	≥3A
Efficiency:	80%

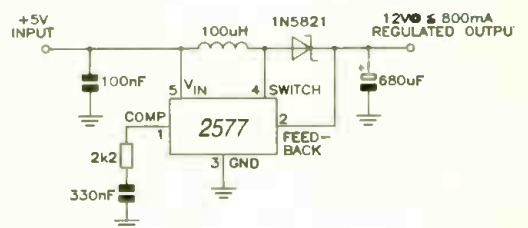
Order Code	Type	Price each
AD90X	Reg. LM2577T-ADJ	£7.99

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LM2577T-12 Step-Up Voltage Regulator

National Semiconductor

The LM2577 is a monolithic IC that provides all the power and control functions for a step-up converter deriving 12V DC from a 5V DC supply in one package. It requires a minimum number of components to operate and can even form the basis of simple flyback and forward converter switching power supplies. An NPN switching transistor capable of up to 3A is provided on chip with its associated protection circuitry, comprising current and thermal limiting and under-voltage lock-out. The load inductor is directly connected to its collector at pin 4. Other features include a fixed, internal 52kHz oscillator requiring no external timing components, a soft-start mode to reduce in-rush current during start-up, and current mode control for improved rejection of input voltage and output load transients. Case style is 5-pin TO220.



Specification

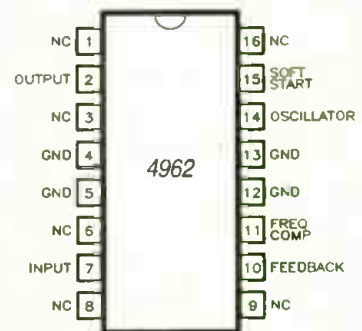
Input voltage:	5V to 10V DC (45V max.)
Line regulation:	20mV
Output voltage:	12V fixed
Load regulation:	20mV
Efficiency:	80%
Under-voltage lock-out level:	2.9V
NPN switch V _{CE} max.:	65V
NPN switch I _C max.:	3A
Switch current limit:	4.5A (flyback or forward converter modes only)
Oscillator frequency:	52kHz

Order Code	Type	Price each
GX47B	LM2577T-12	£6.75

L4962/A Switching Regulator

SGS-Thomson

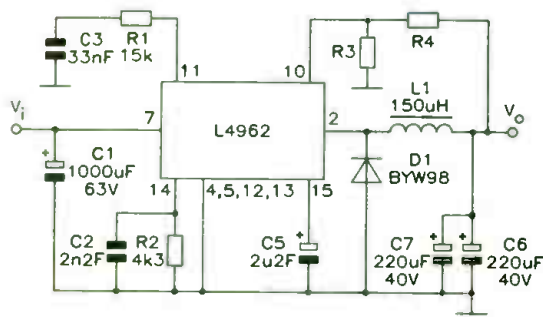
The L4962 is a monolithic stepdown switching regulator providing output voltages from 5.1V to 40V and delivering up to 1.5A. The regulation loop consists of a sawtooth oscillator, error amplifier, comparator and an output stage. An error signal is produced by comparing the output voltage with a precise 5.1V on-chip reference. This is then compared with the sawtooth signal to generate the fixed frequency, pulse-width modulated pulses which drive the output stage.



The gain and frequency stability of the loop can be adjusted by an external RC network connected to pin 11. Closing the loop directly gives an output voltage of 5.1V. Higher voltages are obtained by inserting a voltage divider.

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Output overcurrents are prevented by the soft-start function. The error amplifier output is initially clamped by the external capacitor at pin 15 being allowed to rise linearly. Output overload protection is provided in the form of a current limiter. The load current is sensed by an internal metal resistor connected to a comparator. When the load current is exceeded this sets a flip-flop to disable the output stage and discharge the soft-start capacitor. The flip-flop is reset when the soft-start voltage has fallen to 0.4V. Continuous overload will re-trip the flip-flop, a safe short-circuit current value being maintained by the dead-time period of the soft-start network. A thermal overload circuit disables circuit operation when the junction temperature reaches approximately 150°C.

Specification

Input voltage range: 9 to 46V
 Output voltage range: 5.1 to 40V
 Line regulation: 15mV @ 5.1V out, 1A
 Load regulation: 8mV (20mV max.) @ 5.1V out, 0.5 to 1.5A

Internal reference voltage: 5.1V
 Dropout voltage: 1.5V, $I_{OUT} = 1A$
 Maximum operating load current: 1.5A
 Current limiting threshold: 2 to 3.3A max.
 Efficiency: 70% @ 100kHz
 Supply voltage ripple rejection: 56dB
 Switching frequency range: 85kHz to 115kHz

Order Code	Type	Price each
AH74R	L4962 A	£2.80

L4975A Switching Regulator

SGS-Thomson

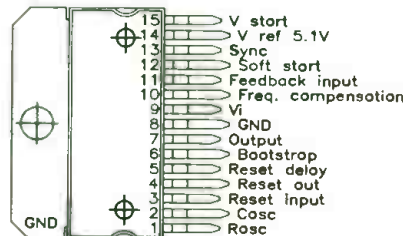
A 5A stepdown switching regulator operating in continuous mode manufactured in a new BCD technology allowing the integration of isolated, vertical DMOS power transistors with mixed CMOS/bipolar transistors. The device can deliver 5A at an output voltage adjustable from 5.1V to 40V and contains diagnostic and control functions that make it particularly suitable for microprocessor based systems. Integrated functions include a reference voltage of 5.1V $\pm 2\%$, soft-start, under-voltage lockout, an oscillator with feed-forward control, pulse by pulse current limit, thermal shutdown and a reset and power failure circuit. The latter provides an output signal for a microprocessor indicating the status of the system.

Device turn-on is around 11V with a typical 1V hysteresis; this threshold ensures the correct driving voltage for the DMOS gate, developed from an internal 12V source. The driving circuit is able to source and sink peak currents of around 0.5A to the gate of the DMOS transistor, resulting in typical current switching times of 50ns. Due to the fast commutation switching frequencies up to 500kHz are possible.

The PWM control loop comprises a sawtooth oscillator, an error amplifier, comparator, latch and

the output stage. Fixed frequency pulses of variable width are generated from the sawtooth waveform and an error signal derived by comparing the output with the 5.1V reference. The PWM latch eliminates multiple pulsing within a period even in noisy environments. Gain and stability of the loop can be adjusted by an external RC network. Voltage feed-forward is added to the oscillator maintaining superior line regulation over a wide input voltage range. A closed loop gives an output equal to the 5.1V reference; higher voltages are obtained by inserting a voltage divider.

Output over-currents are prevented at turn-on by the soft-start function, and output overload protection is provided by a current limiter which, if the output exceeds the threshold, sets a flip-flop to turn off the power DMOS. The next clock pulse, from an internal 40kHz oscillator, resets the flip-flop which will be re-tripped again if the overload still exists at the next gating pulse. This method ensures a constant current output during an overload or short-circuit condition, limited to a switching frequency of 40kHz. The reset and power failure circuitry generates an output when the supply voltage exceeds a threshold set by an external voltage divider, and the reset can have a delay time determined by an external capacitor. The reset output is open-collector active-low, and goes low immediately the output falls below 5V, or the input voltage falls below the threshold. Thermal protection disables circuit operation when the junction temperature reaches approximately 150°C.



Specification

Input voltage range: 15V to 50V max.
 Output voltage range: 5V to 40V
 Line regulation: 12mV @ 5V out, 2A
 Load regulation: 10mV @ 5V out, 1 to 5A
 Dropout voltage: 0.55V @ $I_{OUT} = 5A$
 Maximum current limiting: 7.5A
 Efficiency: 80% @ 12V out, 3A
 Supply voltage ripple rejection: 60dB
 Switching frequency: 180kHz to 220kHz (500kHz max.)

Reference voltage: 5.1V
 Turn-on threshold: 10 to 12V
 Turn-off hysteresis: 1V
 Quiescent current: 13mA
 Operating supply current: 16mA
 Output leakage current: 2mA max.
 Reset delayed output, source current: 60µA
 sink current: 10mA min.
 saturation voltage: 0.4V max. @ $I_{sink} = 15mA$

Order Code	Type	Price each
AH78K	L4975 A	£9.99

L4977A Switching Regulator

SGS-Thomson

A 7A stepdown switching regulator operating in continuous mode manufactured in a new BCD technology allowing the integration of isolated, vertical DMOS power transistors with mixed CMOS/bipolar transistors. The device can deliver 7A at an output voltage adjustable from 5.1V to 40V and contains diagnostic and control functions that make it particularly suitable for microprocessor based systems.

Integrated functions include a reference voltage of 5.1V $\pm 2\%$, soft-start, under-voltage lockout, an

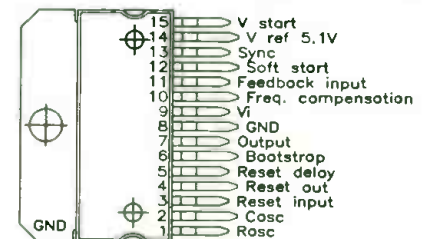
oscillator with feed-forward control, pulse by pulse current limit, thermal shutdown and a reset and power failure circuit. The latter provides an output signal for a microprocessor indicating the status of the system.

Device turn-on is around 11V with a typical 1V hysteresis; this threshold ensures the correct driving voltage for the DMOS gate, developed from an internal 12V source preventing instability. The driving circuit is able to source and sink peak currents of around 0.5A to the gate of the DMOS transistor, resulting in typical current switching times of 50ns. Due to the fast commutation switching frequencies up to 500kHz are possible.

The PWM control loop comprises a sawtooth oscillator, an error amplifier, comparator, latch and the output stage. Fixed frequency pulses of variable width are generated from the sawtooth waveform and an error signal derived by comparing the output with the 5.1V reference. The PWM latch eliminates multiple pulsing within a period even in noisy environments. Gain and stability of the loop can be adjusted by an external RC network. Voltage feed-forward is added to the oscillator maintaining superior line regulation over a wide input voltage range. A closed loop gives an output equal to the 5.1V reference; higher voltages are obtained by inserting a voltage divider.

Output over-currents are prevented at turn-on by the soft-start function, and output overload protection is provided by a current limiter which, if the output exceeds the threshold, sets a flip-flop to turn off the power DMOS. The next clock pulse, from an internal 40kHz oscillator, resets the flip-flop which will be re-tripped again if the overload still exists at the next gating pulse. This method ensures a constant current output during an overload or short-circuit condition, limited to a switching frequency of 40kHz. The reset and power failure circuitry generates an output when the supply voltage exceeds a threshold set by an external voltage divider, and the reset can have a delay time determined by an external capacitor. The reset output is open-collector active-low, and goes low immediately the output falls below 5V, or the input voltage falls below the threshold. Thermal protection disables circuit operation when the junction temperature reaches approximately 150°C.

Thermal protection disables circuit operation when the junction temperature reaches approximately 150°C.



Specification

Input voltage range: 15V to 50V max.
 Output voltage range: 5V to 40V
 Line regulation: 12mV @ 5V out, 3A
 Load regulation: 10mV @ 5V out, 2 to 7A
 Dropout voltage: 0.8V @ $I_{OUT} = 7A$
 Maximum current limiting: 9.5A
 Efficiency: 80% @ 12V out, 7A
 Supply voltage ripple rejection: 60dB
 Switching frequency: 180kHz to 220kHz (500kHz max.)

Reference voltage: 5.1V
 Turn-on threshold: 10 to 12V
 Turn-off hysteresis: 1V
 Quiescent current: 13mA
 Operating supply current: 16mA
 Output leakage current: 2mA max.
 Reset delayed output, source current: 60µA
 sink current: 10mA min.
 saturation voltage: 0.4V max. @ $I_{sink} = 15mA$

Order Code	Type	Price each
AH79L	L4977 A	£11.49

L4974A Switching Regulator

SGS-Thomson

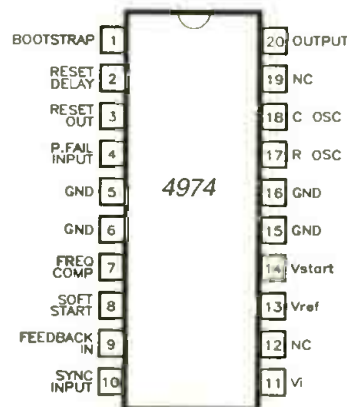
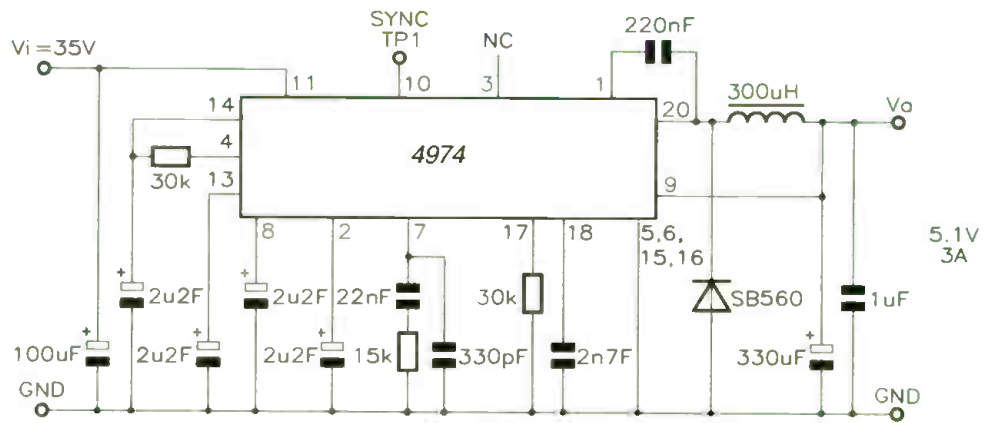
The LA4974A is a 3.5A monolithic stepdown switching regulator operating in continuous mode and realised in a new BCD technology allowing the integration of isolated, vertical DMOS power transistors with mixed CMOS/bipolar transistors. The device can deliver 3.5A at an output voltage adjustable from 5.1V to 40V and contains diagnostic and control functions that make it particularly suitable for microprocessor based systems.

Integrated functions include a reference voltage of 5.1V $\pm 2\%$, soft start, under-voltage lockout, an oscillator with feed-forward control, pulse by pulse current limit, thermal shutdown and a reset and power failure circuit. The latter provides an output signal for a microprocessor indicating the status of the system.

Device turn-on is around 11V with a typical 1V hysteresis; this level ensures a correct driving voltage for the DMOS gate. The driving circuit is able to source and sink peak currents of around 0.5A to the gate of the DMOS transistor resulting in typical current switching times of 50ns. Due to the fast commutation, switching frequencies can be up to 200kHz.

The PWM control loop consists of a sawtooth oscillator, an error amplifier, comparator, latch and the output stage. Fixed frequency pulses of variable width are generated from the sawtooth waveform and an error signal derived from comparing the output with the 5.1V reference. The PWM latch eliminates multiple pulsing within a period even in noisy environments. Gain and stability of the loop can be adjusted by an external RC network. Voltage feed-forward is added to the oscillator maintaining superior line regulation over a wide input voltage range. A closed loop gives an output equal to the 5.1V reference; higher voltages are obtained by inserting a voltage divider.

Output over-currents are prevented at turn-on by the soft-start function, and output overload protection is provided by a current limiter. This senses the load current which, if it exceeds the threshold, sets a flip-flop to turn off the power DMOS. The next clock



pulse, from an internal 40kHz oscillator, resets the flip-flop which will be re-tripped again if the overload still exists at the next gating pulse. This method ensures a constant current output during an overload or short-circuit condition limited to a switching frequency of 40kHz. The reset and power failure circuitry generates an output when the supply voltage exceeds a threshold set by an external voltage divider, and the reset can have a delay time determined by an external capacitor. The reset output is open-collector active-low and goes low immediately the output falls below 5V or the input voltage falls below the threshold. Thermal protection disables circuit operation when the junction temperature reaches approximately 150°C.

Specification

Input voltage range:	15V to 50V max.
Output voltage range:	5V to 40V
Line regulation:	12mV @ 5 to 40V out, 0.5A
Load regulation:	8mV @ 5V out, 0.5 to 2A
Dropout voltage:	0.45V @ $I_{OUT} = 3.5A$
Maximum current limiting:	4.75A
Efficiency:	90% @ 12V out, 3.5A
Supply voltage ripple rejection:	60dB
Switching frequency:	90kHz to 110kHz (200kHz max.)
Reference voltage:	5.1V
Turn-on threshold:	10 to 12V
Turn-off hysteresis:	1V
Quiescent current:	13mA
Operating supply current:	16mA
Output leakage current:	2mA max.
Reset delayed output, source current:	60µA
Reset delayed output, sink current:	10mA min.
Reset delayed output, saturation voltage:	0.4V max. @ $I_{sink} = 15mA$

Order

Code	Type	Price each
AH77J	L4974 A	£6.99

L4960 2.5A Power Switching Regulator

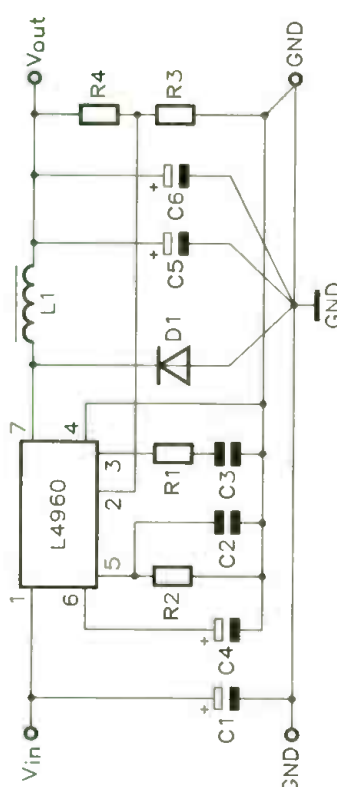
SGS-Thomson

A switch-mode voltage regulator capable of delivering between 5.1V and 40V at 2.5A maximum. The device features soft start, internal current limiting and thermal shutdown. Very few external components are required and because of the very high switching frequencies a reduction in the size and cost of them is achieved. The device has a close tolerance on-chip reference $\pm 2\%$. The unregulated voltage on pin 1 should be designed to fall to about 4V above the output voltage at maximum current. Under these conditions a heatsink of 6°C/W is required.



Specification

Output voltage range:	5.1V to 40V
Input voltage range:	9V to 46V
Line regulation:	15mV
Load regulation:	10mV
Internal reference voltage:	5.1V $\pm 0.1V$
Dropout voltage:	1.4V
Maximum current:	2.5A
Current limit threshold:	3 to 4.5A
Switching frequency:	100kHz



V_{out}	R4	
9V	3k6	(M3K6)
12V	6k2	(M6K2)
15V	9k1	(M9K1)
18V	12k	(M12K)
24V	18k	(M18K)
30V	23k (11k+12k)	(M11K)+ (M12K)

Parts List

R1	Min Res 15k	(M15K)
R2	Min Res 4k3	(M4K3)
R3	Min Res 4k7	(M4K7)
R4	Min Res - see table	
C1	SMPS Cap 100µF 100V	(JL49D)
C2	Polystyrene 220pF	(BX37S)
C3	Polyester 0.033µF	(BX73Q)
C4	PC Elect 2.2µF 100V	(FF02C)
C5,6	SMPS Cap 220µF 50V	(JL51F)
D1	BYW80-150	(UK63T)
L1	Toroid 150µH 5A	(JL72P)

Order

Code	Type	Price each
UK64U	L4960	£2.99

The output voltage is 5.1V with R4 short circuit. For higher voltages R4 should be set according to the following table:

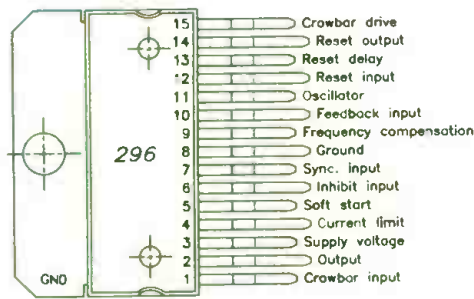


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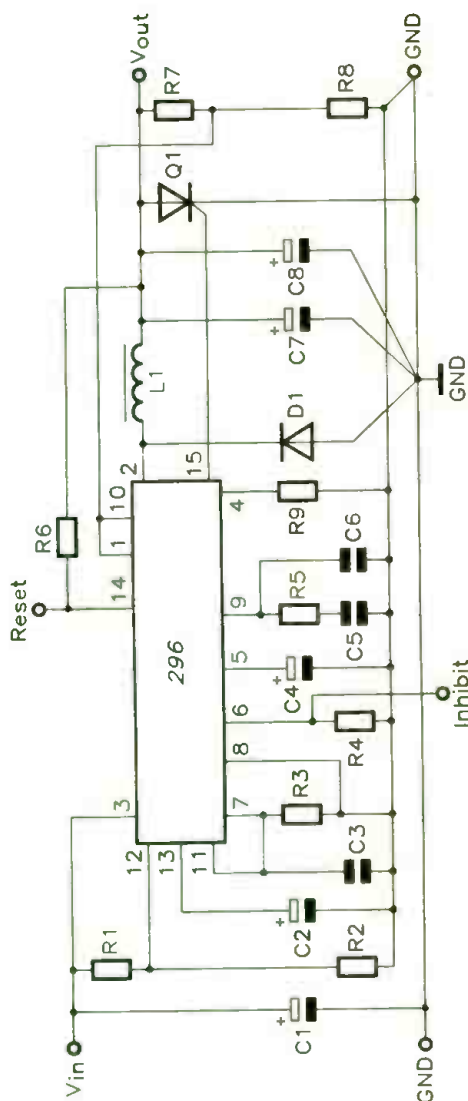
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L296P 4A Power Switching Regulator

SGS-Thomson



A switch-mode voltage regulator capable of delivering between 5.1V and 40V at 4A maximum. The device features soft start, programmable current limiting, thermal protection, remote inhibit, a reset output for microprocessors and a PWM comparator input for synchronisation in multichip configurations.



Very few external components are required and because of the very high switching frequencies a reduction in the size and cost of them is achieved. The device has a close tolerance on-chip reference $\pm 2\%$. A voltage sense input and SCR drive output are provided for optional crowbar overvoltage protection with an external SCR. The unregulated voltage on pin 1 should be designed to fall to about 4V above the output voltage at maximum current. Under these conditions a heatsink of 4°C/W is required. The crowbar input triggers the SCR when V_{out} exceeds nominal by 20%. Pin 4 can be left unconnected to provide normal current limiting, but this can be lowered by connecting a resistor between here and ground, and for example a 33k resistor sets the current limit to 2.5A. The sync input allows several L296's to work together. Simply link all the pin 7's together and omit the oscillator RC network on all but one device. A logic high level on pin 6 disables the L296. The open collector reset output generates an output signal when

the supply voltage exceeds a threshold and goes low immediately the supply voltage falls below the threshold generating a reset signal for microprocessors. If reset is not used, omit R6.

The values of some of the components depend on the output voltage according to the table below:

V_{out}	R1	R6	R7
5V	82k	100 Ω	Short circuit
9V	160k	180 Ω	3k6
12V	220k	240 Ω	6k2
15V	270k	300 Ω	9k1
18V	330k	360 Ω	12k
24V	470k	470 Ω	18k
30V	560k	620 Ω	23k(11k + 12k)

Specification

Output voltage range:	5.1V to 40V
Input voltage range:	9V to 46V
Line regulation:	15mV
Load regulation:	15mV
Internal reference voltage:	5.1V \pm 0.1V
Dropout voltage:	2V
Maximum current:	4A
Current limit threshold:	<8A
Switching frequency:	100kHz
Pin 1 threshold voltage:	6V
Pin 15 source current:	100mA

For remote on-off a TTL level is needed on pin 6. A high on pin 6 disables the chip, but if not required, R4 can be omitted and pin 6 connected directly to ground. If the output voltage is set to 5V, then C6 can be omitted, but it is necessary for all other output voltages.

Parts List

R1	Min Res – see table	
R2	Min Res 100k	(M100K)
R3	Min Res 4k3	(M4K3)
R4	Min Res 10k	(M10K)
R5	Min Res 15k	(M15K)
R6	Min Res – see table	
R7	Min Res – see table	
R8	Min Res 4k7	(M4K7)
R9	Min Res – see text	
C1	PC Elect 10 μ F 63V	(JL10L)
C2,4	PC Elect 2.2 μ F 100V	(FF02C)
C3	Polystyrene 2200pF	(BX37S)
C5	Polyester 0.033 μ F	(BX73Q)
C6	Ceramic 390pF	(WX63T)
C7,8	SMPS Cap 100 μ F 50V	(JL57M)
D1	BYW80-15	(UK63T)
Q1	C116D	(WQ22Y)
L1	Toroid 300 μ H 8A	(JL73Q)

Order

Code	Type	Price each
UK62S	L296P	£6.49

TL7702/5A Voltage Supply Supervisors

SGS-Thomson

Supply voltage supervisor ICs specifically designed for use as reset controllers in microcomputer and microprocessor systems. During power-up, the device tests the supply voltage and keeps both the active high and active low RESET outputs active as long as the supply voltage has not reached its nominal voltage value. Taking RESIN low has the same effect. To ensure that the microcomputer system has reset, the device then initiates an internal time delay that delays the return of the reset outputs to their inactive states. Since the time delay for most microcomputers and microprocessors is in the order of several machine cycles, the device internal time delay is determined by an external capacitor connected to the C_T input pin 3. Delay time, t_d , is found by: $t_d = 1.3 \times 10^4 \times C_T$, where C_T is in farads

and t_d in seconds. In addition, when the supply voltage drops below the nominal value, the outputs will be active until the supply voltage returns to the nominal value. An external capacitor (typically 100nF) must be connected to the REF output pin 1 to reduce the influence of fast transients in the supply voltage.



Three types are available; in TL7702ACP/A the sense input threshold is $+V_S - 1V$, or 6V, whichever is less, whereas for TL7705ACP/A the sense threshold is 10V, and the operating temperature range of both is 0 to 70 $^\circ\text{C}$, and both are packaged as 8-pin DIL. The TL7705ACD1/A is as TL7705ACP/A but packaged as 8-pin SO8 (surface mount).

Order

Code	Type	Price each
AH71N	T27702ACP/A	86p
AH73Q	TL7705ACP/A	90p
AH72P	TL7705ACD1/A	86p

HV3-2405-5 Single Chip Power Supply

Harris



A single chip power supply that can supply up to 50mA at 5V to 24V regulated DC when the input is anything between 28V and 264V AC rms. Thus the unit may be connected directly to the mains (via a current limit resistor) anywhere in the world and will supply the same regulated output. The IC eliminates the need for a mains transformer, bridge rectifier and separate voltage regulator. Note however, that if mains isolation is required, an isolation transformer (LW33L) should be used.

The output voltage is +5V regulated if pins 5 and 6 are linked. Output voltages from 5V up to 24V are possible by modifying the output circuit as shown in Figures 1, 2 and 3. Figure 1 is the simplest circuit, where $R3 = 1000(V_{\text{OUT}} - 5)$. E.g., for 12V output, $R3 = 1000(12 - 5) = 7k\Omega$ (2k7 and 4k3 in series). The circuit of Figure 2 will improve the accuracy of the output voltage. In this case R5 should be 1k Ω and

$$R4 = \frac{1000(V_{\text{OUT}} - 5)}{6}$$

E.g., for 12V output,

$$R3 = \frac{1000(12.2 - 5)}{6} = \frac{7200}{6} = 1k2$$

Figure 3 shows how to set the output voltage using a zener diode. In this case the output voltage is 5V plus the zener voltage. This circuit has the added advantage that 5V is also available at pin 5, but ensure that the total of the currents on pins 5 and 6 does not exceed 50mA, and note that the current from pin 5 flows through the zener, so be careful not to exceed the zener's power rating.

Specification

Input voltage range:	18V rms to 264 V rms
Input frequency range:	48Hz to 440Hz
Output current:	at least 50mA
Output voltage:	5V DC to 24V DC
Line and load regulation:	<5%

Typical for circuit shown $V_{\text{IN}} = 240V$ AC 50Hz, $V_{\text{OUT}} = +5V$ DC, $I_{\text{OUT}} = 50mA$, 25 $^\circ\text{C}$.
Output voltage: 5V $\pm 2\%$

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Output ripple:	22mV
Line regulation (80V rms to 264V rms):	10mA
Load regulation (5mA to 50mA):	<20mV
Output current:	50mA max
Short circuit current:	95mA
Dropout voltage (pin 2 to 6):	2.2V
Current into pin 5:	1mA

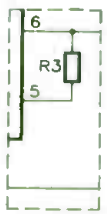
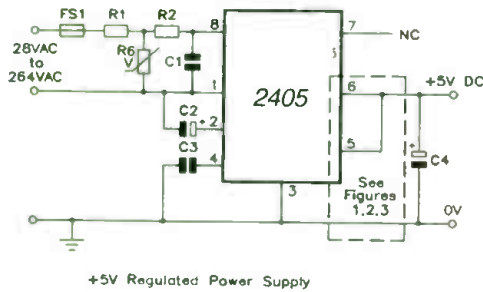


Figure 1

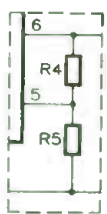


Figure 2

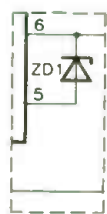


Figure 3

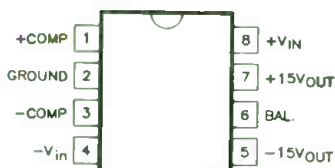
Parts List

R1,2	W/W Min 68Ω	(W68R)
R3,4	See text (Min Res)	
R5	Min Res 1k	(M1K)
R6	Suppressor 250V AC	(HW13P)
C1	IS Cap 0.047μF	(JR33L)
C2	PC Elect 470μF 35V	(FF16S)
C3	Ceramic 150pF	(WX58N)
C4	PC Elect 1μF 100V	(FF01B)
ZD1	See text	
FS1	Fuse 20mm 500mA	(WR02C)

Order Code	Type	Price each
CR13P	HV3-2405-5	£3.49

RC4195N ±15V Dual-Tracking Regulator

Raytheon



4195

A dual polarity tracking regulator designed to provide balanced positive and negative 15V output voltages at currents up to 100mA per rail. The IC is fully protected against short circuit and shuts down if the internal temperature exceeds 175°C. For operation from the mains only six additional components are required. A centre-tapped 15V mains transformer, a bridge rectifier, two 1000μF 25V capacitors (one for each input to earth) and two 10μF 25V capacitors (one on each output to earth). In use take care to ensure that the power dissipation in the IC does not exceed 600mW. Power dissipation = (input V - 15) × load current. Add both rails together. For instance with the components mentioned above the absolute max, current that could be drawn is 60mA per rail because with a 15V transformer the output of the bridge will be around 20V.

Electrical Characteristics

Line regulation:	2mV
Load regulation:	5mV
Output V temp stability:	0.005%/°C
Standby current drain:	+1.5mA

Input voltage range:	Min: 18V, Max 30V
Output voltage tracking:	+50mV
Ripple rejection:	75dB
Input/Output V differential:	Minimum 3V
Short-circuit current:	220mA
Output noise voltage:	60μV rms

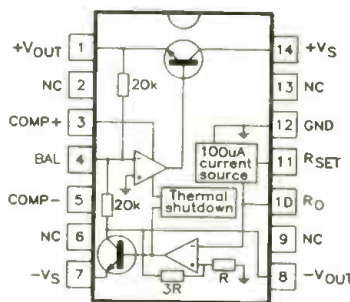
Order Code	Type	Price each
XX02C	RC4195N	£1.94

RC4194N Dual Tracking Regulator

Raytheon

NEW

The RC4194 is a dual tracking voltage regulator giving balanced output voltages between ±50mV and ±35V, at an output current of ±200mA. Designed mainly for on-card regulation applications to eliminate problems of single point regulation. Other features include overcurrent shut-down, 3W power dissipation and simultaneous adjustment of both output rails from a single resistor. An ideal regulator for use with dual rail operation amplifiers.



LM723C Variable Voltage Regulator

National Semiconductor

Formulae for Various Output Voltages

Outputs from +2 to +7 Volts
(Figure 1)

$$V_{OUT} = \left[V_{REF} \times \frac{R_2}{R_1 + R_2} \right]$$

Outputs from +7 to +37 Volts
(Figures 2,4)

$$V_{OUT} = \left[V_{REF} \times \frac{R_1 + R_2}{R_2} \right]$$

Current Limiting

$$I_{LIMIT} = \frac{V_{SENSE}}{R_{SC}} \quad V_{SENSE} = 0.7V.$$

Outputs from -6 to -250 Volts
(Figure 3)

$$V_{OUT} = \left[\frac{V_{REF}}{2} \times \frac{R_1 + R_2}{R_2} \right]; R_3 = R_4$$

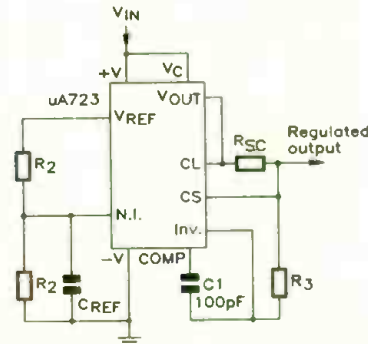
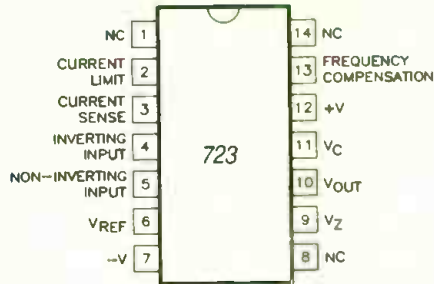


Figure 1

Basic Low Voltage Regulator

($V_{OUT} = 2V$ to $7V$)

$R_3 = (R_1 \times R_2) / (R_1 + R_2)$ for min temp drift

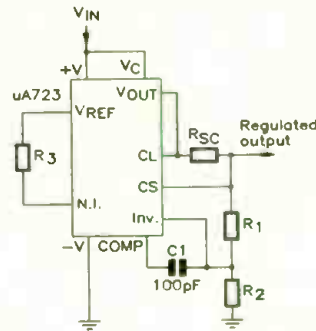


Figure 2

Basic High Voltage Regulator

($V_{OUT} = 7V$ to $37V$)

R_3 is as Fig. 1 but can be omitted

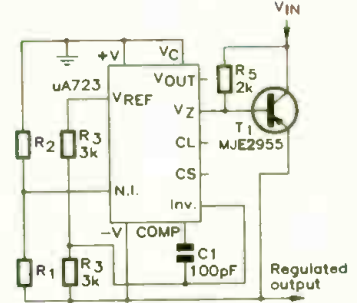


Figure 3

Negative Voltage Regulator

For metal can applications where V_Z is needed connect a 6.2V zener in series with V_{OUT}

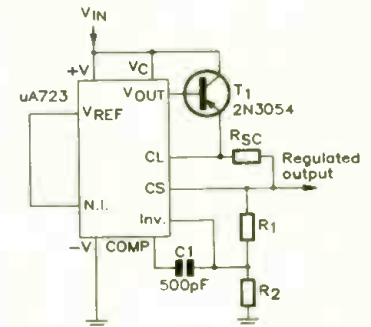


Figure 4

Positive Voltage Regulator (External NPN pass transistor)

Order Code	Type	Price each
QL21X	LM723 DIL14	86p



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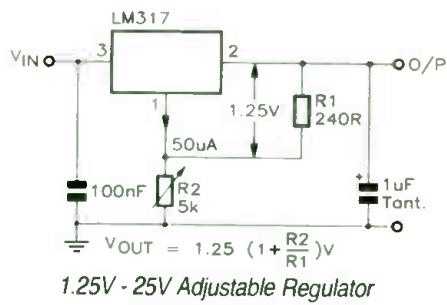
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Voltage Regulators

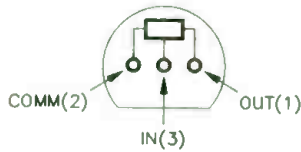
NSC=National Semiconductor ST=SGS Thomson

Order	Type No. and manufacturer	Price Each	Output Current (max)	Output Voltage (typ)	Line Regulation (typ)	Load Regulation (typ)	Ripple Rejection (dB) (typ)	Quiescent Current (typ)	Input Voltage Range	Output Resistance Voltage	Output Noise Current	Short Circuit	Case Style
QL26D	LM78L05ACZ NSC	38p	100mA	+5V ±4%	0.36%	0.4%	62dB	3mA	7V to 35V	0.2Ω	40μV	-	TO92r
WQ77J	LM78L12ACZ NSC	36p	100mA	+12V ±4%	0.25%	0.25%	54dB	3mA	14.5V to 35V	0.2Ω	80μV	-	TO92r
QL27E	LM78L15ACZ NSC	40p	100mA	+15 ±4%	0.25%	0.25%	51dB	3.1mA	17.5V to 35V	0.2Ω	90μV	-	TO92r
RA87U	LM317LZ NSC	86p	100mA	+1.2V to 37V	0.01%V	0.1%	80dB	3.5mA	3V to 40V	0.08Ω	150μV	200mA	TO92s
QL28F	L78M05CV ST	50p	500mA	+5V ±4%	0.06%	0.4%	80dB	4.5mA	7V to 35V	0.05Ω	40μV	300mA	P1d
QL29G	L78M12CV ST	50p	500mA	+12V ±4%	0.07%	0.2%	80dB	4.8mA	14.5V to 35V	0.05Ω	75μV	240mA	P1d
QL30H	L78M15CV ST	50p	500mA	+15V ±4%	0.07%	0.17%	70dB	4.8mA	17.5V to 35V	0.05Ω	90μV	240mA	P1d
WQ78K	LM78MGCP NSC	£1.10	500mA	+5V to 30V	1%(max)	1%(max)	62dB	5mA	7.5V to 35V	0.05Ω	50μV	-	P4a
RA86T	LM317MP NSC	£1.28	500mA	+1.2V to 37V	0.01%V	0.1%	80dB	3.5mA	3V to 40V	0.04Ω	150μV	800mA	P4c
CR14Q	L7805CP ST	86p	1A	+5V ±4%	0.06%	0.2%	78dB	4.2mA	7V to 35V	0.017Ω	40μV	750mA	P1d†
CR15R	L7808CP ST	99p	1A	+8V ±4%	0.06%	0.2%	72dB	4.2mA	10.5V to 25V	0.016Ω	52μV	450mA	P1d†
CR16S	L7812CP ST	99p	1A	+12V ±4%	0.06%	0.2%	71dB	4.3mA	14.5V to 35V	0.018Ω	75μV	350mA	P1d†
QL31J	L7805CV ST	56p	1A	+5V ±4%	0.06%	0.2%	78dB	4.2mA	7V to 35V	0.017Ω	40μV	750mA	P1d
QL32K	L7812CV ST	60p	1A	+12V ±4%	0.085%	0.07%	71dB	4.3mA	14.5V to 35V	0.018Ω	75μV	350mA	P1d
QL33L	L7815CV ST	56p	1A	+15V ±4%	0.075%	0.055%	70dB	4.4mA	17.5V to 35V	0.019Ω	90μV	230mA	P1d
WQ79L	LM78GCP NSC	£1.20	1A	+5V to 30V	1%(max)	1%(max)	62dB	5mA	7.5V to 35V	0.02Ω	50μV	-	P4a
UF27E	LM317T ST	95p	1.5A	+1.2V to 37V	0.01%V	0.1%	80dB	3.5mA	3V to 40V	0.012Ω	150μV	2.2A	P1e
UJ54J	L78S05CV ST	72p	2A	+5V ±4%	100mV max	80mV max	54dB	8mA	8V to 35V	0.017Ω	40μV	500mA	P1d
UJ55K	L78S09CV ST	72p	2A	+9V ±4%	130mV max	100mV max	47dB	8mA	12V to 35V	0.017Ω	60μV	500mA	P1d
UJ56L	L78S12CV ST	72p	2A	+12V ±4%	240mV max	150mV max	47dB	8mA	15V to 35V	0.018mΩ	75μV	500mA	P1d
UJ57M	L78S15CV ST	80p	2A	+15V ±4%	300mV max	150mV max	46dB	8mA	18V to 35V	0.019mΩ	90μV	500mA	P1d
RA88V	LM338K NSC	£6.49	5A	+1.2V to 32V	0.005%V	0.1%	75dB	3.5mA	3V to 35V	0.001Ω	150μV	8A	TO3a
WQ85G	LM79L05ACZ NSC	48p	100mA	-5V ±5%	1%	0.2%	60dB	3mA	-7V to -35V	-	40μV	-	TO92n
WQ86T	LM79L12ACZ NSC	48p	100mA	-12V ±5%	1%	0.2%	55dB	3mA	-14.5V to -35V	-	80μV	-	TO92n
WQ87U	LM79L15ACZ NSC	48p	100mA	-15V ±5%	1.5%	0.3%	52dB	3mA	-17.5V to -35V	-	90μV	-	TO92n
WQ88V	LM79M05CT NSC	95p	500mA	-5V ±4%	0.14%	1.5%	60dB	1mA	-7V to -35V	-	125μV	140mA	P1n
WQ89W	LM79M12CT NSC	80p	500mA	-12V ±4%	0.075%	0.55%	60dB	1.5mA	-14.5V to -35V	-	300μV	140mA	P1n
WQ90X	LM79M15CT NSC	95p	500mA	-15V ±4%	0.06%	0.45%	59dB	1.5mA	-17.5V to -35V	-	375μV	140mA	P1n
WQ92A	L7905CV ST	56p	1A	-5V ±4%	0.06%	0.2%	60dB	1mA	-7V to -35V	-	125μV	750mA	P1n
WQ93B	L7912CV ST	38p	1A	-12V ±4%	0.085%	0.07%	60dB	1.5mA	-14.5V to -35V	-	300μV	350mA	P1n
QL36P	L7915CV ST	79p	1A	-15V ±4%	0.075%	0.055%	60dB	1.5mA	-17.5V to -35V	-	375μV	230mA	P1n

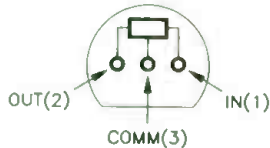
Voltage Regulator Application Circuits and Pinouts



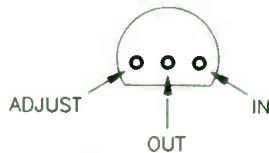
TO92n



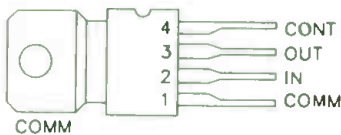
TO92r



TO92s

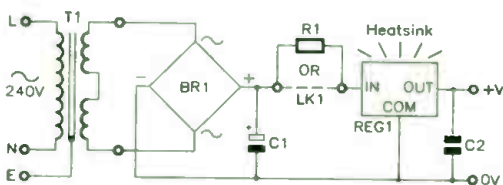


P4a



Circuits are shown and pcb's are available for regulated power supplies, also see Maplin Magazines Issues 52 and 53 for fuller construction details.

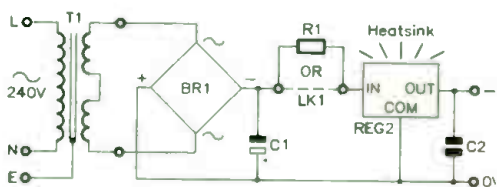
PARTS LISTS 100mA PSU Range



100mA Positive Voltage Regulator

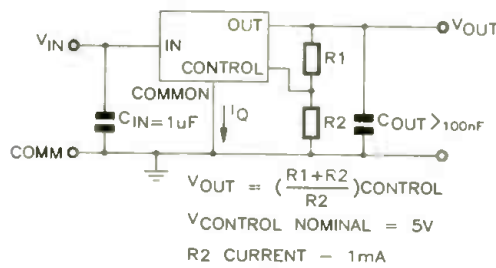
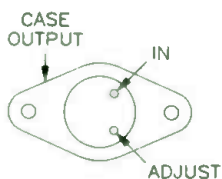
The following parts are required for all voltages.

- | | | |
|-----|------------------|---------|
| 1 | 0.1A Reg PSU PCB | (YQ39N) |
| 7 | Pins 2141 | (FL21X) |
| 1 | Heatsink 92F | (HQ79L) |
| 2 | Bolt 6BA 1/2in | (BF06G) |
| 2 | Nut 6BA | (BF18U) |
| 2 | Washer 6BA | (BF22Y) |
| 1 | Tag 6BA | (BF29G) |
| BR1 | W005 | (QL37S) |
| C2 | Disc 0.01uF | (BX00A) |



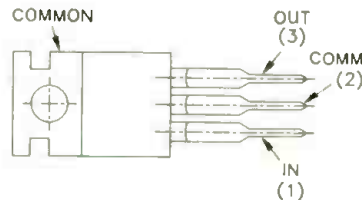
100mA Negative Voltage Regulator

TO3a



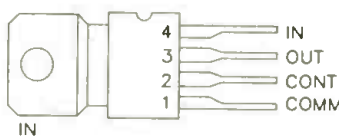
Variable Voltage Regulator

P1d



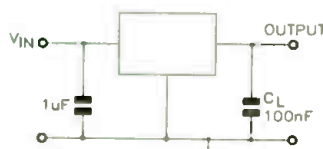
P1d† These devices are supplied in a fully isolated package guaranteed to 1500V AC or 2000V DC. They can be bolted directly to the heatsink without an insulating washer. Thermal grease must still be used.

P4b



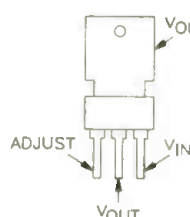
Additional parts required

- | | | |
|-------------|------------------|---------|
| +5V | | |
| T1 | Sub-Min Tr 6V | (WB00A) |
| C1 | Axial 330uF 25V | (FB68Y) |
| Reg 1 | LM7805ACZ | (QL26D) |
| Link 1 | Yes | |
| +12V | | |
| T1 | Min Tr 6V | (WB06G) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 1 | LM78L12ACZ | (WQ77J) |
| Link 1 | Yes | |
| +15V | | |
| T1 | Min Tr 12V | (WB10L) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 1 | LM78L15ACZ | (QL27E) |
| R1 | W/W Min 47u | |
| Link 1 | No | |
| -5V | | |
| T1 | Sub-Min Tr 6V | (WB00A) |
| C1 | Axial 330uF 25V | (FB68Y) |
| Reg 2 | LM79L05ACZ | (WQ85G) |
| Link 1 | Yes | |
| -12V | | |
| T1 | Min Tr 6V | (WB06G) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 2 | LM79L12ACZ | (WQ86T) |
| Link 1 | Yes | |
| -15V | | |
| T1 | Min Tr 12V | (WB10L) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 2 | LM79L15ACZ | (WQ87U) |
| R1 | W/W Min 47u | |
| Link 1 | No | |



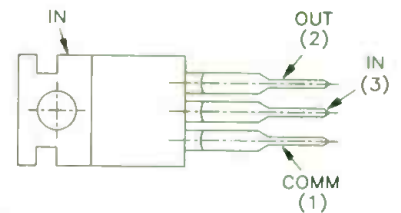
Fixed Voltage Regulator

P4c

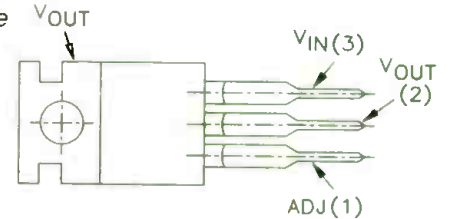


All viewed from above

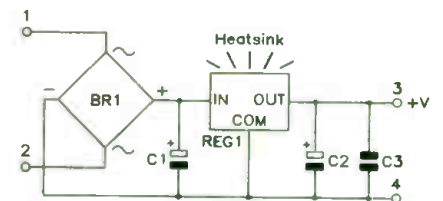
P1n



P1e



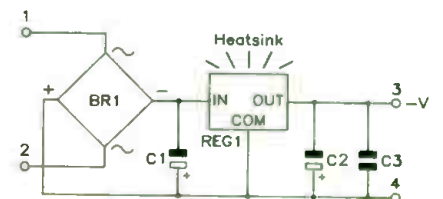
500mA/1A +V PSU Range



500mA/1A Positive Voltage Regulator

The following parts are required for all voltages.

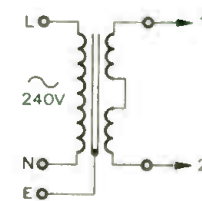
- | | | |
|-----|----------------------|---------|
| BR1 | W01 | (QL38R) |
| C2 | PC Elect 10uF 63V | (JL10L) |
| C3 | Disc 0.1uF | (BX03D) |
| 1 | 0.5/1A Reg PSU Pos V | (YQ40T) |
| 1 | 8W Heatsink | (HQ81C) |
| 4 | Pins 2141 | (FL21X) |
| 3 | Bolt 6BA 1/2in | (BF06G) |
| 3 | Nut 6BA | (BF18U) |
| 3 | Washer 6BA | (BF22Y) |



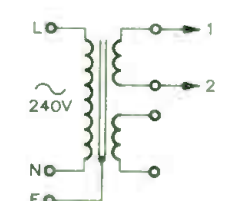
500mA/1A Negative Voltage Regulator

Additional parts required

- | | | |
|-------------------|------------------|---------|
| +5V 500mA | | |
| T1 | Min Tr 6V | (WB06G) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 1 | L78M05CV | (QL28F) |
| +12V 500mA | | |
| T1 | Min Tr 9V | (WB11M) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 1 | L78M12CV | (QL29G) |



Min Tr 6-0-6/9-0-9 for 5V/12V or 15V at 500mA



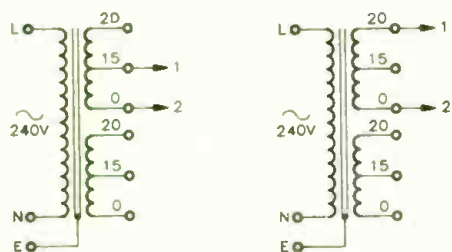
Tr 12V 1A for 5V at 1A

- | | | |
|-------------------|------------------|---------|
| +15V 500mA | | |
| T1 | Min Tr 9V | (WB11M) |
| C1 | Axial 1000uF 63V | (FB84F) |
| Reg 1 | LM78M15CV | (QL30H) |

- | | | |
|---------------|------------------|---------|
| +5V 1A | | |
| T1 | Tr 12V 1A | (WB25C) |
| C1 | Axial 2200uF 40V | (FB91Y) |
| Reg 1 | L7805CV | (QL31J) |

+12V 1A
 T1 Tr 20V 1A (WB12N)
 C1 Axial 2200µF 40V (FB91Y)
 Reg 1 L7812CV (QL32K)

+15V 1A
 T1 Tr 20V 1A (WB12N)
 C1 Axial 2200µF 40V (FB91Y)
 Reg 1 L7815CV (QL33K)

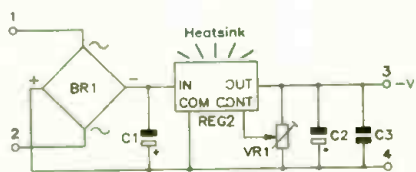
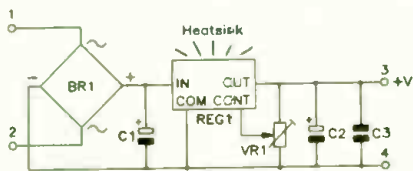


Tr 20V 1A for 12V at 1A Tr 20V 1A for 15V at 1A
500mA/1A -V PSU Range

The parts required are exactly the same as those for the 500mA/1A +V range except:

PSU All voltages 0.5/1A Reg PSU Neg V: (YQ41U)
 Reg 1: -5V 500mA: LM79M05CT (WQ88V)
 -12V 500mA: LM79M12CT (WQ89W)
 -15V 500mA: LM79M15CT (WQ90X)
 -5V 1A: LM7905CV (WQ92A)
 -12V 1A: LM7912CV (WQ93B)
 -15V 1A: LM7915CV (QL36P)

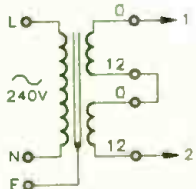
500mA/1A Variable Regulated PSU's



500mA/1A Variable Regulated Power Supply +V and -V

The following parts are required for all voltages

BR1 W01 (QL38P)
 C1 Axial 2200µF 40V (FB91Y)
 C2 PC Elect 10µF 63V (JL10L)
 C3 Disc 0.1µF (BX03D)
 VR1 Hor Sub-Min Preset 10k (UH03D)
 1 8W Amp Heatsink (HQ81C)
 4 Pins 2141 (FL21X)
 1 Tr 12V 1A (WB25C)
 3 Bolt 6BA 1/2in (BF06G)
 3 Nut 6BA (BF18U)
 3 Washer 6BA (BF22Y)



Tr 12V 1A for 500mA & 1A (+V & -V)

Additional parts required

500mA +5V to +27V
 Reg 1 LM78MGCP (WQ78K)
 1 0.5/1A Vareg PSU +V (YQ54J)
1A +5V to +27V
 Reg 1 LM78GCP (WQ79L)
 1 0.5/1A Vareg PSU +V (YQ54J)
1A -5V to -27V
 Reg 2 LM79GCP (WQ94C)
 1 0.5/1A Vareg PSU -V (YQ55K)

100mA Range PCB

For up to 100mA at +5V, +12V, +15V, -5V, -12V or -15V

Order Code	Type	Price each
YQ39N	100mA Reg PSU PCB	£3.25

500mA/1A +V Range PCB

For up to 500mA at +5V, +12V or +15V or up to 1A at +5V, +12V or +15V.

Order Code	Type	Price each
YQ40T	0.5/1A Reg +V PS PCB	£1.49

500mA/1A -V Range PCB

For up to 500mA at -5V, -12V or -15V or up to 1A at -5V, -12V or -15V.

Order Code	Type	Price each
YQ41U	0.5/1A Reg -V PS PCB	£1.49

500mA/1A Variable +V PCB

For up to 500mA or up to 1A with variable voltage from +5V to +27V output.

Order Code	Type	Price each
YQ54J	0/5/1A Vareg +V PCB	£1.49

500mA/1A Variable -V PCB

For up to 500mA or up to 1A with variable voltage from -5V to -27V output.

Order Code	Type	Price each
YQ55K	0.5/1A Vareg -V PCB	£1.49

SUBSECTION 68 DRIVER & BUFFER IC's

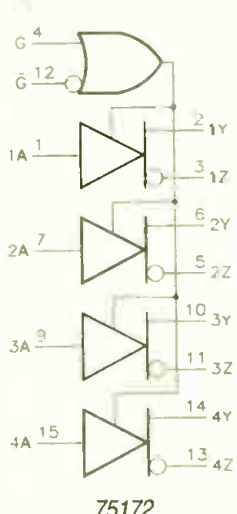
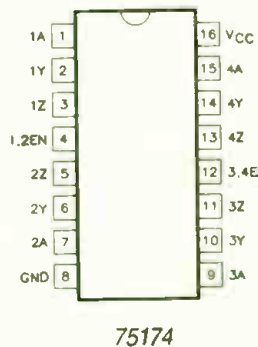
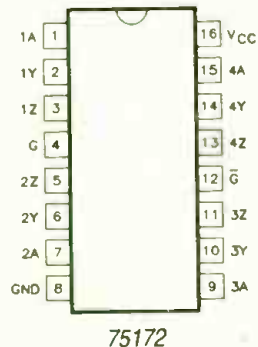
SN75172N & SN75174N

Quad Differential Line Drivers

Texas Instruments



A pair of quad differential line drivers with tri-state output, meeting EIA Standards RS-422-A and RS-485 and CCITT Recommendations V.11 and X.27. The devices have been optimised for balanced multipoint communications up to 4Mbps. Amongst their many features are positive and negative common-mode output voltage in the range of -7V to 12V, and therefore makes them ideal for supporting party-line applications in noisy environments. Both positive and negative current limiting are supported to guard against faulty conditions on the transmission bus line.



The 75172 supports both active low and active high enables, which can be used to control data flow out of the device as well as the tri-state capability. The 75174 device offers separate active high enables, one for inputs 1 & 2, and another for inputs 3 & 4. This means that each pair of inputs can be controlled totally independently of the other. Optimum performance is offered when used in conjunction with devices SN75173 & SN75175, both quad differential line receivers.

Specification

Supply voltage, V_{CC} : 4.75V to 5.25V, 5V typ
 High-level input voltage, V_{IH} : 2V
 Low-level input voltage, V_{IL} : 0.8V

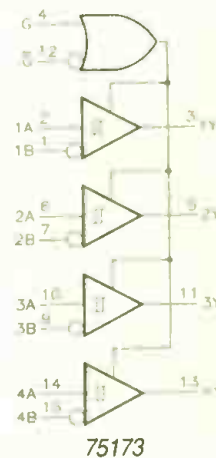
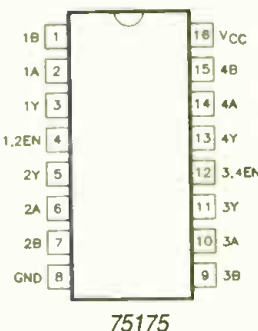
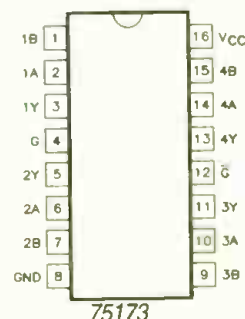
Order Code	Type	Price each
AE05F	SN75172N	£2.89
AE06G	SN75174N	£2.89

SN75173 & SN75175 Quad Differential Line Receivers

Texas Instruments



A pair of quad line receivers with tri-state outputs, designed to meet the requirements of EIA Standards RS-422-A, RS-423-A, RS-485 and several CCITT recommendations. These devices are optimised for communications up to 10Mbps and perform optimally when used with devices SN75172 or SN75174, quad differential line drivers. The 75173 device has both active high and active low enables, which can be used to both control the flow of data out of the device and also its high impedance state. On the 75173, all the four receivers in the package share a common pair of control lines. In the 75175 device there are two active high enables, one controlling inputs 1 & 2, the other controlling inputs 3 & 4. This makes the 75175 more versatile in a control aspect, but removes the ability to control the device with positive and negative logic enables.



Specification

Supply voltage, V_{CC} : 4.75V to 5.25V, 5V typ
 High-level enable-input voltage, V_{IH} : 2V
 Low-level enable-input voltage, V_{IL} : 0.8V
 Common-mode input voltage, V_{IC} : ±12V
 Differential input voltage, V_{ID} : ±12V
 High-level output current, I_{OH} : -400µA
 Low-level output current, I_{OL} : 16mA
 Ambient operating temperature: 0°C to 70°C

Order Code	Type	Price each
AE07H	SN75173N	£2.89
AE08J	SN75175N	£3.29

SN75176B & SN75LBC176

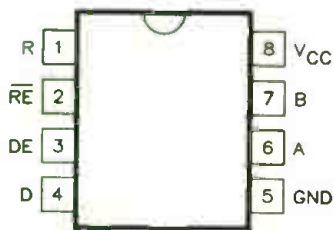
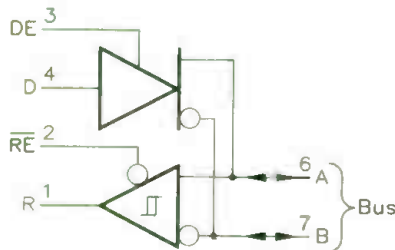
Bidirectional Transceiver

NEW!

Texas Instruments

Two bidirectional transceiver ICs meeting with EIA Standards RS-422/RS-485/CCITT V.11/CCITT V.27 and EIA Standards RS-485/ISO 8482:1987(E) respectively. Designed for bidirectional data communications on balanced multipoint transmission lines. Each device combines a tri-state differential line driver and differential input line receiver operating from a single 5V supply. The driver and receiver have active-high and active-low enables, respectively, which can be connected together to act as a direction control. The driver and receiver are connected in such a way as to minimise bus loading when the driver is disabled or $V_{CC}=0V$. A wide positive and negative common-mode range makes these devices ideal for party-line applications.

The 75LBC176 device offers the same features with high-speed low-power operation and a very low disabled supply current of $200\mu A$. Both devices offer thermal shutdown protection, driver positive and negative current limiting, operate from a single 5V supply and have a driver output capacity of $\pm 60mA$.



SN75LBC176

Specification

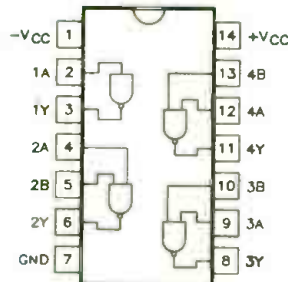
Supply voltage, V_{CC} : 4.75V to 5.25V, 5V typ
 Voltage at any bus terminal (separately or common-mode):
 V_I : 12V
 V_{IC} : -7V
 High-level input voltage, V_{IH} : 2V
 Low-level input voltage, V_{IL} : 0.8V
 Differential input voltage, V_{ID} : $\pm 12V$
 High-level output current, I_{OH} :
 Driver: -60mA
 Receiver: -400 μA
 Low-level output current, I_{OL} :
 Driver: 60mA
 Receiver: 8mA
 Operating temperature, T_A : 0°C to 70°C

Order Code	Type	Price each
AE09K	SN75176B	£1.59
AE10L	SN75LBC176	£2.69

MC1488P Quad RS232 Line Driver

SGS-Thomson

A quad line driver IC which converts standard TTL levels through one stage of inversion to output levels which meet EIA standard RS232C and CCITT standard V24. The package contains three NAND functions and one inverter.



1488

Characteristics

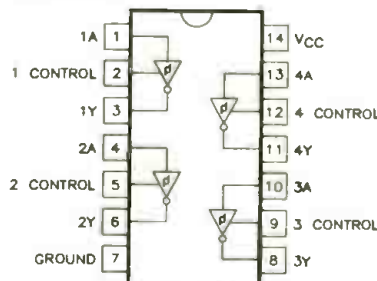
Supply voltage (max): +15V, -15V
 Input voltage (min/max): -15V, +7V
 Output voltage (max): $\pm 15V$
 Power dissipation (max): 800mW
 Input current ($V_{in} = 0V$): -1mA
 ($V_{in} = +5V$): 5mA
 Output voltage ($V_{in} = 0.8V$, $R_L = 3K$, $V_S = \pm 9V$): +7V
 ($V_S = \pm 13.2V$): +10.5V
 ($V_S = \pm 9V$): -6.8V
 ($V_S = \pm 13.2V$): -10.5V
 Short-circuit current ($V_{out} = 0V$, $V_{in} = 0.8V$): -10mA
 ($V_{in} = 1.9V$): 10mA
 Output resistance: 300 Ω

Order Code	Type	Price each
YH89W	MC1488P	48p

MC1489P Quad RS232 Line Receiver

SGS-Thomson

A quad line receiver IC designed to interface data terminal equipment with data communications equipment. The devices meet the EIA standard RS232C specification.



1489

Characteristics (typical)

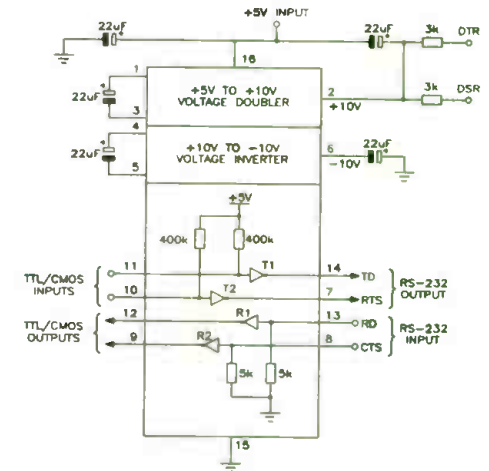
Supply voltage (max): 10V (5V typical)
 Input voltage (max): $\pm 30V$
 Output load current (max): 20mA
 Power dissipation (max): 800mW
 Input high threshold voltage ($V_{out} < 0.45V$, $I_{out} = 10mA$): 1V min, 1.5V max
 Input low threshold voltage ($V_{out} < 2.5V$, $I_{out} = -0.5mA$): 0.75V min, 1.25V max
 Input current ($V_{in} = +25V$): +5.6mA
 ($V_{in} = -25V$): -5.6mA
 ($V_{in} = +3V$): +0.53mA
 ($V_{in} = -3V$): -0.53mA
 Output high voltage ($V_{in} = 0.75V$, $I_{out} = -0.5mA$): 3.8V
 ($V_{in} = \text{Open}$, $I_{out} = -0.5mA$): 3.8V
 Output low voltage ($V_{in} = 3V$, $I_{out} = 10mA$): 0.33V
 Output short-circuit current ($V_{in} = 0.75V$): 3mA
 Supply current ($V_{in} = 5V$): 20mA
 Power dissipation ($V_{in} = 5V$): 100mW

Order Code	Type	Price each
YH90X	MC1489P	45p

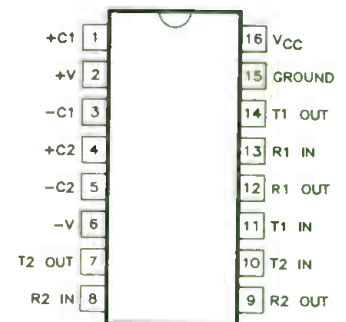
MAX232CPE RS-232 Transmitter/Receiver

Maxim

A dual RS-232 receiver/transmitter that meets all the EIA RS-232C specifications while requiring only a single +5V supply. This significantly simplifies system design by removing the need to provide power supply voltages other than +5V. The IC has two on-board charge pump voltage converters which generate +10V and -10V power supplies from the single +5V supply.



The IC contains four level translators, two of which convert TTL/CMOS input levels into $\pm 9V$ RS-232 outputs ready for transmission, and two of which convert RS-232 inputs to 5V TTL/CMOS levels. The receivers have a nominal threshold of 1.3V, a typical hysteresis of 0.5V, and can operate with up to $\pm 30V$ inputs.



232

Characteristics

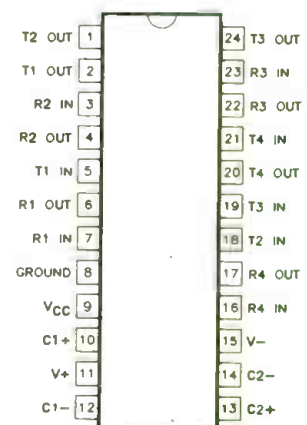
Supply voltage: 5V $\pm 10\%$
 Output voltage swing: $\pm 9V$
 RS-232 input voltage: $\pm 30V$ max
 Propagation delay: 0.5 μs
 Output resistance: 300 Ω min
 RS-232 output short circuit current: $\pm 10mA$

Order Code	Type	Price each
FD92A	MAX232CPE	£2.99

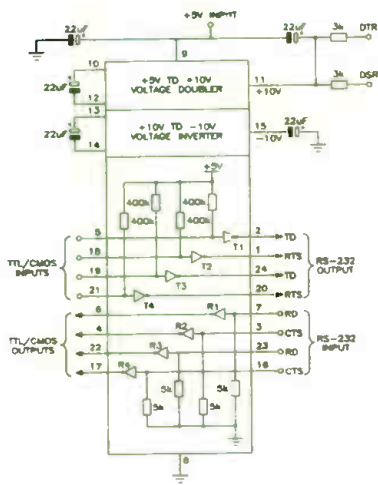
MAX238CNG Quad RS232 Transmitter/Receiver

Maxim

A quad version of MAX232CPE described previously. All the data given are identical for both IC's except pin outs.



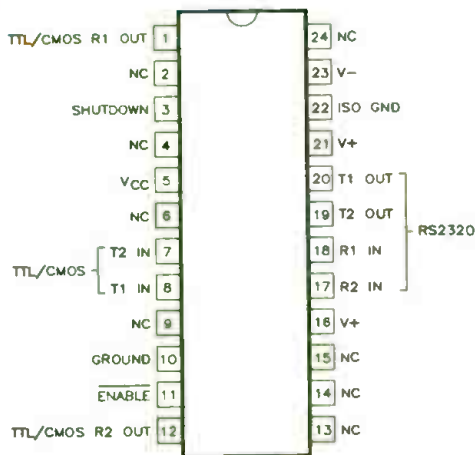
238



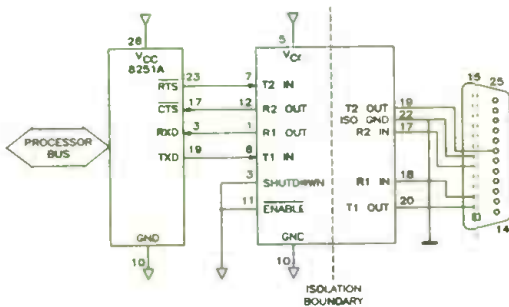
Order Code	Type	Price each
CR21X	MAX238CNG	£6.30

NM232DD Isolated Dual EIA-232D Transmitter and Receiver

Newport Components



232



An electrically isolated dual transmitter and receiver designed for use between standard UARTs and RS232 lines. The device provides two data receive and two data transmit channels, with no external components and one +5V supply. Each channel is EIA-232D and CCITT-V28 compatible at the interface and TTL/CMOS compatible at the logic connections. A low power shutdown mode and high impedance state for receiver outputs are effected via pins 3 and 11. Isolation is 1500V rms for 1 second.

Specification (typical at $V_{CC} = +5V$)

Supply voltage:	+5V $\pm 10\%$
Input voltage at receivers:	$\pm 30V$ max
Output voltage at transmitter:	$\pm 15V$ max
Output voltage ($R_L = 3k\Omega$):	$\pm 7V$
Transmission rate:	>9600 baud
Supply current:	<110mA

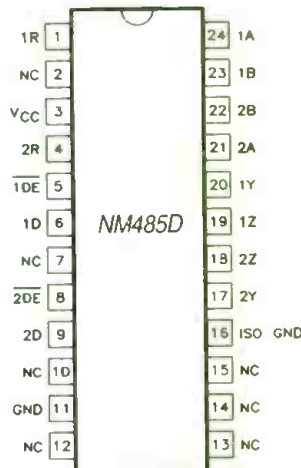
Supplied in a 24-pin package measuring 32.3 x 14.7 x 7.2mm high with pins on a 2.54mm spacing in two rows 16.7mm apart.

Order Code	Type	Price each
UL96E	NM232DD	£21.99

NM485D Isolated Dual Differential EIA-485 Driver and Receiver

Newport Components

An electrically isolated dual differential driver and receiver designed for balanced multipoint bus transmissions at rates up to 1M-bits per second. The device provides two receive channels and two driver channels, with the two driver channels having an active low enable. No external components are needed and a single 5V input supply powers all functions either side of the isolation boundary. The driver outputs provide limiting to positive and negative currents and thermal shutdown protection from line fault conditions on the transmission bus line. The receiver outputs will always be low if the receiver inputs are open. The isolation voltage between input and output is 1000V rms.



Specification (recommended operating conditions)

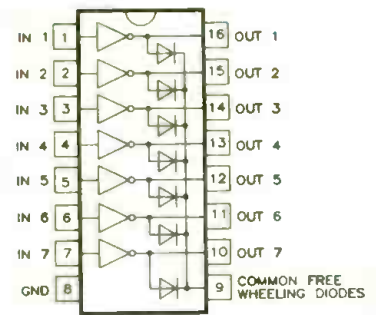
Supply voltage:	+5V $\pm 5\%$
DE and D inputs	
high level input voltage:	2V min
low level input voltage:	0.8V max
Driver	
common mode output voltage:	-7V min, 12V max
high level output current:	-60mA
low level output current:	60mA
Receiver	
common mode input voltage:	$\pm 12V$
differential input voltage:	$\pm 12V$
high level output current:	-400 μ A
low level output current:	16mA

Order Code	Type	Price each
BU39N	NM485D	£34.99

ULN2001N, ULN2002N, ULN2003N & ULN2004N Darlington Arrays

SGS-Thompson

A range of high-current Darlington arrays for driving a number of families of logic and loads. These versatile devices can be used for driving loads including solenoids, motors, LEDs, thermal printheads, etc. Each device contains seven separate Darlington pairs with commoned emitters. Each pair is rated at 500mA continuous, and can withstand surges up to 600mA. Suppression diodes are also provided so that inductive loads like motors and relays can be driven without the need for extra protective components. The ULN2001N is designed for use with general purpose, DTL, TTL, PMOS and CMOS loads. The ULN2002N is used with 14V to 25V PMOS, the ULN2003N with 5V TTL and CMOS, and the ULN2004N is used with 6V to 15V CMOS and PMOS. All devices are supplied in standard 16-pin DIP packages. Other features include: withstanding output voltages of 50V; outputs can be paralleled to give higher output current; TTL/CMOS/PMOS/DTL compatible inputs; and inputs pinned opposite to outputs.



2001/2/3/4

Specification (All figures are absolute maximums)

Output voltage, V_o :	50V
Input voltage, V_{in} :	30V
Continuous collector current, I_c :	500mA
Continuous base current, I_b :	25mA
Operating temperature ambient range, T_A :	-20°C to 85°C
Junction temperature, T_j :	150°C
Thermal resistance junction-ambient, $R_{th(amb)}$:	70°C/W

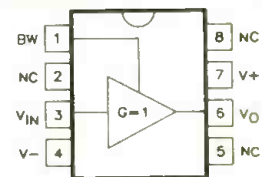
Order Code	Type	Price each
AD91Y	ULN2001N	69p
AD92A	ULN2002N	69p
AD93B	ULN2003N	69p
AD94C	ULN2004N	69p

BUF634 250mA High-Speed Buffer

Burr-Brown

NEW!

The BUF634 is a high-speed, unity gain, open-loop buffer recommended for a wide range of applications, which can include valve, solenoid and motor drivers, add-on output current booster stages for op-amps, audio line and headphone drivers, and video and test equipment applications. It can be used inside the feedback loops of op-amps to increase output current, eliminate thermal feedback and improve capacitive load drive. For low-power applications, the BUF634 can operate at a quiescent current of 1.5mA with a 250mA output capability and a slew rate of 2,000V/ μ s. Bandwidth can be increased from 30MHz to 180MHz by connecting pin 1 (BW or bandwidth control) to pin 4 (-V) with a corresponding increase in quiescent current; extra care is also required in layout to prevent an increased tendency to RF instability. The output circuitry is fully protected by internal current limiters and thermal shutdown, making the device rugged and easy to use. This device is supplied in an 8-pin DIP package, and should preferably be soldered directly into a PCB to allow heatsinking via the pins, instead of using a DIP socket.



634

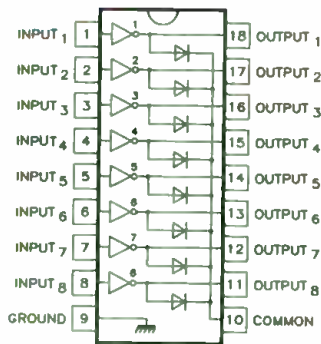
Specification

	Narrow Band Mode	Wide Band Mode
Supply voltage range (V_S):	± 2.25 to $\pm 18V$	
Quiescent current:	1.5mA	15mA
Bandwidth, -3dB, $R_L = 1k\Omega$:	30MHz	180MHz
$R_L = 100\Omega$:	20MHz	160MHz
Slew rate:	2,000V/ μ s into 100 Ω	
Input voltage range:	$\pm V_S$	
Input impedance, $R_L = 100\Omega$:	80M Ω || 8pF	8M Ω || 8pF
Max. output voltage, $I_O = 10mA$:	$+V_S - 1.7$	
$I_O = 10mA$:	$-V_S + 1.8$	
$I_O = 100mA$:	$+V_S - 2.4$	
$I_O = 100mA$:	$-V_S + 3.5$	
$I_O = 150mA$:	$+V_S - 2.8$	
$I_O = 150mA$:	$-V_S + 4$	
Continuous output current:	$\pm 250mA$	
Short-circuit output current:	$\pm 350mA$	$\pm 400mA$

Order Code	Type	Price each
AD65V	BUF634P	£5.65

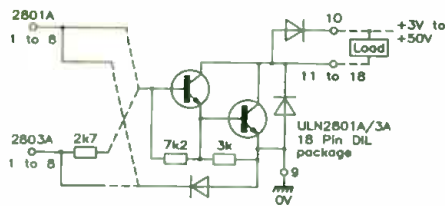
ULN2801A/3A Octal Darlington Driver Arrays

SGS-Thomson



2801

Eight separate darlington amplifiers in one 18-pin package, each capable of supplying 500mA at up to 50V. Outputs may be paralleled to give up to 4A at 50V (at 23% duty cycle and 25°C). Internal diodes are provided for inductive loads. Type 2801 may be used with standard bipolar digital logic or CMOS, while type 2803 has a 2k7 base resistor to enable direct connection to TTL and 5V CMOS.



Order Code	Type	Price each
QY78K	ULN2801A	99p
QY79L	ULN2803A	99p

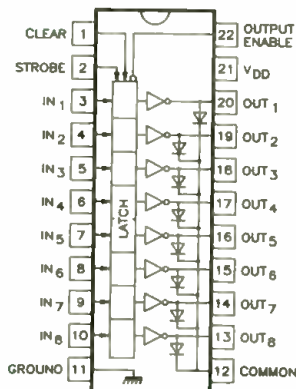
UCN5801A Latching Octal Driver

Sprague

A high current, high voltage driver IC comprising eight CMOS data latches, a bipolar darlington transistor driver for each latch, and CMOS control circuitry. Inputs are CMOS, PMOS and NMOS compatible, and a pull-up resistor is required for TTL. Input speeds up to 5MHz are possible with 5V supply, and much higher rates with 12V supply. Outputs are open collector with integral diodes for inductive loads, and are capable of sinking 500mA at 50V at 25°C. If more than two maximum loads are connected at once, then the duty cycle must be reduced (to 23% for all eight loads at 25°C). Outputs can be paralleled for higher currents.

Specifications:

Supply voltage (V_{DD}):	5V to 12V
Input voltage high (min):	$V_{DD} - 1.5V$ (V_{DD} max.)
Input voltage low (max):	1V (-0.3V min.)
Supply current:	5.6mA @ $V_{DD} = 5V$ 8mA @ $V_{DD} = 12V$



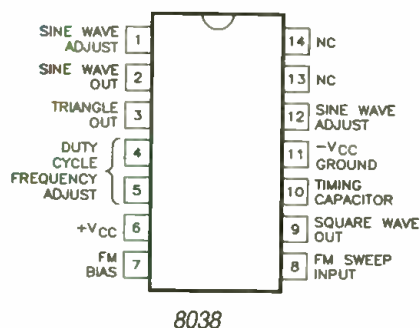
5801

Data present at an input is transferred to its latch when pin 2 is high. A high on pin 1 sets all latches to output off regardless. A high on pin 22 sets all outputs off regardless. When pin 22 is low, the output depends on the state of its latch.

Order Code	Type	Price each
QY77J	UCN5801A	£6.75

SUBSECTION 69 FREQUENCY GENERATOR IC's ICL8038CCPD Waveform Generator

Harris



8038

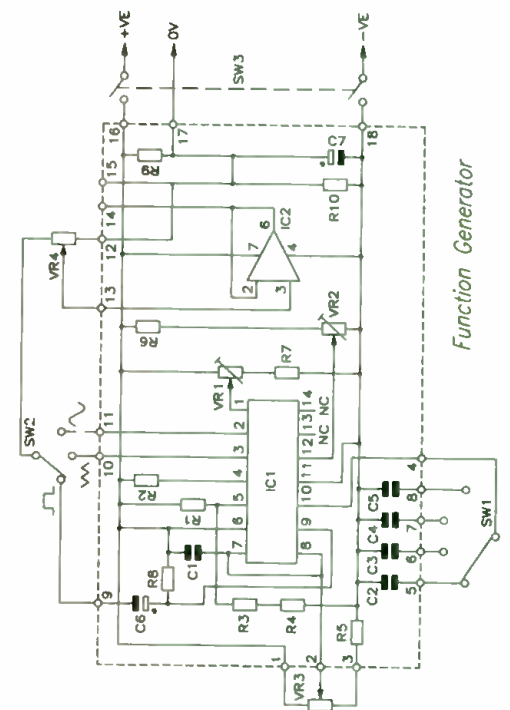
A 14-pin DIL IC capable of producing sine, square, triangular, sawtooth and pulse waveforms of high accuracy and stability. The frequency may be selected to be from 0.001Hz to 1MHz, Frequency modulation and sweeping can be accomplished with an external voltage and the frequency can be programmed digitally by resistors or capacitors. Sweep range can be up to 40:1 or 1000:1 with a little less quality. The circuit shows a sine, triangle and square wave generator. SW1 is the range switch, SW2 sets the waveshape, VR4 sets the output level and VR3 is the frequency control. VR1 and VR2 should be adjusted to give minimum distortion of sine wave.

Specification

Supply voltage:	5.0-5V to 10.0-10V (e.g. 2 x PP3 batteries)	
Output impedance:	600Ω	
Output levels max peak-to-peak sinewave:	($V_S = 7.5-0-7.5V$) 3V	
triangle:	5V	
square:	12V	
Distortion sinewave <10kHz:	<1%	
10kHz to 100kHz:	<4%	
100kHz to 200kHz:	<7%	
Linearity triangle <40kHz:	<0.1%	
40kHz to 100kHz:	<1%	
100kHz to 200kHz:	<8%	
Square Wave <100kHz:	Rise time 2μs	Fall time 2μs
100kHz to 200kHz:	1μs	1μs
Frequency range Range 1:	10Hz to 400Hz	
Range 2:	100Hz to 4kHz	
Range 3:	1kHz to 40kHz	
Range 4:	6.25kHz to 200kHz	

Parts List

R1,2,9,10	Min Res 2k2	(M2K2)
R3	Min Res 10M	(M10M)
R4	Min Res 4M7	(M4M7)
R5	Min Res 22k	(M22K)
R6,7	Min Res 10k	(M10K)
R8	Min Res 2k7	(M2K7)
C1	Poly Layer 1μF	(WW53H)
C2	Polyester 0.22μF	(BX78K)
C3	Polyester 0.022μF	(BX72P)
C4	Polystyrene 2200pF	(BX37S)
C5	Polystyrene 220pF	(BX30H)
C6	PC Elect 47μF 25V	(FF08J)
C7	PC Elect 100μF 25V	(FF11M)
VR1,2	Hor Sub-Min Preset 100k	(UH06G)
VR3,4	Pot Lin 10k	(FW02C)
IC1	8038CCPD	(YH38R)
IC2	LF351	(WQ30H)
SW1	Rotary SW4B	(FF75S)
SW2	Rotary SW3B	(FF76H)
SW3	Sub-Min Toggle E	(FH04E)
1	8038 PCB	(YQ65V)
1	DIL Socket 8-pin	(BL17T)
1	DIL Socket 14-pin	(BL18U)
18	Pins 2141	(FL21X)



Order Code	Type	Price each
YQ65V	8038 PCB	£1.39
YH38R	ICL8038CCPD	£2.90

Access VISA AMERICAN EXPRESS PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161



BS 5750 Part 2 1987
Level B: Quality Assurance
RS12750

Maplin

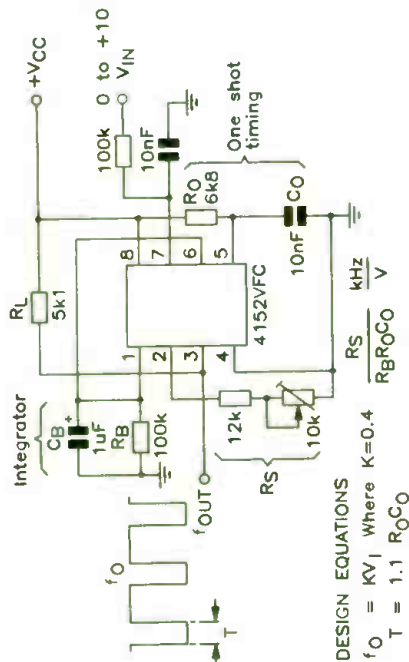
Stockist of
Assessed Capability
**YOUR GUARANTEE OF
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SUBSECTION 70 D/A & A/D CONVERTER

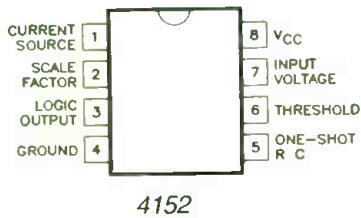
IC's RC4152N Voltage to Frequency Converter

Raytheon

A simple analogue to digital (A/D) converter which is very low cost yet has precision linearity typically $\pm 0.05\%$ with e.g. LF351 used as an integrator, or a linearity of typically 1% on its own. The output of the 4152 is a series of pulses of constant duration whose frequency is proportional to the applied input voltage. Supply voltage range is +7V to +18V, temperature stability is $\pm 75\text{ppm}/^\circ\text{C}$ and the device has a high noise rejection ratio. Max output sink current: 20mA, open collector output. Supply current 2.5mA.



DESIGN EQUATIONS
 $f_0 = KV_1$ Where $K=0.4$
 $T = 1.1 R_0 C_0$



Order Code	Type	Price each
UR17T	RC4152N	£5.99

RC2211N FSK Demodulator/ Tone Decoder

Raytheon

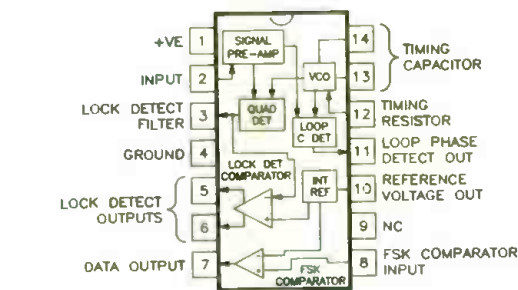
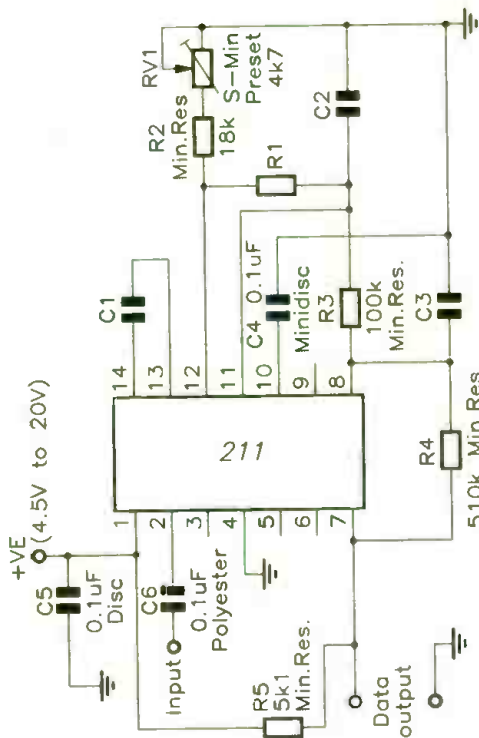
A monolithic phase locked loop for data communications. The IC contains a basic phase locked loop for tracking an input signal within the pass band, a quadrature phase detector which provided carrier detection and an FSK voltage comparator which provides FSK demodulation. In the circuit shown, the IC is used as an FSK demodulator such as would be found in the receiver circuit of a modem. The table below shows the component values required for a modem demodulator using standard European tones on the public switched network.

Characteristics (typical)

Supply voltage:	4.5V min to 20V max
Supply current:	5mA
Frequency accuracy:	$\pm 1\%$
Stability:	$\pm 20\text{ppm}/^\circ\text{C}$
Upper frequency limit:	300kHz
Lowest practical operating frequency:	0.01Hz
Timing resistor (R2 + RV1):	5k Ω min, 2M Ω max.
recommended:	15k Ω min, 100k Ω max.
Input impedance:	20k Ω
Input signal voltage:	2mV rms min, 3V rms max.
Internal reference voltage:	5.3V and 100 Ω impedance.

Baud Rate	Receive Frequencies (Hz)	R1 (Ω)	C1 (μF)
300	980/1180*	100k	Poly Layer
300	1650/1850†	180k	0.047
600	1300/1700	75k	0.027
1200	1300/2100	43k	0.027
75	390/450	150k	0.012
Baud Rate	Receive Frequencies (Hz)	C2 (μF)	C3 (μF)
300	980/1180*	0.01	0.01
300	1650/1850†	0.0068	0.01
600	1300/1700	0.0082	0.0047
1200	1300/2100	0.0068	0.0022
75	390/450	0.0033	0.047

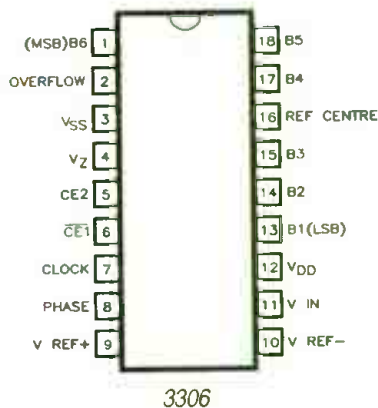
* Calling modem. † Answering modem.



Order Code	Type	Price each
QY43W	RC2211N	£2.25

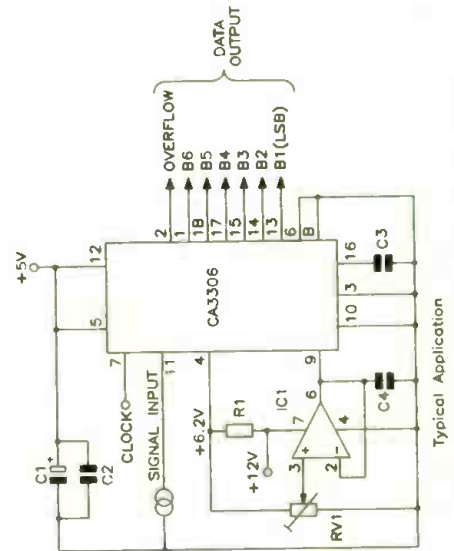
CA3306 Video Speed 6-Bit Flash A/D

Harris



A family of CMOS parallel (flash) analogue to digital converters designed for low power, high speed applications. The CA3306CE operates at sampling rates up to 10 million samples per second and the

CA3306E up to 15 million samples per second permitting analogue signals with bandwidths up to 5MHz or 7.5MHz to be fully digitised to 6-bit accuracy. An overflow output allows two devices to be connected in series to produce a 7-bit converter. Alternatively, two devices connected in parallel will permit conversion speed to be doubled.



Specification

(typical $V_{DD} = 5V$, $V_{REF} = +4.8V$, 25°C)

Supply voltage:	3V to 7.5V
Linearity error:	$\pm 0.5\text{LSB}$
Full scale input range:	0V to +4.8V
Input capacitance:	15pF
Input current:	$< \pm 500\mu\text{A}$
Resistor ladder impedance:	1100 Ω
Maximum conversion speed:	13MS/s (CA3306CE) 20MS/s (CA3306E)
Supply current:	11mA (CA3306CE) 14mA (CA3306E)
Digital output current:	$> 1.6\text{mA}$ source $> 3.2\text{mA}$ sink
Zener voltage:	6.2V at 10mA

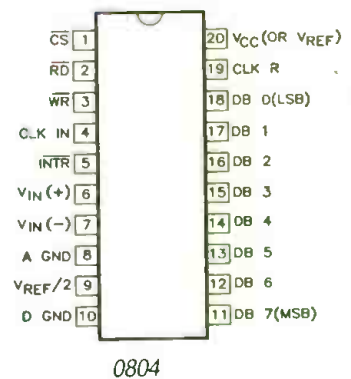
Parts List

R1	Min Res 560 Ω	(M560R)
C1	PC Elect 10 μF 50V	(FF04E)
C2	Disc 0.22 μF 25V	(JL01B)
C3,4	Minidisc 0.1 μF 16V	(YR75S)
RV1	Cermet 5k	(WR41U)
IC1	741	(QL22Y)

Order Code	Type	Price each
CR23A	CA3306CE	£8.49
CR24B	CA3306E	£8.99

ADC0804LCN 8-Bit A/D Converter

National Semiconductor

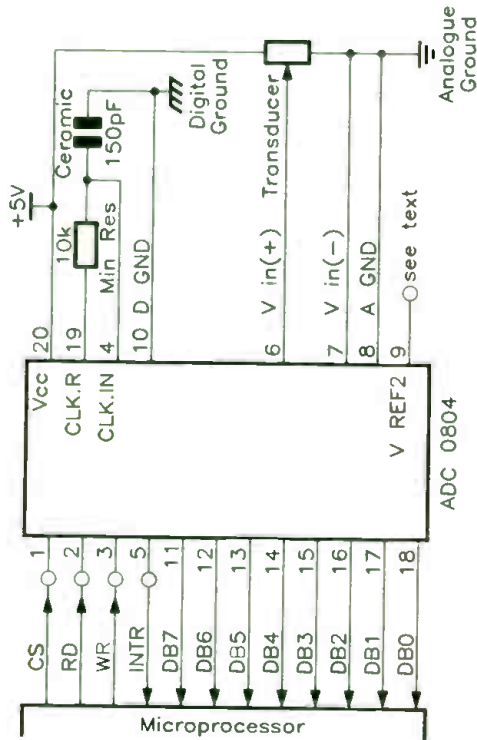


A CMOS 8-bit analogue to digital converter with output latches that can directly drive a microprocessor data bus. The IC looks like a memory location or I/O port to the microprocessor so no interfacing logic is required. The analogue input voltage range is 0V to 5V with a

Continued on next page.

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single 5V supply, and 2.5V applied to pin 9. However, the voltage reference on 9 can be any voltage under 2.5V so that any voltage span can be converted with a full 8-bits of resolution. In addition, by connecting pin 7 to a voltage other than ground the span need not start at 0V. For example if the span was 0.5V to 3.5V (a span of 3V) 0.5V would be applied to pin 7 and 1.5V to pin 9 (i.e. $\frac{1}{2}$ of 3V). No zero adjustment is needed with this IC.



Specification

Supply voltage:	+5V (V_{CC})
Max error:	± 1 bit
Input resistance at pin 9:	1.3k Ω
Analogue input voltage range:	Ground to V_{CC}
Conversion rate:	8770/second max
Supply current:	1.3mA

Order Code	Type	Price each
QQ00A	ADC0804LCN	£4.49

ADS7806 Low-Power 12-Bit Sampling CMOS ADC

Burr-Brown®

NEW!

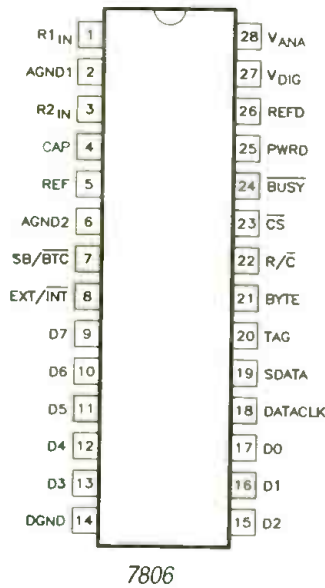
A low-power, 12-bit sampling A to D converter using state-of-the-art CMOS structures and powered from a single 5V supply. It contains a complete 12-bit capacitor-based successive approximation register with sample and hold, internal clock, reference, microprocessor interface and parallel and serial output drivers. It can acquire and convert to full 12-bit accuracy in 25 μ s maximum while consuming only 35mW. Laser trimmed scaling resistors provide industry standard input ranges of ± 10 V and 0V to 5V. In addition a 0V to 4V range allows development of complete single rail supply systems. It also has a 50 μ W power down mode, $\pm 1/2$ LSB resolution and 72dB minimum dynamic range.

Specification

Resolution:	12 bits
Input voltage ranges:	± 10 , 0 to 5, 0 to 4
Input impedances:	45.7k Ω (± 10 V), 20k Ω (0 to 5V), 21.4k Ω (0 to 4V)
Input capacitance:	35pF
Conversion time:	20 μ s

Complete cycle time

(acquire and convert):	25 μ s
Throughput rate:	40kHz
Transition noise:	0.1 LSB
Spurious free dynamic range:	90dB (± 10 V input)
Total harmonic distortion:	-90dB
Signal to noise ratio:	73dB
Full power bandwidth:	50kHz
Aperture delay:	40ns
Transient response:	5 μ s
Overvoltage recovery:	750ns
Internal reference:	2.5V
Parallel data format:	12 bits in two bytes
Serial data format:	two's complement or straight binary



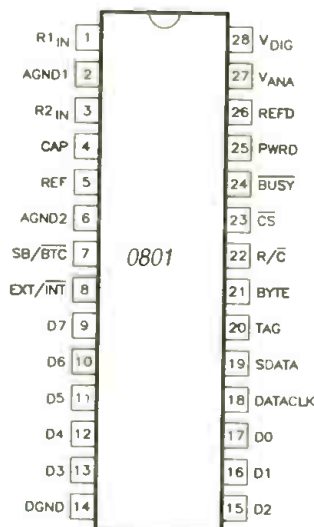
Order Code	Type	Price each
AD67X	ADS7806P	£18.65

ADS7807 Low-Power 16-Bit Sampling CMOS ADC

Burr-Brown

NEW!

A low-power, 16-bit sampling A to D converter using state-of-the-art CMOS structures and powered from a single 5V supply. It contains a complete 16-bit capacitor-based successive approximation register with sample and hold, internal clock and reference, microprocessor interface and parallel and serial output drivers. It can acquire and convert a full 16-bits to within ± 1.5 LSB in 25 μ s maximum while consuming only 35mW. Laser trimmed scaling resistors provide industry standard input ranges of ± 10 V and 0V to 5V. In addition a 0V to 4V range allows development of complete single rail supply systems. It also has a 50 μ W power down mode, ± 1.5 LSB resolution and 86dB minimum dynamic range, and is pin-for-pin compatible with the ADS7806.



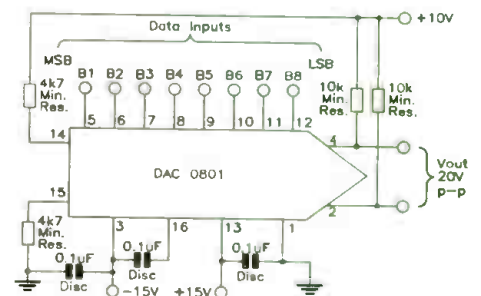
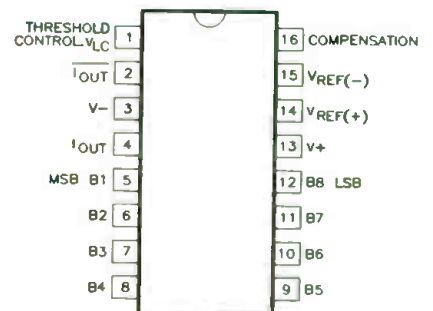
Specification

Resolution:	16 bits
Input voltage ranges:	± 10 , 0 to 5, 0 to 4
Input impedances:	45.7k Ω (± 10 V), 20k Ω (0 to 5V), 21.4k Ω (0 to 4V)
Input capacitance:	35pF
Conversion time:	20 μ s
Complete cycle time (acquire and convert):	25 μ s
Throughput rate:	40kHz
Transition noise:	0.8 LSB
Spurious free dynamic range:	100dB (± 10 V input)
Total harmonic distortion:	-100dB
Signal to noise ratio:	88dB
Full power bandwidth:	50kHz
Aperture delay:	40ns
Transient response:	5 μ s
Overvoltage recovery:	750ns
Internal reference:	2.5V
Parallel data format:	16 bits in two bytes
Serial data format:	two's complement or straight binary

Order Code	Type	Price each
AD68Y	ADS7807P	£52.50

DAC0801LCN 8-Bit D/A Converter

National Semiconductor



An 8-bit digital to analogue converter with a full scale error of less than $\pm 0.39\%$. The DAC has high compliance complementary current outputs to allow differential output voltages of 20V peak-to-peak with simple resistor loads.

Specification

Supply voltage:	± 4.5 V to ± 18 V
Settling time:	100ns (typical)
Output voltage compliance:	-10V to +18V
Full scale current ($V_{ref} = 10$ V, $R_{14,15} = 5$ k Ω):	1.99mA
Output current range ($V^- = -5$ V):	0 to 2.1mA
($V^- = -8$ V to -18 V):	0 to 4.2mA
Reference bias current (Pin15):	-1 μ A
Reference input slew rate:	8mA/ μ sec
Power supply current ($V_S = \pm 5$ V, $I_{ref} = 1$ mA)	I ⁺ : 2.3mA I ⁻ : 4.3mA
Power supply current ($V_S = \pm 15$ V, $I_{ref} = 2$ mA)	I ⁺ : 2.5mA I ⁻ : -6.5mA

Order Code	Type	Price each
QQ01B	DAC0801LCN	£3.49

DAC813 Microprocessor Compatible 12-Bit DAC

Burr-Brown

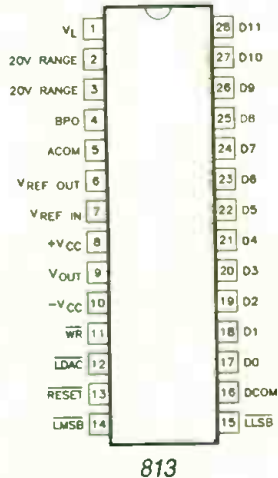
NEW!

The DAC813 is a complete 12-bit digital-to-analogue converter with a flexible digital interface. It includes a precision +10V reference, interface control logic, double-buffered latch and a 12-bit D/A converter with voltage output op amp. Fast current switches and laser-trimmed thin-film resistors provide a highly accurate, fast D/A converter.

Digital interfacing is facilitated by a double buffered latch. The input latch consists of one 8-bit byte and one 4-bit nibble to allow interfacing to 8-bit (right justified) or 16-bit data buses. Input gating logic is designed so that the last nibble or byte to be loaded can be got simultaneously with the transfer of data to the D/A latch, saving computer instructions. A reset control allows the DAC813 D/A latch to asynchronously reset the D/A output to zero, a feature useful for power-up reset, recalibration or for system re-initialisation upon system failure. The device is specified to $\pm 1/4$ LSB maximum linearity error.

Specification

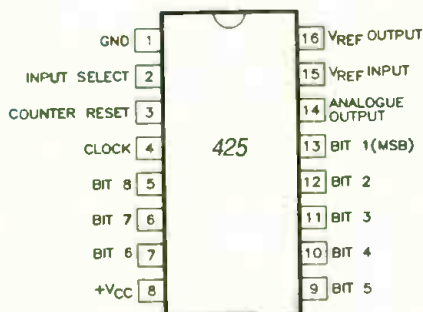
Digital input resolution:	12 bits
Linearity error:	$\pm 1/4$ LSB
Differential linearity error:	$\pm 1/4$ LSB
Gain error:	$\pm 0.05\%$
Settling time:	3.3 μ s 10V range, 4.5 μ s 20V range
Output voltage range:	0 to 10V unipolar mode $\pm 5V$, $\pm 10V$ bipolar mode
Output current:	$\pm 5mA$
Output impedance:	0.2 Ω @ DC
Short circuit duration:	indefinite
Reference voltage:	+10V
Power supply:	$\pm 15V$



Order Code	Type	Price each
AD72P	DAC813KP	£20.99

ZN425E8 8-Bit D/A and A/D Converter

GEC-Plessey



An 8-bit D/A converter also containing a counter and a 2.5V precision voltage reference. By including an 8-bit counter, analogue to digital conversion can be obtained simply by adding an external comparator and clock inhibit gating (7400). By simply clocking the counter, the IC can be used as a self-contained precision ramp generator.

Characteristics (typical)

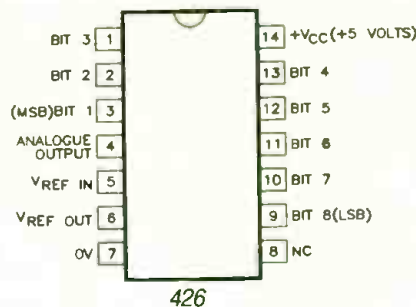
Supply voltage	4.5 to 5.5V
Settling time	1 μ s
Voltage reference	2.55V
Non-linearity	± 0.5 LSB
Analogue output resistance	10k Ω
Counter clock frequency	5MHz max

Order Code	Type	Price each
UF38R	ZN425E-8	£5.29

ZN426E-8 8-Bit D/A Converter

GEC-Plessey

An 8-bit D/A converter also containing a 2.5V precision voltage reference. Binary weighted voltages are produced at the output, the value depending on the digital number applied to the input bits.



Characteristics (typical)

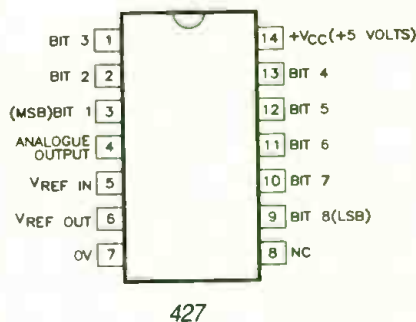
Supply voltage	4.5 to 5.5V
Settling time	1 μ s
Voltage reference	2.55V
Non-linearity	± 0.5 LSB
Analogue output resistance	10k Ω
Supply current	5mA

Order Code	Type	Price each
UF39N	ZN426E-8	£3.20

ZN427E-8 8-Bit A/D Converter

GEC-Plessey

An 8-bit A/D converter with 3-state outputs to permit easy interfacing to a common data bus. The IC contains a voltage switching DAC, a fast comparator, successive approximation logic and a 2.56V precision voltage reference.



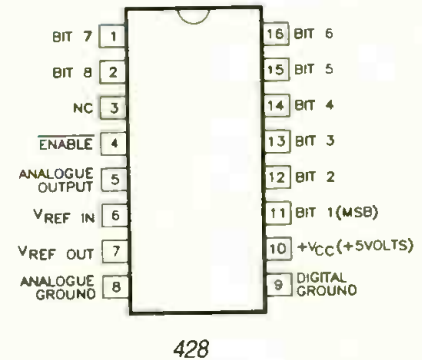
Characteristics (typical)

Supply voltage	4.5 to 5.5V
Max error	± 0.5 LSB
Conversion time	10 μ s
Clock frequency	1MHz
Supply current	25mA

Order Code	Type	Price each
UF40T	ZN427E-8	£10.99

ZN428E-8 8-Bit D/A Converter

GEC-Plessey



An 8-bit D/A converter with input latches to facilitate updating from a data bus. A 2.5V reference is also included. Complementary to ZN427E.

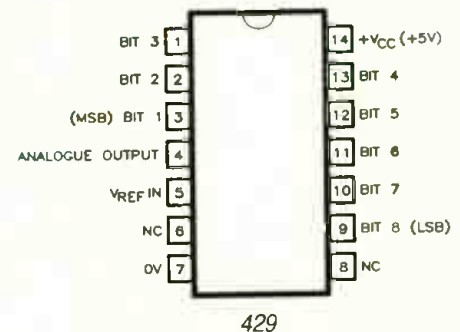
Characteristics (typical)

Supply voltage	4.5 to 5.5V
Linearity error	± 0.5 LSB
Settling time	800ns
Voltage reference	2.55V
Analogue output resistance	4k Ω
Supply current	20mA

Order Code	Type	Price each
UF41U	ZN428E-8	£6.30

ZN429E-8 8-Bit D/A Converter

GEC-Plessey



A low-cost 8-bit D/A converter that contains an advanced design of R-2R ladder network and an array of precision bipolar switches on a single monolithic chip. The special design of the ladder network results in full 8-bit accuracy using normal diffused resistors.

Specification

Supply voltage:	4.5V to 5.5V
Voltage reference:	3.0V
Linearity error:	± 0.5 LSB
Analogue output resistance:	10k Ω
Settling time:	1 μ s
Typical supply current:	5mA

Order Code	Type	Price each
DB52G	ZN429E-8	£1.89

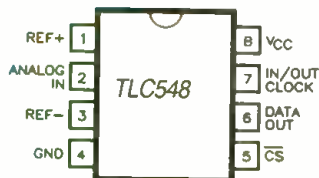
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TLC548IP A to D Peripheral With Serial Control

Texas Instruments



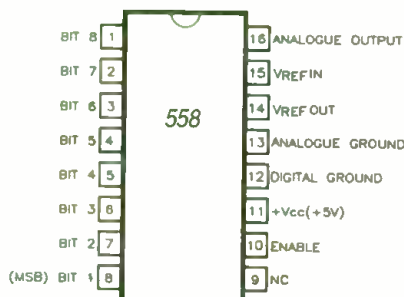
The TLC548 is an A/D peripheral IC built around an 8-bit, switched-capacitor, successive-approximation ADC. It is designed for serial interface with a microprocessor or peripheral through a 3-state data output and an analogue input. The device uses only the I/O clock input, along with the Chip Select (CS) input for data control. The maximum clock I/O frequency is guaranteed to be up to 2.048MHz. Operation is very similar to that of more complex ADCs, however, the TLC548 provides an on-chip system clock allowing internal device operation to proceed independently of serial input/output data timing, and permits manipulation of the device as desired for a wide range of software and hardware requirements. The I/O clock, together with the internal system clock, allows high-speed data transfer and conversion rates of 45,500 conversions per second. Additional features include versatile control logic, an on-chip sample-and-hold circuit that can operate automatically or under microprocessor control, and a high-speed converter with differential high-impedance reference voltage inputs that ease ratiometric conversion, scaling and circuit isolation from logic and supply noise. The design of the totallyswitched-capacitor successive-approximation converter circuit allows conversion with a maximum total error of ± 0.5 least significant bits (LSB) in less than 17 μ s. Operating temperature range is -40°C to $+85^{\circ}\text{C}$. The device is encapsulated in an 8-pin DIL package.

Order Code	Type	Price each
GX06G	TLC548P	£3.99

ZN558 8-Bit Latched Input D/A

GEC-Plessey

A monolithic 8-bit D/A converter with input latches which allow updating from a data bus. The latch is transparent when enable is LOW, and data is held when enable is taken HIGH. The device contains a 2.5V reference output and a separate reference input, thus allowing the device to be used with an external fixed or varying reference or its internal reference. The device is guaranteed monotonic over the full operating temperature range (0°C to $+70^{\circ}\text{C}$), and is microprocessor, TTL and 5V CMOS compatible. Housed in a 16-pin MP-16W package.



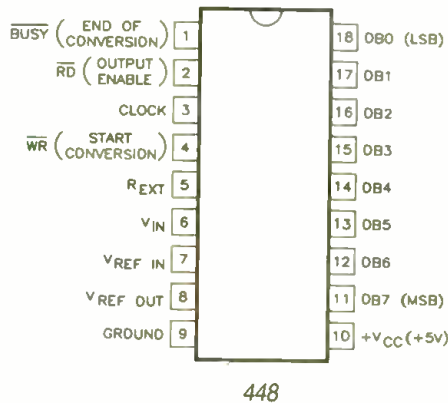
Specification
 Supply voltage: 4.5V to 5.5V
 Voltage reference: 2.5V
 Linearity error: ± 0.5 LSB
 Analogue output resistance: $4\text{k}\Omega$
 Settling time: 800ns
 Typical supply current: 20mA

Order Code	Type	Price each
DB51F	ZN558	£4.99

ZN448E 8-Bit A/D Converter

GEC-Plessey

An 8-bit A/D converter designed for easy interfacing to microprocessors. The chip contains a 2.5V precision reference, comparator, clock generator, interface and control logic and 3-state output buffers. Only a reference resistor and capacitor, clock resistor and capacitor and input resistors are required for operation with either uni- or bipolar input voltages.

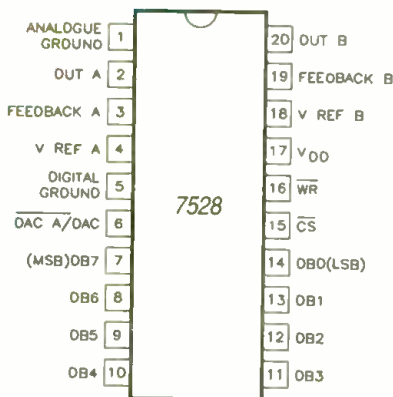


Characteristics (typical)
 Supply voltage: 4.5 to 5.5V
 Max error: ± 0.5 LSB
 Voltage reference: 2.55V
 Clock frequency: 1MHz (max)
 Clock resistor: $<2\text{k}\Omega$
 Conversion time: 9 μ s
 Supply current: 25mA

Order Code	Type	Price each
UF43W	ZN448E	£8.49

PM7528HP Dual 8-Bit D/A Converter

Analog Devices



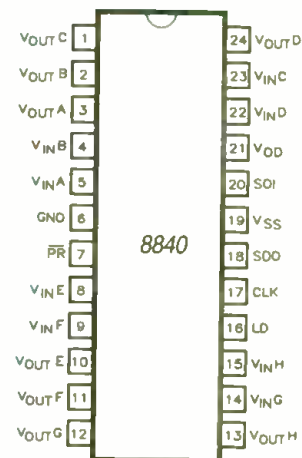
Two 8-bit multiplying digital to analogue converters in one package. Excellent DAC to DAC matching and tracking is achieved. Digital input data is directed into the latches of one of the DAC's according to the condition on pin 6. The chip is TTL and CMOS compatible and the data load cycle is similar to the write cycle of a RAM.

Specification (typical at 25°C)
 Supply voltage: +5V to +15V
 Non-linearity: ± 1 LSB max
 Settling time: 350ns at 5V, 180ns at 15V
 Supply current: 1mA

Order Code	Type	Price each
UL11M	PM7528HP	£8.65

DAC-8840FP 8-Bit, 4-Quadrant Multiplying D/A Converter

Analog Devices



A device that contains eight, general-purpose, digitally controlled, voltage adjustment devices, thus allowing the device to replace trimming potentiometers, especially in new designs. The device is ideal for AC and DC gain control of signals up to 1MHz bandwidth, and is particularly useful for signal inversion and modulation, that is often found in video convergence circuitry. Internally, there are eight voltage output CMOS D/A converters, each with separate reference inputs. Each converter has its own register, which is updated from an internal serial-to-parallel shift register, which in turn is loaded from a 3-wire serial input interface. A 12-bit data word is used, and when decoded, the first 4-bits determine the address of the D/A converter register to be loaded, and the remaining 8-bits are the control data. A serial data output is provided to allow simple daisy-chaining in multiple converter applications, without additional external decoding logic.

Specification
 Supply voltage: $\pm 5\text{V}$
 Supply current: $\pm 19\text{mA}$
 Nonlinearity: ± 1 LSB maximum
 DAC output voltage range: $\pm 3\text{V}$ min ($10\text{k}\Omega$ load)
 Multiplying gain bandwidth: 2.5MHz
 Slew rate: 1.3V/ μ s minimum
 THD: 0.01%

Order Code	Type	Price each
DC11M	DAC-8840FP	£23.79

DAC7800/1/2 Dual CMOS 12-Bit Multiplying DACs

Burr-Brown

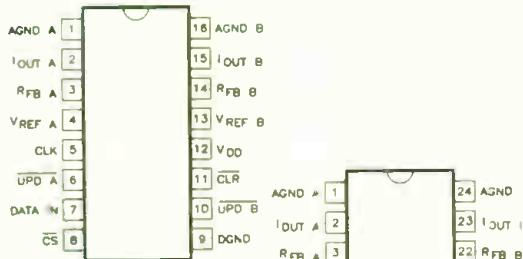
NEW!

The DAC 7800, 7801 and 7802 are members of a new family of monolithic dual 12-bit CMOS multiplying digital-to-analogue converters. The digital interface speed and the AC multiplying performance are achieved by using an advanced CMOS process optimised for data conversion circuits. High stability on-chip resistors provide true 12-bit integral and differential linearity over the wide industrial temperature range of -40°C to $+85^{\circ}\text{C}$. The DAC7800 features a serial interface capable of clocking in data at a rate of at least 10MHz. Serial data is clocked (edge triggered) MSB first into a 24-bit shift register and then latched into each D/A separately or simultaneously as required by the application. An asynchronous CLEAR control is provided for power-on reset or system calibration functions. The DAC7801 has a 2-byte (8 + 4) double-buffered interface. Data is first loaded (level transferred) into the input registers in two steps for each D/A, then both D/As are updated simultaneously. DAC 7801 features an asynchronous CLEAR control.

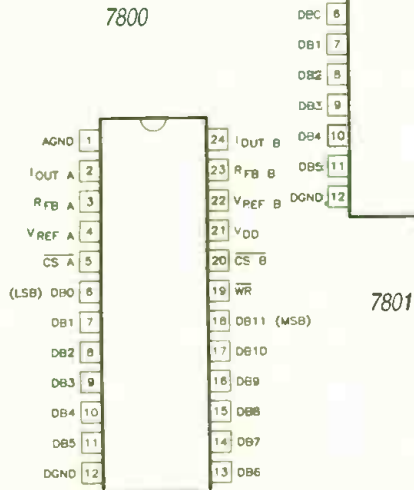
The DAC7802 has a single-buffered 12-bit data word interface. Parallel data is loaded (edge triggered) into the single D/A register for each D/A. All versions operate from a single 5V supply.

Specification

Resolution: 12 bits minimum
 Relative accuracy: ± 1 LSB
 Differential non-linearity: ± 1 LSB
 Gain error: ± 3 LSB
 Digital input impedance: $10k\Omega$
 Digital input capacitance: $10pF$
 Digital input levels: 2V min. 0-8V max. TTL compatible
 Output current settling time: $0.4\mu s$
 D-to-A glitch impulse: $0.9nV/s$
 AC feedthrough: $-75dB @ 10kHz$
 Output capacitance: 30 to $70pF$
 Channel to channel isolation: $-95dB$



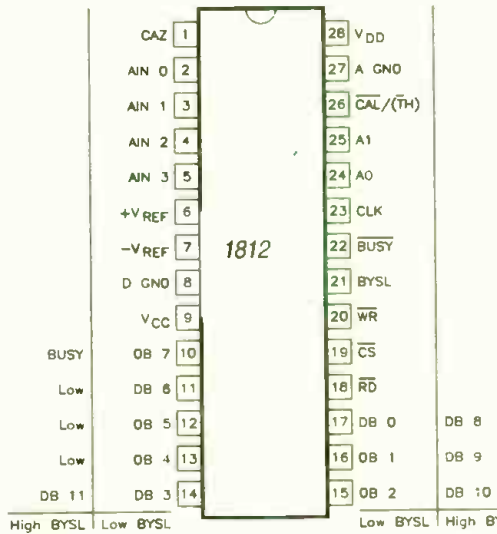
Digital crosstalk: $0.9nV$



Order Code	Type	Price each
AD69A	DAC7800KP	£14.99
AD70M	DAC7801KP	£15.25
AD71N	DAC7802KP	£15.65

device uses the standard control signals, \overline{CS} , \overline{RD} and \overline{WR} , while the 4-channel input multiplexer is controlled via address inputs A0 and A1. Two converter busy flags are available to facilitate polling of converter status.

The full differential, auto-zeroed comparator has a high power supply rejection ratio, and very low offset voltages. The SDA1812D uses a binary weighted capacitor network that makes it suitable for digitising AC signals, as well as DC signals. The device has a maximum sampling rate of 100kHz.



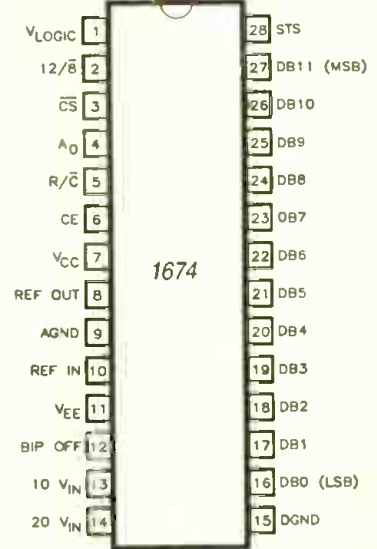
Specification

Supply voltage: 5V
 Maximum supply current: 2.5mA
 Resolution: 12 bit
 Total unadjusted error SDA1812D: $\pm 3/4$ LSB
 Differential non-linearity: $\pm 1/2$ LSB
 Conversion time: 2.5 μs
 Typical clock frequency: 2MHz

Dynamic performance

S/N ratio (includes THD): 71dB (1kHz sine wave i/p)
 Full power bandwidth (-3dB): 4MHz
 Aperture delay time: 5ns

Order Code	Type	Price each
DB28F	SDA1812D	£24.99



A complete multipurpose 12-bit, 10 μs , A/D converter, consisting of an on-board sample-and-hold amplifier (SHA), 10V reference, clock and tri-state output buffers for microprocessor interface. The SHA has a wide bandwidth input capable of 12-bit accuracy over the full Nyquist bandwidth of the converter.

The device is suitable for use with AC signals making it ideally suited for use in signal processing as well as DC measurement applications. The device will accept a 10V span on input pin 13 (0 to 10V unipolar mode, $\pm 5V$ bipolar mode) or a 20V span on input pin 14 (0 to 20V unipolar mode, or $\pm 10V$ bipolar mode). Housed in a plastic 28-pin DIP package.

Specification

Supply voltage logic: +5V (pin 1)
 analogue: ± 12 to $\pm 15V$ (+ on pin 7, - on pin 11)
 Typical supply current pin 1: 5mA
 pin 7: 10mA
 pin 11: 14mA
 Typical S/N and distortion ratio: 70dB
 THD: $-90dB$
 IMD: $-90dB$
 Full power bandwidth: 1MHz
 Analogue input impedance 10V span: $5k\Omega$
 20V span: $10k\Omega$
 Linearity error: $\pm 1LSB$
 Conversion time 8-bit cycle: 8 μs maximum
 12-bit cycle: 10 μs maximum

AD1674JN 12-Bit A/D Converter

Analog Devices

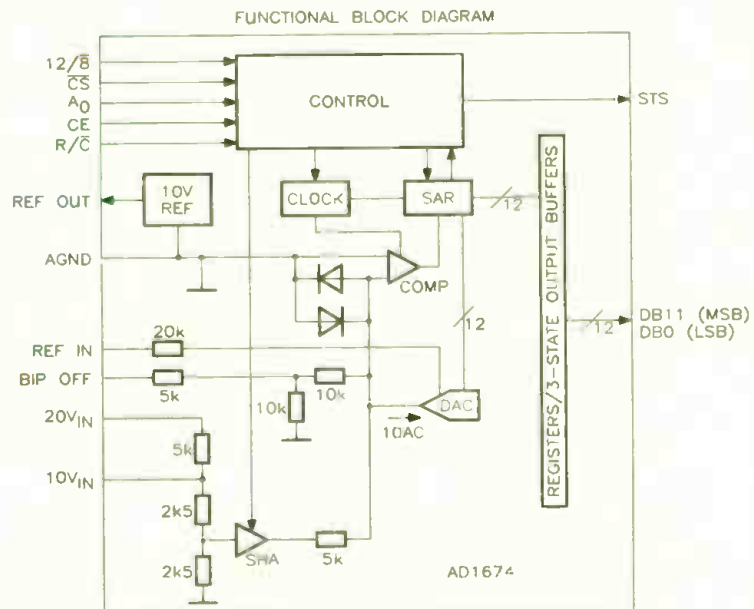
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SDA1812D 12-Bit A/D Converter with 4-Channel Multiplexer

Siemens

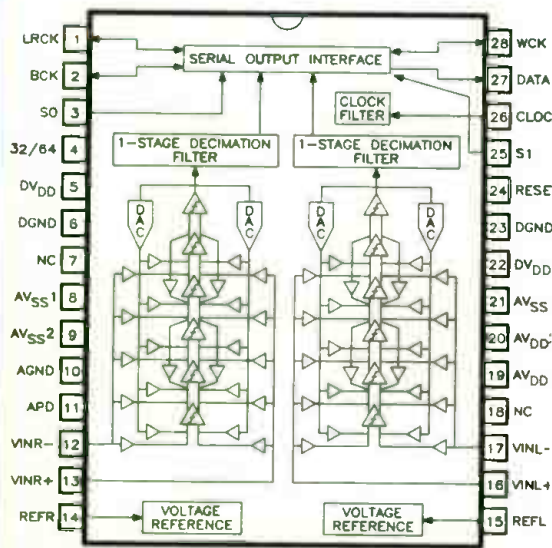
CMOS analogue-to-digital converter with a 4-channel analogue multiplexer and a conversion time of 6 μs plus 2.5 μs sample time. The device requires a single 5V power supply, and uses a 'capacitor network successive approximation' technique to obtain a low conversion time. An auto-calibration technique guarantees a total unadjusted error within $\pm 3/4$ LSB for the SDA1812D. The converter requires no external offset or gain adjustments and features a temperature stabilised differential comparator, a sample-and-hold function and a 12-bit data output in a 2-byte format. Designed for easy microprocessor interface, the



Order Code	Type	Price each
DC08J	AD1674JN	£37.19

AD1879N Stereo 18-Bit Oversample ADC

Analog Devices



A two-channel, 18-bit oversample digital audio A/D converter, in which each channel features a high performance one-bit noise shaping modulator and a digital filter. The A/D converter output data is transmitted from a flexible serial data port. The device includes an on-board reference voltage, and has an excellent low level signal performance, requires no S/H circuits, and has full differential analogue inputs. Using an external master clock, the one-bit modulators operate at $64 \times F_s$ oversampling ratio. This ratio permits the antialias filters to be simple resistor-capacitor combinations, and results in linear phase throughout the passband. Housed in a plastic 28-pin DIP package.

Specification

Supply voltage:	±5V
Power dissipation:	900mW maximum
Oversampling ratio:	$64 \times F_s$
Resolution:	18 bits
Dynamic range (0 to 20kHz, no A-Weight filter)	
stereo mode:	103dB
mono mode:	106dB
S/N + distortion	
0dB, 1kHz:	98dB
-20dB, 1kHz:	85dB
-60dB, 1kHz:	45dB
Crosstalk:	105dB at 20kHz
Analogue input range:	±3V
Input impedance:	12.8kΩ
Reference output:	+3V
Digital filter passband ripple:	0.001dB
Stopband attenuation:	115dB
Nominal master clock frequency:	12.288MHz

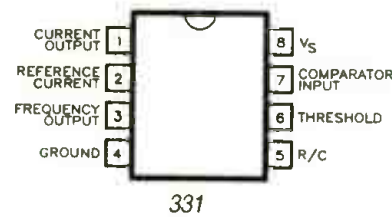
Order Code	Type	Price each
DC09K	AD1879N	£84.99

LM331N Voltage to Frequency Converter

National Semiconductor

A voltage to frequency converter IC which is ideally suited for use in simple low-cost circuits for A/D conversion, F/V conversion, linear frequency modulation or demodulation and many other functions. The output when used as a V/F converter is a pulse train at a frequency precisely proportional to the applied input voltage. Features include: full scale frequencies from 1Hz to 100kHz attainable; dynamic range of 100dB at 10kHz full scale; non-

linearity typically ±0.003% full scale; and excellent temperature stability typically ±30ppm/°C.

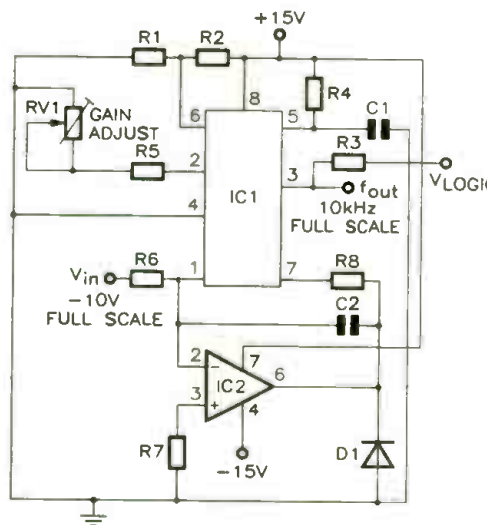


Specification (typical at 25°C)

Supply voltage:	4.5V to 40V
Scale factor:	1kHz/V
Output current:	136µA
Operating range of current:	10 to 500µA
Reference voltage (pin 2):	1.89V
Supply current:	3mA at $V_s = 5V$ 4mA at $V_s = 40V$

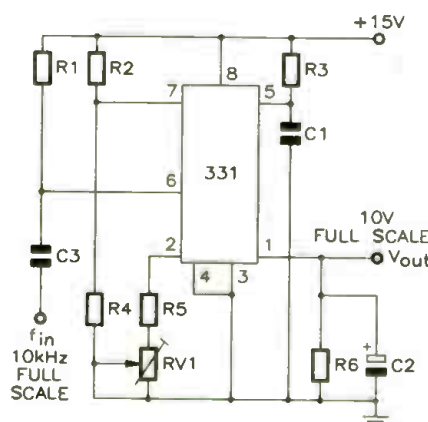
Parts List for Precision Voltage-to-Frequency Converter

R1,2,3	Min Res 10k	(M10K)
R4	Min Res 6k8	(M6K8)
R5	Min Res 12k	(M12K)
R6,7	Min Res 100k	(M100K)
R8	Min Res 2k2	(M2K2)
RV1	22-Turn Cermet 5k	(UH24B)
C1	Poly Layer 0.01µF	(WW29G)
C2	Mylar 0.0047µF	(WW17T)
D1	1N4002	(QL74R)
IC1	LM331	(UL47B)
IC2	OP-77	(UL05F)



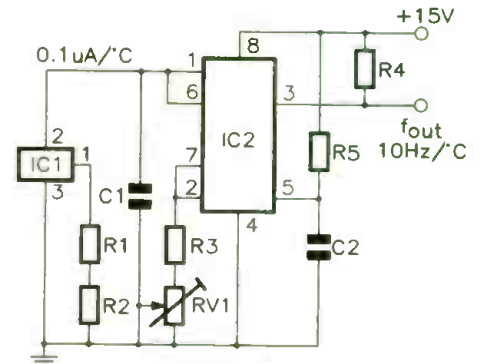
Parts List for Frequency-to-Voltage Converter

R1,2	Min Res 10k	(M10K)
R3	Min Res 6k8	(M6K8)
R4	Min Res 68k	(M68K)
R5	Min Res 12k	(M12K)
R6	Min Res 100k	(M100K)
RV1	22-Turn Cermet 5k	(UH24B)
C1	Poly Layer 0.01µF	(WW29G)
C2	PC Elect 1µF 100V	(FF01B)
C3	Polystyrene 470pF	(BX32K)



Parts List for Temperature to Frequency Converter

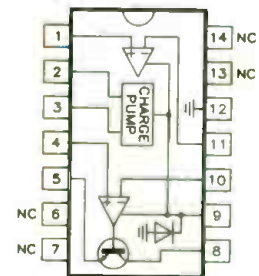
R1	Min Res 2k2	(M2K2)
R2	Min Res 120Ω	(M120R)
R3	Min Res 12k	(M12K)
R4	Min Res 22k	(M22K)
R5	Min Res 6k8	(M6K8)
RV1	22-Turn Cermet 5k	(UH24B)
C1	Poly Layer 0.1µF	(WW41U)
C2	Poly Layer 0.01µF	(WW29G)
IC1	LM334Z	(WQ32K)
IC2	LM331	(UL47B)



Order Code	Type	Price each
UL47B	LM331N	£5.99

LM2917N Frequency to Voltage Converter

National Semiconductor



2917

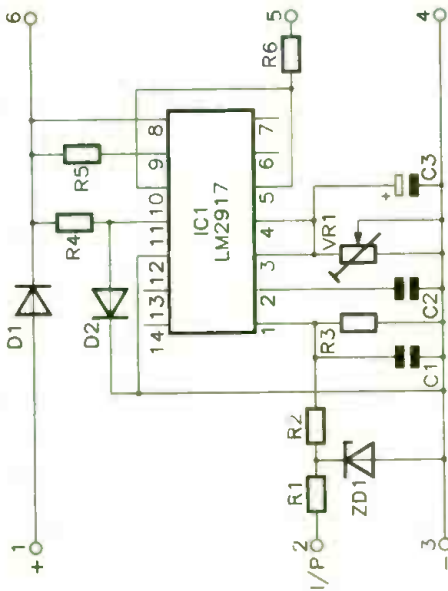
This 14-pin DIL IC is extremely easy to use since $V_{out} = f_{in} \times V_{CC} \times R1 \times C1$ where R1 is the resistor between pin 3 and ground and C1 is the capacitor (in Farads) between pin 2 and ground. Features include ground referenced tachometer whose input interfaces directly with magnetic variable reluctance pick-ups; op-amp comparator with floating relays, solenoids, meters or LED's etc; frequency doubling with low ripple; tachometer with built-in hysteresis for either differential or ground referenced input; built-in zener for accurate and stable frequency to current conversion and linearity typically ±0.3%. Applications include over/under speed sensing, tachometers, speedometers, breaker point dwell meters, hand-held tachometers, speed governors, cruise control, touch or sound switches etc.

Parts List

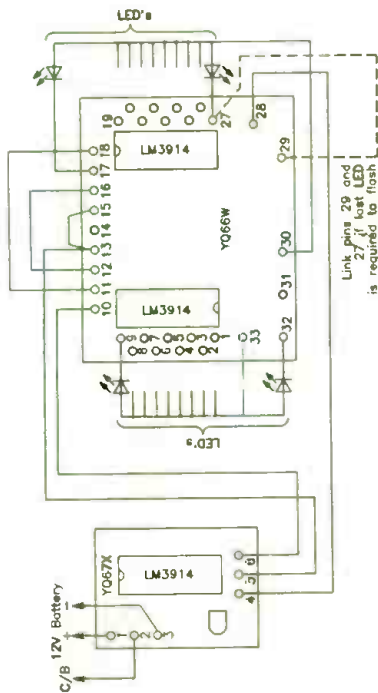
R1,2	Min Res 4k7	(M4K7)
R3	Min Res 22k	(M22K)
R4	Min Res 10k	(M10K)
R5	Min Res 470Ω	(M470R)
R6	Min Res 1k	(M1K)
C1	Poly Layer 0.022µF	(WW33L)
C2	Poly Layer 0.01µF	(WW29G)
C3	PC Elect 2.2µF 100V	(FF02C)
VR1	Hor S-Min Preset 100k	(UH06G)
D1	1N4001	(QL73Q)
D2	1N4148	(QL80B)
ZD1	BZY88C12	(QH16S)
IC1	LM2917	(WQ38R)
1	LM2917 PCB	(YQ67X)
6	Pins 2145	(FL24B)

Application Circuits

Frequency to Voltage Converter



20-LED Display Rev Counter



A printed circuit board is available to make a frequency to voltage converter building block using the LM2917. A particular application is shown for a 20 LED display rev counter where this pcb is connected to the LM3914 pcb.

Order Code	Type	Price each
WQ38R	LM2917N	£3.99
YQ67X	LM2917 PCB	£1.49

ICL7106CPL, ICL7107CPL

Analogue to Digital Converter/Display Drivers

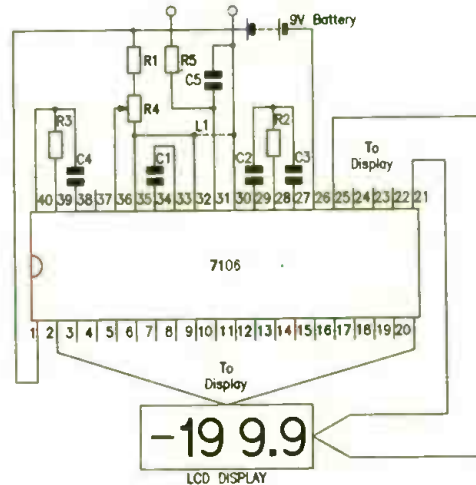
Harris

These two IC's are high performance, low power 3 $\frac{1}{2}$ digit A/D converters. The input requires about 1pA typically. Other features are guaranteed zero reading for 0 volts input on all scales; true polarity at zero for precise null detection; true differential input and reference; low-noise; on chip clock and reference; low supply current 0.8mA typical. The output of the 7106 will drive LCD displays directly and a +9V supply is required at pin 1 and ground at pin 26. This IC is ideally suited for battery operation since it requires only 0.8mA supply current. The output of the 7107 will drive

LED displays directly and a +5V supply is required at pin 1, -5V at pin 26 and ground at pin 21. Accuracy ± 1 count in ± 2000 counts guaranteed.

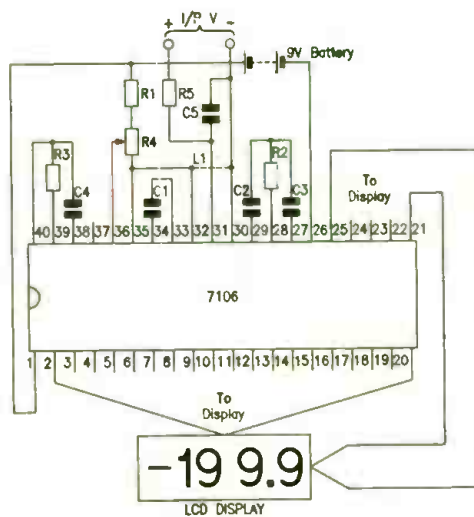
Display Driver and Thermometer PCB

A printed circuit board is available for use with the 7106 or 7107. The same printed circuit may be used to produce a $\pm 1.999V$ (2V) voltmeter, a ± 0.1999



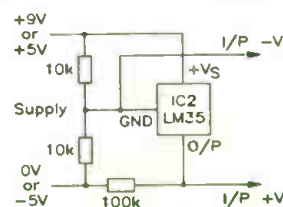
LCD Digital Panel Meter
200mV/2V Full Scale Deflection

(200mV) voltmeter or a thermometer using the LM35CZ or LM35DZ IC's shown on page 748, with either an LED or LCD. A leaflet is supplied with every PCB, which shows how to build and calibrate all four projects.

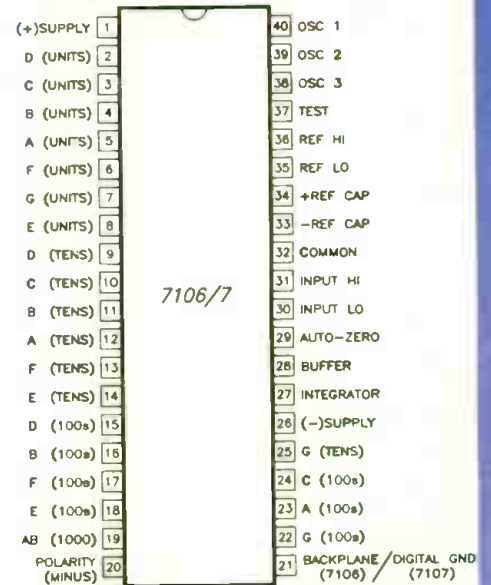


LED Digital Panel Meter
200mV/2V Full Scale Deflection

	7106 2V LCD	7106 200mV LCD	7107 2V LED	7107 200mV LED
R1 Min Res	15k	22k	15k	22k
R2 Min Res	470k	47k	470k	47k
R3 Min Res	100k	100k	100k	100k
R4 18-turn Cermet	10k	1k	10k	1k
R5 Min Res	1M	1M	1M	1M
R6 Min Res	-	-	150 Ω	150 Ω
C1 Poly Layer	0.1 μ F	0.1 μ F	0.1 μ F	0.1 μ F
C2 Poly Layer	0.047 μ F	0.47 μ F	0.047 μ F	0.47 μ F
C3 Poly Layer	0.22 μ F	0.22 μ F	0.22 μ F	0.22 μ F
C4 Ceramic	100pF	100pF	100pF	100pF
C5 Poly Layer	0.01 μ F	0.01 μ F	0.01 μ F	0.01 μ F
IC1	7106	7106	7107	7107
Link L1	Yes	Yes	Yes	Yes
DIL Socket 40-pin	1	1	1	1
PCB (BY76H)	1	1	1	1
Display - 1 needed	FY89W	FY89W	BY66W	BY66W
Display - 1 needed	-	-	BY67X	BY67X



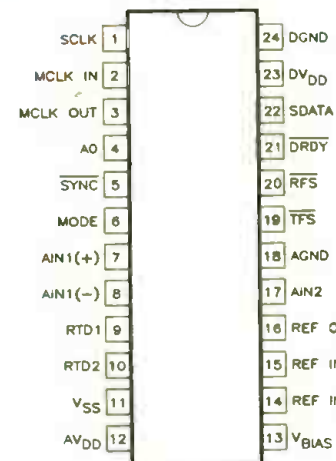
Temperature Sensor Input



Order Code	Type	Price each
QW94C	ICL7106CPL	£4.25
QW95D	ICL7107CPL	£4.25
BY76H	7106/7 PCB	£1.99

AD7711AN Signal Conditioning A/D Converter with RTD Excitation Currents

Analog Devices



7711

An LC²MOS device that is a complete analogue front end for low frequency measurement applications. The device accepts low level signals directly from a transducer and outputs a serial digital word. It employs a sigma-delta conversion technique to produce up to 21 bits with a 'no missing codes' performance. The input signal is applied to a programmable gain front end, based around an analogue modulator, whose output is processed by an in-built digital filter. The first notch of this filter is programmable via the in-built control register. This allows adjustment of the filter cut-off and settling time. The device features one differential analogue input, one single ended analogue input and a differential reference input. Additionally, two current sources are provided that can be used to provide excitation in three and four wire RTD (resistance temperature detection) configurations. Ideal for use in intelligent, microcontroller based systems, as gain settings, signal polarity, input channel selection and RTD current control can all be configured by software, using the bidirectional serial port. The device contains self-calibration, system calibration and background calibration operations and includes in-built calibration registers that the user can read and write to. Available in a 24-pin DIP package with low power consumption requirements, and a software programmable power down mode that reduces the standby power consumption to 50 μ W.

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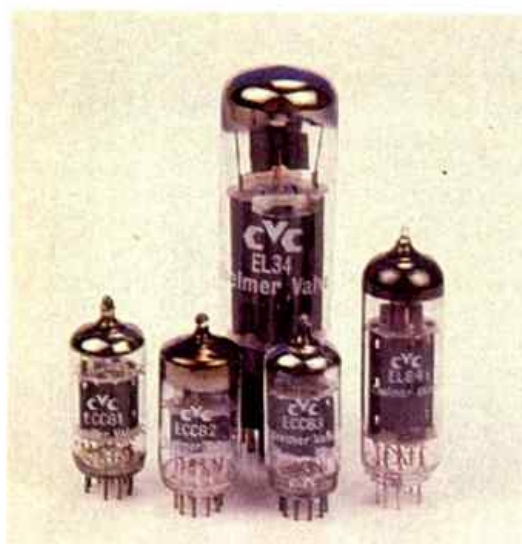
Specification

Power supply voltages	
V_{DD} to V_{SS} :	+5V to +10V
DV_{DD} :	+5V
Power supply currents	
AV_{DD} :	3mA max.
DV_{DD} :	4mA max.
V_{SS} :	1.5mA max.
Power dissipation	
Normal mode:	40 to 45mW max.
Standby mode:	100µW max., 50µW typical
Analogue/reference inputs	
50Hz or 60Hz rejection:	100dB min.
Sampling capacitance:	20pF max.
Source impedance:	10kΩ max.
Analogue input voltage range:	0V to + V_{REF}
Input sampling rate:	$f_{CLK IN}/512$ for gain of 1 $2 \times f_{CLK IN}/512$ for gain of 2 $4 \times f_{CLK IN}/512$ for gain of 4 to 128.
Reference inputs	
REF IN(+) to REF IN(-):	+2.5V to +5V
input sampling rate:	$f_{CLK IN}/512$
Logic inputs	
low:	0.8V max.
high:	2.0V min. (MCLK=3.5V min.)
Logic outputs	
low:	0.4V max.
high:	4.0V min.
Reference output voltage:	2.5V nominal
RTD excitation currents	
Output:	200µA nominal
Drift:	35ppm/°C typical
Initial tolerance:	±20%

Order Code	Type	Price each
DC07H	AD7711AN	£34.52

SUBSECTION 71 VALVES

Chelmer Valve



A range of high quality valves primarily for use in high fidelity and other audio applications. A booklet containing comprehensive data and typical circuits is also available.

Double Triodes

All these types feature identical pin numbering and have their heaters configured for either 6.3V or 12.6V operation.

ECC81

A miniature 9-pin (B9A), high- μ , high current RF double triode with separate cathodes. It can be used in a variety of audio amplifier, mixer, and frequency changer applications as well as for RF. For audio it is typically used in RC coupled voltage amplifier configurations.

Heater	Series	Parallel
V_h	12.6V	6.3V
I_h	150mA	300mA

Characteristics (each section)

V_a	200V	250V
V_g	-1.0V	-2.0V
I_a	11.5mA	10mA
g_m	6.7mA/V	5.5mA/V
μ	70	60

ECC82

A miniature 9-pin (B9A), low- μ , high current double triode with separate cathodes. It is primarily intended for use as an amplifier or oscillator, and can be employed in both RC coupled voltage amplifier and cathode follower (buffer) configurations, or as a phase splitter. Useful in audio applications requiring low microphony.

Heater	Series	Parallel
V_h	12.6V	6.3V
I_h	150mA	300mA

Characteristics (each section)

V_a	100V	250V
V_g	0V	-8.5V
I_a	11.8mA	10.5mA
g_m	3.1mA/V	2.2mA/V
μ	19.5	17

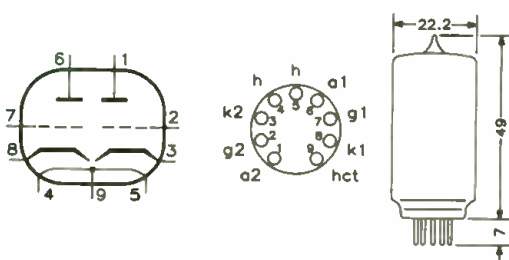
ECC83

A miniature 9-pin (B9A), high- μ , low current double triode primarily intended for RC coupled, small signal voltage amplifiers. Its low anode current and controlled low noise, hum and microphony characteristics, together with its high gain, make it ideal for high quality, small signal preamplifier applications. It is equally at home as a higher level voltage amplifier, phase splitter or cathode follower. Especially suitable for Hi-Fi applications.

Heater	Series	Parallel
V_h	12.6V	6.3V
I_h	150mA	300mA

Characteristics (each section)

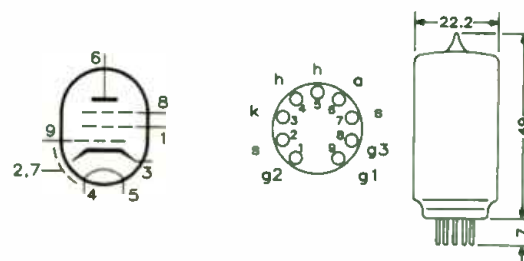
V_a	100V	250V
V_g	-1.0V	-2.0V
I_a	0.5mA	1.2mA
g_m	1.25mA/V	1.6mA/V
μ	100	100



Order Code	Type	Price each
CR25C	ECC81	£5.99
CR26D	ECC82	£4.65
CR27E	ECC83	£6.49

Pentode EF86

A low noise, AF voltage amplifying pentode specifically for very small signal preamplifier applications. It features an all enclosing, outer screen or shield around all electrodes, special measures for extra mechanical stability against microphony, and a bifilar wound heater element to reduce hum injection to the absolute minimum. Open loop gain can exceed 40dB, with both white noise and hum down to typically 2µV at the anode (heater supply must be balanced and centre tapped to 0V near the valve, or DC). Especially suited to first stage amplification of magnetic cartridge (phono) and playback tape head inputs. Pins 2 or 7 (screen) should be grounded to 0V.



Heater	Series	Parallel	Characteristics
V_h	6.3V	200mA	V_a 250V
I_h			V_g 0V
			V_{g3} 140V
			V_{g2} -2.0V
			V_{g1} 3.0mA
			I_a 600µA
			I_{g2} 2.0mA/V
			g_m 38
			H_{g1-g2}

Mullard recommended circuits

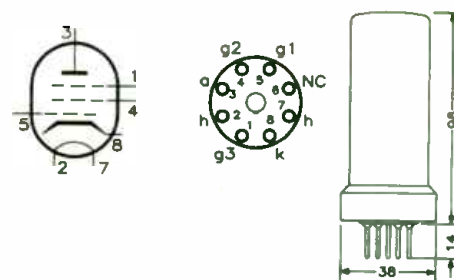
There is basically just one recommended circuit configuration for the EF86 (shown in more detail in the data booklet). In this only two variations for resistor values are advised, as follows:

	Option 1	Option 2
Anode load resistor	100kΩ	220kΩ
Screen grid (g_2) resistor	390kΩ	1MΩ
Cathode bias resistor	1kΩ	2k2Ω

In each case the cathode bias resistor should be bootstrapped to 0V with a 47µF 50V electrolytic. The grid leak resistor (g_1) can be 1MΩ or less (usually chosen to match the sending transducer). The suppressor grid (g_3) normally connects directly to the cathode.

Order Code	Type	Price each
DM56L	EF86	£4.99

Power Output Pentodes EL34



A power output pentode with the international octal (8-pin) base, primarily for the output stages of audio power amplifiers. The valve was especially designed with push-pull 'ultra-linear' (distributed load) operation in mind. Given the appropriate output transformer, pure class A up to 15W and 'ultra-linear' up to 20 or 30W is possible, or class B up to 100W. The valve is able to cope with peak anode voltages of up to 800V, and connections between the glass envelope and pins

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Access, Visa, American Express**

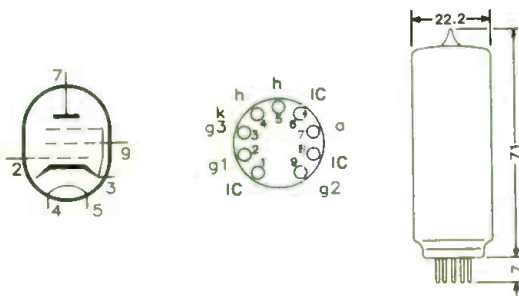
on the bonded octal base are carefully arranged to prevent flash-over. Several application circuits for different output powers are shown in the booklet. Although highly rated, the EL34 is of a comparatively small physical size compared with contemporary equivalents. Maximum rated anode dissipation is 25W.

Heater		Characteristics	
V_h	6.3V	V_{a1}	250V
I_h	1.5A	V_{a2}	250V
		V_{a3}	0V
		R_{k1}	106Ω
		I_a	100mA
		I_a	15mA
		g_{m1}	11mA/V
		R_{m1}	2.0kΩ
		P_{out}	11W

Order Code	Type	Price each
CR28F	EL34	£8.99

EL84

A miniature 9-pin (B9A), power output pentode designed for low to medium output audio power amplifiers. Push-pull 'ultra linear' (class AB1) can be up to 17W. Also often used for single-ended class A operation in small low power amplifiers of a few watts. Maximum rated anode dissipation is 12W.



Heater		Characteristics	
V_h	6.3V	V_{a1}	250V
I_h	760mA	V_{a2}	250V
		R_{k1}	135Ω
		I_a	48mA
		I_a	5.5mA
		g_{m1}	11.3mA/V
		R_{m1}	4.5kΩ
		P_{out}	5.7W

Order Code	Type	Price each
CR29G	EL84	£4.75

Valve Booklet

Contains comprehensive data and typical circuits.

Order Code	Type	Price each
XL52G	Valve Data Booklet	£1.25 NV

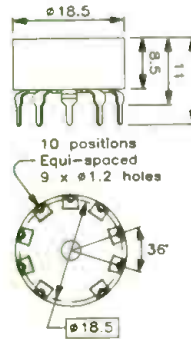
Valve Bases

Chelmer Valve



Bases are available for the above valves. The octal type is chassis-mounting with tin-plated solder tags in a thermoplastic housing. Overall size 47 x 32mm fixing holes 38mm x M4. Two types are available for B9A base valves. Both types have silver-plated contacts, pins and tags in a ceramic base.

One has pcb pins and the other is chassis-mounting with solder tags. Chassis-mounting type, overall size 35 x 27mm, fixing holes 28mm x M3.



Order Code	Type	Price each
CR30H	Base Octal	£1.99
CR31J	Base Chass	£1.80
CR32K	Base PCB	£1.80

SUBSECTION 72 HEATSINKS AND ACCESSORIES

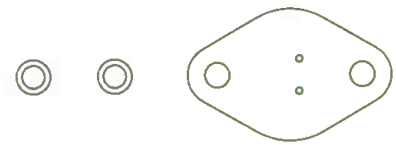
Transistor Sockets



PCB mounting low-profile sockets with contacts on a 0.1in pitch. Glass filled nylon body with gold-plated phosphor-bronze contacts. Current rating: 1A per contact. Types are available for 3-lead and 4-lead TO18 transistors and 3-lead TO5 transistors. Overall height 9.1mm. Pin length 3.5mm. Body dia: TO18 types 7.1mm, TO5 types 10.9mm.

Order Code	Type	Price each
WR29G	3L TO18	32p
WR30H	4L TO18	42p
WR31J	3L TO5	32p

Semiconductor Mounting Kits TO3

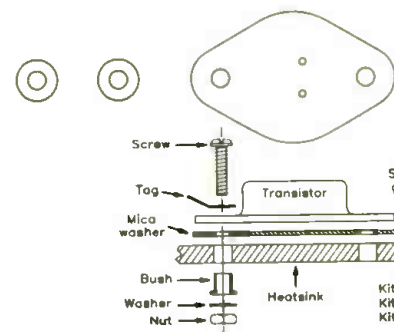


For mounting TO3 case transistors on heatsinks. Kit comprises one mica washer and two insulating bushes.

Order Code	Type	Price each
WR24B	Kit TO3	15p

TO66

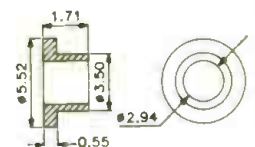
For mounting TO66 case transistors on heatsinks. Kit comprises one mica washer and two insulating bushes.



Order Code	Type	Price each
WR25C	Kit TO66	15p

Plastic Bush TO66 (short)

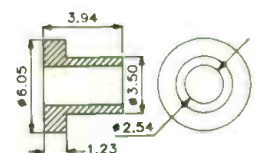
Packs of plastic bushes for use with TO66 package semiconductor devices. Supplied in packs of 20 bushes.



Order Code	Type	Price each
JR78K	Bush TO66	99p

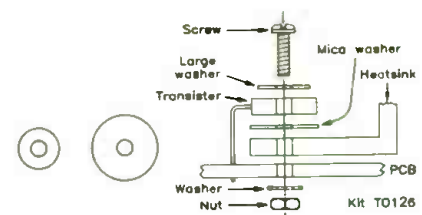
Plastic Bush TO66 (long)

Packs of plastic bushes for use with TO66 package semiconductor devices. Supplied in packs of 20 bushes.



Order Code	Type	Price each
UL69A	Bush TO66L	£1.99

TO126



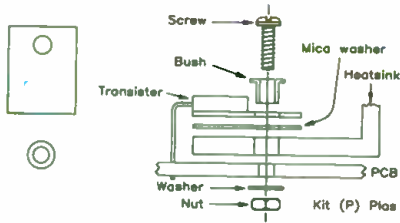
For mounting TO126 case transistors on heatsinks. Kit comprises one mica washer and one large washer to cover plastic side of transistor.

Order Code	Type	Price each
WR26D	Kit TO126	9p

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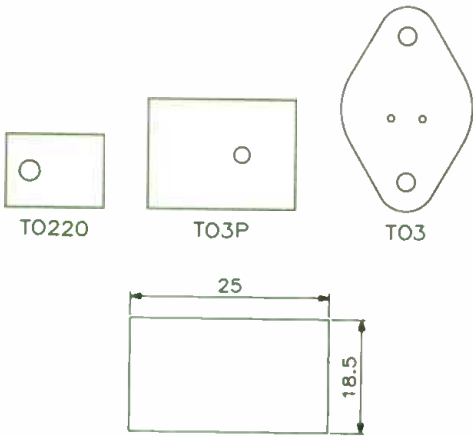
Plastic TO66 (P)



For mounting plastic TO66 case (P1, P2 and P3) semiconductors one mica washer and one insulating bush.

Order Code	Type	Price each
WR23A	Kit P Plas	16p

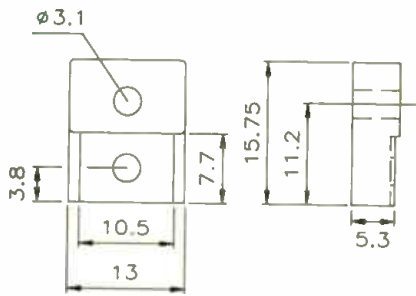
Greaseless Semiconductor Insulators



Power semiconductor insulating washers that give excellent heat conduction without the need for silicone grease. The heat transfer capability without silicone grease is marginally better than mica or plastic with silicone grease, yet they offer similar electrical resistance (at least 1GΩ). They are exceptionally easy and clean to use and make assembly extremely fast. Four types are available, TO3, TO3P, TO218 and TO220.

Order Code	Type	Price each
QY44X	Insulator TO3	12p
UK86T	Insulator TO3P	10p
UL74R	Insulator TO218	22p
QY45Y	Insulator TO220	7p

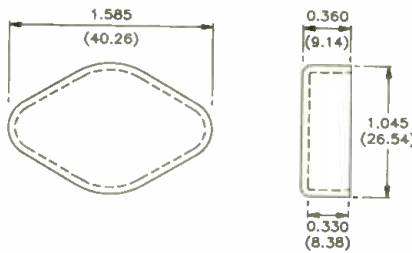
TO220 Insulating Cover



A plastic cover for TO220 packaged devices. The cover encloses the metal heatsink mounting tab of the device and includes a spigot for locating the hole in the tab, so that the device is entirely secured by the cover which is itself attached to the heatsink by one nut and screw, no other screws are necessary. This has the added advantage that there is no bolt anywhere near the tab and no risk of short circuit. For complete insulation of the tab, the addition of an insulator is required, such as UL74R, beneath which, a bolt hole is not needed. Made from white nylon 66 approved to UL94V-0. Overall size: 15.75 x 13 x 5.3mm.

Order Code	Type	Price each
UL92A	TO220 Cover	9p

TO3 Insulating Cover



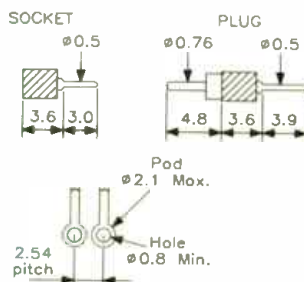
A clip-on plastic insulating cover for TO3 case transistors. Prevents short circuits and provides insulation up to 30kV.

Order Code	Type	Price each
FL56L	TO3 Cover	15p

Modular Connectors



Single row modular 2.54mm pitch sockets, and matching plugs, which are intended for mother-daughter board applications. The shrouded socket is fitted with a highly reliable four leaf gold on beryllium copper contact, and is also suitable for use with ICs. The unshrouded tin/lead finished brass plugs are also suitable for cable wiring applications. The 32-way connector strip can be easily cut to size using suitable hand tools. Insulator material: glass filled polyester UL94V-0.



Order Code	Type	Price each
DC17T	32 Socket Strip	79p
DC18U	32 Plug Strip	£1.49

Dual-In-Line Sockets



A range of high quality low-profile dual-in-line sockets with black glass-reinforced polyester bodies and tin-plated phosphor-bronze contacts. The contact makes against the flat face of the IC leg for maximum contact area and low insertion pressure. Sockets may be mounted end to end to achieve longer continuous runs of 0.1in spaced sockets. Sockets have chamfered side walls to assist insertion. The ultra-reliable, precision-stamped dual-wipe contacts offer an anti-overstress feature to prevent contact spring damage. One end is indented for polarisation.

Dimensions:

Pin size: 3.3 x 0.6 x 0.15mm
PCB hole required: 0.8mm
Overall height above pcb: 5.1mm
Height above pcb to base of IC: 4.1mm
Distance between sockets (lengthwise): 0.1in (2.54mm)

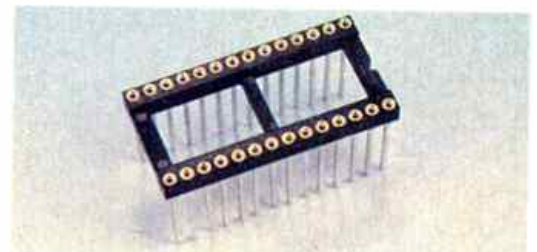
The following types are available

Type	Pin spacing (mm)	Pin spacing (in)	Overall length (mm)	Overall length (in)	Overall width (mm)	Overall width (in)
6-pin	7.62	0.3	7.62	0.3	10.16	0.4
8-pin	7.62	0.3	10.16	0.4	10.16	0.4
14-pin	7.62	0.3	17.78	0.7	10.16	0.4
16-pin	7.62	0.3	20.32	0.8	10.16	0.4
18-pin	7.62	0.3	22.86	0.9	10.16	0.4
20-pin	7.62	0.3	25.4	1.0	10.16	0.4
24-pin	15.24	0.6	30.48	1.2	17.78	0.7
28-pin	15.24	0.6	35.56	1.4	17.78	0.7
40-pin	15.24	0.6	50.8	2.0	17.78	0.7

8-pin and 14-pin types are available in packs of 25.

Order Code	Type	Price each
CJ79L	DIL Socket 6-pin	10p
BL17T	DIL Socket 8-pin	5p
AQ00A	DIL Skt 8 Pin 25Pk	99p
B_18U	DIL Socket 14-pin	10p
AQ01B	DIL Skt 14 Pin 25Pk	£1.99
BL19V	DIL Socket 16-pin	10p
HQ76H	DIL Socket 18-pin	11p
HQ77J	DIL Socket 20-pin	12p
BL20W	DIL Socket 24-pin	14p
BL21X	DIL Socket 28-pin	14p
HQ38R	DIL Socket 40-pin	20p

28 Way Wire Wrap DIL Socket

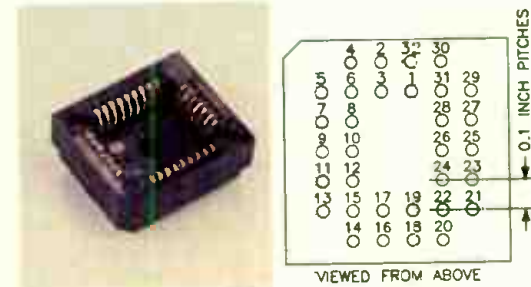
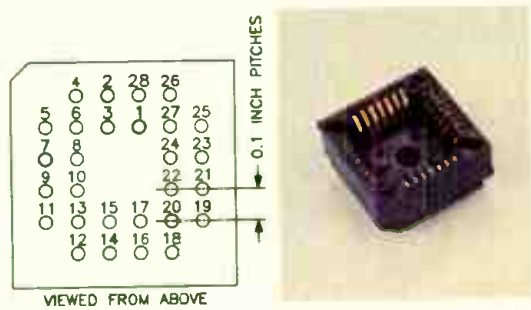


A very high quality DIL socket with wire wrapping pins. Features include: four leaf gold plated beryllium copper contacts, contact life 1000 insertions, low profile (4.9mm). Insulation glass reinforced polyester to UL 94 V0. Pin material turned brass. Pin Spacing 2.54mm (0.1in) x 15.24mm (0.6in). Frame Size 35.62 x 17.78mm.

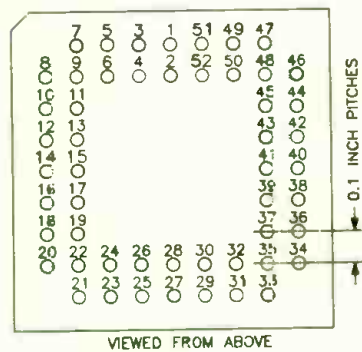
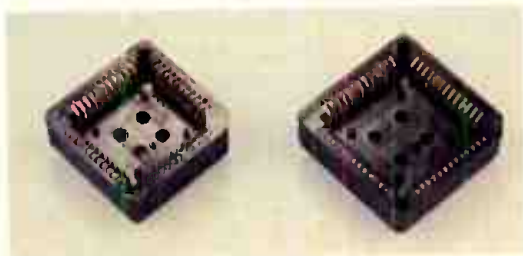
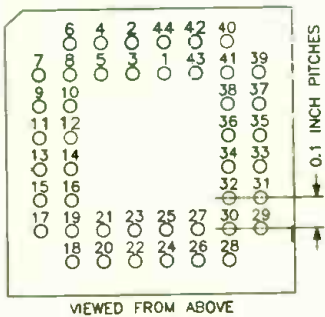
Order Code	Type	Price each
JR75S	W/Wrap 28p DIL Skt	£1.75

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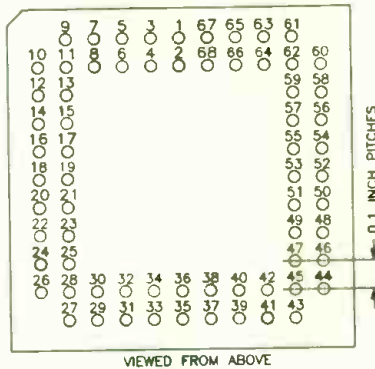
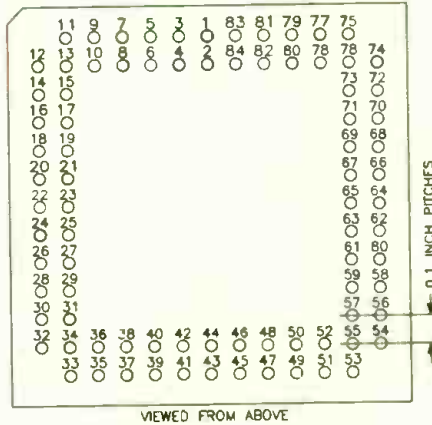
PLCC Sockets



Very high quality sockets for IC's packaged in PLCC's (plastic leaded chip carriers). Tin-plated phosphor-bronze pins with gold-plated contacts. One corner is chamfered for polarisation

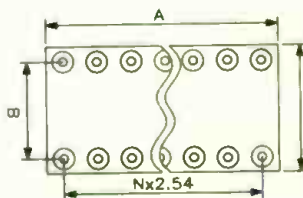
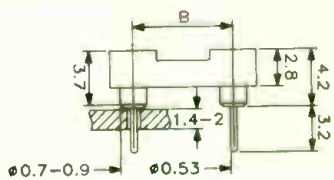
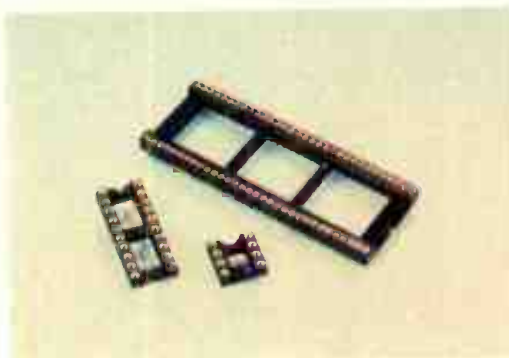


Pin length:	3.5mm	
Height above pcb:	8mm	
Socket size	28-pin	19 x 19mm
	32-pin	22 x 19mm
	44-pin	24 x 24mm
	52-pin	27 x 27mm
	68-pin	32 x 32mm
	84-pin	37 x 37mm



Order Code	Type	Price each
JH38R	PLCC Socket 28 Pin	90p
JH39N	PLCC Socket 32 Pin	99p
JH40T	PLCC Socket 44 Pin	£1.06
JH41U	PLCC Socket 52 Pin	£1.15
JC18U	PLCC Socket 68 pin	£1.35
JC19V	PLCC Socket 84 pin	£1.55

Open Frame Dual-In-Line Sockets



An Open Frame designed line of standard low profile IC-Sockets. Advantages include increased space beneath the IC for improved heat dissipation, PCB cleaning and inspection.

Plating Sleeve (Pin): 5µmSn
Plating Contact (Clip): 0.25µmAu

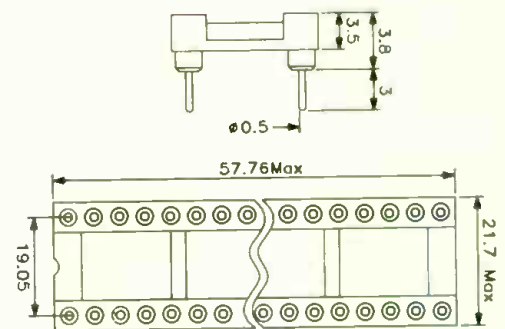
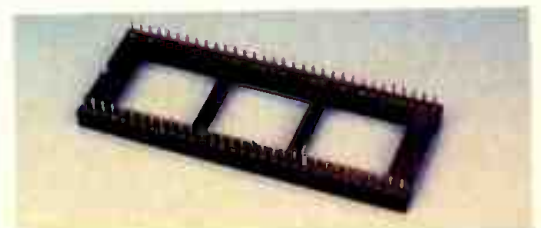
Order Code	Dimensions			No of pins	Order Code
	A	B	C		
FJ63T	10.1	7.62	10.1	8	FJ63T
FJ64U	17.7	7.62	10.1	14	FJ64U
FJ65V	20.3	7.62	10.1	16	FJ65V
FJ66W	22.8	7.62	10.1	18	FJ66W
FD90X	25.3	7.62	10.1	20	FD90X
FD91Y	27.8	7.62	10.1	22	FD91Y
FJ67X	30.4	7.62	10.1	24	FJ67X
FJ68Y	36.5	15.24	17.7	28	FJ68Y
KW69A	40.6	15.24	17.7	32	KW69A
FJ69A	50.6	15.24	17.7	40	FJ69A

Order Code	Manufacturers Code
FJ63T	110-91-308-41-001
FJ64U	110-91-314-41-001
FJ65V	110-91-316-41-001
FJ66W	110-91-318-41-001
FD90X	110-91-320-41-001
FD91Y	110-91-322-41-001
FJ67X	110-91-324-41-001
FJ68Y	110-91-628-41-001
KW69A	110-91-632-41-001
FJ69A	110-91-640-41-001

Order Code	Type	Price each
FJ63T	Turned Pin Skt 8-pin	20p
FJ64U	Turned Pn Skt 14-pin	32p
FJ65V	Turned Pn Skt 16-pin	36p
FJ66W	Turned Pn Skt 18-pin	38p
FD90X	Turned Pin Skt 20-pin	45p
FD91Y	Turned Pin Skt 22-pin	48p
FJ67X	Turned Pn Skt 24-pin	50p
FJ68Y	Turned Pn Skt 28-pin	56p
KW69A	Turned Pn Skt 32-pin	65p
FJ69A	Turned Pn Skt 40-pin	80p

Turned Pin Dual-In-Line Sockets

Harwin

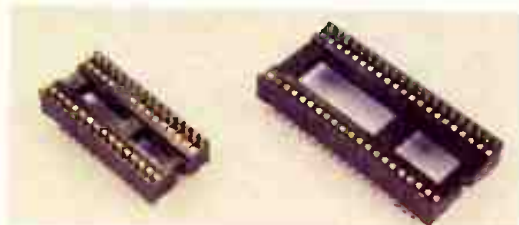


A good quality 64-way turned-pin open frame shrink dip IC socket. The contacts are 4-leaf beryllium copper contact for maximum reliability.

Material
Contact Spacing: 1.778 (0.070") in each row
Insulator: 30% glass filled polyester UL94V-0
Shell: Precision machined brass
Contact: Beryllium Copper
Number of operations: 1,000 insertions

Order Code	Type	Price each
FP99H	64pin Shrink DIP Skt	£6.49

1.778mm High Density Shrink DIP IC Sockets



Dual In-line Pin IC sockets as used in the NICAM project, for use with IC's featuring the narrow ('shrink DIP') spacing of 1.778mm (0.07in) between pins along each side. Two types are available, 30-pin and 42-pin; the two rows of pins are spaced 10.16mm apart in the case of the 30-pin version, and 15.24mm in the 42-pin version. Insulator material is glass filled P.B.T., and contacts are tin-plated phosphor bronze. Current rating – 1A per pin max., contact resistance 20mΩ max.

Dimensions of body –

30-pin: 26.95mm long x 12.65mm wide x 4.8mm high.
42-pin: 37.62mm long x 17.33mm wide x 4.8mm high.

Order Code	Type	Price each
JM97F	Shrink DIP Skt 30Pin	99p
JM98G	Shrink DIP Skt 42Pin	£1.29

Zero Insertion Force IC Socket

Harwin



A range of DIL sockets ideally suited for programming EPROM's where different IC's must be inserted in one socket. With the lever in the unlocked position, IC's may be inserted or withdrawn with no force. When the IC has been inserted, push the lever over to the locked position and the IC will be held firmly in position with excellent contact to all leads.

Order Code	Type	Price each
YX50E	ZIF Socket 24-Way	£7.99
FT14Q	ZIF Socket 28-way	£6.99
FT15R	ZIF Socket 40-way	£9.99

Universal Test Socket

Aries



A zero insertion force socket which can accept IC's of any size up to 32 pins, because its wide sockets permit 0.3in, 0.4in and 0.6in wide IC's to be inserted. With the lever up, IC's can be inserted or removed with no force. Throw the lever down to lock the IC and firmly clamp the pins.

Order Code	Type	Price each
JK75S	Universal Tst Socket	£9.99

IC Pin Straightening Tool

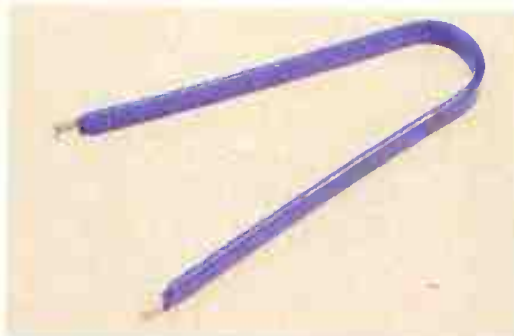
A universal tool for quickly and easily straightening the pins of all sizes of dual in-line ICs. The tool operates like a vice and has two sprung, outer 'jaws' which close upon a centre portion. To use, simply drop the IC pins into the two slots and squeeze both sides of the tool together. The tool is double sided, with the centre portion being 0.3in. wide on one side for 8, 14, 16, 18 and 20-pin DIL ICs, and 0.6in. wide for 24, 28, 40, 42 and 48-pin ICs on the other side. To protect CMOS devices, an earth wire may be attached to the screw provided on one face, to neutralise static. Made in moulded black plastic. Dimensions: 81mm long x 37mm wide x 12mm thick.



Order Code	Type	Price each
KU42V	Straightening Tool	£3.99

IC Extraction Tool

A pair of plastic-coated, chrome-plated sprung steel tweezers with hooked ends for lifting and placing IC's without touching the pins. Overall length 102mm.



Order Code	Type	Price each
FD54J	Extraction Tool	80p

IC Insertion Tool



A high quality tool which makes inserting integrated circuits one simple operation. No more complicated alignment of pins or handling problems.

Order Code	Type	Price each
FR25C	Insertion Tool	86p

HEATSINKS

Bonded IC Heatsink

Thermalloy



A black anodised finned heatsink designed for 14 and 16 pin dual-in-line ICs. The heatsink may be attached using contact adhesive or similar at each end, and for best results it should be smeared with heatsink compound in between. Temperature rise in centre of heatsink: 68°C per watt. Dimensions: length 19.05mm, width 6.35mm, height 4.83mm. Fins are orientated longitudinally.

Order Code	Type	Price each
KU44X	Bonded Heatsink	34p

Large Bonded IC Heatsink

Thermalloy



A black anodised finned heatsink for 24, 28, and 40 pin dual-in-line ICs. Requires no extra board space. The heatsink may be attached using contact adhesive or similar at each end, and for best results it should also be smeared with heatsink compound in between. Temperature rise in centre of heatsink: 38°C per watt. Dimensions: length 31.75mm, width 13.46mm, height 4.83mm. Fins are longitudinal.

Order Code	Type	Price each
KU49D	Lrg Bonded Heatsink	52p

Choosing a Heatsink

The generation of heat by electronic devices is an unavoidable consequence of Ohm's Law and the Second Law of Thermodynamics. Heat will always need to be removed from electronic equipment, however in many cases the fact that the equipment stands in air and loses heat to same is in many cases quite sufficient if power levels are low. But if the number of functions in a confined space (e.g. many LSI chips) or the power output is increased, the heat generated also increases due to the greater demand on the system, and must not be allowed to reach too high a level. Electronic components may need to be cooled for three basic reasons:

1. Silicon semiconductor junctions will fail at 175°C, although the plastic package (if used) will fail before this.
2. The life expectancy of such junctions is inversely proportional to temperature, and typically at up to 150°C the life expectancy halves for every 10 to 15°C increase. Between 150°C and 175°C it halves for every 5 – 10°C increase.
3. The properties of semiconductors change with temperature, and it may be necessary to control the temperature of key devices, or to maintain several devices at the same temperature to maintain a function. Electrical noise, for instance, increases with temperature.

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For power devices, always ensure that an adequately sized heatsink is selected. A clue is in the quoted °C per Watt rating. Very roughly you can determine the maximum power dissipation by Ohm's Law, and multiply this by the rating to obtain an indication of the device's temperature. Assume, to be on the safe side, that say 100°C is too much and select a bigger heatsink or separate heatsinks for separate devices.

Always ensure that the heatsink is adequately ventilated. In practice good thermal conductivity is difficult to achieve between device and heatsink, as this joint offers high thermal resistance. An application of proper heatsink compound or paste before bolting the device down will drastically improve the efficiency - try a 'before and after' test for yourself!

For Case Style TO92

Redpoint



Push-fit brass radiator suitable for TO92 and E-line transistor packages. The heat is partly radiated and partly conducted back into the PCB through the location pegs being soldered to the PCB on 10.16mm (0.4in.) centres. The heatsink may be inverted if PCB fixing is not required.

Overall size: 13.7mm wide, 13.8mm high plus mounting lugs, 11.4mm deep.
Temperature rise in free-standing mode: 50°C/W
Temperature rise fixed to PCB: 36°C/W

Order Code	Type	Price each
HQ79L	Heatsink 92F	28p

For Case Style TO18

Redpoint

Push-fit, lobed radiation fin in black anodised finish. Outside dimensions: 15mm diameter, 12.7mm high.

Temperature rise: 55°C/W.



Order Code	Type	Price each
HQ80B	Heatsink 18F	38p

For Case Style TO5

Thermalloy

Push-fit, lobe finned radiators in a black anodised finish for TO5 style devices. Two sizes are available, low profile and high profile. Outside diameter is 15.8mm; height of low profile type is 6.5mm, high profile type, 12.7mm. Temperature rise: low profile, 80°C per watt; high profile, 48°C per watt.



Order Code	Type	Price each
KU43W	Low Profile TO5	25p
FL78K	High Profile TO5	25p

For Case Style TO3 - Basic Radiator

Redpoint

A basic fin radiator in matt black finish. Pre-drilled to accept a standard TO3 transistor. Overall size: 44.5 x 31.5 x 14mm high. Temperature rise: 11°C/W



Order Code	Type	Price each
FG50E	Basic TO3 Fin	52p

Low Profile TO3

Thermalloy

Space saving black anodised vaned heatsink for TO3 style devices.

The design conforms to the diamond TO3 case style, using very little extra space on the board.

Temperature rise in centre of heatsink: 6.9°C per watt. Overall dimensions: length 47.76mm, width 35.56mm, height 25.4mm.



Order Code	Type	Price each
KU45Y	Low Profile TO3	60p

High Power Twisted Vane For TO3

Redpoint

A vaned radiator in matt black finish, pre-drilled to accept a standard TO3 transistor.

Overall size: 47mm long, 43mm wide x 50mm high. Temperature rise: 4.2°C/W.



Order Code	Type	Price each
FG51F	Powerfin TO3	£1.10

For Plastic Package Devices - Clip On



A low-cost clip-on heatsink for TO220 style devices. The TO220 package is inserted into the clip as far as the dimple and is then retained by the pressure applied directly above the device junction, thus providing optimum thermal transfer. Black anodised finish. Overall size: 25. x 19.05 x 8mm. Temperature rise: 23°C/W.

Order Code	Type	Price each
FG52G	Clip on TO220	40p

Clip-On TO220

Thermalloy

A clip-on black anodised heatsink for vertically mounted TO220 devices, with slotted side vanes. A strong, reinforced clip allows maximum heat transfer and an integral locking tab secures the device in position. Temperature rise in centre of heatsink: 25°C per watt. Dimensions: height 18mm, width 22.86mm, thickness including vanes, 9.52mm.



Order Code	Type	Price each
KU50E	Clip on TO220	28p

Clip-On Vaned TO220

Thermalloy

Labour saving, clip-on black anodised vaned heatsink for TO220 devices. It can be mounted vertically or horizontally. A strong, reinforced clip allows maximum heat transfer

and an integral locking tab secures the device in position. Temperature rise in centre of heatsink: 13.6°C per watt. Dimensions: height 29.44mm, width 25.53mm, thickness including vanes, 15.5mm.



Order Code	Type	Price each
KU51F	Clip on Vaned TO220	40p

Slotted Heatsink for Plastic Packages

Thermalloy

A black anodised radiator pre-drilled to accept almost any flat plastic packaged device, with slotted side vanes. Overall size: 19 x 17 x 20.5 high. Temperature rise: 22°C per watt.



Order Code	Type	Price each
FL58N	Slotted Heatsink	32p

TO126 Style

Redpoint

A miniature extruded heatsink with matt black finish for use with TO126 style packages. A 3.66mm device mounting hole is drilled in the heatsink and a slot is cut where the device leadouts are positioned.

Overall size: 7.9 x 19 x 25.4mm
Temperature rise: 28°C/W



Order Code	Type	Price each
JR93B	Heatsink TO126	£1.60

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Twisted Vane for TO126

Redpoint

Twisted vane heatsink suitable for one TO126 etc. style device. Base is 19 x 22mm. One hole provided in the centre of 4mm diameter. Height of fins, 19mm. Thermal rating 21°C/W. Black anodised finish.



Order Code	Type	Price each
JX21X	Vaned Heatsink TO126	52p

TO202 Style

Redpoint

A twisted vane radiator in matt black finish, pre-drilled to accept TO202 style devices e.g. C106D. Overall size: 30 x 12.7 x 45mm long plus mounting lugs. Temperature rise: 13°C/W.

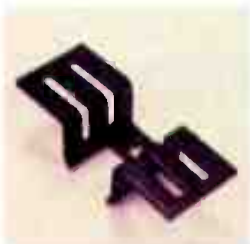


Order Code	Type	Price each
FG53H	Vaned Heatsink TO202	65p

Top Mounting TO220

Thermalloy

Can be added to a TO220 packaged device fitted to the low profile heatsink above to provide heatsinking on the top side as well. A special cut out makes space for the plastic encapsulation leaving a flat strip which lies flat on top of the heatsink tab giving the device double-sided cooling. Shaped to mate with low profile heatsink above. Temperature rise in centre of heatsink: 15°C per watt. Dimensions: length 17.78mm, width 44.45mm, height 12.7mm. Channel 12.7mm. Cutout: width 10.67mm, depth 13.46mm.

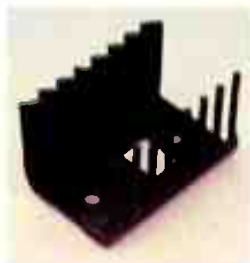


Order Code	Type	Price each
KU47B	Top Mount TO220	28p

TO220 5-Lead Style

Redpoint

A twisted vane radiator in matt black finish, pre-drilled to accept 5-lead TO220 (Pentawatt) style devices e.g. LM383. Overall size: 38 x 28 x 22mm high. Temperature rise: 9.9°C/W.



Order Code	Type	Price each
FG54J	Vaned Heatsink Penta	£1.30

Twisted Vane PCB Mounting

Redpoint

Low profile, low cost PCB mounting twisted vane design with a good thermal rating for TO220 and TO126 devices etc. A central device fixing slot of 3.8 x 9mm is provided 15.2mm from the bottom edge. The complete assembly occupies only 30 x 13mm of PCB space. Height above PCB, 30.2mm. Thermal rating = 14°C/W. Black anodised finish.

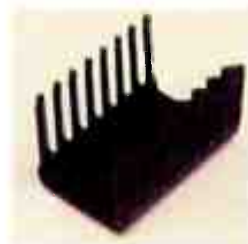


Order Code	Type	Price each
JW29G	Vert Vaned HSk TO220	56p

High Power Twisted Vane

Redpoint

A twisted vane radiator in matt black finish, pre-drilled to accept almost any flat plastic package device. Overall size: 38 x 28 x 22mm high. Temperature rise: 9.9°C/W.



Order Code	Type	Price each
FG55K	Powerfin plastic	65p

Twin Device Horizontal Twisted Vane PCB Mounting

Redpoint

Designed to accept one or two plastic packaged devices of TO220 etc. style. Base is 38 x 42mm. Two holes provided each 14mm from each end, of 4mm diameter. Height of fins, 25mm. Thermal rating 7.1°C/W. Black anodised finish.

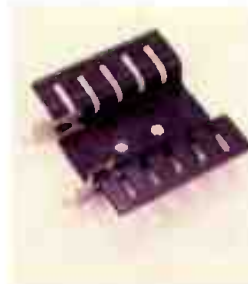


Order Code	Type	Price each
JW30H	Hor Vaned HSk TO220	90p

Low Profile TO220

Thermalloy

Low profile, black anodised pre-drilled heatsink, large enough for up to two TO220 devices, with slotted side vanes. Designed for mounting flat onto a PCB and can be used with the top mounting part described previously. Temperature rise in centre of heatsink: 7.1°C per watt. Dimensions: length 36.83mm, width 44.45mm, height 9.52mm. Channel 17.78mm. Each mounting hole is 13.21mm from each end.



Order Code	Type	Price each
KU48C	Low Profile TO220	48p

Low Profile High Performance TO220

Thermalloy

A low profile, black anodised pre-drilled heatsink for up to two TO220 devices, having folded slotted side vanes. Designed for mounting flat onto a PCB. Temperature rise in centre of heatsink: 6.5°C per watt. Dimensions: length 50mm, width 50mm, height 9.52mm. Channel 24.28mm. Each mounting hole is 10.52mm from each end.



Order Code	Type	Price each
KU53H	Hi Performance TO220	45p

High Performance TO220

Redpoint



Very high performance 4-sided heatsink pre-drilled for TO220 style devices in black anodised finish. Has a 45.2mm square base. Height of fins 25.4mm. Temperature rise 6°C/W.

Order Code	Type	Price each
FG61R	Heatsink TO220 EHP	65p

Vertical High Power PCB Solderable

Redpoint

A very professional looking heatsink for TO220, TO128, TO3P and TO202 etc. devices. The heatsink is not symmetrical and has a 'narrow' mounting surface on one side for TO220 size devices, and a 'wide' surface on the other for larger TO3P style devices. The device's pins do not need to be folded to accommodate a flat fixing version, but instead the device remains vertical as the fixing tab is attached to the flat centre of the vertical heatsink. The heatsink has a pair of 2.6mm diameter pins spaced 25.4mm apart at the bottom end, for insertion through a pair of PCB holes and soldering. In addition longitudinal, round section channels on each side are accessible at both ends for a pair of self-tap screws for further

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anchoring. The final completed assembly takes up very little board space (12.5 x 34.5mm). Height (excluding pins) is 25mm for SW25-24 and 38mm for SW38-2. Type SW25-4 has a 2mm diameter bolt hole ready-drilled in the mounting surface, while type SW38-2 is plain undrilled, to which a device is attached using the special retaining clip supplied, obviating fiddly screw attachment. Thickness at centre is 2mm.



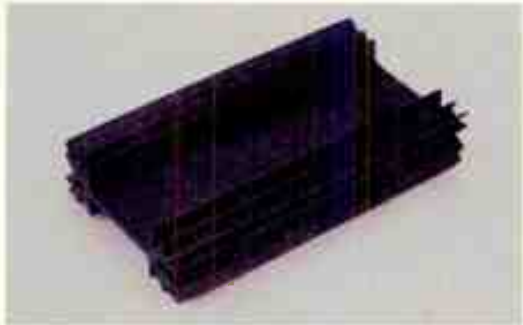
Thermal rating = 13°C/W (SW25-4), 10°C/W (SW38-2). Black anodised finish.

Order Code	Type	Price each
JW27E	SW25-4 Vert HSink	80p
JW28F	SW38-2 Vert HSK Pln	80p

8-Fin TO220 Heatsinks

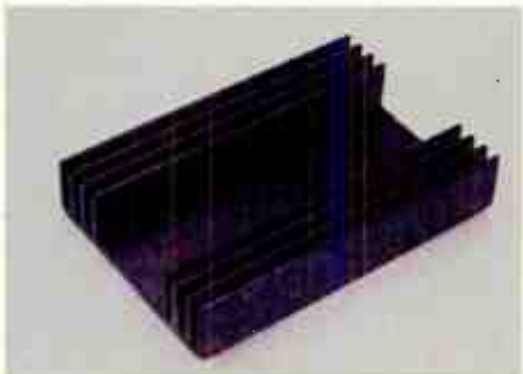
Pre-drilled for one TO220 package. Available in two versions:

Length	Overall height	Overall width	No. of semi. packages	Thermal rating	Colour
25mm	12.3mm	35mm	1	13°C/W	Matt black
40mm	12.3mm	35mm	1	9°C/W	Matt black



Order Code	Type	Price each
KW41U	8 Fin TO220 25mm	45p
KW42V	8 Fin TO220 40mm	60p

Centrally Mounting Heatsink for TO220 Semiconductor Packages

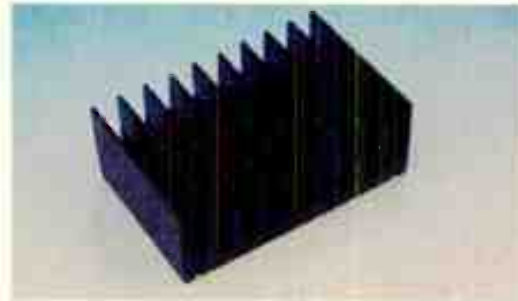


Available for a single TO220 package which mounts in the centre of the heatsink, the main areas of heat dissipation being concentrated at the ends. Overall dimensions: 50mm length x 12.5mm height x 43mm width. Manufactured from matt black anodised aluminium alloy, the thermal rating of the heatsink is 6.8°C/W. Pre-drilled for one TO220 package.

Order Code	Type	Price each
KW43W	Central Mount TO220	86p

High Power Types - Type 2E

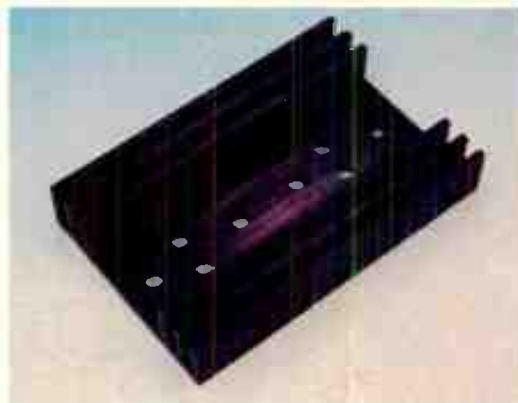
Redpoint



Plain undrilled aluminium heatsink. Dimensions: Width: 80mm (3.15in); Length: 51mm (2in); Thickness: 30mm (1.2in). Temperature rise in centre of heat sink: 2.4°C/W.

Order Code	Type	Price each
HQ70M	Heatsink 2E	£3.75

6-Fin TO3 Heatsinks (Type V)



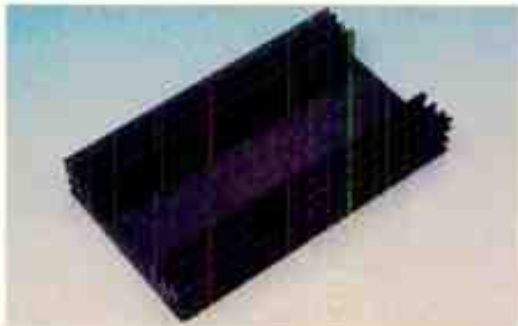
Available in two versions. Pre-drilled for one or two TO3 package devices.

Length	Overall height	Overall width	No. of semi. packages	Thermal rating	Colour
50mm	18.4mm	66mm	1	5.4°C/W	Black
100mm	18.4mm	66mm	2	3.4°C/W	Black

Order Code	Type	Price each
KW44X	6 Fin TO3 50mm	£1.48
KW45Y	6 Fin TO3 100mm	£2.49

Type 4Y

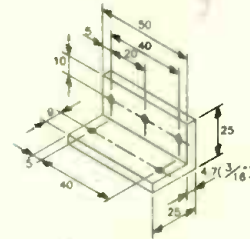
Redpoint



Plain undrilled aluminium heatsink. Dimensions: Width: 60mm (2.4in). Length: 102mm (4in). Thickness: 16mm (0.63in). Temperature rise in centre of heatsink: 3.3°C/W.

Order Code	Type	Price each
FL41U	Heatsink 4Y	£2.45

8W Hi-Fi Heatsink



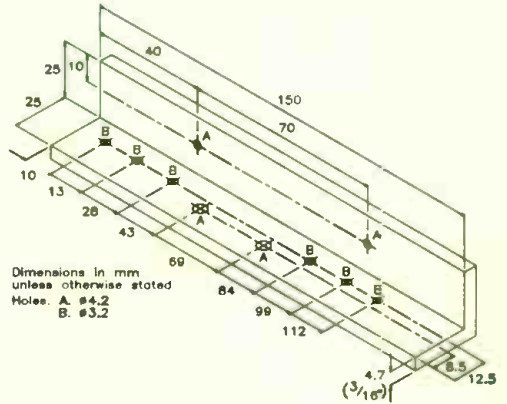
Dimensions in mm unless otherwise stated. All holes ø3.5



Designed to bolt to a pcb, the power amp IC then bolts onto this heatsink and a further heatsink may be bolted to it. It is therefore an ideal method of transferring heat from an on-board plastic power device to a large finned heatsink easily. Manufactured in aluminium angle 4.76mm (3/16in.) thick and black anodised.

Order Code	Type	Price each
HQ81C	8W Hi-Fi Heatsink	£1.99

50W Hi-Fi Heatsink

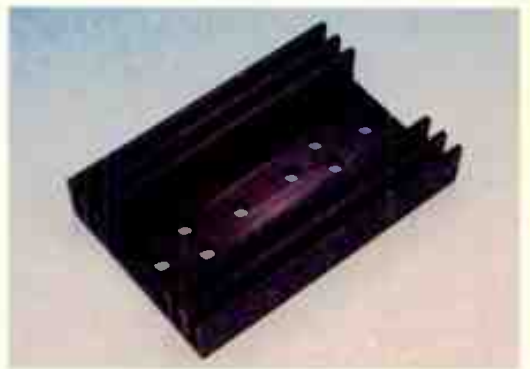


Dimensions in mm unless otherwise stated. Holes: A: ø4.2 B: ø3.2

As 8W Heatsink, but longer and designed for two plastic power transistors or power ICs.

Order Code	Type	Price each
HQ69A	50W Hi-Fi Heatsink	£2.99

Centrally Mounting TO3 Heatsinks (Type X)



The semiconductor(s) are mounted centrally and horizontally. The base of the heatsink will fit flush against a flat surface and as a result is suitable for PCB mounting, the leads from the package being soldered on the other side. Available in three versions. Pre-drilled for one, two, or three TO3 package devices.

Length	Overall Height	Overall Width	No. of semi. packages	Thermal rating	Colour
50mm	25mm	86mm	1	2.90°C/W	Black
100mm	25mm	86mm	2	1.85°C/W	Black
150mm	25mm	86mm	3	1.30°C/W	Black

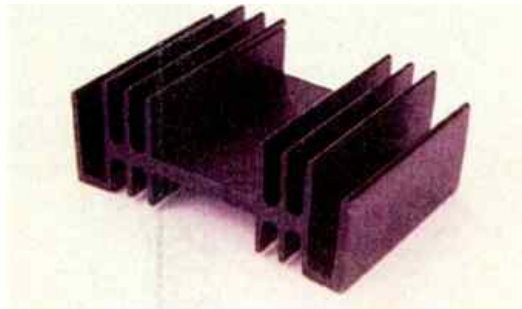
Order Code	Type	Price each
KW46A	Central TO3 50mm X	£1.99
KW50E	Central TO3 100mm X	£3.49
KW54J	Central TO3 150mm X	£5.99



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Centrally Mounting TO3 Heatsinks (Type Y)



A range of heatsinks where the semiconductor(s) are mounted centrally and horizontally. From a side view the heat dissipating device is centrally mounted, sufficient clearance for its lead-outs being provided when the heatsink is chassis mounted. Available in two versions. Pre-drilled for one or two TO3 package devices.

Length	Overall Height	Overall width	No. of semi. packages	Thermal rating	Colour
50mm	36mm	91.4mm	1	2.75°C/W	Black
100mm	36mm	91.4mm	2	1.75°C/W	Black

Order Code	Type	Price each
KW47B	Central TO3 50mm Y	£1.99
KW51F	Central TO3 100mm Y	£4.75

Flat Type

Redpoint



Plain undrilled aluminium heatsink ideal for printed circuit boards and suitable for external mounting on equipment.

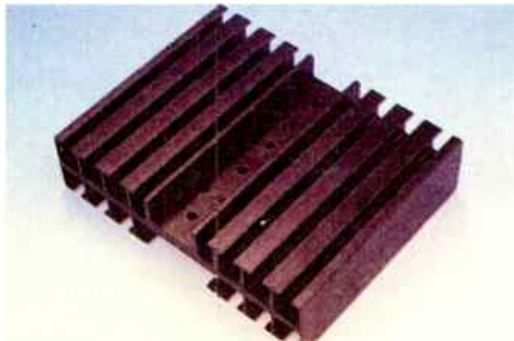
Dimensions: Width: 94mm (3.7in); Length: 152mm (6in.); Thickness: 14mm (0.6in).
Temperature rise in centre of heatsink: 1.8°C per watt.

Order Code	Type	Price each
FL42V	Flat Heatsink	£4.95

High Power 'T' Slotted

Redpoint

An efficient, general purpose symmetrically finned heatsink where the two outer pairs of fins, on both sides, feature integral 'T' slots 4.7mm wide for locating screw heads. With these the heatsink can be attached to panels, supported on pillars or carry PCB's.



One side of the central device mounting section has a pair of thick longitudinal fins 22.2mm apart. Holes are provided for two TO3 devices to be mounted upon the other side. Centre of heatsink is 6.4mm thick. Width 130.2mm, length 101.6mm, depth 31.8mm. Thermal rating 1.2°C/W. Black anodised finish.

Order Code	Type	Price each
JW31J	Scw Slotted HtSink	£6.99

Type 6W-1

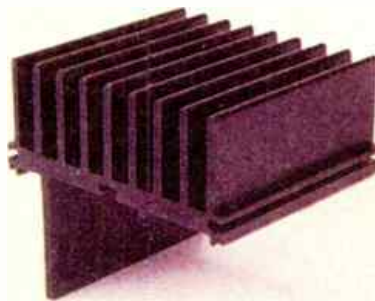
Redpoint



Plain undrilled aluminium heatsink. Dimensions: Width: 130mm (5.1in); Length: 152mm (6in); Thickness: 32mm (1.25in). Temperature rise in centre of heatsink: 1.1°C/W.

Order Code	Type	Price each
FL77J	Heatsink 6W-1	£7.65

10-Fin TO3 Heatsink (Type Z)

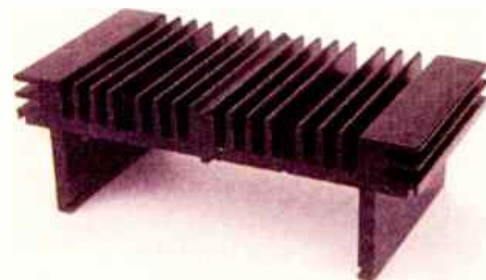


There are 10 fins on this heatsink. 9 are devoted to dissipating heat while the tenth, which is mounted at 180° to the rest, accommodates the semiconductor package(s). Three versions are available. Pre-drilled for one, two, or three TO3 package devices.

Height	Overall Length	Overall Width	No. of semi. packages	Thermal rating	Colour
50mm	75mm	69.4mm	1	2.20 C/W	Black
100mm	75mm	69.4mm	2	1.39 C/W	Black
150mm	75mm	69.4mm	3	1.00 C/W	Black

Order Code	Type	Price each
KW48C	10 Fin TO3 50mm	£2.99
KW52G	10 Fin TO3 100mm	£5.95
KW55K	10 Fin TO3 150mm	£6.95

Heatsinks for Multiple TO3 Packages (Type W)



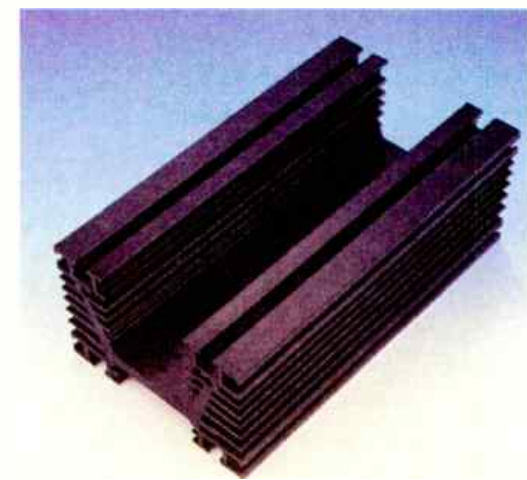
The semiconductors are mounted on the two end panels, the main area of heat dissipation being in the middle section. Available in two versions. Pre-drilled for two, or four TO3 package devices.

Length	Overall height	Overall width	No. of semi. packages	Thermal rating	Colour
50mm	44mm	130mm	2	2.1°C/W	Black
100mm	44mm	130mm	4	1.33°C/W	Black

Order Code	Type	Price each
KW49D	Multiple TO3 50mm	£3.25
KW53H	Multiple TO3 100mm	£6.49

Type 9SV

Redpoint



A very high power heatsink in extruded aluminium. Black anodised and with holes punched to accept up to 8 TO3 packages.

Dimensions 127 x 85 x 229mm long.
Temperature rise in centre of heatsink: 0.45°C/W

Order Code	Type	Price each
XJ66W C4	Heatsink Drilled	£29.99



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Heat Transfer Compound Large Syringe *Electrolube*



Heat transferring grease having about 3½ times the thermal transmission of ordinary silicone grease. The material is non-irritant except to the eyes. In the case of such contamination wash freely with water until the smarting stops. Supplied in a box with syringe-type applicator for accurate and wasteless placement of the compound. Contains 10ml.

Order Code	Type	Price each
FL79L	Silicone Grease 10ml	£1.89

Small Syringe *Electrolube*



Heat transferring grease having about 3½ times the thermal transmission of ordinary silicone grease. The material is non-irritant except to the eyes. In the case of such contamination wash freely with water until the smarting stops. Supplied in a box with syringe-type applicator for accurate and wasteless placement of the compound. Contains 2ml.

Order Code	Type	Price each
HQ00A	Silicone Grease Tube	£1.30

SUBSECTION 73 TECHNICAL BOOKS

D.A.T.A Books

NEW

The D.A.T.A technical library covers over 240,000 semiconductors from diodes to microprocessors. For each device all the relevant electrical and physical parameters are listed, as well as the manufacturer.

The volumes listing Integrated Circuits have a cross reference listing pin for pin compatible devices.

The ten volumes are listed under 'Integrated Circuits' and 'Discrete Devices'.



Integrated Circuits

Title	Book Code	Order Code
Linear IC's	LN	(AB61R)
Digital IC's	DG	(AB62S)
Interface IC's	IF	(AB63T)
Memory IC's	MM	(AB64U)
Microprocessor IC's	MP	(AB65V)

Discrete Devices

Title	Book Code	Order Code
Transistors	TR	(AB66W)
Diodes	DI	(AB67X)
Thyristors	TY	(AB68Y)
Power Semicdrs	PW	(AB69A)
Optoelectronics	OE	(AB71N)

CD ROM

All the above titles are available on one compact CD ROM
Part number: D.A.T.A./P/A/L/-CD

Order Code	Type	Price each
AB61R	Data Digest LN	£175.00
AB62S	Data Digest DG	£175.00
AB63T	Data Digest IF	£175.00
AB64U	Data Digest MM	£175.00
AB65V	Data Digest MP	£175.00
AB66W	Data Digest TR	£175.00
AB67X	Data Digest DI	£175.00
AB68Y	Data Digest TY	£175.00
AB69A	Data Digest PW	£175.00
AB71N	Data Digest OE	£175.00
AB72P	D.A.T.A./P/A/L/-CD	£2345.00

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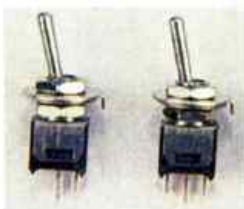
SWITCHES AND RELAYS

DIL Switches	792	Maka-switch	796	Rotary Switches	793
Foot Switches	800	Membrane Switches	802	Slide Switches	798
Keyboard Switches	802	Microswitches	797	Solenoids	805
Keypads	802	Push Switches	798	Thumbwheel Switches	794
Key Switches	795	Reed Switches	810	Tilt Switches	810
Knife Switch	805	Relays	805	Toggle Switches	790
Magnets	810	Rocker Switches	792	Touch Pad	805

TOGGLE SWITCHES

Ultra Miniature Toggle Switches

A range of ultra miniature toggle switches. Rated 3A 125VAC, 1A 250VAC. Chrome plated brass dolly. Mounting hole: 5.2mm (0.2in). Available in SPST, SPDT and DPDT types.



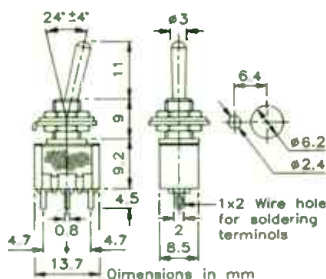
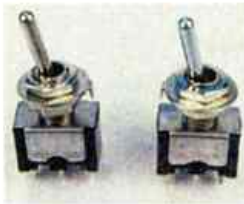
Insulation resistance: >100MΩ
Contact resistance: 20mΩ max.

Dimensions	Single-pole	Double-pole
Body	8 x 5 x 7mm	8 x 9 x 7mm
Bush length	5.6mm	5.6mm
Dolly length	9.5mm	9.5mm
Tag length	5mm	5mm

Order Code	Type	Price each
FH97F	SPST Ultra Min Toggle	89p
FH98G	SPDT Ultra Min Toggle	89p
FH99H	DPDT Ultra Min Toggle	£1.05

Sub-Miniature Toggle Switches

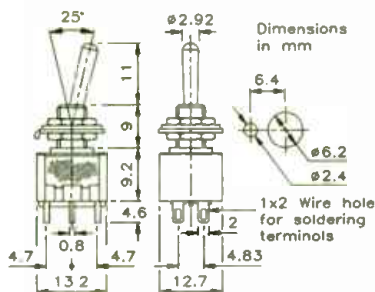
A range of toggle switches in SPDT and DPDT with a variety of switching actions. Switches have chrome-plated brass dolly and silver-plated contacts.



Rated:	2A	250V AC
	5A	125V AC
	5A	30V DC
Contact resistance:	<20mΩ	
Insulation resistance:	>100MΩ	
Life:	50,000 make/break cycles at full load	
Mounting hole:	6.35mm dia.	

Single-pole double-throw (SPDT) types are available in the following switching actions. Non-locking indicates biased or momentary action.

Type	Action	Description
A	ON-ON	Locking both ways
J	ON-(ON)	Locking one way, non-locking one way
B	ON-OFF-ON	Locking both ways, centre off
C	ON-OFF-(ON)	Locking one way, non-locking one way, centre off
D	(ON)-OFF-(ON)	Non-locking both ways, centre off



Similarly double-pole double-throw (DPDT) types are available in the following switching actions.

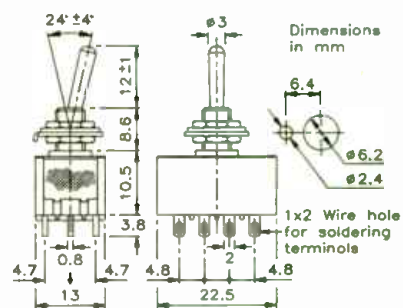
Type	Action	Description
E	ON-ON	Locking both ways
K	ON-(ON)	Locking one way, non-locking one way
F	ON-OFF-ON	Locking both ways, centre off
G	ON-OFF-(ON)	Locking one way, non-locking one way, centre off
H	(ON)-OFF-(ON)	Non-locking both ways, centre off

Order Code	Type	Price each
FH00A	Sub-Min Toggle A	95p
FF70M	Sub-Min Toggle J	£1.04
FH01B	Sub-Min Toggle B	95p
FH02C	Sub-Min Toggle C	£1.04
FH03D	Sub-Min Toggle D	£1.04
FH04E	Sub-Min Toggle E	£1.04
FF71N	Sub-Min Toggle K	£1.31
FH05F	Sub-Min Toggle F	£1.31
FH06G	Sub-Min Toggle G	£1.31
FH07H	Sub-Min Toggle H	£1.31

4-Pole Type

4-pole changeover.

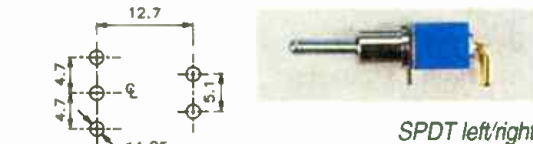
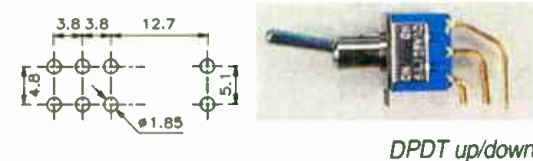
Dimensions:
Body 13 x 22.8 x 12.3mm
Bush length: 8mm
Dolly length: 12mm
Tag length: 4mm



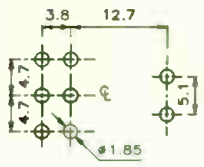
Order Code	Type	Price each
FH08J	4-Pole SM Toggle	£2.79

Right-Angled PCB Mounting Type

Sub-miniature toggle switches rated at 250V AC 3A, 125V AC 6A, 30V DC 5A. Silver-plated alloy contacts. Nickel-plated brass dolly. The switches have extended right-angled terminals and a pair of pins at the edge of the toggle pivot plate for insertion in a pcb. The switches are not threaded for front panel fixing. Two styles are available for up/down and left/right operation and both are available in single- and double-pole double-throw versions. All other dimensions are as panel mounting types.



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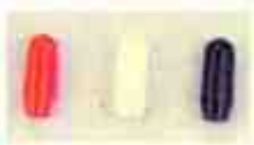


DPDT left/right

Order Code	Type	Price each
FA70M	R/A Tggl SPDT Up/Dwn	£2.15
FA72P	R/A Tggl DPDT Up/Dwn	£2.89
FA71N	R/A Tggl SPDT Lft/Rt	£2.15
FA73Q	R/A Tggl DPDT Lft/Rt	£2.89

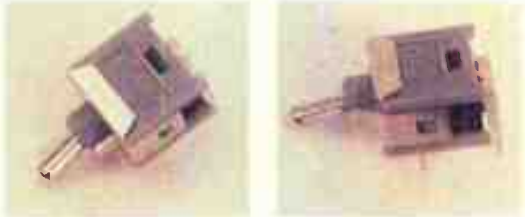
Toggle Covers

Moisture proof covers that fit over the dolly of the miniature toggle switches. Available in the colours red, white or black.



Order Code	Type	Price each
RA95D	Min Toggle Cover Red	14p
RA96E	Min Toggle Cover Wht	14p
RA97F	Min Toggle Cover Blk	14p

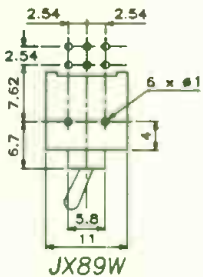
Miniature PCB Mounting Toggle Switches



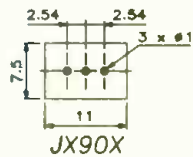
A range of miniature toggle switches for direct PCB mounting, available in both single and double pole changeover, both vertical or right-angled mounting. Right-angled types have two extra PCB pins at front near the toggle for secure fixing. Suitable for use with 0.1in. matrix board. All types are rated at 0.3A at 125V DC. Contact resistance is 20mΩ. Insulation resistance, 100MΩ at 500V DC. Insulation strength, 1000V AC for 1 minute. Chrome toggle dolly is 6mm long on all types.

Dimensions of body

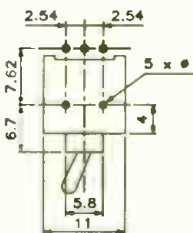
Type	Height mm	Width mm	Depth mm
Vertical SPDT	13.6	11	7.5
Horizontal SPDT	8	11	14.4
Vertical DPDT	13.6	11	11.7
Horizontal DPDT	12.2	11	14.4



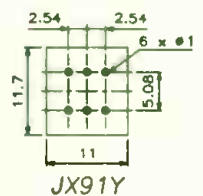
JX89W



JX90X



JX88V



JX91Y

Order Code	Type	Price each
JX90X	PCB Sw Vert SPDT	£1.10
JX88V	PCB Sw Hori SPDT	£1.40
JX91Y	PCB Sw Vert DPDT	£1.50
JX89W	PCB Sw Hori DPDT	£2.25

Sub-Miniature Waterproof Toggle Switch Cover

A waterproof toggle switch cover for use with sub-miniature toggle switches having 1/4-40 UNS threaded mounting bushes. This cover fits the 'Sub-Miniature Toggle Switch' range. The cover comprises of a polychloroprene boot with a knurled nickel-plated brass nut. To provide sealing between the panel and the cover, an O-ring is also supplied. When this toggle switch cover is used, the switch locating plate and outer fixing nut are not required.



Order Code	Type	Price each
JR79L	Small Toggle Cover	£1.36

DPDT Toggle Calvyn Industrial

A standard DPDT toggle switch rated 2A 250V AC, 6A 125V AC. Supplied with on/off plate.



Body size: 27.5 x 17 x 14.5mm high
 Tag length: 5.5mm
 Bush: M12 x 8.5mm long
 Dolly: 14mm long, 5mm dia.
 Panel cut-out: 12.7mm dia.
 Contact resistance: <50mΩ
 Insulation resistance: >100MΩ
 Life: >20,000 make/break cycles at full load

Order Code	Type	Price each
FH39N	Toggle Sw	95p

Toggle Switch Cover

A black flexible PVC boot with integral nut to suit an M12 thread 0.7mm pitch, e.g. FH39N and 10A Toggle switch range. The cover is splashproof.



Order Code	Type	Price each
YL01B	Toggle Switch Cover	99p

10A Toggle Switches

A range of heavy duty toggle switches with chrome-plated dolly. Connections are 1/4in. blade terminals with hole for soldering if desired as an alternative.

Rated: 10A 250V AC
 15A 125V AC

Contact resistance: <50mΩ
 Insulation resistance: >100MΩ
 Life: >50,000 make/break cycles at full load

Available in single pole and double pole.

Single pole types



Body size: 29.2 x 15.8 x 17.5mm high
 Tag length: 11mm
 Bush: M12 x 11.5mm long
 Dolly: 16.5mm long x 6mm dia.
 Panel cut-out: 12.7mm dia.

Double pole types



Body size: 32.5 x 19.5 x 20mm high
 Tag length: 11mm
 Bush: M12 x 11.5mm long
 Dolly: 16.5mm long x 6mm dia.
 Panel cut-out: 12.7mm dia.

Type	Action	Description
SPST	ON-OFF	Single-pole locking, 2-pin
SPDT-A	ON-ON	Single-pole locking, 3-pin
SPDT-B	ON-OFF-ON	Single-pole locking, 3-pin, centre off
DPST	ON-OFF	Double-pole locking, 2-pin
DPDT-E	ON-ON	Double-pole locking, 3-pin
DPDT-F	ON-OFF-ON	Double-pole locking, 3-pin, centre off

Order Code	Type	Price each
JK25C	10A Toggle SPST	£1.35
JK27E	10A Toggle SPDT A	£1.45
JK28F	10A Toggle SPDT B	£1.45
JK26D	10A Toggle DPST	£1.75
JK29G	10A Toggle DPDT E	£1.85
JK30H	10A Toggle DPDT F	£1.85



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ROCKER SWITCHES Round-Faced Miniature Rocker Switches

A range of three miniature round faced rocker switches with single round hole fixing and solder terminals. Mounting hole: 18mm. Current rating: SPST and SPDT 240V AC 3A; DPDT 240V AC 1.5A.



Order Code	Type	Price each
FG47B	Round Rocker SPST	£1.39
FG48C	Round Rocker SPDT	£1.65
FG49D	Round rocker DPDT	£1.99

Snap-in Miniature Round Rocker Switches

A range of miniature round faced rocker switches which snap-in a 20.4mm diameter hole. Body has a 2mm wide locating lug for which a slot must be provided in the edge of the hole, to prevent rotation.



Available in SPST, SPDT, DPST and DPDT contact configurations with red or black rocker. All buttons have a white spot to indicate the 'on' direction. Connections are 4.8mm push-on style terminals which can be soldered. Contacts are rated at 125V AC @ 5A, 250V AC @ 3A. Contact resistance is 20mΩ max. as measured with 2.5V @ 1A DC. Insulation resistance 100MΩ @ 500V DC. Insulation strength is > 1,500V AC.

Order Code	Type	Price each
JR96E	Round Rocker SPST Bk	£1.06
JR97F	Round Rocker SPST Rd	£1.06
JR98G	Round Rocker SPDT Bk	£1.20
JR99H	Round Rocker SPDT Rd	£1.20
JU00A	Round Rocker DPST Bk	£1.42
JU01B	Round Rocker DPST Rd	£1.42
JU02C	Round Rocker DPDT Bk	£1.65
JU03D	Round Rocker DPDT Rd	£1.65

Miniature Rocker Switches

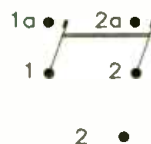
A very attractive single hole fixing miniature rocker switch available in SPST and DPDT styles. Switch has a white rocker in a matt finish black frame.



Rating:	6A/125V AC, (2A/250V AC)
Contact resistance:	<20mΩ
Panel cut-out:	18mm diameter
Overall depth behind front of panel:	14mm
Overall height in front of panel:	12mm (including rocker) 7.5mm (frame only)
Frame size:	30 x 20mm.

Order Code	Type	Price each
YX64U	Min Rocker SPST	79p
YX65V	Min Rocker DPDT	£1.05

Double-Pole Rocker Switch



A range of slim aesthetically styled, double-pole, single-throw, rocker switches that are mains rated and available with or without a neon indicator. Moulded in self-extinguishing thermoplastic these switches are supplied with either a black rocker or a red illuminated rocker and snap-fit into a cut-out 19 x 13mm in a panel 0.7 to 1.25mm thick. Rated at 6A/250V AC for resistive loads or 2A/250V AC for inductive loads.

Order Code	Type	Price each
RD17T	DP Neon Rocker Sw	£1.65
RD19V	Rocker Switch	99p

Single-Pole Rocker Switch

A slim aesthetically styled, single-pole, change-over, illuminated rocker switch that is mains rated and uses a neon indicator. Moulded in self-extinguishing thermoplastic this switch is supplied with a red illuminated rocker and snap-fits into a cut-out 19 x 13mm in a panel 0.7 to 1.25mm thick. Rated at 10A/250V AC for resistive loads or 4A/250V AC for inductive loads.



Order Code	Type	Price each
RD18U	SP Neon Rocker Sw	99p

Illuminated Rocker Switch

A smart, snap-in rocker switch with concave, red, neon illuminated rocker. Contacts are single pole single throw rated at 125V at 10A, 250V at 6A AC. Connectors are push-on style terminals which can be soldered. The snap-in switch requires a panel cut out of 22 x 18mm. Overall depth from front of panel is 23.5mm. Contact resistance is 50mΩ max. Insulation resistance is 100MΩ at 500V DC. Insulation strength is 1500V AC for 1 minute.

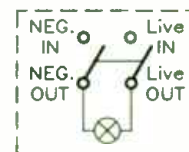


Order Code	Type	Price each
KU99H	Red Neon Switch	£1.25

Rocker Switches

A range of 10A 250V AC rocker switches having a black polycarbonate body and white rocker, or green (with white body) or red lens. The switches are snap-mounting and require a panel cut-out 29 x 12.5mm for single-pole types and 29 x 25mm for double-pole types, except for YR70M/FE64U which require a cutout of 30 x 22mm. Types available are: Single-pole make (SPST); Single-pole changeover (SPDT); Single-pole make with integral neon indicator with red or green lens (Neon); Double-pole make (DPST); Double-pole changeover (DPDT); Double-pole make

with integral neon indicator with red or green lens (Dual Rocker Neon).



Order Code	Type	Price each
FH30H	SPST Rocker	65p
FH31J	SPDT Rocker	75p
YR68Y	Rocker Neon Red	£1.35
FE63T	Rocker Neon Green	£1.48
YR69A	DPST Rocker	99p
FH34M	DPDT Rocker	£1.35
YR70M	Dual Rocker Neon Red	£1.80
FE64U	Dual Rocker Neon Grn	£1.99

Rocker Switch

Cliff

NEW!

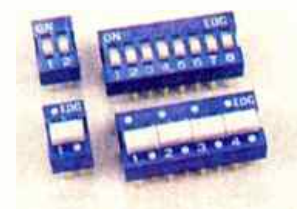


A snap-in, black rocker switch that is available with either DPDT, or DPST contacts. Suitable for panel thickness 0.75 to 3.00mm.

Specification	Value
Rating:	250V AC 6A, 125V AC 8A
Inrush current:	>80A
Contact resistance:	≤20mΩ
Dimensions:	24 x 21 x 24mm
Panel thickness (mm)	Size of mounting hole (mm)
0.75 to 1.25	width height
1.25 to 2.00	19.2 21.9
2.00 to 3.00	19.4 21.9
	19.8 21.9

Order Code	Type	Price each
DE62S	DPST Rocker	£1.56
DE63T	DPDT Rocker	£1.91

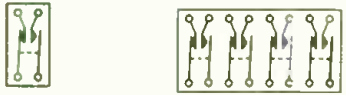
DUAL-IN-LINE SWITCHES



Subminiature switches in dual-in-line packages for pcb mounting. Pin spacing 0.3in. x 0.1in. Manufactured in UL94-V0 grade plastic with gold-plated contacts and leads.

Contact rating, non-switching:	100mA 50V DC
switching:	25mA 24V DC
	100mA 5V DC

Contact resistance <50mΩ
Life >3000 operations per pole

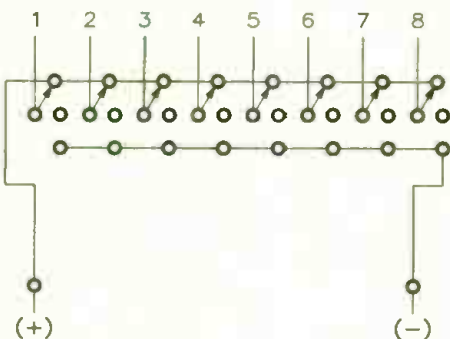


Dimension
Width: 9.7mm
Height: 6.6mm SPST types
7.7mm SPDT types
Pin length: 3mm
Length: 2-pole SPST: 6.7mm
4-pole SPST: 11.7mm
6-pole SPST: 16.7mm
8-pole SPST: 21.7mm
10-pole SPST: 26.7mm
1-pole SPDT: 6.7mm
2-pole SPDT: 11.7mm
4-pole SPDT: 21.7mm

Order Code	Type	Price each
XX26D	DIL Switch SPST Dual	65p
FV43W	DIL Switch SPST Quad	79p
FV44X	DIL Switch SPST 6Way	90p
XX27E	DIL Switch SPST Octl	£1.09
FV45Y	DIL Switch SPST 10W	£1.25
XX28F	DIL Switch SPDT Sgl	65p
JH11M	DIL Switch SPDT 2Way	79p
XX29G	DIL Switch SPDT Quad	£1.09

Slimline Tri-State Switch

A PCB mounting switch in a dual-in-line package with tri-state switching. The eight outputs can be either 'high', 'indeterminate', or 'low'. The switch is manufactured from UL94V0 plastics with gold plated contacts, to ensure low resistance and long operating life. Designed to fit a standard IC socket or can be directly mounted on the pcb. Ideally suited for encoding/decoding circuitry in digital and computer circuits.



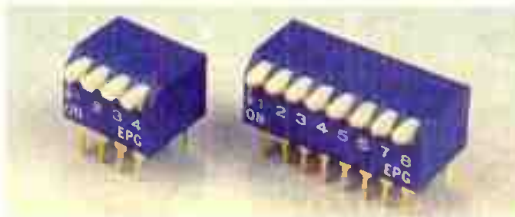
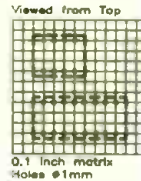
Contact rating
non-switching: 100mA, 50V DC
switching: 25mA, 24V DC
Contact resistance
initial: 50mΩ max.
after life test: 100mA max.
Insulation resistance: 1,000MΩ min at 100V DC
Dielectric strength: 500V DC min for 1 minute
Capacitance between adjacent switches: 5pF max.
Operating life: > 2,000 operations per pole
Acceptable soldering temperature: 260 ±5 °C for 5 ±1 second

Dimensions
width: 7.62mm
length: 21.92mm
height: 4.1mm
pin spacing: 2.54mm (0.1in.)
pin length: 3.5mm

Order Code	Type	Price each
GW74R	8W Tri-State DIL Sw	£1.35

Piano Type SPST

Subminiature switches in a dual-in-line package with right-angle piano-style levers, designed for PCB mounting. Pin spacing 0.3in x 0.1in. Body is made from glass reinforced Polyester resin to UL 94 VO. Contacts gold plated phosphor bronze. Available in 4-way and 8-way versions.



Specifications
Mechanical Life: 5000 operations (min)
Electrical Life: 2000 operations (min) @ 50mA 24V DC
Operating Force: 400g ±200g
Non-switching Rating: 100mA, 50V DC
Switching Rating: 50mA, 24V DC
Switch Action: SPST ('down' is ON)

Order Code	Type	Price each
JW75S	Piano DIL Sw 4-way	69p
JW76H	Piano DIL Sw 8-way	89p

FOR CASHTEL
Phone 01702 552941

Slimline SPST



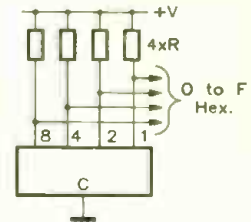
DIL switches with dimensions identical to DIL IC's. The pins fit standard IC sockets or can be directly mounted on the pcb. The white levers are numbered 1 and 2, 1 to 4, 1 to 6, or 1 to 8 depending on size and have a movement of 1mm. The switch is made from UL94V-0 plastics with gold-plated twin contacts to ensure low contact resistance and long operating life. Pin spacing is 0.3in. x 0.1in.

Contact rating, non-switching: 100mA 50V DC
switching: 100mA 5V DC
Contact resistance: <50mΩ
Insulation resistance: 1000MΩ at 100V DC
Dielectric strength: 500V DC min. for 1 minute
Capacitance between adjacent switches: 5pF
Life: >2000 operations per pole

Dimensions:
Width: 7.62mm
Height: 4.3mm
Pin length: 3mm
Actuator height: 1mm
Length: 2-pole: 5.04mm
4-pole: 10.12mm
6-pole: 15.20mm
8-pole: 20.28mm

Order Code	Type	Price each
JH09K	Slimline 2W DIL Sw	69p
JH08J	Slimline 4W DIL Sw	89p
CJ90X	Slimline 6W DIL Sw	99p
QY70M	Slimline 8W DIL Sw	£1.15

ROTARY SWITCHES Sub-Miniature PCB Mounting 'Hex' Encoded Rotary Switches



Extremely compact, PCB mounting, sub-miniature switch arrays which can produce any 4-bit hexadecimal number from 0 to F by simply turning the integral slotted actuator with a screwdriver, to one of 16 click-stop positions. The switches are 10mm square and 11mm high overall excluding pins. The five pins are spaced for a 0.1in. matrix, comprising one common pin and four 'output' pins for hex 0 to 3.

Switch QY68Y is arranged so that any pin output 'bit 0' in hex is connected to the common pin. For identification purposes, the actuator is white. Switch QY69A has the complementary arrangement in that any pin output 'bit 0' in hex is open circuit, or not connected to the common pin. For identification purposes, the actuator is red.

Specification
Contact rating: 100mA @ 50V DC non-switching
100mA @ 5V DC switching
Contact resistance: 100mΩ
Dielectric strength: 250V AC for 1 minute
Insulation resistance: >1000MΩ @ 100V DC
Life: 10000 operations
Acceptable soldering temperature: 260°C ±5°C for 10 min.

Order Code	Type	Price each
QY68Y	PCB Hex Sw On = 0	£2.45
QY69A	PCB Hex Sw On = 1	£2.45

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Decimal Rotary DIL Switch

A PCB mounting, sealed, dual-in-line, 10-position, BCD rotary programming switch with 1-2-4-8 binary coding. The switch is easily operated by means of the screwdriver slot on top of the body and has a positive click action. The switch provides compliment coding and is suitable for use in pre-programming of digital circuits and computers.

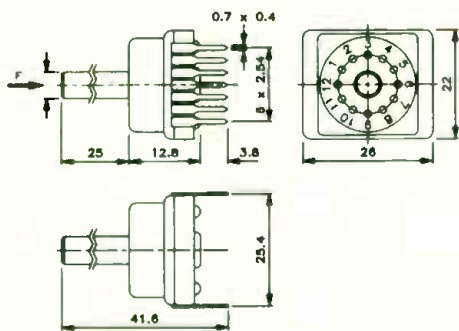


Specification

Contact rating
Non-switching: 100mA, 50V DC
Switching: 25mA, 24V DC resistive
Contact resistance: 100mΩ max. at 5V DC, 10mA
Insulation resistance: 1000MΩ min at 100V DC
Dielectric strength: 240V x 10² operations without load
Acceptable soldering temperature: 230 ±5°C for 3 ±0.5 secs - (75% coverage)

Order Code	Type	Price each
CJ89W	DIL SW Dec	£1.70

DIL Rotary Switch



A choice of two DIL flat rotary switches for PCB mounting with a 2.54mm pitch. The switches have a mounting bush (M10 x 0.75) with a 25mm shaft, and are fitted with a stop position. 1P 12W or 2P 6W are available.

Specification

Contact material: Silver plate
Maximum switching power: 5VA
Maximum switching current: 150mA
Maximum current: 5A
Contact resistance: <150mΩ

Order Code	Type	Price each
DK85G	DIL Rotary Sw 1P12W	£2.69
DK87U	DIL Rotary Sw 2P6W	£3.49

Rotary Switches

Lorlin

A high quality rotary switch moulded in glass-filled nylon. Indexing 30°. 6.3mm (1/4 in.) spindle. 9.5mm (3/8 in.) bush. With adjustable rotation limit stop. Silver-plated contacts.



Bush length: 8mm
Spindle length: 30mm (with flat)
Overall length: 58mm
Max voltage: 300V AC or DC
Max current: 5A continuous
Contact resistance: 10mΩ
Contact rating: 150mA at 250V AC or DC
350mA at 110V AC or DC

The following types are available:

Break before Make action

1 pole 12 way: FF73Q 3 pole 4 way: FF75S
2 pole 6 way: FF74R 4 pole 3 way: FF76H

Order Code	Type	Price each
FF73Q	Rotary SW12B	99p
FF74R	Rotary SW6B	99p
FF75S	Rotary SW4B	99p
FF76H	Rotary SW3B	99p

Make before Break action

1 pole 12 way: FH42V 3 pole 4 way: FH44X
2 pole 6 way: FH43W 4 pole 3 way: FH45Y

Order Code	Type	Price each
FH42V	Rotary SW12	99p
FH43W	Rotary SW6	99p
FH44X	Rotary SW4	99p
FH45Y	Rotary SW3	99p

Clickless Switch

Lorlin

A Rotary Sw12 without clicks.

Order Code	Type	Price each
XX45Y	Switchpot 1p 12w	99p

Right Angle PCB Mounting Rotary Switch

Lorlin

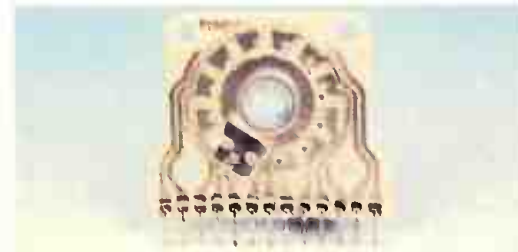


A right-angle PCB mounting rotary switch which features single line PCB insertion pins on a 0.1in. spacing. Two mounting pillars and fixing screws are provided under the switch body to ensure rigid support to the PCB, in addition to the usual 3/8 in. spindle bush and nut fitting for front panel mounting, and adjustable end stop. The switch contacts are an integral part of a PCB at rear of the switch and are brought out to the insertion pins at the bottom. Available as break before make in 1 x 12 way.

Order Code	Type	Price each
FT56L	PCB R/A Rotary 1x12	£3.99

Stackable PCB Mounting Wafer

Lorlin



A 1-pole, 12-way rotary wafer switch designed to be added behind any of the main PCB switch units above.

The main switch couples to a number of secondary wafers via a nylon shaft, which inserts into a keyed recess at rear of the main switch. The shaft will pass through up to 11 stackable wafers, forming one complete, pcb mounted multi-pole rotary switch assembly. Shaft is 76mm in length x 4.5mm dia. Wafers available as 1-pole 12-way only.

Order Code	Type	Price each
FA97F	Wafer 1 pole 12 way	£2.35
FA98G	Wafer Shaft Plastic	49p

Rotary Mains Switch

Lorlin



A double-pole single-throw (DPST) rotary mains switch moulded in flame retardant plastic. Recommended for use in circuits where heavy switching current surges occur. Indexing 45°. 6.3mm (1/4 in) spindle. 9.5mm (3/8 in) bush.

Bush length: 8mm
Spindle length: 25mm (with flat)
Overall length: 47mm
Contact rating: 4A at 250V AC
Current surge: 80A for 10msec.
Contact resistance: 20mΩ

Order Code	Type	Price each
FH57M	Rotary Mains	£1.39

FOR TOP QUALITY & VALUE!

THUMBWHEEL EDGE SWITCHES

A thumbwheel edge switch in a black plastic housing. This high quality switch has gold plated contacts on both the PCB and wiper to ensure reliable operation. The numbers 0 to 9 appear in the aperture in the front as the aperture is revolved, and the operation is smooth and positive. The switches are front panel mounting with snap-in fixings, and can be snapped together to form a bank of switches if desired. Connections are made as follows:



No.	Pin numbers
0	C and 0 None
1	C and 1 C and 1
2	C and 2 C and 2
3	C and 3 C, 1 and 2
4	C and 4 C and 4
5	C and 5 C, 1 and 4
6	C and 6 C, 2 and 4
7	C and 7 C, 1, 2 and 4
8	C and 8 C and 8
9	C and 9 C, 1 and 8

Switch resistance: 100mΩ max
Current carrying capacity: 1A max
Contact rating: 150mA at 50VAC or 28VDC

Character height: 5.8mm
 Width of switch: 8mm
 Overall height: 33mm
 Overall depth: 43mm
 Panel cut-out: 31 x 8mm

Order 2438		
Code	Type	Price each
JK36P	Thumbwheel BCD	£1.89
JK35Q	Thumbwheel Decimal	£1.89

End Cheeks for Thumbwheel Switches

A pair of end cheeks, one right-hand and one left-hand mounting that enable snap-in mounting. To calculate the size of panel cut-out required use the formula:- Multiply the number of switches by eight, then add eight to give the width in mm, and the height is 33mm.

Order 2438		
Code	Type	Price each
JK37S	End Cheeks	65p

KEY OPERATED SWITCHES

Miniature Short Round Type SPST



A single-pole, single-throw, short, zinc-alloy bodied key switch with a chrome-plated bezel. The key switch uses a round key for extra security. The switch position is indicated by an arrow; the key can be withdrawn from either position. The switch has two solder bucket terminals at the rear. Supplied with two keys, with a wide range of combinations.

Specification

Bezel diameter: 15mm
 Panel cut-out: 12mm diam, 10.8mm across the flats (provided to prevent twisting)
 Bush length: 10.3mm
 Indexing: 90°
 Contact rating: 1A 125V AC
 0.5A 250V AC

Order 2445		
Code	Type	Price each
CJ92A	Min Round Key Sw	£1.99

Miniature Round Type



A single-pole make/break, metal-bodied key switch with a chrome-plated bezel. The key switch uses a

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RZ54J

This compact ioniser is designed to improve the quality of the air in your car. The ioniser generates a copious stream of negative ions into the air that combine with the positively charged pollution particles. Airborne particles and odours are removed from the atmosphere by a process of electrostatic precipitation which results in a 'after a rainstorm freshness'. The device may help to relieve colds and similar respiratory problems, as well as benefiting headache and hayfever sufferers. Easy to install, just connects to a cigarette lighter socket. Supplied with plug and 1m of connecting lead.



round key for extra high security. The switch has two solder buckets at the rear. Supplied with two keys. The key may be withdrawn in either position.

Bezel diameter: 15mm
 Panel cut-out: 12mm (the bush is flattened to 10.25mm on opposing sides to prevent twisting)

Bush length: 20mm
 Indexing: 90°
 Contact rating: 1/2 A at 250V AC

Order 2441		
Code	Type	Price each
FE44X	Min Key Switch	£3.99

Metal Body SPST



A top quality, single-pole, single-throw, key switch with a zinc-alloy die-cast housing and cylinder with a chrome plated bezel. The cylinder has a five-disc tumbler mechanism, with dust shutter, to deter lock-picking; the reversible key can be withdrawn from either position. Ideal for burglar alarms and security systems. The switch has two solder bucket terminals at the rear. Supplied with two keys with a range of 150 combinations.

Specification

Bezel diameter: 22mm
 Panel cut-out: 19mm diam. 16.3mm across the flats (provided to prevent twisting)

Bush length: 27.5mm
 Indexing: 90°
 Contact rating: 4A 125V AC
 2A 250V AC

Order 2455		
Code	Type	Price each
CJ98G	Metal SPST Sw	£3.99

FOR TOP QUALITY & VALUE!

Plastic Body SPDT



An SPDT rotary switch operated with a non-reversible flat key, in a tough black plastic body. Three solder tags at rear. Barrel has a white pointer dot. Panel cut-out 19.9mm (3/4 in.). Supplied with 2 keys. The key may be withdrawn in either position.

Bezel diameter: 22mm
 Bush length: 19.5mm
 Indexing: 90°
 Contact rating: 3A 125V AC
 1A 250V AC

Contact resistance: <20mΩ
 Insulation resistance: @ 500V DC >100MΩ
 Insulation Strength: 1 minute @ 1000V AC

Order 2458		
Code	Type	Price each
FV42V	Plas Key Switch	£6.99

Miniature Round Type SPDT



A single-pole, double-throw, key switch with a zinc-alloy die-cast housing and chrome-plated bezel. The key switch uses a round key for extra security; the key can be withdrawn from either position. The switch has four solder bucket terminals at the rear. Supplied with two keys with a range of 200 combinations.

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Specification

Bezel diameter: 15mm
 Panel cutout: 12mm diam, 10.8mm across the flats (provided to prevent twisting)
 Bush length: 21.5mm
 Indexing: 90°
 Contact rating: 1A 125V AC
 0.5A 250V AC

Order Code	Type	Price each
CJ94C	Min SPDT Key	£3.99

Miniature Four Position



A single-pole, four-position, key switch with a zinc-alloy die-cast housing and stainless steel bezel. This key switch is ideal for specialist alarm systems where there is a need for separate arming and testing positions; the key can be withdrawn from any of the four positions. At the rear, the switch has four pin terminals and one solder bucket terminal. Supplied with two keys, with a wide range of combinations.

Specification

Bezel diameter: 15.5mm
 Panel cut-out: 12mm diam, 10.8mm across the flats (provided to prevent twisting)
 Bush length: 23.5mm
 Indexing: 0°, 90°, 180°, 270°
 Contact rating: 400mA 125V AC
 200mA 250V AC

Order Code	Type	Price each
CJ95D	Min 4 Pos Key	£4.99

Specification

Bezel diameter: 22mm
 Panel cut-out: 19mm diam, 15.8mm across the flats (provided to prevent twisting)
 Bush length: 25.5mm
 Indexing: 90°
 Contact rating: 4A 125V AC
 2A 250V AC

Order Code	Type	Price each
CJ96E	Metal DPST Round Key	£4.99

Metal Body DPST



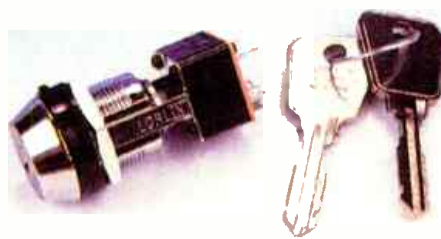
A top quality, double-pole, single-throw, key switch with a zinc-alloy die-cast housing and cylinder with a chrome plated bezel. The cylinder has a five-disc tumbler mechanism, to deter lock-picking; the reversible key can be withdrawn from either position. Suitable for burglar alarms and security systems. The switch has four solder tags at the rear. Supplied with two keys with a range of 150 combinations.

Specification

Bezel diameter: 22mm
 Panel cut-out: 19mm diam, 15.8mm across the flats (provided to prevent twisting)
 Bush length: 27mm
 Indexing: 90°
 Contact rating: 4A 125V AC
 2A 250V AC

Order Code	Type	Price each
CJ97F	Metal DPST Key	£4.99

Metal Body DPDT



A DPDT rotary switch operated with a flat key. Ideal for burglar alarms and all security applications. The key may be withdrawn in either position. Two keys provided with each lock. Random supply of 200 different lock numbers. Panel cut-out 19.9mm (3/4 in).

Bezel dia: 22.2mm
 Bush length: 12.7mm
 Indexing: 90°
 Contact rating: 4A 250V AC
 10A 12V DC

Order Code	Type	Price each
FH40T	Key Switch	£5.79

Key Switch Cover

Calvyn Industrial



An attractive chrome-plated cover for use with our Key Switch FH40T. Cover is spring loaded and provides weather-proof protection.

Order Code	Type	Price each
FE43W	Key Switch Cover	£1.09

MAKA-SWITCH

Lorlin

Switches may be made up using the various accessories to suit individual requirements. Available only in 'miniature' size. 1/4 in spindle, 3/8 in bush.

Shaft Assembly



Switch mechanism (shafting assembly) accommodates up to 4 wafers.

Indexing: 30°
 6.3mm (1/4 in.) spindle. 9.5mm (3/8 in.) bush
 Spindle length: 41mm (with flat).
 Bush length: 8mm
 Overall length: 90mm
 With adjustable rotation limit stop.

Order Code	Type	Price each
FH46A	Maka Shaft	£2.49

Wafers

Glass filled dialyl phthalate stators, acetal rotors and silver-plated contacts.



Max working voltage: 300V AC or DC
 Max current: 5A continuous
 Contact resistance: 10mΩ
 Contact rating: 150mA at 250V AC or DC
 350mA at 110V AC or DC

The following types are available:

Break before Make action

1 pole 12 way: FH47B. 2 pole 6 way: FH48C. 2 pole 9 way: FF81C. 4 pole 3 way: FH50E. 6 pole 2 way: FH51F.

Order Code	Type	Price each
FH47B	Maka Wafer 1p 12w	£1.89
FH48C	Maka Wafer 2p 6w	£1.89
FF81C	Maka Wafer 2p 9w	£1.89
FH50E	Maka Wafer 4p 3w	£1.89
FH51F	Maka Wafer 6p 2w	£1.89

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Metal Body Round Type DPST



A top quality, double-pole, single-throw, key switch having a zinc-alloy die-cast housing and cylinder with a chrome plated bezel. The key switch uses a round key for extra security; the key can be withdrawn from either position. The radial cylinder has a seven-pin tumbler mechanism, deterring lock-picking and providing a wide range of key differences. Random supply from 50,000 different combinations. Ideal for alarm and security systems. The switch has four solder tags at the rear. Supplied with two keys.

**THE BEST
 OF SERVICE**

Continued from previous page.

1 pole 12 way, can also be wired as independent 1 pole 2 way for the first 2 positions (thereafter open circuit), followed by the remaining 10 ways on a separate circuit. The wafer can be reversed to make the SPDT action the last 2 positions. The two wiper contacts must be wired together for single pole 12 ways: FH52G. 2 pole 6 way: FH53H.

Order Code	Type	Price each
FH52G	Maka Wafer 1p 12w MB	£1.89
FH53H	Maka Wafer 2p 6w MB	£1.89

Screen

Metal plate to mount between wafers for screening.

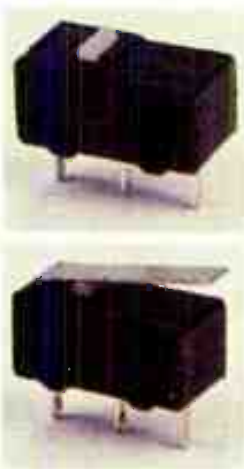


Order Code	Type	Price each
FH55K	Maka Screen	15p

MICROSWITCHES

Sub-Miniature

A low-cost range of subminiature microswitches produced to an internationally accepted standard size and operating characteristics. These switches are manufactured from glass-reinforced thermoplastic to give rugged performance. Switches are single-pole double-throw and available in the basic style, or with an actuator attached. Terminals are suitable for PCB mounting at a standard pitch.



The actuator is of stainless steel and is a 13mm long lever.

Specification
 Contact rating: 3A 125V AC
 Body size: 12.8 x 6.5 x 5.8mm
 Fixing centres: 6.5mm
 Fixing hole: 1.2mm diameter (for M1 screws)

Order Code	Type	Price each
GW66W	Sub-Microsw	59p
GW67X	Sub-Microsw/Lever	65p

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01702 553935

Sub Miniature

Crouzet



A sub-miniature microswitch of internationally accepted size and operating characteristics. It is manufactured to the highest standards using glass-reinforced thermoplastic with inlaid silver contacts. Switches are single-pole double-throw. Post Office approved.

Contact rating: 5A 250VAC
 Body size: 19.84 x 6.35 x 9.6mm high
 Fixing centres: 9.53mm, 2.3mm clear
 Actuator: 2.4mm above body, 2.26mm square

The switch is also available with an 18mm long lever or with a 16.8mm long lever with roller. Solder tag connections.

Order Code	Type	Price each
FP41U	Min Microswitch	99p
FP42V	Min M-Sw with Lever	£1.19
FP43W	Min M-Sw with Roller	£1.29

Low Cost Miniature

A low-cost range of miniature microswitches produced to an internationally accepted standard size and operating characteristics. These switches are manufactured from glass-reinforced thermoplastic to give rugged performance.



Switches are single-pole double-throw and available in the basic style, or with a choice of actuators attached. Terminals are standard solder lugs. The actuators are of stainless steel and either a 16.5mm long lever, or a 18.5mm long lever carrying a roller.

Specification
 Contact rating: 3A 250V AC
 Body size: 19.8 x 10.2 x 6.4mm
 Fixing centres: 9.5mm
 Fixing hole: 2.35mm diameter (for M2.3 screws)

Order Code	Type	Price each
GW68Y	Min-Microsw	59p
GW69A	Min-Microsw/Lever	65p
GW70M	Min-Microsw/Roller	69p

Miniature

Crouzet

A miniature microswitch of standard size with internationally accepted operating characteristics. Constructed in glass-reinforced thermoplastic to give strength and good temperature performance. Switches are single-pole double-throw.



Contact rating: 16A 250VAC
 Body size: 27.76 x 10.3 x 15.9mm high
 Fixing centres: 22.2 x 10.31mm, 3.16mm clear
 Actuator: 2.76mm above body

The switch is also available with a 28.3mm long lever, or with a 27mm long lever with roller. Standard 1/4in. blade connections.

Order Code	Type	Price each
FP44X	Microswitch	£1.15
FP45Y	Lever Microswitch	£1.35
FH95D	Roller Microswitch	£1.39

Low Cost Standard



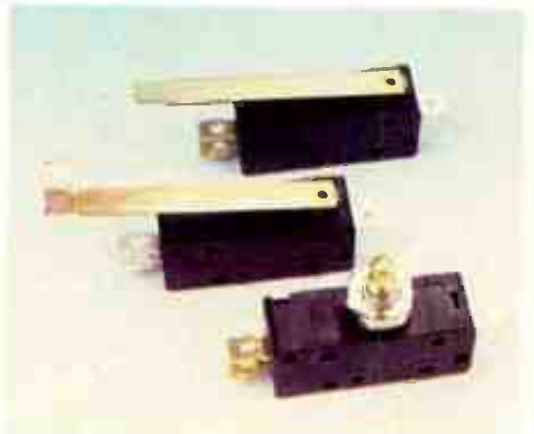
A low-cost range of standard microswitches produced to an internationally accepted standard size and operating characteristics. These switches are manufactured from glass-reinforced thermoplastic to give rugged performance. Switches are single-pole double-throw and available in the basic style, or with a choice of actuators attached. Terminals are 1/4in. blade type that can either be soldered or used with push-on connectors (e.g., HF10L). The actuators are of stainless steel and either a 27.5mm long lever, or a 27.5mm long lever carrying a roller.

Specification
 Contact rating: 15A 250V AC
 Body size: 27.8 x 15.9 x 10.3mm
 Fixing centres: 22.2 x 10.3mm
 Fixing hole: 3.1mm diameter

Order Code	Type	Price each
GW71N	Std-Microsw	79p
GW72P	Std-Microsw/Lever	85p
GW73Q	Std-Microsw/Roller	89p

Heavy Duty

Crouzet



A heavy duty microswitch with internationally accepted dimensions and operating characteristics and a particularly rugged construction. Switches are single-pole double-throw.

Contact rating: 16A 250VAC
 Body size: 46.4 x 16.3 x 18.7mm high
 Fixing centres: 25.4mm, 3.78mm clear
 Actuator: 5.26mm above body

The switch is also available with a 60mm long lever, or a 60mm long lever with roller, or a panel-mounting bush and push-button. Bush requires 9.5mm panel cut-out and is 8mm long, flattened to 8.1mm on opposing sides. Button is 8mm long. Standard 1/4in. blade connections.

Order Code	Type	Price each
FP48C	HD M-Sw with Lever	£1.89
FP49D	HD M-Sw with Roller	£2.49
FP50E	HD M-Sw with Button	£2.69

SLIDE SWITCHES

Single Pole Sub-Miniature

Sub-miniature SPDT slide switch suitable for use as replacements in calculators, clocks etc. Can be PCB mounted.

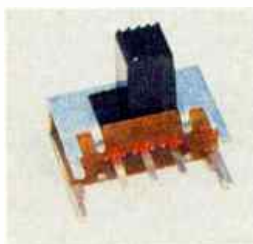
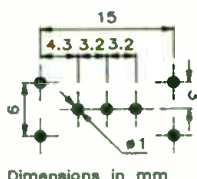


Dimensions: Body: 11 x 5 x 6mm
Front plate: 19 x 5mm
Tang: 3.8mm long (throw 3mm)
Tags: 4mm long x 1.5mm wide
Fixing centres: 15mm x M2 tapped
Rating: 125V AC 0.3A

Order Code	Type	Price each
FF77J	SP Slide	29p

Single-Pole Right-Angled

Calvyn Industrial

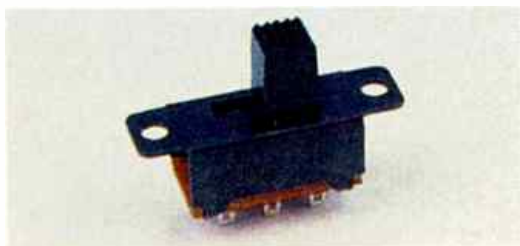


A sub-miniature right-angled SPDT slide switch for pcb mounting. Ideal for horizontal left/right action on edge of pcb etc.

Dimensions of body: 16mm wide x 6.5mm deep
Height above pcb: 9.5mm
Toggle: 8mm (throw 3mm)

Order Code	Type	Price each
FV01B	R/A SPDT Slide	52p

Double Pole Sub-Miniature



A sub miniature DPDT slide switch with wiring tags.
Dimensions: Body: 15 x 7 x 7.5mm
Front plate: 23 x 7mm
Tang: 7.5mm long (throw 3.5mm)
Tags: 3mm long x 1.5mm wide
Fixing centres: 19mm x M2 clear
Rating: 125V AC 0.3A

Order Code	Type	Price each
FH35Q	Sub-Min Slide	49p

Double Pole Sub-Miniature Chrome Tang

Calvyn Industrial

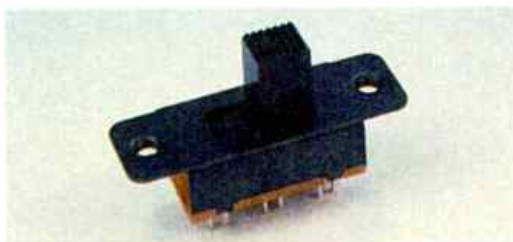


A sub-miniature DPDT slide switch with wiring tags and a long tubular turned aluminium tang.

Dimensions: Body: 15 x 7 x 7.5mm
Front plate: 23 x 7mm
Tang: 13.5mm long (throw 3.5mm)
Tags: 3mm long x 1.8mm wide
Fixing centres: 19mm x M2 tapped
Rating: 125V AC 0.3A

Order Code	Type	Price each
FF79L	Long Chrome Slide	35p

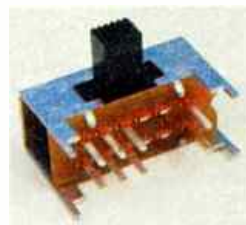
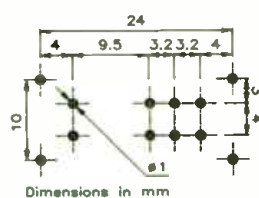
Double Pole Miniature



A miniature DPDT slide switch with wiring tags.
Dimensions: Body: 22 x 12.5 x 8mm
Front: plate: 35 x 12.5mm
Tang: 10mm long (throw 5.5mm)
Tags: 5mm long x 2.5mm wide
Fixing centres: 28mm x M3 tapped
Rating: 125V AC 0.3A

Order Code	Type	Price each
FH36P	Std Slide Switch	39p

Right-Angled 2-Pole 3-Position



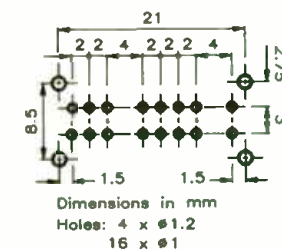
A 2-pole 3-way switch with a horizontal slider with left/right action for pcb edge mounting.
Dimensions of body: 25mm wide x 10mm
Height above pcb: 14mm

Order Code	Type	Price each
FV02C	R/A DT3T Slide	79p

4-Pole 3-Position

Calvyn Industrial

Miniature 4-pole 3-position.
Rated 125V AC 0.3A.



Order Code	Type	Price each
FH38R	4-Pole Slide	79p

PUSH SWITCHES

Sub-Min Push Switch



A sub-miniature push-to-make switch with non locking action. Available with red and black actuating button.
Overall size: 20.5mm long, 7mm dia. Rated 0.5A 125V. Panel cut-out 5mm dia.

Order Code	Type	Price each
JM01B	Sub Min Push Sw Blk	45p
JM47B	Sub Min Push Sw Red	45p

Push to Make Low Cost

Miniature low cost push to make switch non-locking with red button.
Overall size: 28mm long, 10.5mm dia. Rated 1A 125V AC.
Panel cut-out 7mm dia.



Order Code	Type	Price each
FH59P	Push Switch	42p

Push to Break

Miniature non-locking push to break switch with black button. Rated 1A 250V AC.



Order Code	Type	Price each
FH60Q	Break Push	49p

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HOT TIP

Use an empty 35mm film container to house suitable push-buttons, switches and potentiometers, by refitting in the end cap. They make ideal hand-held controllers.

Round Push Switch SPST



A large circular, momentary contact, push-to-make switch that is ideal for use in games machines and similar equipment. The switch is available in a choice of five bright colours and is provided with a threaded ring for mounting into a panel. The switch bezel is 36mm diameter, the body is 30mm deep and requires a 28mm diameter hole. The locking ring is 39mm diameter. Two solder tags on the rear are connected to low-voltage, gold-plated, switch contacts that have a current rating of 100mA

Order Code	Type	Price each
CJ84F	Large Push Red	79p
CJ85G	Large Push Green	79p
CJ86T	Large Push Blue	79p
CJ87U	Large Push Yellow	79p
GW93B	Large Push Orange	79p

Miniature Push-Button Switches

Miniature PCB mounting push-button switches having square buttons with identical dimensions to the body, 11.6mm square, so that any number of switches can be stacked horizontally or vertically with ease, and all buttons will mate together side-by-side.



The four pins are on a 7.62 x 5.08mm matrix, which includes a 1.6mm diameter locating peg on the body itself, offset 5.4mm from centre. Total height above PCB, 17.7mm; to base of button, 12mm. Contacts are rated at 3A at 125V AC. Contact resistance is 20mΩ. Insulation resistance, 100MΩ at 500V DC; insulation strength, 1,000V AC for 1 minute. Two types are available, SPST push-on/push-off locking, and SPST push-on/release-off momentary action. Each type is also available with either a Black or White button.

Order Code	Type	Price each
JX94C	Min Sw Locking Black	£1.99
JX95D	Min Sw Locking White	£1.99
JX98G	Min Sw Momntry Blk	£1.79
JX99H	Min Sw Momntry Wht	£1.79

Square Push-Button Switches

Smart push-button switches featuring a silver coloured square bezel 14 x 14mm, and a silver square button 10 x 10mm. Remainder of body is threaded for a 10mm dia. panel hole, and a lockwasher and fixing nut are included. Single pole single throw only with two solder terminals. Overall depth from front of panel is 20mm. Rated at 125V at 3A, 250V at 1A AC. Two types are available, push-on/push-off locking, and momentary push-on/release-off non-locking.



Order Code	Type	Price each
FG46A	PB Silver Alternate	99p
FG45Y	PB Silver Momentary	99p

Table Light Switch

Calvyn Industrial



A push-on push-off single pole make/break switch with a white push button.

Panel cut-out: 10mm.
Max panel thickness: 4mm
Switch body dimensions: 24 x 13 x 8.5mm
Rated: 2A at 250V AC.
Connections by screw terminals.

Order Code	Type	Price each
FH94C	Table Light Switch	42p

Large Push to Make

A push button switch with a large red dimpled button and smart chromed bezel. Action is non-locking push to make single pole. Panel fixing requires 12mm dia. cut-out. Rated 1A at 50V AC.



Order Code	Type	Price each
FH91Y	Motor-Start Press	85p

Miniature Momentary Action

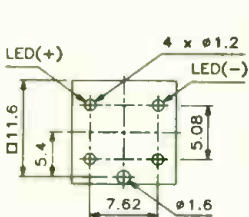


A miniature momentary action, panel mounting, push button switch with a separate 10mm cap. Fitted with solder terminals. Initial contact resistance: <math><10\text{m}\Omega</math>

Dimensions: Length (overall) 39.5mm
Diameter (behind panel) 22mm
Cut-out 6.4mm
Body size 10 x 13.2mm
Button diameter 4mm

Order Code	Type	Price each
BK68Y	SPCO Nonlock Switch	£3.29
BK71N	10mm Cap Green	17p

Miniature Illuminated Push-Button Switches

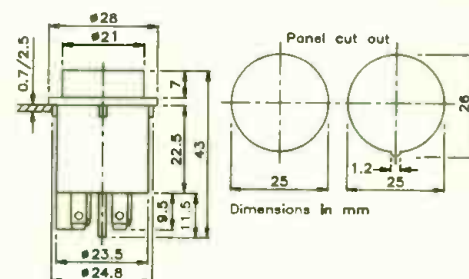


Miniature PCB mounting push-button switches as above, but also having a square LED indicator inset into the button. Again both the body and button are 11.6mm square, so that switches can be stacked. The four pins are on a 7.62 x 5.08mm matrix, which includes a 1.6mm diameter locating peg on the body itself, offset 5.4mm from centre. Two of these are the connections for the integral LED which does not include a dropper resistor. Total height above PCB, 17.7mm; to base of button, 12mm. Contacts are rated at 3A at 125V AC. Contact resistance is 20mΩ. Insulation resistance, 100MΩ at 500V DC; insulation strength, 1,000V AC for 1 minute. Two types are available, SPST push-on/push-off locking, and SPST push-on/release-off momentary action, and both types available with either a red or green LED within a black button. Forward current of LED must not exceed 40mA, nor power dissipation exceed 80mW (Red) or 100mW (Green). Voltage drop is 1.7V for Red type, and 2.1V for Green at $I_f = 20\text{mA}$.

Order Code	Type	Price each
JX92A	Min Sw Locking Red	£2.49
JX93B	Min Sw Locking Green	£2.49
JX96E	Min Sw Momntry Red	£2.29
JX97F	Min Sw Momntry Green	£2.29

Large Push Button

A large push button switch in an attractive modern styling. Available with SPST non-latching contact, in red only. Rated at 10A/250V AC, and has snap-in fixing for panels between 0.7mm & 2.5mm thickness.



Order Code	Type	Price each
RK82D	Lge Red Push Button	£1.10

Square Push to Make Switch

Push to make non-locking switch with large square button available in Black or Red.



Fax your orders to:
01702 553935

Continued on next page.

Continued from previous page.

Specifications

Contact rating:	1A @ 125V AC 0.5A @ 240V AC
Panel cut-out:	12mm x 12mm
Overall length:	25mm
Length behind bezel:	20.5mm
Button:	9mm square
Bezel:	14mm square
Connection:	tags

Order Code	Type	Price each
JB00A	Square Push Sw Red	52p
JB01B	Square Push Sw Blk	52p

Square Push to Make

Push to make non-locking switch with a large square button available in Black and Red. Rated 250V AC 3A.

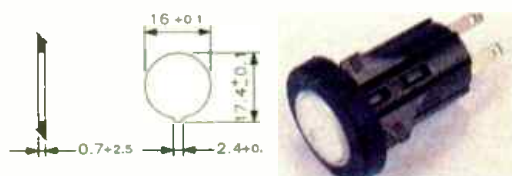


Panel cut-out:	12.7mm (1/2 in) diameter
Overall length:	39mm (1 1/2 in)
Length behind bezel:	29mm
Button:	10mm square
Bezel (elephant grey):	14mm square

Order Code	Type	Price each
FF96E	Square Push Black	72p
FF98G	Square Push Red	72p

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Splashproof Push Switch



An attractively styled, single-pole, momentary action, circular push-button switch that is mains rated, with normally-open silver contacts. The switch is moulded in black self-extinguishing thermoplastic, with a white push-button, and snap-fits into a 16mm diameter hole in panels 0.7 to 2.5mm thick. Supplied with a waterproof cap and bezel. Rated at 3A/250V AC for resistive loads and 1A/250V AC for inductive loads.

Order Code	Type	Price each
RD20W	Splashproof Sw	£1.85

Square Locking

Push to make locking switch with large square button available in Black and Red. Rated 250V AC 3A.



Panel cut-out:	12.7mm dia.
Overall length:	39mm
Length behind bezel:	29mm
Button:	10mm square
Bezel:	14mm square

Order Code	Type	Price each
YW41U	Square Psh Lck Black	79p
YW43W	Square Psh Lck Red	79p

Round Locking

Miniature push button switches with 3A 250V AC contacts. Single-pole changeover (SPCO) and double pole changeover (DPCO) types are available. Both are locking (i.e. press-press). Fitted with red plastic button with dimpled top.



Panel cut-out:	6.2mm
Bush length:	8.5mm
Body size (excl tags):	17.5 x 9.2 x 13mm (SPCO); 17.2 x 11 x 11.5mm (DPCO)
Button size:	8 x 10mm dia.

Order Code	Type	Price each
FH41U	Pushlock SPCO	£2.15
FH66W	Pushlock DPCO	£2.85

Foot Switches

Hard-wearing push-on push-off switch with strong metal shaft and knob for use as foot operated switch. Requires a 12.7mm (1/2 in) dia. panel cut-out and has a 12mm long threaded bush.

2A Type

SPDT switch. Rated 2A at 250V AC. Body size: 36 x 12 x 15mm. Bush and knob length: 28mm. The common terminal is the centre one.



Order Code	Type	Price each
FH92A	Press Toe SPDT	£3.69

6A Type

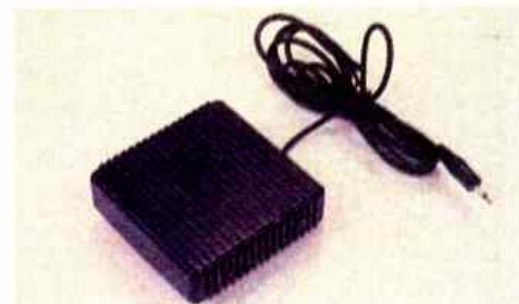
Calvyn Industrial

DPDT switch. Rated 6A at 250V AC, 10A at 120V AC. Body: 28 x 18 x 23mm. Bush and knob length: 24mm.



Order Code	Type	Price each
FH93B	Press Toe DPDT	£4.49

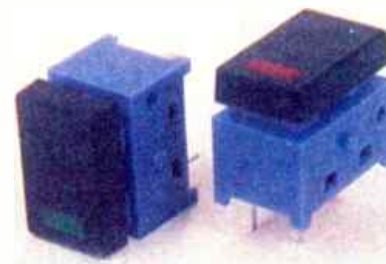
Cassette Recorder Remote Control Footswitch



For cassette recorders and dictation machines having a start/stop remote control 2.5mm jack socket. Upon plugging in the footswitch, the machine will be able to play tape while the switch is held down, and pause while the footswitch is released. Fitted with 1.4m of lead terminated in a mono 2.5mm jack plug. Dimensions of switch housing: 77 x 75 x 28mm deep. Has a non-slip rubber pad underneath and a ribbed rocking top face. Colour black.

Order Code	Type	Price each
KW02C	Remote Footswitch	£2.79

Illuminated Click Effect Push Switches



A very smart click effect push switch for direct PCB mounting. The rectangular black button has a dimple over the switch end, and a rectangular window for the LED indicator lamp at the other end. The switch mechanism is of the conductive rubber contact type with a smooth, positive click action, and is single pole push to make connecting a pair of PCB pins underneath. The body is 15.5 x 10.1mm rectangular with support feet at the corners to ensure it stands firm and square on the PCB surface. The switches are stackable side by side and include locating pegs and sockets on the sides for this purpose. A very professional, neat array of switches can be made up in this way. The LED is electrically accessible via a further pair of pins (four in total), with the polarity marked on the switch base. Available with red or green LED's.

Contact rating:	1A @ 125V AC
Contact resistance:	20mΩ max.
Insulation resistance:	100MΩ (as measured at 500V)
Max. voltage:	1000V AC for 1 minute
Life:	100,000 operations
Button size:	15.3 x 9.8 x 5.1mm
Button travel:	1.5mm
Gap between stacked buttons:	0.5mm
LED reverse voltage:	4V max.
LED forward drop:	2.1V @ 20mA
Max. current:	25mA
Overall height from PCB:	14.1mm
Height of body from PCB:	9mm
Pin length:	3.8mm
Pin diameter:	Switch 0.6mm, LED 0.45mm
Pin spacing:	'T' pattern, 0.2in. between switch pins, 0.2in. between middle switch pin and both LED pins, which are 0.1in. either side of switch pins' axis.

Order Code	Type	Price each
JU04E	Click Sw+LED Red	£1.29
JU05F	Click Sw+LED Green	£1.29

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Illuminated Push Button Switch

Switch Assembly



Attractive square push button switches in push/push locking or non-locking styles, with a double pole make function, using two pairs of solder tags at rear. The switches include a sprung metal snap-in-plate which makes installation simply a process of pressing the switch into a $\frac{1}{8}$ in. square (12.7 x 12.7mm) hole. The buttons are 9.8mm square in a 14mm square escutcheon. Overall length 23mm less tags. Contact rated 100mA at 30V DC.

Note Lens cap and bulb must be ordered separately. The switch can be used without the bulb if desired.

Order Code	Type	Price each
FA78K	Illuminatd Momtry Sw	£2.35
FA79L	Illuminated Latch Sw	£2.65

Lens and Diffuser

A lens and diffuser cap for the above switches, is available in red, white, yellow, blue and green. The diffuser provides an even illumination.



Order Code	Type	Price each
UF54J	Lens + Diffuser Red	32p
UF55K	Lens + Diffuser Wht	32p
UF56L	Lens + Diffuser Yel	32p
UF57M	Lens + Diffuser Blu	32p
UF58N	Lens + Diffuser Grn	32p

Bulbs and Holders

Twin-pin filament bulbs which, using a special holder, plug into the switch body and so illuminate the coloured cap. The bulbs are available in:



Voltage	6V	12V	28V
Current	65mA	50mA	24mA
Average life	10,000h	10,000h	5000h
Colour coded	Red	Green	White

Order Code	Type	Price each
UF59P	6V Lamp + Holder	£1.29
UF60Q	12V Lamp + Holder	£1.29
UF61R	28V Lamp + Holder	£1.55

Bulb Extractor

A tool required to remove the twin-pin filament bulbs.



Order Code	Type	Price each
FA80B	Extraction Tool	15p

Modular Switch

A switch available in momentary and latching types which may be used on its own or in various combinations with its accessories. Possible combinations are switch with button, switch with button and bezel, and switch with button, bezel and LED. Buttons are available in blue, grey or red; bezels are black, one type being plain and the other having a hole in the top right-hand corner for an LED; and the LED's are available in red or green. Momentary and latching switches are identical except that momentary type has



silver-flashed, nickel-coated beryllium-copper.

Specification
 Contact rating: 250mA and 120V subject to 9W AC max, 6W DC max.
 Max non-switching current: 500mA
 Contact resistance: 35mΩ
 Contact bounce: <5ms
 Insulation resistance: 5 x 10¹³Ω

Dimensions
 Switch body size: 12.6 x 12.6 x 10.1mm high
 Plunger size: 3.3 x 3.3 x 5.6mm high
 Pins: 0.7 x 0.3 x 4mm long
 Button size: 12.3 x 6 x 4.8mm high (with button fitted overall switch height is increased by 1.1mm)
 Bezel size: 15.1 x 15.1 x 14.5mm high (when fitted to switch height from base of switch is 16mm and button protrudes by a further 0.8mm)

LED
 Forward voltage at I_F = 20mA, 1.6V red, 2.7V green
 Max forward current: 50mA red, 30mA green

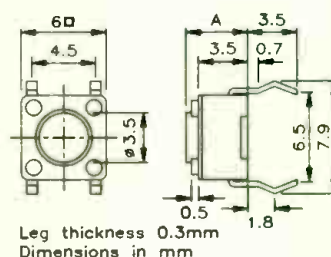
Order Code	Type	Price each
FP51F	Mod Sw Momentary	£1.69
FP52G	Mod Sw Latching	£1.85
UH58N	Mod Sw Button Red	24p
UH74R	Mod Sw Button Grey	24p
UH75S	Mod Sw Button Blue	24p
FP53H	Mod Sw Plain Bezel	24p
FP54J	Mod Sw LED Bezel	24p
UH76H	Mod Sw LED Red	92p
UH77J	Mod Sw LED Green	92p

Tactile Switches

A range of high quality PCB surface mounting click-effect switches with a positive click action in miniature and sub-miniature sizes. The switches are single-pole push-to-make non-locking and each contact is connected to two pins for ease of track layout.



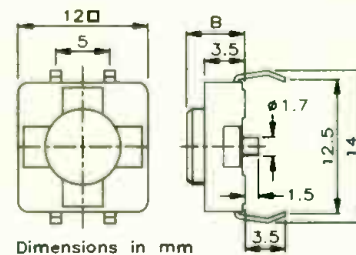
Sub-Miniature



Specification
 Rating: 12V DC 50mA
 Operating force: 120 ± 30gF
 Travel: 0.25mm ± 0.1mm
 Contact resistance: 50mΩ max
 Life: 100,000 cycle min.
 Type Knob height Colour (dim. a)

105	4.3mm	Black
105A	5.0mm	Beige
105B	9.5mm	Black
105T	7.3mm	Black

Miniature



Specification
 Rating: 12V DC 30mA
 Operating force: 150 ± 40gF
 Travel: 0.30mm ± 0.1mm
 Contact resistance: 100mΩ at 1mA 5V DC
 Life: 300,000 cycle min.
 Type Knob height Colour (dim. b)

12F	4.3mm	Blue
12J	7.3mm	Black

Order Code	Type	Price each
KR88V	Switch 105	32p
KR89W	Switch 105A	36p
KR90X	Switch 105B	36p
KR91Y	Switch 105T	36p
KR92A	Switch 12F	42p
KR93B	Switch 12J	42p

Click-Effect Push Switch

A neat, small low cost push switch in a matt grey finish for direct pcb mounting. Smooth, gentle and positive action with a click-effect so that you know switch has operated. Action is single-pole push-to-make non-locking. Switch has a small square button fitted to a circular base. Each contact is connected to two pins for ease of track layout on pcb. Contact is self-cleaning laminated silver.



FOR TOP QUALITY & VALUE!

Continued from previous page.

Contact rating:	10mA at 35V DC
Contact resistance:	≤50mΩ
Bounce:	1ms
Insulation resistance:	>10 ⁹ MΩ
Life:	10 ⁶ operations
Inter-contact capacity at 1MHz:	<1pF
Key travel:	0.8mm
Size of button:	7.7 x 7.7mm
Height of button:	4mm
Overall diameter:	11.5mm
Overall height from pcb:	10.8mm
Pin length:	2.8mm
Pin diameter:	0.8mm
Pin spacing:	5 x 5mm

Order Code	Type	Price each
FF87U	Click Switch	55p

Caps For Click Switch

Two different colour caps which may be snapped on to our click-effect push switches. (See FF87U)



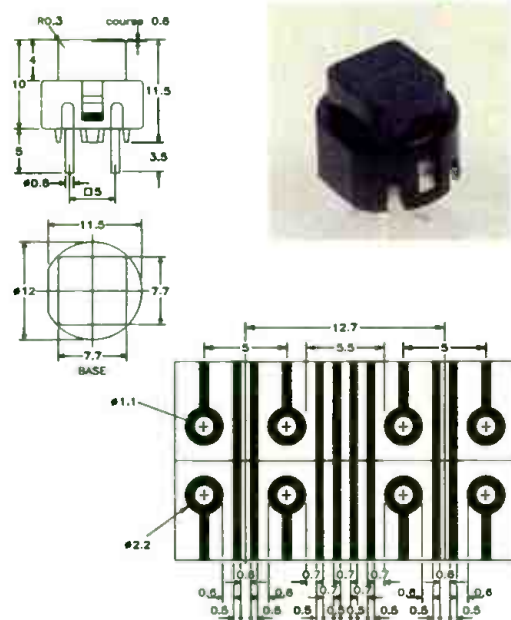
Size of cap:	12.4 x 12.4mm
Height of cap:	5.5mm
Overall height from pcb:	12.3mm
Available in Black and White.	

Order Code	Type	Price each
FF88V	Click Cap Black	36p
FF94C	Click Cap White	36p

Key Switch with Integral Button

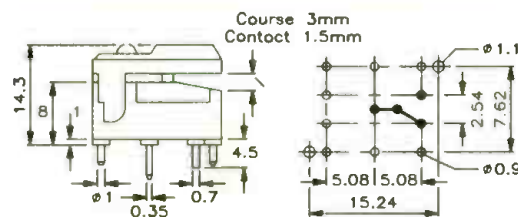
A single-pole, momentary, black key switch that has been designed for digital electronic control. The switch has self-cleaning silver contacts and is available with either an integral black square button (DC72P) or an integral round button (DK83E). Additionally, the switch is available with a plunger head, measuring 3.3 x 3.3mm (DK84F).

Specification	
Maximum voltage:	100V AC
Maximum breaking current:	100mA
Maximum breaking power:	6VA
Contact resistance:	<100mΩ
Life expectancy at maximum power:	250,000 operations



Order Code	Type	Price each
DC72P	Square Key Switch	85p
DK83E	Round Key Switch	65p
DK84F	Plunger Key Switch	65p

Rocker Action Key Switch

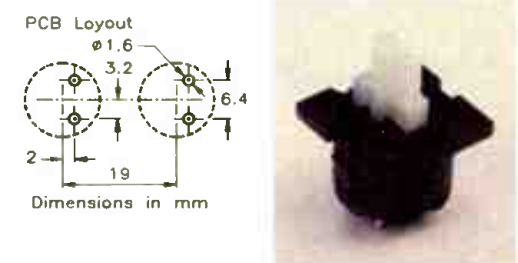


An impulse push-button with a single change-over contact that features a 'click' action. The switch has been designed for switching digital signals, and has sealed, dustproof silver contacts. A matching black button is also available.

Specification	
Maximum switching voltage:	60V DC
Maximum switching current:	100mA
Maximum operating life:	>500,000 operations
Initial contact resistance:	<50mΩ
Distance between button centres:	
horizontal:	12.7mm
vertical:	17.78mm

Order Code	Type	Price each
DC73Q	Rock Action Switch	£1.85
DC74R	Rock Action Button	18p

Keyboard Switch



A low-cost non-locking push switch designed for making up keyboards and key pads etc. The keytops must be ordered separately. Designed to be mounted directly on the pcb, the centre of each switch should be 19mm distant from its neighbour. The keytops will then butt up to one another to avoid having a complicated front panel cut-out.

Specification:	
Rating:	1mA at 24V DC
Bounce:	10ms max. (4ms typical)
Contact resistance:	200mΩ
Stroke:	2.5mm
Life:	10 ⁶ operations
Overall size:	15 x 15mm
Height:	17mm (excluding 3mm pins)
Height with key-top:	19mm (excluding pins)
Switches are non-locking push-to-make	

Order Code	Type	Price each
DM76H	Keyboard Switch	39p

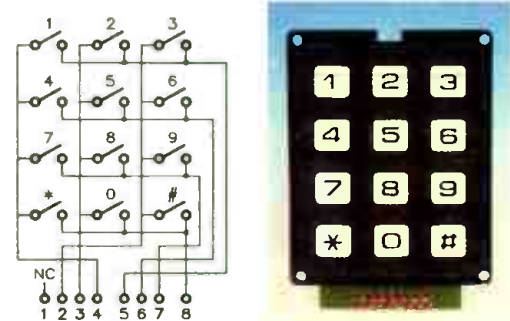
Keyboard Switch Keytop

A two-part key-top which snaps on to the switch. The top is in two parts, the upper part being transparent. Thus the lower part may be engraved, marked with Letraset, or a piece of printed card may be placed on it, then when the top part is snapped on the key-top appears to have a legend printed on it. Available in: 1 x 1: size 18 x 18 x 9mm.



Order Code	Type	Price each
DM77J	Keytop 1 Position	36p

Numeric Press Button Keypad



A numeric keypad comprising twelve square, double moulded white buttons with black legend, on a black ABS escutcheon. Legends are 0 to 9, asterisk and hash (#). The buttons operate conductive silicon rubber pads and have a click effect. The single pole make switches are arranged on a four by three X/Y matrix. Overall dimensions 51 x 64 x 13mm. Fixing centres 46 x 59.

Specification	
Contact rating:	24V DC 5mA
Contact resistance:	200Ω (max)
Bounce:	5ms (max)
Actuating force:	140g ±40g
Key travel:	1.8mm
Key life:	1,000,000 operations

Order Code	Type	Price each
JM09K	Numeric Keypad	£2.59

MAPLIN KEY CALL

Phone 01702 556751

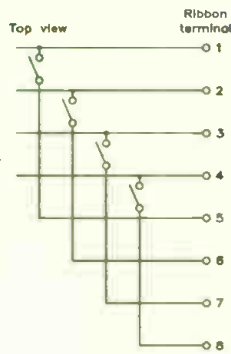
MODULAR MEMBRANE KEYPAD KITS

A range of membrane keypads and keyboards designed to provide you with exceptional reliability, performance and extended life, and, most importantly of all, are supplied with blank keys, a set of coloured key overlays and rub-down lettering. Now at last you can make up your own keypads with your own individual key legends! From these basic units many different types of keypad switches may be easily created for your one-offs and prototypes with professionally finished, custom legends. The flexible membranes are built up from wafer-thin assemblies consisting of an array of normally open

FOR TOP QUALITY & VALUE!

contact switches, produced by printing a conductive substrate onto plastic films. The two contact layers, one above the other, are separated by a spacer layer, and the whole laminated together. When the switch area is depressed, the top contact closes with the bottom one to make the connection, and then opens when the pressure is released. Connection to the membrane's switch array is made through a ribbon cable which is simply an extension of the conductive layers, and terminated with an inline, multi-way PCB terminal which plugs onto the end. The ribbon can be easily disconnected and re-inserted into this terminal during service if required.

the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters



Order Code	Type	Price each
JY01B	4 Way Keypad	£4.79

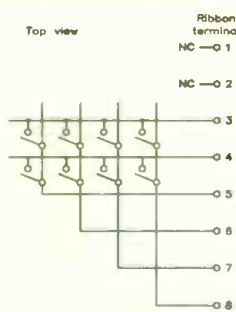
HOT TIP

If you have to bend the wires of a reed switch, grip each wire with a pair of pliers beforehand, in order to safeguard the glass envelope of the switch. Failure to do this will often result in the glass shattering under the strain.

8-Way Keypad



An 83 x 49mm keypad with eight keys 13.5mm square with rounded corners. Keys are arranged in two 2 x 4 rows and are spaced 3mm apart. The connecting ribbon cable is 70mm long and 21mm wide. An 8-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters.



Order Code	Type	Price each
JY02C	8 Way Keypad	£5.49

**PHONE BEFORE 5PM
FOR SAME DAY DESPATCH**

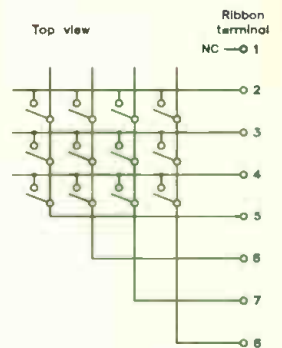
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Access, Visa, American Express

12-Way Keypad

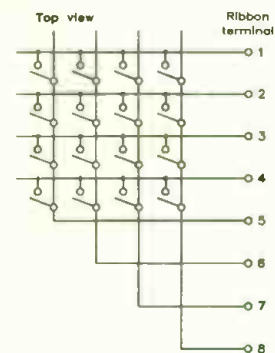
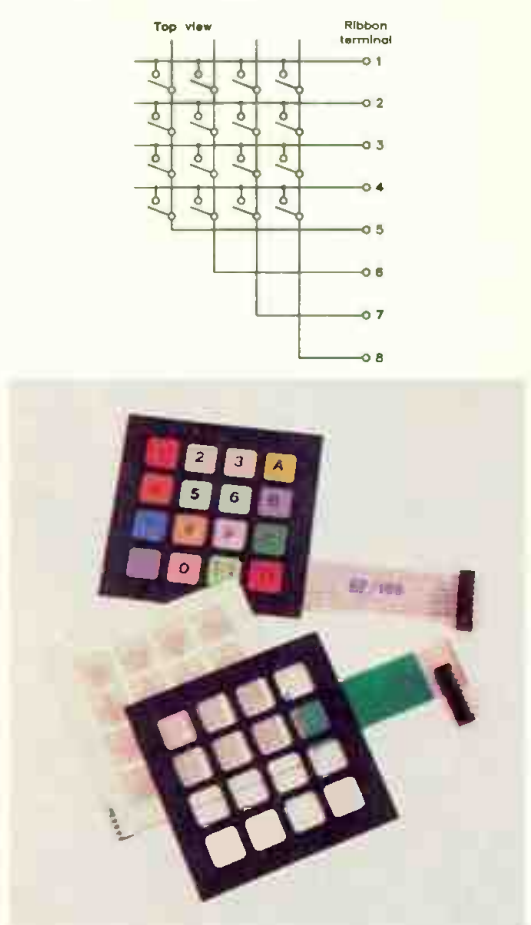


An 85 x 65mm keypad with twelve keys 13.5mm square with rounded corners. Keys are arranged in three 4 x 3 rows and are spaced 3mm apart. The connecting ribbon cable is 70mm long and 21mm wide. An 8-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters.



Order Code	Type	Price each
JY03D	12 Way Keypad	£5.99

16-Way Keypad



Each membrane keypad kit contains the main basic keypad switch and connector array; a textured, hard wearing top template with a black border surrounding the keys to finish the keypad, protecting the keys and legends; and the single inline connector which can be directly soldered into a PCB and is compatible with 0.1in. spaced matrix and strip-board. All these parts are supplied separately in the package. The custom overlay system includes a set of pre-cut, self-adhesive transfer pads, designed to fit over each switch key area and fill the key space. The keys are surrounded with a double-sided adhesive film (for the top template) protected by a backing sheet, both of which leave the key areas free. There is a choice of six colours for the transfer pads and enough of them to entirely fill whichever size of keypad chosen with keys of the same colour.

To assemble, the desired coloured pad is placed over the key position which, when stuck down, will lie flush with the backing sheet of the adhesive border. It will be helpful to leave the pad attached at one corner to the edge of its carrier sheet while positioning it over the key area. The pads will accept marks from felt tip pens, but better results will be produced by using the rub-down transfer lettering.

**A B C D E F G H I J K
L M N O P Q R S T U
V W X Y Z
0 1 2 3 4 5 6 7 8 9
+ , - \$ @ = ~**

These are specially developed letter transfers for use with the coloured pads. To apply, place the desired character over the pad and rub over with a blunt point, e.g. blunt pencil, tip of an artist's brush, cap of ballpoint pen etc., do this carefully to prevent cracking the character. Only alpha-numeric characters with capital letters are provided, with a selection of other symbols.

When the legends are finished, the surrounding backing sheet is carefully peeled off and then the top template applied, making sure that the textured surface is outermost. Six styles of keypad are available.

4-Way Keypad

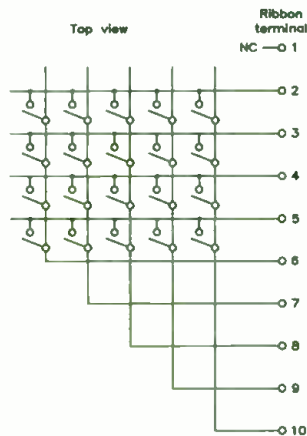
An 80 x 32mm keypad with four keys 13.5mm square with rounded corners. Keys are arranged in one row and spaced 3.5mm apart. The connecting ribbon cable is 70mm long and 23mm wide. An 8-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and

Continued from previous page.

An 85 x 85mm keypad with sixteen keys 13.5mm square with rounded corners. Keys are arranged in four 4 x 4 rows and are spaced 3mm apart. The connecting ribbon cable is 70mm long and 22mm wide. An 8-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters.

Order Code	Type	Price each
JY04E	16 Way Keypad	£6.99

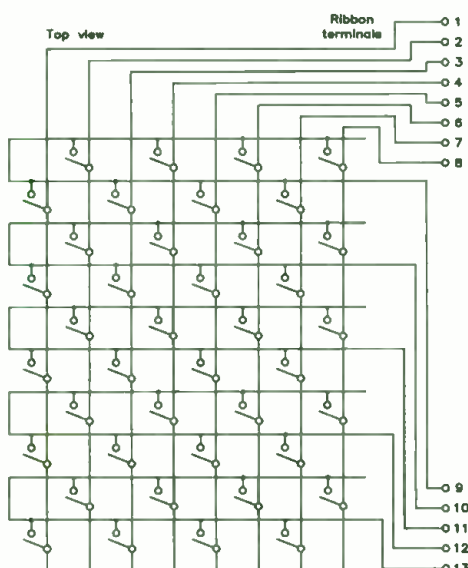
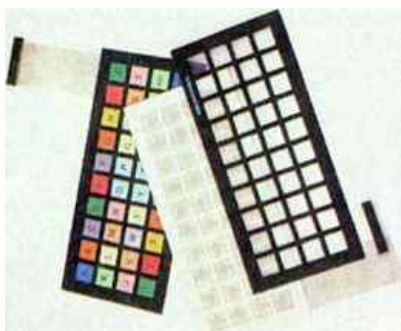
20-Way Keypad



An 85 x 65mm keypad with twenty keys 13.5mm square with rounded corners. Keys are arranged in four 4 x 5 rows and are spaced 3mm apart. The connecting ribbon cable is 70mm long and 27mm wide. A 10-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters.

Order Code	Type	Price each
JY05F	20 Way Keypad	£7.99

40-Way Keypad



An 87 x 188mm keypad with forty keys 13.5mm square with square corners. Keys are arranged in four 4 x 10 rows and are spaced 4mm apart. The connecting ribbon cable is 70mm long and 32mm wide. A 13-way PCB terminal is supplied unattached. Pins are spaced 0.1in. apart and the terminal is compatible with 0.1in. matrix and stripboard. Supplied with 2 sets of 8 White, 4 Blue, 4 Red, 4 Green, 12 Grey and 4 Yellow self-adhesive transfer pads and a sheet of alpha-numeric rub-down characters.

Order Code	Type	Price each
JY06G	40 Way Keypad	£9.99

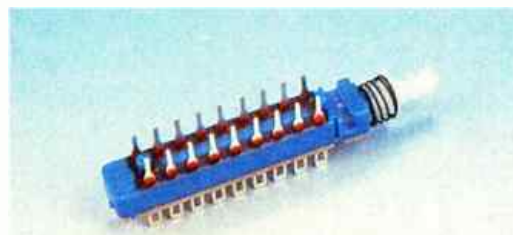
INTERLOCKING PUSH-BUTTON SWITCH SYSTEM

A very high quality, low-cost range of push-button switches, each of which is capable of operating as either push-on/push-off (locking), momentary push only (non-locking), or as part of an inter-locked group (push-on any one to latch and release others). The push-on/push-off action is provided by a wire detent, which is simply removed to provide the momentary or inter-locking action. An almost infinite variety of configurations are possible using the latch brackets, so that these switches fulfil practically all the likely requirements of a quality push-button switch installation.

Signal Switches

Moving contacts are spring-loaded and contoured to achieve constant pressure, a positive self-cleaning action and long-term low contact resistance. The housing has printed circuit pins fixed on the bottom face and solder terminals on the top face.

Rated:	0.5A, 100V AC 0.2A, 250V AC 1A, 25V DC
Max. contact resistance:	<50mΩ after 20,000 operations
Max. insulation resistance between adjacent contact or frame and any contact:	100MΩ at 500V DC
Working temperature range:	-20°C to +70°C
Action:	Break before make



PCB pins are on a 4 x 6mm matrix. Four different button styles are available. These switches are available in the following types: 2-pole changeover, 4-pole changeover and 6-pole changeover.

Length of body:	
2-pole changeover:	24.5mm
4-pole changeover:	36.5mm
6-pole changeover:	48.5mm

Order Code	Type	Price each
FH67X	Latchswitch 2-pole	45p
FH68Y	Latchswitch 4-pole	55p
FH69A	Latchswitch 6-pole	75p

Mains Switch



Double pole single throw latchswitch especially designed for use as an on/off mains power switch.

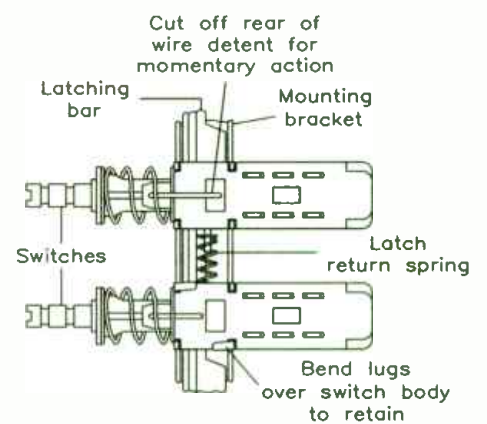
Rated:	4A, 250V AC
Contact resistance:	<20mΩ
Max. voltage:	1500V AC

Order Code	Type	Price each
KU79L	Latch Switch Mains	89p

Mounting Brackets



A range of mounting brackets for mounting the latchswitches and providing interlocking action where required. The switches have no other means of fixing except by their PCB pins. Latchbrackets are available for mounting up to 10 switches, any group of which can be interlocked, and any switch may be locking or non-locking (if not interlocked). The single version is only a mounting frame for one switch, whereas the others include a latching bar and a latch return spring for the interlocking function. The length of the latch bar is matched to the frame, but it can be cut down for only those switches in the whole group which are required to be interlocked, and the return leafspring can be located at any switch position. See below for latchswitch mounting details.



Order Code	Type	Price each
FH75S	Latchbracket Single	19p
FH76H	Latchbracket 2-way	25p
FH78K	Latchbracket 4-way	29p
FH80B	Latchbracket 6-way	35p
FH84F	Latchbracket 10-way	49p

Rectangular Buttons

Width, 15mm; height, 7.5mm; length, 11mm. Button can be mounted horizontally or vertically. Available in Black and Grey.



Order Code	Type	Price each
FH61R	Rct Latchbutton Blk	19p
FH62S	Rct Latchbutton Grey	19p

THE BEST OF SERVICE

Small Round Button

Diameter at base, 8.3mm; at top, 8.2mm; length 8mm. Available in black.



Order Code	Type	Price each
KU75S	Sml Latch button Black	19p

Round Button

Diameter: 12.3mm. Length: 12.5mm. Available in black.



Order Code	Type	Price each
FL31J	Rd Latchbutton Black	59p

TOUCH PAD

Calvyn Industrial

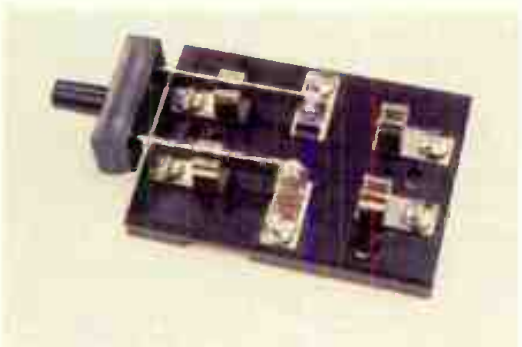
Matt finish chrome-flashed steel touch pad with bevelled edges. An 18.5mm long 6BA threaded stud is welded centrally to the back of the pad. Suitable for mounting on plastic or any insulating material. Pad is triangular. Width of base 21mm. Height: 22mm



Order Code	Type	Price each
HY01B	Touch Pads Tri	49p

KNIFE SWITCH

Calvyn Industrial



Ideal for educational and demonstration purposes, the switch is double-pole changeover, having four sets of spring contacts, along with the fulcrums of the moving contacts, fixed to a base-board. Uses should be restricted to switching voltages not exceeding about 24VDC. A safe maximum current rating is about 10 to 15A. The base board is 60mm long x 43mm wide and 6mm thick

Order Code	Type	Price each
FK31J	Knife Switch	£1.15

SOLENOID

A miniature solenoid suitable for light high speed duty and capable of operating in excess of 300 cycles per minute (5Hz). The plunger has a maximum stroke of 16mm, 5.5mm dia. and the end is 6BA tapped. The hard brass push-rod has a diameter of 1.8mm



ANALOGUE CLOCK WITH MSF DECODER

An ingenious, very accurate, analogue alarm clock that incorporates a radio receiver tuned to the MSF time-code transmitter at Rugby. An internal quartz oscillator keeps the clock running should the MSF reception be lost, or goes out of range. The clock has an alarm with 'snooze', and a backlight which is operated by a switch on the side. Setting the clock is very simple. A thumb-wheel on the rear of the clock is used to set the hour and minute hand to the top of the current hour (e.g. if the current time is 7:45, then the hour hand is set to 7 and the minute hand to 12). Two AA batteries (not supplied) are inserted and the 'SNOOZE' button is pressed until the seconds hand reaches the top of the minute. After approximately 2m the clock hands will automatically adjust to the correct time. Housed in an attractive black case measuring 88 x 98 x 56mm, the clock requires two AA batteries to operate.

NEW

GREAT VALUE!
£24.99
RJ88V



diameter and an effective maximum stroke of 12.7mm. Single hole fixing, 6.35mm panel cut-out. With 300mm flying leads.

Dimensions of body: 38.5 x 18 x 16mm.

12V DC Coil	
Pull force at 10mm	28g
Pull force at 3mm	56g
Nominal coil voltage	12V DC

Order Code	Type	Price each
YR88V	Solenoid 12V	£10.99

Max contact resistance:	50mΩ
Operate time:	3.5ms
Release time:	1.8ms

Coil details:

Nominal voltage:	6V DC	12V DC	24V DC
Coil resistance:	80Ω	320Ω	1000Ω
Operate voltage range:	4.8V to 7.2V	9.6V to 14.4V	19.2V to 28.8V
Must release voltage:	>0.6V	>1.2V	>2.4V

Order Code	Type	Price each
FM89W	Micro-Min Relay 6V	£1.55
BK47B	Micro-Min Relay 12V	£1.55
FM90X	Micro-Min Relay 24V	£1.55

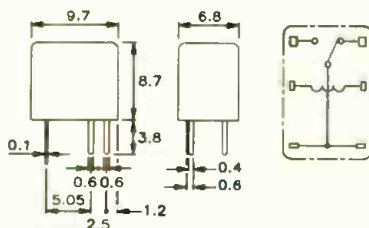
RELAYS

Micro Miniature Relay

This micro miniature relay which is only a little larger than a TO5 transistor package is designed for direct PCB mounting. Available in single-pole change-over style only with silver contacts.



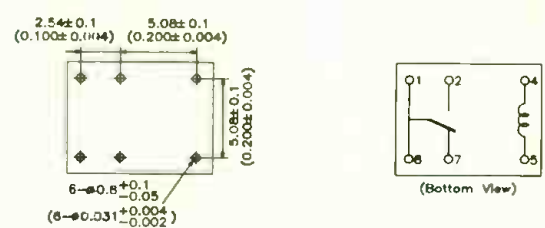
Dimensions: 9.7 x 6.8 x 8.7mm high excluding pins. Pin length: 3.8mm.



Contact details:	
Max current:	2A DC, 2A AC resistive 1A AC inductive
Max voltage:	2V DC, 100V AC
Life:	>100,000 operations

1A Microminiature Low-Power PCB Relay

A fully enclosed microminiature PCB mounting relay that has a typical power consumption of less than 200mW. The relay has gold over silver palladium, single-pole contacts, and has a minimum life of 100,000 operations.



Specification	
Maximum current:	0.5 AC or 1A DC resistive load
Maximum voltage:	28V DC, 120V AC
Life:	>100,000

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Contact details

Max current: 16A 125V AC/24V DC
Max Voltage: 125V AC/24V DC

Coil Details

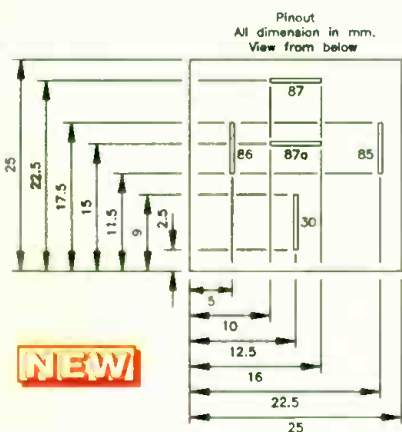
Nominal voltage: 12V
Coil resistance: 170Ω
Operating voltage: 9V to 15.6V

Order

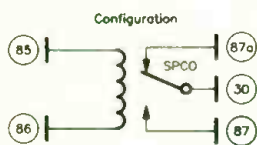
Code	Type	Price each
JM26D	16A/12V Car Relay	£1.39

40A Relay For Automotive Applications

Designed with automotive applications in mind, this high power relay is capable of switching loads up to 40A at 12V. Suitable for controlling spot-lights, heater systems, wiper motors, compressor driven air horns, tail-gate lifts etc. Electrical contact is made with push on 1/4 in. blade connectors. The relay configuration is SPDO, with silvered contacts.



NEW!



Specification

Coil details

Nominal voltage: 12V
Coil resistance: 90Ω ±9Ω
Coil current: 133mA ±12mA (at 12V)
Operating voltage: 7.2 to 20.5V DC

Contact details

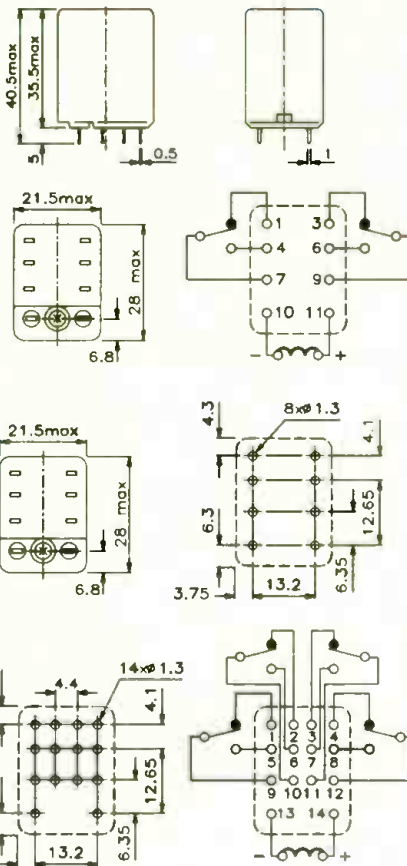
Maximum current: 40A
Maximum voltage: 24V DC
Approximate weight: 30g
Nominal power cons.: 1.6W

Order

Code	Type	Price each
AR32K	12V 40A Car Relay	£4.49

5A Miniature Relay

A fully enclosed relay capable of carrying 5A and having pins for direct pcb mounting or for use with socket available separately. The relay is available with double-pole or 4-pole changeover contacts, with 6V DC, 12V DC or 24V DC coils.



Contact details

Max current: 5A
Max voltage: 250V AC, 125V DC

Max switching power, AC:
1100VA resistive DPDT
440VA inductive DPDT
660VA resistive 4PDT
176VA inductive 4PDT
120W resistive DPDT
48W inductive DPDT
72W resistive 4PDT
36W inductive 4PDT

DC:

Contact resistance: <math><50\text{m}\Omega</math>
Operate time: 10ms max
Release time: 10ms max
Insulation resistance: >100MΩ at 500V DC
Mechanical life: >10 million operations
Electrical life: >100,000 operations at full load

Contact material: Silver cadmium oxide

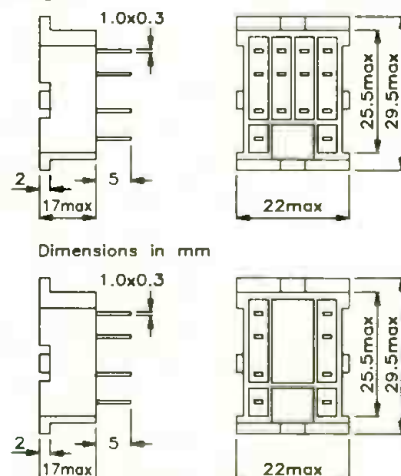
Coil details

Nominal voltage	Operate range (V)	Coil resistance	Current at nominal voltage
6V DC	4.8 to 6.6	40Ω ±5%	150mA
12V DC	9.6 to 13.2	160Ω ±5%	75mA
24V DC	19.2 to 26.4	650Ω ±5%	37mA

Size of base: 28 x 21.5mm
Height: 35.5mm (+ pin 5mm)

Sockets are available, 8-pin for the DPDT types and 14-pin for the 4PDT types. Sockets have pcb pins.

Size of base: 29 x 21.5mm
Height: 11mm (+ pin 4mm)

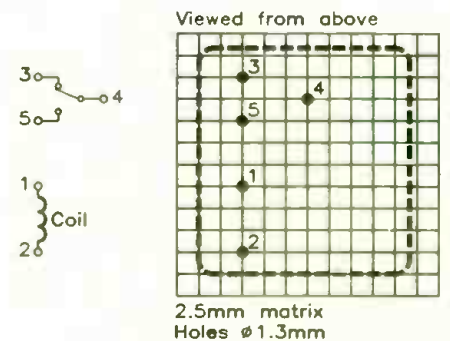


Order

Code	Type	Price each
JG65V	5A Relay 6VDC DPDT	£3.29
JG66W	5A Relay 12VDC DPDT	£3.29
JG67X	5A Relay 24VDC DPDT	£3.29
JG68Y	5A Relay 6VDC 4PDT	£4.15
JG69A	5A Relay 12VDC 4PDT	£4.15
JG70M	5A Relay 24VDC 4PDT	£4.15
JG52G	Rly Skt 5A 8-Pin	£1.03
JG51F	Rly Skt 5A 14-Pin	£1.17

8A Relay

A printed circuit mounting power relay with one changeover contact with cadmium oxide flashed silver contacts. The relay is fully enclosed in a plastic case. Size: 28.5 x 25.5 x 10.5mm + 3.5mm pin length.



Contact Details:

Max current: 8A (resistive load)
5A (inductive load)
Max voltage: 250V AC, 18.5V DC
Max contact resistance: 30mΩ
Life: >100,000 operations at 8A
Operating time: 8ms
Release time: 4ms

Coil Details:

Nominal voltage: 12V DC
Coil resistance: 330Ω

Order

Code	Type	Price each
HY20W	Relay Flat 12V	£2.49

High Current Relay

NEW!

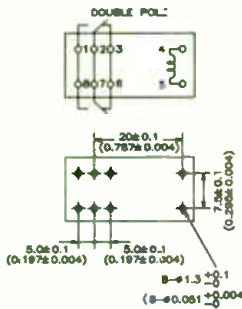
A high quality, high current switching relay that is available with double pole contacts. This relay is capable of switching 240V AC 5A, and has a minimum life of 100,000 operations. Conforms to UL-508 and CSA standards.



Specification

Maximum current double pole: 5A AC or DC resistive load
Maximum voltage: 30V DC, 240V AC
Coil rating: 12V DC
Coil resistance: 285Ω
Coil current: 42mA approx.
Life: >100,000

Maximum contact resistance: 100mΩ
 Operate time: 15ms maximum
 Release time: 5ms maximum
 Pickup voltage: 70% max. of rated coil voltage
 Drop-out voltage: 10% min. of rated coil voltage
 Dimensions: 29(L) x 25(H) x 13(W)mm excluding pins
 Weight: 16g approx.

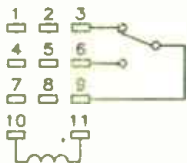


Order Code	Type	Price each
DC58N	12V DP Hi-Curr Relay	£2.49

Power Relay

Open construction relay with two-pole changeover pure silver contacts.

Contact Details:



Max ratings:

- 7.5A at 250V AC
- 3A at 440V AC
- 7.5A at 6V DC
- 7A at 12V DC
- 4.5A at 24V DC
- 1.5A at 48V DC
- 0.3A at 100V DC
- 0.15A at 200V DC

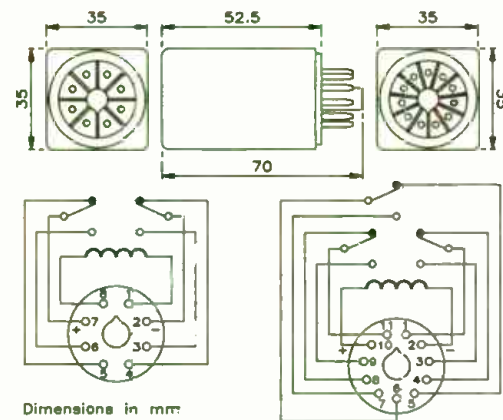
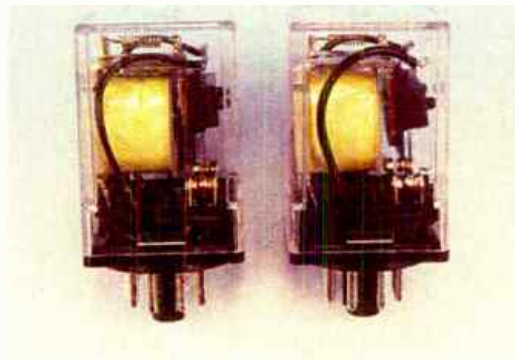
Life: >20 million operations

Operate and release time: 10 to 20ms

Nominal coil voltage	Operate voltage range	Coil resistance
12V DC	9.6 to 13.2V	120Ω
230V AC	184 to 253V	7300Ω

Order Code	Type	Price each
FX48C	Power Relay 12V	£4.65
FX49D	Power Relay 230V AC	£4.75

Round-base Relays



High power standard industrial relays with DPDT contacts on an 8-pin base and 3PDT contacts on an 11-pin base. The relay is fully enclosed and will plug in to any standard 8-pin or 11-pin round base. It is a direct replacement for all standard industry types. It is available in both double-pole and 3-pole with a choice of four coil voltages: 6V, 12V and 24V DC, and 240V AC.

Contact details

Max current: 10A
 Max voltage: 240V AC, 28V DC
 Max switching power: 2400VA resistive, 280W resistive
 Contact resistance: <50mΩ
 Operate time: 15ms max
 Release time: 10ms max
 Insulation resistance: 100MΩ at 500V DC
 Mechanical life: >10 million operations
 Electrical life: >100,000 operations at full load
 Contact material: Silver cadmium oxide

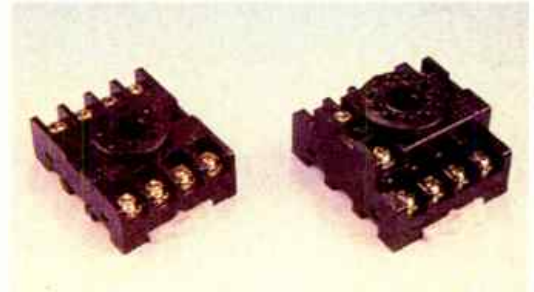
Coil details

Nominal voltage	Operate range (V)	Coil resistance	Current at nominal voltage
6V DC	4.8 to 6.6	32.1Ω ±5%	187mA
12V DC	9.6 to 13.2	120Ω ±5%	100mA
24V DC	19.2 to 26.4	472Ω ±5%	51mA
240V AC	192 to 264	9110Ω ±5%	9mA

Size of base: 35 x 35mm
 Height of body: 52.5mm
 Overall height: 70mm

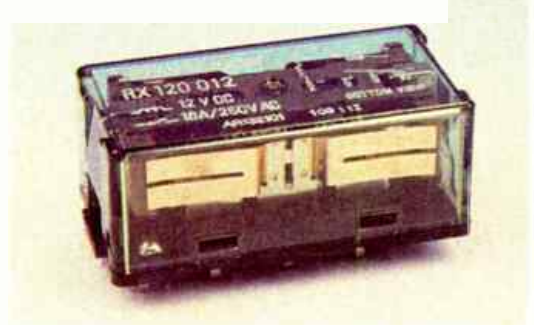
Sockets are available which will clip onto 35mm DIN rail and have a screwdriver-operated quick-release clip. Connections are now made to the relays via screw-terminals. Screws are in recesses 7mm wide.

Size of base: 51 x 40mm (8-pin), 51 x 43mm (11-pin)
 Height: 21mm (8-pin), 30mm (11-pin)
 Fixing centres: 33mm x 4mm clear (8-pin), 34mm x 4.5mm clear (11-pin)



Order Code	Type	Price each
JG57M	Power Rly 6VDC DPDT	£4.49
JG58N	Power Rly 12VDC DPDT	£4.49
JG59P	Power Rly 24VDC DPDT	£4.49
JG60Q	Power Rly 240VAC DPDT	£4.69
JG62S	Power Rly 12VDC 3PDT	£4.89
JG63T	Power Rly 24VDC 3PDT	£4.89
JG64U	Power Rly 240VAC 3PDT	£4.89
JG54J	Rly Skt 10A 8-Pin	£2.25
JG53H	Rly Skt 10A 11-Pin	£2.45

250V AC 16A Relay



An ultra high reliability power relay with pivoted armature and bifurcated contacts providing extremely low operating power. The DPDT contacts are virtually bounce-free giving extended life over conventional power relays. The relay has pcb pins and silver tin oxide contacts.

Contact details

Max current: 16A
 Max voltage: 250V AC
 Max switching power: 4000VA
 Operate time: 20ms max
 Release time: 13ms max

Coil details

Nominal voltage: 12V DC
 Coil resistance: 480Ω
 Current at nominal voltage: 25mA
 Size of base: 50 x 36.8mm
 Height: 22mm (+pin 3.5mm)

Order Code	Type	Price each
JG22Y	Relay 16A 250V AC	£24.99

IT'S A FACT!

SELECTING A RELAY

When selecting a relay, it is important to pay special attention to the material used in the contacts.

SILVER - This should not be used for voltages under 6V because of problems associated with sulphur.

SILVER-NICKEL - This has the same characteristics as silver but is able to cope with higher switching currents.

SILVER-CADMIUM OXIDE - This does

not weld easily and is therefore suitable for switching mains powered equipment with high initial current peaks. Less suitable for voltages below 12V.

TUNGSTEN - This is suitable for switching large power levels, resists arcing and welding, but has a tendency to oxidise, so cannot be used in unfriendly environments. Not suitable for 24V or less.

GOLD - Suitable for low current and low voltages. It has low contact resistance which also makes it suitable for switching signals etc.

Fax your orders to:
01702 553935

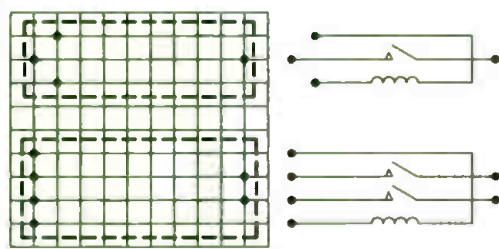
Reed Relays

A sealed reed relay suitable for use at voltages from 3.8V to 22V with single-pole make or double-pole make actions. The high resistance coil enables the relay to be driven directly by 74 series IC's and most logic buffers. At the same time the relay can switch up to 10VA.



Contact Details (per contact)

Max current: 1A
 Max voltage: 100V
 Max switching power: 10VA
 Contact resistance: 150mΩ max
 Operate time: 1ms max including bounce time
 Release time: 0.5ms max including bounce time
 Life: >1 million operations at full load



0.1 inch matrix
Holes Ø0.8mm

Coil details

Nominal voltage	Operate range(V)	Coil resistance	Current at nominal voltage
5V DC	3.8 to 11	500Ω ±10%	10mA
12V DC	8.8 to 22	1050Ω ±10%	11.4mA

Coil temperature

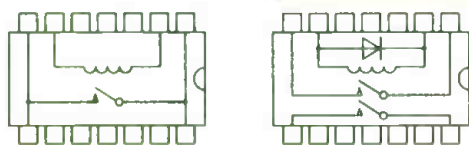
rise: 30°C max
 Insulation resistance: >100MΩ at 500V DC between coil and contact

Size SPST: 24 x 8 x 9mm high
 DPST: 25 x 11 x 9mm high
 Pin length: 4mm

Order Code	Type	Price each
JH12N	Reed Relay 5V SPST	£1.45
JH13P	Reed Relay 12V SPST	£1.45
JH15R	Reed Relay 5V DPST	£1.80
JH16S	Reed Relay 12V DPST	£1.80

DIL Reed Relays

A reed relay with single pole or double pole make contacts moulded in a standard 14-pin dual-in-line package.



Contact Details:

	1 pole make	2 pole make
Max power	10W	3W
Max current	0.5A	0.11A
Max voltage	100V	28V
Contact capacitance	2pF	2pF
Max contact resistance	100mΩ	200mΩ
Life (millions of operations)	100	100
Operate time	0.25ms	0.25ms

Release time 0.15ms 0.15ms
 Insulation resistance 10⁹Ω 10⁹Ω

Coil Details:

Type	Nominal coil voltage	Operate voltage range	Must release voltage	Coil resistance
1 pole make	5V DC	3.7-7.5V	0.5V	500Ω
2 pole make	5V DC	3.7-7.5V	0.5V	200Ω

2 pole type has an internal diode connected across the coil to protect the driver. The 5V type may be driven directly from TTL.

Order Code	Type	Price each
FX88V	Dil Reed Relay 1p 5V	£1.60
FX90X	Dil Reed Relay 2p 5V	£4.65

Reed Switches



A dry-reed switch with rhodium plated contacts for long life. When a magnet or electromagnet is brought near the reed, magnetism is induced into both halves of the reed in the same direction. Thus, of the overlapping ends, one becomes a north pole and one a south pole and the attraction of the poles causes the switch to close. When the operating magnet is removed, the springiness of the reed enables the switch to break.

Type	Standard	Compact	Miniature
Glass length (mm)	52	38.8	20.3
Glass diameter (mm)	5.4	5.5	3.2
Overall length (mm)	79	88	57.2
Contact arrangement	Single pole make	Single pole changeover	Single pole make
Max power	25W	10W	15W
Max current AC or DC	2A	0.5A	0.5A
Switching voltage DC	800V	100V	200V
Switching voltage AC rms	250V	125V	125V
Operate ampere-turns	75-95	50-90	20-50
Contact capacitance	0.8pF	3pF	0.2pF
Max contact resistance	80mΩ	100mΩ	150mΩ
Life (millions of operations)	100	100	100
Operate time	4ms	2ms	1ms
Release time	0.2ms	4ms	0.2ms
Insulation resistance	10 ¹¹ Ω	10 ¹⁰ Ω	10 ¹¹ Ω

Order Code	Type	Price each
FX68Y	Reed SW Standard	£1.36
FX69A	Reed SW Compact	£2.79
FX70M	Reed SW Miniature	69p

Magnets

Magnets for use with our Reed Switches.

Approximate sizes:
 Small: 18 x 3 x 3mm.

Large: 25 x 5 x 5mm. In the table below the distance in mm is that when the reed just operates and just releases when the wide face of the reed is parallel to a long face of the magnet and is measured from the centre of the reed to the nearest face of the magnet. In practice reduce the operate distance and increase the release distance by 25% to ensure reliable operation.

Magnet Large	Standard	Compact	Miniature
Operate distance	22mm	19mm	26mm
Release distance	36mm	29mm	36mm
Magnet Small	Standard	Compact	Miniature
Operate distance	6mm	5mm	10mm
Release distance	12mm	9mm	15mm

Order Code	Type	Price each
FX71N	Magnet Small	80p
FX72P	Magnet Large	£1.75

MERCURY SWITCHES

These mercury switches comprise an encapsulation containing a pair of contacts, bridged by a ball of mercury which is free to roll about the interior. Thus the on/off state of the switch is dependent on the attitude of the switch relative to gravity. The encapsulations are sealed and filled with an inert, arc suppressing gas.

Tilt Switches



A sealed encapsulated mercury tilt switch which finds applications in sensing angles of position for machine control, angular movement detectors, etc. The switch is finished in black and includes a mounting clip. It is fitted with a pair of 14cm long leads terminated in 4BA (M5) crimped ring tags.

Specifications:

Type	G5Z-003
Included angle*	11° max.
Contact rating	13A @ 240V AC 10A @ 240V DC

Insulation Strength:

Contact to contact, off state	1500V
Encapsulation	5000V

Dimensions:

Length	46mm
Diameter	13mm

*Max included angle = degree of movement from position to guarantee an 'off' state through horizontal to position to guarantee an 'on' state.

Order Code	Type	Price each
FA74R	13A Mercury Tilt Sw	£9.99



BS 5750 Part 2 1987
 Level B: Quality Assurance
 RS12750

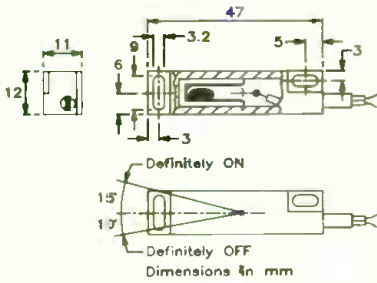
Stockist of
 Assessed Capability

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Encapsulated Mercury Switch



A surface mounted mercury tilt switch encapsulated in a plastic housing. Slotted screw holes are incorporated in the casing to allow fine adjustments to be made. The switch is supplied with 300mm of 2 core cable.

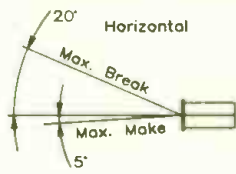


Specifications

Included Angle: 25° about the horizontal
 Contact Rating: 1A @ 240V AC
 Contact Resistance: 300mΩ
 Dimensions 47mm long x 12mm wide x 11mm high

Order Code	Type	Price each
FS99H	Encap Merc Switch	£4.49

Miniature Tilt Switch



A miniature tilt switch which because of its low cost is ideal as a position sensor. The contacts and their mercury conductor are completely sealed and encapsulated within an outer metal can. When mounted horizontally, contact is made when device is tipped up and broken when tipped down. Typically changeover occurs within 15°, but contact is always broken when device is 5° below horizontal and always made when device is 20° above horizontal.

Specification

Max. tilt angle: 20°
 Contact rating: 0.25mA @ 5V
 Contact resistance: <150Ω
 Body length: 10.2mm
 Body diameter: 4.8mm
 Lead length: 17mm
 Flange diameter: 5.5mm

Order Code	Type	Price each
FE11M	Min Tilt Switch	£1.35

Vibration Switch

A mercury loaded switch which can be mounted at any angle. The contacts are normally open, but when vibrated the switch pulses on to set off an alarm. Applications include mobile security units for bikes, cars etc. or as a safety device in machinery. The fact that the switch is always off when stationary, regardless of its orientation, makes it particularly useful with items which might be left in any position, but need to alarm when moved. Nickel-plated steel case.



Contact rating: 1A at 120V AC
 Can size: 9.5 x 8.2mm dia.
 Flange size: 9.3mm dia.
 Pin size: 11.2 x 1mm dia.

Order Code	Type	Price each
UK57M	Vibration Switch	£2.50

**Fax your orders to:
 01702 553935**

Tip-Over Break Contact Switches



A pair of mercury switches in nickel plated steel encapsulations. These switches are designed to be installed such that they are normally 'on' whilst 'upright', and break contact if tilted off vertical.

Safety Supply Breaker Type

The T03-1016 finds applications in free standing electric heaters for example, and will turn off the appliance should it fall over. The switch is terminated with a right-angled 'Lucar' blade at top and a 'Lucar' terminal at the side, suitable for use with our push-on connectors in the Connectors Section.

Motion Break Contact Switch

The 4539 is a tip-over switch which can be used in security applications to detect vibration or for detecting motion. It is quite sensitive to side-ways and vertical displacement, and will break contact if moved or knocked sharply. The switch remains closed for gentle movements. The break angle ensures 'normal' operation of the sensing circuit for any angle up to >79° relative to absolute vertical. The vertical terminals are 7mm long pins spaced at 2.5mm.

Specifications:

Type	T03-1016	4539
Break angle	45°	79°
Contact rating	6A @ 240V AC	1.7A @ 120VAC
Insulation strength:		
Contact to contact, open	1240V	500V
Overall height	23mm inc. tag	16mm inc. pins
Overall diameter	23mm	15mm
	excluding side connector	

Order Code	Type	Price each
FA76H	45deg Tipover Switch	£3.99
FA77J	79deg Tipover Switch	£2.75

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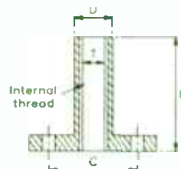
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WOUND COMPONENTS

Anti Parasitic Beads	812	Filters	815	Motors	823
Audio Transformers	819	IF Transformers	815	Pot Cores	812
Auto Transformers	818	Inverter Transformer	818	Pulse Transformers	816
Chokes	813	Ioniser Transformer	819	Toroidal Transformers	821
Coil Formers	812	Isolating Transformers	818,819	Toroids	813
Delay Lines	814	Mains Transformers	817	Transformer Kits	822
Dust Cores	812	Matching Transformers	819	Valve Transformers	819,820
Ferrite Toroid	814	Microphone Transformer	819	Variacs	823

COIL FORMERS

Bakelite with Moulded Base Calvyn Industrial



A bakelite coil former having an integral mounting base, with 8BA clear fixing holes. Iron dust core must be purchased separately if required.

Dimensions in mm.

Type	L	D	C	T	Suitable Core
351/8BA	21	7	20	6	Type 6

Order Code	Type	Price each
LB17T	Former 351	99p

Bakelite

Two different length coil formers. 4.8mm diameter and may be fitted into our Former Base LB44X. Iron dust core Type 4 fits both types.



Type	Length
722/1	14mm
722/2	20.5mm

Order Code	Type	Price each
LB20W	Former 722/2	£1.40
LB19V	Former 722/1	£1.10

Iron Dust Core

Iron dust core which is threaded and may be adjusted by our Trim TT5, (iron grade 500).



Type	Diameter	Length	Suits former
6	6mm	12.7mm	351/8BA

Order Code	Type	Price each
LB42V	Dust Core Type 6	£1.06

Base Plate

Calvyn Industrial

An SRBP base plate for use with our type 722 coil formers. Fitted with six pins. Overall size: 12.7mm square x 7mm high.



Order Code	Type	Price each
LB44X	Former Base	60p

ANTI-PARASITIC BEADS

Small ferrite beads which may be threaded on to wires to add impedance for the suppression of unwanted parasitic oscillations or to provide screening. Max. dia. 4.2mm. Max. length 5.5mm. Min. hole dia. 1.8mm. Packed in tens.



Order Code	Type	Price each
LB62S	A/P Beads	50p

POT CORES

Pot Core (Type 2) Core (Type 2) (LA4345)

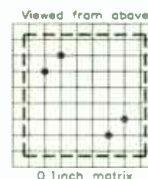
Pot core dia. 23mm, height 17mm. Printed circuit board mounting former (with pins on 0.1in. grid) and clips supplied separately. Specific inductance: 400nH.



Order Code	Type	Price each
HX06G	Core Type 2	£2.29

Bobbin (Type 2) (DT 2470)

Single section bobbins for use with Core Type 2.



Order Code	Type	Price each
HX07H	Bobbin Type 2	99p

Clips (Type 2) (DT 2396)

Tinned sprung steel clips for use with Core Type 2 (2 clips required).

Order Code	Type	Price each
HX08J	Clips Type 2	16p

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THE BEST OF SERVICE

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NOTES ON WINDING INDUCTORS

The following range of pot cores allow inductances from about 10mH to 10H to be wound with a high degree of accuracy. In general it is best to use as thick enamelled copper wire as possible bearing in mind that the thicker the wire the fewer the number of turns that can be contained on the former within the core. Using thicker wire will have negligible effect on the value of inductance, but it will lower the DC resistance which makes the Q higher.

To calculate the number of turns required to make a particular inductance use the formula:

$$n = \sqrt{L/A_L} \text{ or } L = n^2 A_L$$

where n is the number of turns. L is the inductance in Henry's and A_L is the specific inductance.

The specific inductance of our cores is given in nanoHenry's and it is necessary to convert this to Henry's (i.e. $\times 10^{-9}$) to obtain the inductance in Henry's.

Example:

Using Core Type 2 find the number of turns required to give 0.1 Henry's (100mH).

$$\begin{aligned} \text{For core LA4345, } A_L &= 400\text{nH. } n = \sqrt{L/A_L} = \sqrt{0.1/400 \times 10^{-9}} \\ &= \sqrt{0.00025 \times 10^9} \text{ turns} \\ &= \sqrt{250,000} \text{ turns} \\ &= 500 \text{ turns.} \end{aligned}$$

Pot Core (Type 3) Core (Type 3) (LA4543)

Pot core dia. 28mm, height 19mm, printed circuit board mounting former (with pins on 0.1in. grid) and clips supplied separately. Specific inductance: 1000nH.



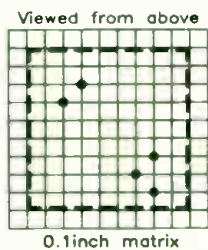
Order Code	Type	Price each
HX09K	Type 3 Core	£3.40

Clips (Type 3) (DT2406)

Tinned sprung steel clips for use with Type 3 Core (2 clips required).

Order Code	Type	Price each
HX11M	Type 3 Clips	15p

Bobbin (Type 3) (DT 2534)



Single section with 5 pins for use with Type 3 Core.

Order Code	Type	Price each
HX10L	Type 3 Bobbin	99p

CHOKES Search Coil



A 100µH inductor designed for use as a search coil in our Mini Metal Detector Kit. Overall size 29mm long x 10mm diameter.

Order Code	Type	Price each
JC25C	100uH Search Coil	49p

R.F. Choke



An axial lead, lacquer-coated radio frequency choke, featuring high inductance and small size.

Inductance: 4.7mH
 Q_{min} : 35 (Test frequency: 252kHz)
 Rated current: 55mA
 Dimensions: 9.2 x 4mm dia.

Order Code	Type	Price each
UK80B	4.7mH Choke	65p

Very High Inductance Choke

A small audio choke inductance 10H (with no DC current present or 3H with 12mA DC). DC resistance: 750Ω. Size: 20 x 16 x 16mm.



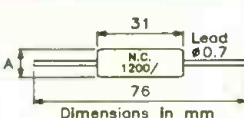
Order Code	Type	Price each
HW27E	Choke 10H	£3.49

General Purpose Axial Lead Inductor

Newport Components



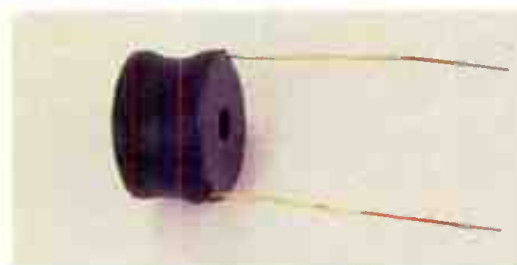
A general purpose inductor with axial lead terminations. The high permeability wound ferrite rod is finished with a flame-retardant heat-shrink sleeve.



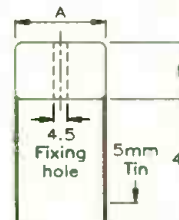
Type	Inductance (@ 1kHz) (µH ±10%)	D.C. Resistance (Ω)	D.C. Current (A)	Q at frequency (kHz)	Diameter (mm)	Price each
1200/15	1000 (1mH)	0.77	1.0	55	10	£1.99
1200/15	0.8	12.0				

Bobbin Type Inductors

Newport Components



These inductors use a novel bobbin core manufactured from a material with a high saturation flux density. The high current capability makes these devices suitable for power-line applications, and they are ideal for use in switching regulators and filters. They have low temperature dependence and can be used at high currents. Each component is finished with a flame retardant heat shrink sleeve. For additional mechanical stability, these inductors may be mounted using an M4 non-magnetic bolt (e.g nylon).



Type	A (mm)	B (mm)
14-104-54	24	14.5
14-224-35	24	14.5
14-334-28	24	14.5
14-474-23	37	25.5

Type	Inductance µH ±10% @ 1kHz	DC Resistance mΩ	DC Current (Continuous) A
14-104-54	100	24	5.4
14-224-35	220	106	3.5
14-334-28	330	165	2.8
14-474-23	470	244	2.3

Order Code	Type	Price each
AH21X	14-104-54	£2.75
AH22Y	14-224-35	£2.75
AH23A	14-334-28	£2.75
AH24B	14-474-23	£2.75

Miniature Radial Lead Inductors

Newport Components

A range of general purpose inductors with radial leads. Their small size makes them particularly suitable for power-line decoupling and low-power switching regulator applications.



This series offers lower DC resistance and a higher current rating than its counterparts. All parts are protected by a flame retardant sleeve. Size is 6.5mm diameter by 11mm high, with leads spaced at 4mm. (680µH is 2.73mm)

Order Code	Type No.	Inductance µH (±10%) at 1kHz	DC Resistance Ω (max.)	DC Current Continuous A
AH26D	22R 103	10	0.20	1.50
AH27E	22R 153	15	0.22	1.10
AH28F	22R 223	22	0.28	1.00
AH29G	22R 333	33	0.30	0.92
AH30H	22R 473	47	0.39	0.90
AH31J	22R 683	68	0.47	0.88
AH32K	22R 104	100	0.60	0.68
AH33L	22R 154	150	0.80	0.58
AH34M	22R 224	220	0.95	0.50
AH35Q	22R 334	330	1.25	0.43
AH36P	22R 474	470	1.50	0.33
AH37S	22R 684	680	1.75	0.30
AH38R	22R 105	1000	4.00	0.21

Order Code	Type	Price each
AH26D	22R 103	65p
AH27E	22R 153	65p
AH28F	22R 223	65p
AH29G	22R 333	65p
AH30H	22R 473	65p
AH31J	22R 683	65p
AH32K	22R 104	65p
AH33L	22R 154	65p
AH34M	22R 224	65p
AH35Q	22R 334	65p
AH36P	22R 474	65p
AH37S	22R 684	65p
AH38R	22R 105	65p

High Current Toroids



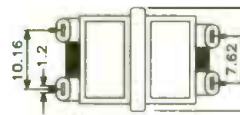
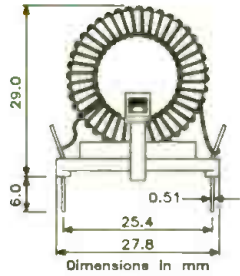
High current chokes wound on toroids designed primarily for use in switched mode power supplies. Two types are available:

Inductance: 150µH. Max current: 5A intermittent, 3A continuous.
 Inductance: 300µH. Max current: 8A intermittent, 5A continuous.

Order Code	Type	Price each
JL72P	5A 150uH Choke	£3.20
JL73Q	8A 300uH Choke	£4.99

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01702 553935**

High Current Toroidal Inductors Newport Components



A range of high current vertically mounted toroidal inductors, designed for use in switching power supply and power line filtering circuits. Suitable for any application requiring high current handling with minimal EMI emissions.

The inductors are mounted on a plastic base having UL94-VO rating and secured by a cable tie.

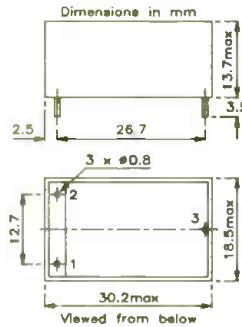
Type	Inductance (@ 1kHz) ($\mu\text{H} \pm 10\%$)	DC Resistance ($\text{m}\Omega$ max.)	DC Current (Continuous) (A max.)
19104	100	65	2.2
19224	220	100	1.2
19334	330	120	1.0
19474	470	145	0.8

Type	Q	at frequency (kHz)	Nominal self-resonant frequency (MHz)
19104	100	50	12.3
19224	90	10	2.9
19334	90	10	1.7
19474	90	10	1.3

Order Code	Type	Price each
BU55K	Toroid 19104	£2.75
BU56L	Toroid 19224	£2.75
BU57M	Toroid 19334	£2.75
BU58N	Toroid 19474	£2.75

Delay Line

The delay consists of two parallel coils which are astatically wound to decrease the influence of magnetic fields from other parts of the receiver. The delay line is in a plastic housing. Three pins enable the unit to be soldered directly to a printed circuit board.

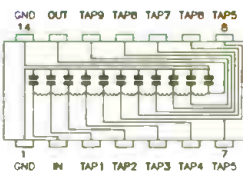


Electrical Data (measured at 25°C)
 Delay: 270ns $\pm 10\%$
 Characteristic impedance: 0.9k Ω $\pm 10\%$
 Group Delay (with respect to 0.5 MHz)
 at 3.5MHz max: 30ns
 at 5.0MHz max: 60ns
 Bandwidth at -3dB: 5MHz
 Ripple with 2r-pulse on pin 2 max: 2.5%
 Breakdown voltage between pins 2 and 3 min: 50V DC

Order Code	Type	Price each
UH84F	DL270 Delay Line	£1.40

Miniature Tapped Passive Delay Lines

Newport Components



A range of passive, lumped constant L/C delay lines forming a delay ladder with up to 10 equally spaced delay taps, and all contained in one low profile 14-pin DIL package no larger than a logic IC and particularly suitable for high-density board layouts. No termination resistor is included, allowing for series connection of two or more units for unequal tap designs. In addition the line can be directly driven from TTL logic very easily with no calculation required. For analogue applications the recommended termination impedance should be 100 Ω . Six types with different delay times are available.

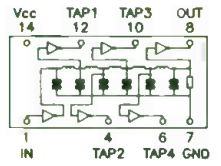
Type	Total delay ns $\pm 5\%$	Tap to tap delay ns $\pm 10\%$	Rise time ns	Attenuation max.
1001	10	1	3.0	5%
2001	20	2	4.5	5%
5001	50	5	8.5	5%
1011	100	10	17	5%
2011	200	20	34	5%
2511	250	25	42	5%

General specification
 Operating voltage: 50V DC
 Insulation resistance: 1000M Ω at 50V DC
 Characteristic impedance: 100 Ω $\pm 10\%$
 Distortion: 10%
 Total delay/risetime ratio: 6:1
 Min. pulse width as % of total delay: 40%
 Repetition rate: 3 x min. pulse width
 Operating temperature range: 0 to 70°C

Order Code	Type	Price each
BU59P	Delay Line 1001	£4.99
UM09K	Delay Line 2001	£4.99
UM11M	Delay Line 5001	£4.99
UM08J	Delay Line 1011	£4.99
BU60Q	Delay Line 2011	£4.99
UM10L	Delay Line 2511	£4.99

Digital Delay Line Modules

Newport Components



A range of miniature digital delay line modules having Schottky TTL buffered delay lines providing precise delay times and direct compatibility with TTL. Five equally spaced delay taps are also provided and the whole packaged in one low profile, 14-pin DIL configuration with standard 0.1in. spaced pinouts. Internal termination of the delay line and compensation for propagation delays are incorporated and no additional external components are necessary. Especially suitable for high density board layouts. Five types with different delay times are available.

Type	Total delay ns $\pm 5\%$	Tap to tap delay ns	Output risetime ns
5250	25	5 ± 2	3
5500	50	10 ± 2	3
5750	75	15 ± 2	3
5101	100	20 ± 2	3
5251	250	50 ± 5	4

General specification
 Supply voltage: 5V DC (7V max.)
 Min. pulse width as % of total delay: 80%
 Input pulse repetition rate: 3 x min. pulse width
 Operating temperature range: 0 to 70°C
 TTL output load capability: 10 per tap max.

Order Code	Type	Price each
UM21X	Delay Line 5250	£3.49
UM23A	Delay Line 5500	£3.49
BU62S	Delay Line 5750	£3.49
UM20W	Delay Line 5101	£3.49
UM22Y	Delay Line 5251	£3.49

FX4054 Ferrite Toroid

A general purpose nylon coated toroid made from 3E2 grade high permeability manganese-zinc ferrite material; suitable for use in a wide range of applications, including interference suppression, inductors, transformers, etc.



Mechanical Specifications	
Inside diameter:	13.4mm
Outside diameter:	23.6mm
Thickness:	7.6mm

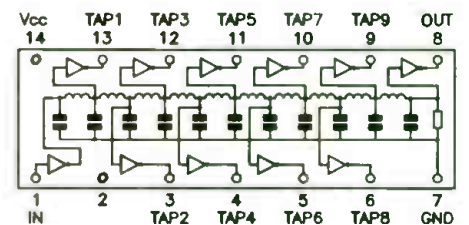
Magnetic Specifications	
Initial inductance factor:	3472nH
Residual plus eddy loss factor:	<15 x 10 ⁻⁶
Curie point:	>130°C
Effective length of magnetic path:	57.0mm
Core factor:	1.81mm ⁻¹
Effective volume of core:	1790mm ³
Effective area of core:	31.5mm ²
μ_{or} at +25 to +70°C:	>5000

Order Code	Type	Price each
JR84F	FX 4054	£1.59

10-Tap Digital Delay Lines

Newport Components

Schottky TTL buffered delay lines providing precise delay times, compatible with TTL logic. The package has been designed into a low profile 14 pin dual-in-line configuration, with ten equally spaced fixed delay taps. The module is capable of handling internal termination, thermal drift and will compensate for propagation delays, all of which are incorporated into the design so that no external components are needed. These delay line packages are designed to be used on high density board designs.



Specification
 Supply voltage V_{CC}: 7V
 Input voltage: 5-5V
 Min. pulse width as % of delay: 40%
 Input pulse repetition rate: 3 x pulse width min.
 Operating free-air temperature: 0°C to 70°C
 Logic 0 output: 10 TTL loads per tap max.



PHONE BEFORE 5PM FOR SAME DAY DESPATCH

01702 554161

Drive capabilities

Logic 0 output: 10 TTL loads per tap max.
20 TTL loads per unit max.

Logic 1 output: 20 TTL loads per unit max.

	Total delay ns ±5%	Tap to tap delay ns	Output risetime ns
10250	25	2.5±2	3
10500	50	5 ±2	3
10750	75	7.5±2	3
10101	100	10 ±2	3
10151	150	15 ±2	3
10201	200	20 ±2	4
10251	250	25 ±3	4
10501	500	50 ±5	4

Order Code	Type	Price each
BU64U	Delay Line 10250	£5.99
UM26D	Delay Line 10500	£5.99
BU65V	Delay Line 10750	£5.99
UM24B	Delay Line 10101	£5.99
BU66W	Delay Line 10151	£5.99
BU63T	Delay Line 10201	£5.99
UM25C	Delay Line 10251	£5.99
UM27E	Delay Line 10501	£5.99

Moulded RF Coils

A range of small moulded coils with ferrite cores for designers. A special nylon trim tool is also available to suit these cores – a metal tool must not be used. The coils are available in 1½ to 8½ turn types and are particularly suited to use at frequencies between 40 and 170MHz.



Inductance in µH	Turns	Q at 100MHz	Colour code
0.04	1½	150	White
0.066	2½	150	Red
0.114	3½	150	Orange
0.180	4½	170	Yellow
0.230	5½	140	Green
0.297	6½	130	Blue
0.389	7½	140	Violet
0.450	8½	170	White

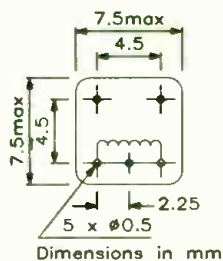
Order Code	Type	Price each
UF62S	RF Coil 0.040uH	60p
UF63T	RF Coil 0.066uH	60p
UF64U	RF Coil 0.114uH	60p
UF65V	RF Coil 0.180uH	60p
UF66W	RF Coil 0.230uH	60p
UF67X	RF Coil 0.297uH	60p
UF68Y	RF Coil 0.389uH	60p
UF69A	RF Coil 0.450uH	60p
UF70M	RF Coil Trim Tool	85p

15µH Adjustable Coil

Type 119ANA5873HM.

Specification

Q: 80
Turns between Pins 1 & 3: 25
Inductance: 15µH
Identification Colour: Pink



Order Code	Type	Price each
UH86T	15uH Adjustable Coil	60p

Coil for Mains Tx/Rx Project

Centre frequency: 125kHz
Q (pins 3, 4) unloaded: 25 min at 125kHz
Adjustment range (pins 3, 4) at 125kHz: 33,000pF ±6%
External tuning cap: 33,000pF
Winding pin 4 to 3: 49½ turns
pin 5 to 6: 7 turns
pin 5 to 2: 3½ turns
pin 5 to 1: 4½ turns

Order Code	Type	Price each
FT55K	Tank Coil AO42YUK	99p

15kHz Lowpass Filter

A multiple inductor low-pass filter with a cut-off frequency at 15kHz which will find uses for the output stage filtering of F.M. audio receivers and stereo decoders.



Specification
Input and output impedances: 3.3kΩ
Attenuation: -2.5 to 3dB @ 15kHz
-43dB @ 36.4kHz max.
Group delay time: 12µs @ 30kHz
Dimensions of can: length 18mm, width 6.1mm, height 9.5mm. Pin length 3mm.

Order Code	Type	Price each
JM94C	15KHz L.P.F	£2.99

R.F. Chokes



A range of r.f. chokes having a triple barrier against moisture, & high termination strength & reliability. Colour code (as resistors) gives value in µH.

Rating: ⅓W at 70°C
Insulation resistance: >10⁹Ω

Value (µH)	Test freq. (MHz)	Self-resonant frequency	Q (min) at 20°C	D.C. resistance (max) at 70°C	D.C. current (max)
0.22	25.2	300	50	0.12Ω	1.4A
0.47	25.2	220	50	0.17Ω	1.15A
1.0	25.2	157	45	0.21Ω	920mA
2.2	7.96	110	55	0.28Ω	750mA
4.7	7.96	56	70	0.39Ω	620mA
6.8	7.96	40	75	0.42Ω	550mA
10.0	7.96	30	65	0.63Ω	500mA
22.0	2.52	9.0	50	0.95Ω	410mA
47.0	2.52	6.0	40	1.31Ω	340mA
100	2.52	4.5	30	2.1Ω	275mA
470	0.796	1.9	60	7.7Ω	126mA
1mH	0.796	1.0	45	14Ω	100mA

Order Code	Type	Price each
WH25C	Choke 0.22uH	65p
WH27E	Choke 0.47uH	65p
WH29G	Choke 1.0uH	65p
WH31J	Choke 2.2uH	65p
WH33L	Choke 4.7uH	65p
WH34M	Choke 6.8uH	65p
WH35Q	Choke 10.0uH	65p
WH37S	Choke 22.0uH	65p
WH39N	Choke 47.0uH	86p
WH41U	Choke 100uH	99p
WH45Y	Choke 470uH	99p
WH47B	Choke 1mH	99p

HIGH FREQUENCY TRANSFORMERS

TV Sound IF Coil

A TV sound I.F. coil with one single winding of 8 turns, which should be tuned externally with 560pF for a resonant frequency of 6MHz, tunable with adjustable ferrite core. Q = 75. Colour: black.



Order Code	Type	Price each
UL56L	Toko TV Sound	52p

TV Video IF Coil

A TV I.F. coil which will tune to 38.9MHz using a 100pF capacitor in parallel. Adjustable ferrite core. Q = 50 (f = 38.9MHz, C_{ext} = 100pF).



Order Code	Type	Price each
UL55K	Toko TV IF	55p

Sub-Miniature I.F. Transformers



Low-cost sub-miniature i.f. transformers. Overall size of screening can: 10mm square x 12mm high.

Specification

Type	YRCS11098	RRCS45327	YHCS11100	CSK3464
Q	90	114	140	100
Internal capacitor	180pF	180pF	180pF	27pF
Turns between pins				
1 & 2	140	124	104	
1 & 3	165	162	140	8
2 & 3	25	38	36	
4 & 6	4	6	20	2
Application	1st i.f.	2nd i.f.	3rd i.f.	radio control
Nominal frequency	455kHz	475kHz	455kHz	27MHz
Range	455-470kHz	460-490kHz	455-470kHz	26-29MHz

Type	YMCS17104	ACS34342	CAN1A350EK
Q	110	70	100
Internal capacitor	180pF	51pF	
Turns between pins			
1 & 2	98		27
1 & 3	165	15	261
2 & 3	67		234
4 & 6		1	27
Application	i.f. osc.	FM i.f.	LW antenna
Nominal freq.	455kHz	10.7MHz	
Range MHz	-455-470	9-11.4	25-28MHz
Inductance			3.5mH
Colour			Red

Type	RWR331208	KANK3333R	KANK3334R	KANK3335R
Q	70	60	85	80
Turns between pins				
1 & 2	2	14	7	4
1 & 3	94	55	18	2
2 & 3	92	41	11	8
4 & 6	8	14	3	
Application	MW osc.	SW1 aerial	SW2 aerial	SW3 aerial
Inductance	330µH	45µH	5.5µH	1.2µH
Colour	Red	Violet	Yellow	Pink

Order Code	Type	Price each
HX42V	Toko YRCS 11098	52p
YG30H	Toko RRCS45327	72p
HX43W	Toko YHCS 11100	52p
YG31J	Toko CSK3464	53p
YG32K	Toko YMCS17104	53p
HX97F	Toko ACS 34342	53p
FD00A	Toko CAN1A350EK	75p
FD01B	Toko RWR331208	52p
FD02C	Toko KANK3333R	54p
FD03D	Toko KANK3334R	54p
FD04E	Toko KANK3335R	54p

THE BEST OF SERVICE

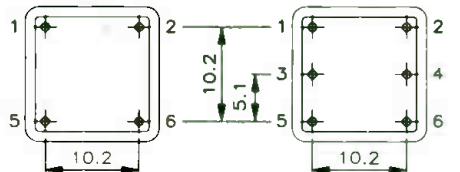
1000 Series Pulse Transformers

Newport Components

The fully encapsulated 1000 series pulse transformers with moulded cases, are intended to be used in wide band and pulse applications including thyristor/triac triggering circuits. Each winding has been voltage tested to withstand 2000V rms, 50Hz.

Type 1001 is a four pin package comprising primary and secondary windings.

Types 1002 and 1003 are six pin packages comprising one primary and two secondary windings.



Specification

	1001	1002	1003
Turns ratio $\pm 2\%$:	1:1	1:1:1	2:1:1
Primary inductance mH (min.):	3	3	12
Primary Et constant $V_{\mu s}$:	200	200	400
Leakage inductance μH :	22	9	35
Capacity pF (max.):	23	28	30
DC resistance of windings Ω (max)			
Primary:	1.2	1.4	4.0
Secondary 1:	1.0	1.3	1.8
Secondary 2:		1.7	2.4

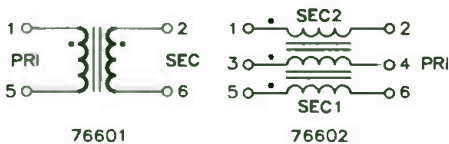
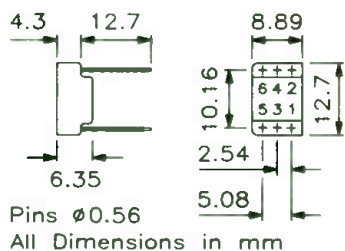
Order

Code	Type	Price each
UM06G	Pulse Tx 1001	£2.85
UM07H	Pulse Tx 1002	£2.99
BU40T	Pulse Tx 1003	£3.25

766 Series Pulse Transformers

Newport Components

These ferrite cored transformers are fully encapsulated in a high grade moulded case. They are widely used in digital and data processing applications, and for line coupling, matching and isolating. Linking the secondaries together can produce an alternative ratio.



Types 76601/1, 76601/2 and 76601/3 are four pin packages and comprise a single primary and secondary winding.

Types 76602/1, 76602/2 and 76602/3 are six pin packages and comprise a single primary and two secondary windings.

Specification

Type	76601/1	76601/2	76601/3
Turns ratio $\pm 2\%$:	1:1	1:1	1:1
Primary inductance μH (min):	2060	492	219
Primary Et constant $V_{\mu s}$:	17.5	8.5	5.5
Capacity pF (max):	45	20	12
Leakage inductance μH (max):	0.6	0.3	0.25
DC resistance of windings Ω (max):	1.5	0.8	0.5

Type	76602/1	76602/2	76602/3
Turns ratio $\pm 2\%$:	1:1:1	1:1:1	1:1:1
Primary inductance μH (min):	2060	492	219
Primary Et constant $V_{\mu s}$:	17.5	8.5	5.5
Capacity pF (max):	35	20	12
Leakage inductance μH (max):	0.6	0.3	0.25
DC resistance of windings Ω (max):	1.5	0.8	0.5

Order

Code	Type	Price each
UM28F	Pulse Tx 76601/1	£2.65
UM29G	Pulse Tx 76601/2	£2.65
BU41U	Pulse Tx 76601/3	£2.65
UM30H	Pulse Tx 76602/1	£2.65
UM31J	Pulse Tx 76602/2	£2.65
BU42V	Pulse Tx 76602/3	£2.65

772 Series Pulse Transformers

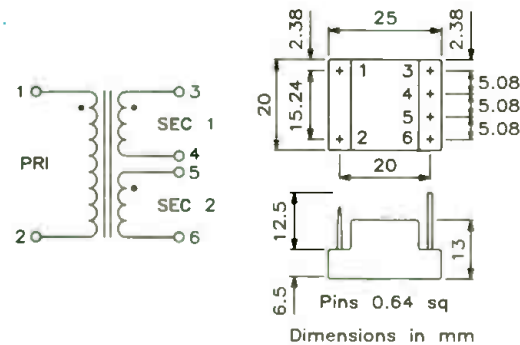
Newport Components

Designed for thyristor/triac triggering applications these pulse transformers are fully encapsulated in a moulded case. The windings have been tested to withstand 2500V rms at 50Hz. The windings may be linked together to obtain alternative turns ratios.

Type 77207 is a six pin package with a single primary (pins 1 and 2) and secondary winding (pins 3 and 4 (pins 5 and 6 may be removed if required)).

Type 77208 is a six pin package with a single primary winding and two secondary windings.

Type 77209 is a six pin package with a double wound primary and two secondary windings.



Specification

Type	77207	77208	77209
Turns ratio $\pm 2\%$:	1:1	1:1:1	2:1:1
Primary inductance mH (min.):	20.7	20.7	20.7
Primary Et constant $V_{\mu s}$:	494	494	494
Leakage inductance μH (max.):	18	40	40
Capacity pF (max.):	65	40	40
DC resistance of winding Ω (max.):			

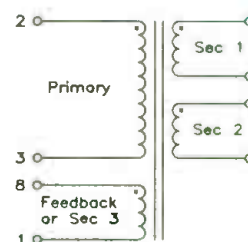
Primary:	3.5	3.6	3.5
Secondary 1:	3.4	3.1	1.6
Secondary 2:		4.2	2

Order

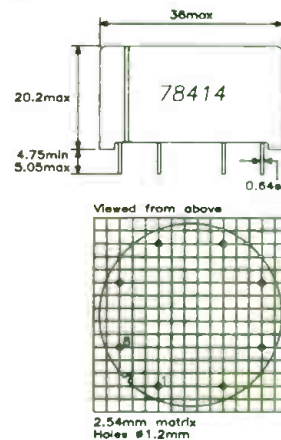
Code	Type	Price each
UM32K	Pulse Tx 77207	£4.75
UM33L	Pulse Tx 77208	£4.75
UM34M	Pulse Tx 77209	£4.75

78414 Pulse Transformer

Newport Components



Designed for thyristor/triac triggering applications this pulse transformer is fully encapsulated in a moulded case. The windings have been tested to withstand 2500V rms at 50Hz, and are suitable for working voltages up to 600V rms. The windings may be series-connected in any combination to obtain alternative turns ratio.



Specification

TURNS RATIO $\pm 2\%$:	2:1:1:1
Primary inductance mH (min):	10
Primary Et constant $V_{\mu s}$:	890
Leakage inductance μH (max):	25
Capacity pF (max):	30
DC resistance of winding Ω (max)	
Primary:	0.55
Secondary 1:	0.3
Secondary 2:	0.3
Secondary 3:	0.2

Order

Code	Type	Price each
BU44X	Pulse Tx 78414	£7.99

TRANSFORMERS

Our range of laminated core transformers is organised as follows:

Standard Transformers: a new range has been added comprising 6VA to 100VA, twin secondary chassis mounting transformers with single 240V primaries.

PCB Mounting Transformers: the 6VA size is now joined by a 12VA PCB range.

Auto-Transformers: two new types increase this range, which now offers 50VA to 450VA ratings.

US Mains Auto-Transformers: this range has been expanded to cover 100VA to 450VA ratings.

Public Address Transformers: a new range of 100V line matching transformers offering power matching from $\frac{1}{4}W$ through to 30W in many useful steps.

Isolation Transformers: 240V to 240V isolation transformers available in 20, 50 and 100VA versions.

MAINS TRANSFORMERS

Sub-Miniature

A range of very small transformers that are wire ended. All types have 100mA output. Overall size: 37 x 31 x 30mm. Fixing centres: 45mm. All primaries tapped 0 to 240V.



Type	Secondary
3V	3.0-3V
6V	6.0-6V
9V	9.0-9V
12V	12.0-12V
15V	15.0-15V

Order Code	Type	Price each
YN12N	Sub-Min Tr 3V	£2.99
WB00A	Sub-Min Tr 6V	£2.99
WB01B	Sub-Min Tr 9V	£2.99
WB02C	Sub-Min Tr 12V	£2.99
YN13P	Sub-Min Tr 15V	£3.29

Miniature 250mA

A range of small transformers that are wire ended. All types have a 250mA output, centre-tapped. All primaries are 0 to 240V. Available in 6V, 9V, 12V and 15V types.



Type	Secondary	Size(wxhxd)*	Fixing Centres
6V	6.0-6V	36 x 31 x 34mm	46mm
9V	9.0-9V	43 x 35 x 34mm	51mm
12V	12.0-12V	43 x 35 x 36mm	51mm
15V	15.0-15V	43 x 35 x 38mm	51mm

*Size excludes fixing feet which protrude 10mm on each side.

Order Code	Type	Price each
YN14Q	250mA Tr 6V	£3.29
YN15R	250mA Tr 9V	£3.65
YN16S	250mA Tr 12V	£3.99
YN17T	250mA Tr 15V	£4.29

Standard Range

A range of high quality mains transformers, all with single 240V primary windings and twin secondaries, wound on double-section safety bobbins. The secondaries can be connected in parallel to double the current capacity, or in series to double the voltage or form a centre-tapped secondary. Available for either chassis or PCB mounting. Chassis mounting types will have either 2-hole clamps or mounting frames; connections are by solder tags. PCB mounting types have PCB pins in place of solder tags.

6VA Chassis Mounting



With 2-hole fixing clamp and solder tags.

Dimensions:	
Size (W x D x H):	45 x 40 x 37mm
Fixing centres:	54mm

Outputs:

Code	Secondaries	Maximum Current
WB06G	2 x 6V	500mA
DH24B	2 x 9V	333mA
WB10L	2 x 12V	250mA
WB15R	2 x 15V	200mA
WB16S	2 x 20V	150mA
WB20W	2 x 24V	125mA

12VA Chassis Mounting

With 2-hole fixing clamp and solder tags.

Dimensions:	
Size (W x D x H):	59 x 50 x 49mm
Fixing centres:	70mm

Code	Secondaries	Maximum Current
YJ50E	2 x 6V	1A
WB11M	2 x 9V	666mA
DM27E	2 x 12V	500mA
DM28F	2 x 15V	400mA
DH25C	2 x 20V	300mA

20/25VA Chassis Mounting

With 2-hole fixing clamp and solder tags.

Dimensions:	
Size (W x D x H):	69 x 57 x 57mm
Fixing centres:	80mm

Code	Secondaries	Maximum Current
YJ51F	2 x 6V	2A
DH26D	2 x 9V	1.38A
WB25C	2 x 12V	1A
DH27E	2 x 15V	830mA
DH28F	2 x 20V	625mA

50VA Chassis Mounting

With 2-hole fixing clamp and solder tags.

Dimensions:	
Size (W x D x H):	78 x 63 x 65mm
Fixing centres:	92mm

Code	Secondaries	Maximum Current
DH29G	2 x 6V	4A
DH30H	2 x 9V	2.78A
WB26D	2 x 12V	2A
DH31J	2 x 15V	1.66A
DH32K	2 x 20V	1.25A

100VA Chassis Mounting

With multi-hole fixing frames and solder tags.

Dimensions:	
Size (W x D x H):	91 x 70 x 77mm
Fixing centres:	4 holes @ 57 x 45mm

Code	Secondaries	Maximum Current
DH33L	2 x 6V	8.33A
DH35Q	2 x 12V	4.17A
DH36P	2 x 15V	3.33A
DH37S	2 x 20V	2.5A
DH38R	2 x 55V	910mA

Order Code	Type	Price each
WB06G	Std 6VA 6V	£5.49
DH24B	Std 6VA 9V	£5.49
WB10L	Std 6VA 12V	£5.49
WB15R	Std 6VA 15V	£5.49
WB16S	Std 6VA 20V	£5.49
WB20W	Std 6VA 24V	£5.49
YJ50E	Std 12VA 6V	£5.99
WB11M	Std 12VA 9V	£5.99
DM27E	Std 12VA 12V	£5.95
DM28F	Std 12VA 15V	£5.95
DH25C	Std 12VA 20V	£5.95
YJ51F	A1 Std 25VA 6V	£7.49
DH26D	A1 Std 25VA 9V	£7.49
WB25C	A2 Std 25VA 12V	£7.49
DH27E	A1 Std 25VA 15V	£7.49
DH28F	A1 Std 25VA 20V	£7.49
DH29G	B2 Std 50VA 6V	£8.75
DH30H	B2 Std 50VA 9V	£8.75
WB26D	B2 Std 50VA 12V	£8.75
DH31J	B2 Std 50VA 15V	£8.75
DH32K	B2 Std 50VA 20V	£8.75
DH33L	D4 Std 100VA 6V	£18.99
DH35Q	D4 Std 100VA 12V	£18.99
DH36P	D4 Std 100VA 15V	£18.99
DH37S	D4 Std 100VA 20V	£18.99
DH38R	D4 Std 100VA 55V	£18.99

Twin Secondary and Multi-Tapped Mains Transformers

A useful range of 240V mains transformers mostly with twin, tapped secondary windings, providing a varied choice of secondary combinations. Mechanical fixing is either by clamps or multi-hole frames. In the following table, 2-hole fixing clamps are indicated by a single number in the 'fixing centres' column, or else multi-hole frames are fitted, and the dimensions of the centres of four holes are given. Dimensions in mm.



Code	VA Rating	Secondary Windings	Maximum Current	Dimensions W x D x H (mm)	Fixing Centres
WB03D	24	(1) 0-8-9V (2) 0-8-9V	1.5A 1.5A	69 x 63 x 57	80
YK28F	12	(1) 0-12V (2) 0-12V	500mA 500mA	55 x 45 x 45	70
LY03D	10	(1) 0-15V (2) 0-15V	330mA 330mA	55 x 45 x 45	70
WB07H	34	(1) 0-10-12-15-17V 1A (2) 0-10-12-15-17V 1A		78 x 70 x 65	92
WB22Y	68	(1) 0-10-12-15-17V 2A (2) 0-10-12-15-17V 2A		91 x 76 x 77	57 x 45
WB12N	40	(1) 0-15-20V (2) 0-15-20V	1A 1A	78 x 70 x 65	92
WB17T	84	(1) 0-28V (2) 0-28V	1.5A 1.5A	91 x 70 x 77	57 x 45
YK02C	128	(1) 32-0-32V	2A	98 x 84 x 65	64 x 54
XB38R	450	(1) 32-0-32V (2) 12-0-12V	6.5A 1.5A	118 x 99 x 127	90 x 65

Order Code	Type	Price each
WB03D	A1 Multi 24VA 9V	£9.49
YK28F	Multi 12VA 12V	£5.99
LY03D	Multi 10VA 15V	£6.99
WB07H	B2 Multi 34VA 17V	£13.99
WB22Y	B3 Multi 68VA 17V	£14.99
WB12N	B2 Multi 40VA 20V	£9.99
WB17T	B3 Multi 84VA 28V	£13.49
YK02C	C5 Multi 128VA 32V	£17.99
XB38R	H14 Multi 450VA 32V	£37.99

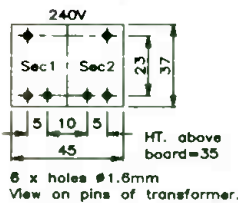
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PCB Mounting Transformers

Two ranges of 6 and 12VA PCB mounting transformers, identical to their chassis-mounting equivalents but having PCB pins instead of solder tags, and no hardware fixing clamps. The pins require PCB holes of 1.6mm diameter. Due to the extra weight of the 12VA types, these have three additional 'dummy' PCB pins for extra security. The actual PCB may also need extra hardware support fixings in the area close to the transformer.



6VA PCB Mounting



With six PCB pins.

Dimensions:
Size (W x D): 45 x 37mm
Height above PCB: 35mm

Outputs:

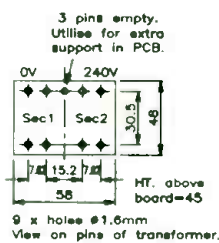
Code	Secondaries	Maximum Current
YJ52G	2 x 6V	500mA
YJ53H	2 x 9V	333mA
YJ54J	2 x 12V	250mA
YJ55K	2 x 15V	200mA
DH39N	2 x 20V	150mA
DH40T	2 x 24V	125mA

12VA PCB Mounting

With six terminated PCB pins and three non-connected support pins.

Outputs:

Code	Secondaries	Maximum Current
DM11M	2 x 6V	1A
DM26D	2 x 9V	660mA
DM13P	2 x 12V	500mA
DH41U	2 x 15V	400mA
DH42V	2 x 20V	300mA



Dimensions:
Size (W x D): 58 x 48mm
Height above PCB: 45mm

Order Code	Type	Price each
YJ52G	PCB 6VA 6V	£4.99
YJ53H	PCB 6VA 9V	£4.99
YJ54J	PCB 6VA 12V	£4.99
YJ55K	PCB 6VA 15V	£4.99
DH39N	PCB 6VA 20V	£4.99
DH40T	PCB 6VA 24V	£4.99
DM11M	PCB 12VA 6V	£5.49
DM26D	PCB 12VA 9V	£5.49
DM13P	PCB 12VA 12V	£5.49
DH41U	PCB 12VA 15V	£5.49
DH42V	PCB 12VA 20V	£5.49

Inverter Transformer

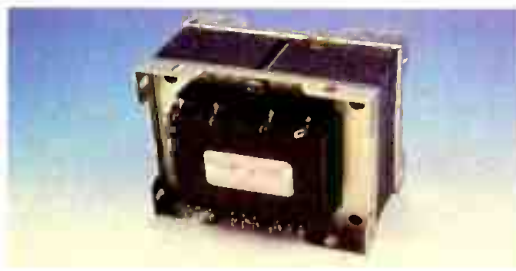
A high quality inverter transformer as used in our 12V/240V, 60W Inverter Kit LW95D, and suitable for similar inverter circuits. Winding details, primary: centre-tapped to suit 12V DC, 50Hz inverter driver at 3A. Secondary: single winding for 240/260V AC output at a nominal 500mA maximum (120W). Turns ratio: 1+1:32. Fitted with multi-hole mounting frames.



Dimensions:
Size (W x D x H): 100 x 88 x 100mm
Fixing centres: 63.5 x 67mm

Order Code XG29G **Type** Inverter Transformer **Price each** £24.99

Stereo Amplifier Transformer



A very high quality transformer designed primarily for use with our 50W Amplifier.

Primary: 120-0-120V
Secondary 1: 22-0-22V at 1 1/2 A
Secondary 2: 22-0-22V at 1 1/2 A
Secondary 3: 15-0-15V at 1 A
Rating: 162VA
Size: 85 x 100 x 80mm
Fixing centres: 63 x 55mm
Style: Similar to TR 20V 1A etc.

Order Code LW34M **Type** 15/22V Power Tran **Price each** £18.99

Isolation Transformers

A range of 240V to 240V AC mains isolation transformers, wound on double-section safety bobbins. Four sizes are available; 12, 25, 50 and 100VA. The three smaller sizes have two-hole fixing clamps. The 100VA type has multi-hole frames for chassis mounting and solder tag connections.



Code	VA Rating	Maximum Current	Dimensions (W x D x H)	Fixing Centres
LW33L	12	50mA	59 x 50 x 49mm	70mm
DH50E	25	100mA	69 x 57 x 57mm	80mm
DH51F	50	200mA	78 x 63 x 55mm	92mm
DH52G	100	400mA	91 x 70 x 77mm	4 holes @ 57 x 45mm

Order Code	Type	Price each
LW33L	12VA Isotran	£6.49
DH50E	25VA Isotran	£8.99
DH51F	50VA Isotran	£9.99
DH52G	100VA Isotran	£19.99

Terminal Covers



Terminal covers for standard transformer styles with solder tags. These covers fit over the terminals and hold on to the plastic bobbin cover beneath. Wires exit through the top of the cover. Three sizes are available: 5-way for 6VA transformers with up to 5 solder tags, 5-way for 20/25VA size and 6-way for 50 to 100VA sizes. These covers are particularly suitable for use with isolation transformers.

Order Code	Type	Price each
DM29G	5-Way 6VA Cover	16p
DM30H	5-Way 25VA Cover	18p
DM31J	6-Way 100VA Cover	21p

Auto-Transformers

A range of auto-transformers which provide step-up or step-down to adapt 120V American equipment to British 240V AC mains and vice versa. Six different power ratings are available from 50VA to 450VA, all with steel shrouds and having screw terminal connections. All types tapped at 0-120-240V.

WARNING: auto-transformers DO NOT provide safety isolation from the 240V mains supply and, despite the lower output voltage, the output should be treated with the same respect as the mains supply proper. These units are NOT intended for outdoor use, neither should they be used with portable tools. Mounting is by four single hole brackets at the base.



Code	VA Rating	Maximum Current (120V out)	Dimensions (W x D x H) (mm)	Fixing Centres (mm)
YJ56L	50	400mA	64 x 84 x 78	48 x 45
YJ57M	100	830mA	64 x 84 x 78	48 x 45
YJ58N	150	1.25A	72 x 94 x 88	57 x 51
YJ59P	250	2A	80 x 110 x 97	63.5 x 54
DH43W	350	2.9A	80 x 123 x 97	63.5 x 67
DH44X	450	3.75A	80 x 123 x 97	63.5 x 67

Order Code	Type	Price each
YJ56L	Auto 50VA	£13.99
YJ57M	Auto 100VA	£15.99
YJ58N	Auto 150VA	£22.99
YJ59P	Auto 250VA	£28.99
DH43W	Auto 350VA	£32.99
DH44X	Auto 450VA	£41.99

TOP QUALITY PRODUCTS AT SUPER LOW PRICES!

US Mains Type Auto-Transformers

Step-down transformers of 100, 250 and 450VA ratings to adapt UK 240V mains supply to American standard 110/120V appliances. All types have enclosing steel shrouds and come complete with UK mains lead and standard American 3-pin outlet socket in the cover. Mounting is by four single hole brackets at the base.



Code	VA Rating	Maximum Current (120V out)	Dimensions W x D x H (mm)	Fixing Centres (mm)
YM50E	100	830mA	80 x 120 x 97	63.5 x 67
DH45Y	250	2.08A	80 x 133 x 97	63.5 x 80
DH46A	450	3.75A	80 x 146 x 97	63.5 x 93

Order Code	Type	Price each
YM50E	C4 US Mains 100VA	£25.99
DH45Y	E6 US Mains 250VA	£34.99
DH46A	H10 US Mains 450VA	£49.99

AUDIO TRANSFORMERS

Two miniature transformers for audio matching. Dimensions 20 x 16 x 15mm. (CT = Centre tapped). Output type 200mW.

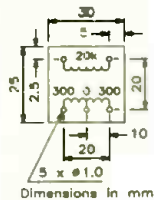


Type No. Application

Primary	Secondary	impedance	impedance
LT44	Driver	20k Ω	1k Ω CT
LT700	Output	1.2k Ω CT	3.2 Ω

Order Code	Type	Price each
HX82D	Min Tr LT44	99p
LB14Q	Min Tr LT700	99p

Microphone Transformer



A transformer specially designed to match low impedance balanced or unbalanced microphones into unbalanced high impedance inputs.

Turns ratio:	7:1
Input impedance:	300-0-300 Ω (600 Ω)
Output impedance:	20k Ω
Frequency response:	50Hz to 18kHz (-1dB)

The transformer is suitable for direct pcb mounting. Overall dimensions: 30 x 30 x 30mm high including 5mm long pcb mounting pins.

Order Code	Type	Price each
FD23A	Mic Xfmr 600:20	£6.99

600-600 Ω Line Isolating Transformer

A 1:1 ratio isolating transformer for use on 600 Ω systems. Low insertion loss and good linearity over a wide signal level range coupled with a high proof voltage make this transformer ideally suited for such applications as telephony, general data transfer, audio and holding coil circuits.

Please Note, this product is not approved for connection to the public switched telephone network.



Order Code	Type	Price each
BK57M	600 Ohm Isotran	£7.49

100V Line-Matching Transformers

A range of line-matching transformers for multiple loudspeaker and Public Address systems. The range offers a choice of power outputs from 1/4W to 30W. Universal types can drive 4, 8 or 16 Ω loads, all others are matched to 8 Ω only. The function of these transformers is to match the 100V line output of PA (Public Address) amplifiers to all loudspeakers in the system. They MUST NOT be connected to amplifiers or systems other than those designed for 100V line operation. Operating in the medium frequency range, the transformers are designed for typical commercial PA speech and music applications. The outputs quoted do not include input losses.

Universal Types 15/30W

Input: standard 100V line. Output power: 1, 2, 5 or 15/30W, selected by connecting the 100V line to the appropriate primary taps. Impedance matching: 4, 8 or 16 Ω , selected by connecting the loudspeaker to the appropriate secondary taps.



WARNING: DO NOT adjust the primary taps of these transformers without first disconnecting the 100V line input or switching off the equipment. High voltages can be found on the adjacent primary tags of this type where only 100V would be expected. Mounting is by 2-hole clamps.

Code	Maximum Power	Dimensions W x D x H	Fixing Centres
DH47B	15W	69 x 57 x 57mm	80mm
YJ60Q	30W	78 x 63 x 65mm	92mm

Order Code	Type	Price each
DH47B	15W 100V Line Tx	£9.49
YJ60Q	A2 30W 100V Line Tx	£11.49

Tapped Output Types

Line transformers with fixed 100V line inputs and outputs for 8 Ω loudspeakers only. Adjustable output taps provide a range of 4 power levels from each type; two different power ranges are available. Mounting is by 2-hole clamps.



Code	Output Taps, Watts	Dimensions W x D x H	Fixing Centres
DH49D	1/4, 1/2, 1, 2W	45 x 40 x 37mm	54mm
DH48C	1, 2, 4, 10W	59 x 50 x 49mm	70mm

Order Code	Type	Price each
DH49D	2W 100V Line Tx	£6.49
DH48C	10W 100V Line Tx	£8.65

Low Power Step-up Transformer

This transformer may find applications where a low power step-up transformer is required. Transformer is wound on a LA4343 pot core.



Specifications

Primary:	10 turns, 24 swg
Secondary:	600 turns, 40 swg
Turns ratio:	1:60

Order Code	Type	Price each
JL94C	Ioniser Transformer	£10.99

Valve Transformer

A transformer with HT and heater secondaries for powering valve circuits. The HT secondary is 0-240V @ 100mA, and the AC heater secondary is the standard 6.3V up to 1.5A max. Dimensions 78x65x65mm. 34VA.



Order Code	Type	Price each
XP27E	B2 Tr 240/0.1 & 6.3/1.5	£11.99

High Power Valve Mains Transformer

NEW

A mains transformer for high power valve circuits such as audio power amplifiers with a single primary winding, and separate single-ended HT and centre-tapped heater secondaries. It was developed for use in our 'Millennium 4-20' valve amplifier project. The transformer is intended for mounting on top of a chassis where one side of the former, carrying all primary and secondary connections, pass through a rectangular cutout, and the top side of the former is shielded by a steel top cover. The core therefore seats flat on the chassis and 4 x M5 mounting hardware is included. Due to the heavy gauge of wire used, the heater secondaries are not terminated at solder tags.

Specification

Input voltage:	240V AC @ 50Hz
HT secondary output voltage:	350V AC max.*
HT secondary output current:	250mA max.*
HT secondary winding impedance:	300 Ω approx.
Heater secondary voltage:	6.3V AC centre-tapped (3.15-0-3.15V)
Heater secondary current:	7A max.
Power consumption, $I_{HT} = 125mA, I_h = 3.5A$:	70W ($V_{HT} = 313V$ AC (350-300 Ω x 125mA))
$I_{HT} = 250mA, I_h = 7A$:	140W ($V_{HT} = 275V$ AC (350-300 Ω x 250mA))

Switch-on input surge current, HT into 68 μ F and fully loaded heater:	>800mA
Nominal continuous primary input current at full load:	>600mA
Overall dimensions:	96 x 80 x 85mm
Fixing centres:	79.3 x 63.5mm
Former cutout:	68 x 62mm min.

* Due to the internal winding impedance, max. voltage and current are not available simultaneously.

Order Code	Type	Price each
DM54J	C5 Valve Amp Mains Trans	£29.99

WIRE GAUGE CONVERSION CHART

SWG to Imperial & Metric		Wire Gauge	AWG to Imperial & Metric	
inch	mm		inch	mm
0.001	0.0254	50	0.00099	0.0251
0.0012	0.0305	49	0.00111	0.0282
0.0016	0.0406	48	0.00124	0.0315
0.002	0.0508	47	0.0014	0.0356
0.0024	0.0610	46	0.00157	0.0399
0.0028	0.0711	45	0.00176	0.0447
0.0032	0.0813	44	0.00198	0.0503
0.0036	0.0914	43	0.00222	0.0564
0.004	0.1016	42	0.00249	0.0632
0.0044	0.1118	41	0.0028	0.0711
0.0048	0.1219	40	0.00314	0.0798
0.0052	0.1321	39	0.00353	0.0897
0.006	0.1524	38	0.00397	0.1008
0.0068	0.1727	37	0.00445	0.1130
0.0076	0.1930	36	0.005	0.1270
0.0084	0.2134	35	0.0056	0.1422
0.0092	0.2337	34	0.0063	0.1600
0.01	0.2540	33	0.0071	0.1803
0.0108	0.2743	32	0.008	0.2032
0.0116	0.2947	31	0.0089	0.2261
0.0124	0.3150	30	0.01	0.2540
0.0136	0.3455	29	0.0113	0.2870
0.0148	0.3759	28	0.0126	0.3201
0.0164	0.4166	27	0.0142	0.3607
0.018	0.4572	26	0.0159	0.4039
0.02	0.5080	25	0.0179	0.4547
0.022	0.5588	24	0.0201	0.5106
0.024	0.6096	23	0.0226	0.5741
0.028	0.7112	22	0.0253	0.6426
0.032	0.8128	21	0.0285	0.7239
0.036	0.9144	20	0.032	0.8128
0.04	1.0160	19	0.0359	0.9119
0.048	1.2192	18	0.0403	1.0237
0.056	1.4225	17	0.0453	1.1507
0.064	1.6257	16	0.0508	1.2904
0.0709	1.8009	15	0.0571	1.4504
0.0787	1.9991	14	0.0641	1.6282
0.092	2.3369	13	0.072	1.8289
0.104	2.6417	12	0.0808	2.0524
0.116	2.9465	11	0.0907	2.3039
0.128	3.2513	10	0.1019	2.5884
0.144	3.6577	9	0.1144	2.9059
0.16	4.0642	8	0.1285	3.2640
0.176	4.4706	7	0.1443	3.6654
0.192	4.8770	6	0.162	4.1150
0.212	5.3850	5	0.181	4.5976
0.232	5.8930	4	0.204	5.1818
0.2598	6.5992	3	0.229	5.8168
0.2812	7.1428	2	0.257	6.5281
0.3	7.6203	1	0.289	7.3409
0.3189	8.1004	1/0	0.324	8.2299
0.348	8.8395	2/0	0.364	9.2460
0.372	9.4492	3/0	0.409	10.3890
0.4	10.1604	4/0	0.46	11.6845

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24-PIECE RATCHET SCREWDRIVER SET

A high quality ratchet screwdriver socket and bit set in chrome vanadium. The screwdriver ratchet is controlled by a small spring loaded knob that is rotated to select forward or reverse. This versatile screwdriver is fitted with a latched pivoting mechanism that allows the handle to be bent at any angle, up to a right angle from the straight line, to increase the leverage. The handle is of tough plastic and provided with a pliable, comfortable grip. The screwdriver is designed to accept the 1/4 in. hex bits and an adaptor is supplied to accept the 1/4 in. square sockets.



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GW44X
[A2]

1/4 in. hex bits:

3, 4, 5 and 6mm flat blade.
No's. 1, 2 and 3 Posidriv blade.
No's. 1, 2 and 3 Phillips blade.

1/4 in. sockets:

5, 6, 7, 8, 9 and 10mm
1/4, 5/16, 11/32, 3/8, 7/16 and 1/2 in. AF.

Valve Output Transformer

A push-pull output transformer suitable for class A/B and B valve output stages at powers up to 20W rms. Screen grid taps are provided for distributed-load ('ultra-linear') designs, but need not be used. It was developed for use in our 'Millennium 4-20' valve amplifier project.

The transformer is intended for mounting on top of a chassis where one side of the former, carrying all primary and secondary connections, pass through a rectangular cutout, and the top side of the former is shielded by a steel top cover. The core therefore seats flat on the chassis and 4 x M5 mounting hardware is included.

NEW!

Specification

Primary anode-to-anode impedance (Ra/a):	6.6kΩ
Screen grid taps:	43% from CT
Winding distribution:	Five sections of interleaved primary and secondary windings
Usable frequency range:	25Hz to 75kHz ±3dB @ 20W rms, <10Hz to >90kHz ±1dB @ 1W rms
Low frequency cut-off:	25Hz @ 20W throughput
Natural resonance frequency of primary winding:	80kHz approx.
Max. Power throughput:	20W rms (30W rms absolute max.)
Speaker load matching:	8Ω only
Output impedance:	0.2Ω approx.
Damping factor:	50 approx.
Overall dimensions:	85 x 71 x 84mm
Fixing centres:	71.5 x 57mm
Former cutout:	60 x 56mm min.

Note that this transformer must only be used in push-pull modes with HT supply connected to CT, and never in single-ended mode.

Order Code	Type	Price each
DM53H C5	20W O/P Transformer	£25.99

IT'S A FACT!

REACTANCE

The reactance of an inductor is given by the formula:

$X_L = 2\pi fL$ ohms, where f = frequency in Hertz and L = inductance in Henries.

The total resistance of an inductance and a capacitor in series is $X_L - X_C$, where X_C is given by:

$X_C = 1/(2\pi fC)$ ohms, where C = capacitance in Farads.

The resonant frequency of a tuned circuit is given by:

$f = 1/(2\pi \sqrt{LC})$



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TOROIDAL MAINS TRANSFORMERS

A range of high quality, toroidal mains transformers whose main features include a low magnetic field, small size and weight, low noise and excellent regulation. A mounting kit is supplied with each, allowing easy mounting to a chassis by placing one neoprene washer below, and the other above the transformer, and bolting the dished washer down on top. DO NOT over-tighten, also ensure that both ends of the bolt do not make contact with the chassis (e.g., top of bolt touches lid of case). Because the bolt is aligned in the same direction as the primary and secondary turns, this will effectively create a short-circuit winding. Either shorten the bolt if too long, or provide some insulation, such as plastic, so the bolt does not make contact.



Note that an antisurge fuse should always be used as the mains fuse for toroidal transformers, as they exhibit a very high initial surge current at switch on.

All types have a single 240V primary and two separate identical secondaries, except YZ23A, YK33L and XJ65V. All connections are approximately 20cm long sleeved leads, and primaries are always colour coded as orange.

The types available are shown in the following list. Dimensions include mounting kit. The start/finish colour codes of the secondary windings are also shown. All types are approved to EN60742/BS3535, VDE0551 and ISO9003.

Note that both DH53H and DH54J are 240V mains isolation transformers.

Code	Rating	Regulation, Approx.	Secondaries, Start/Finish	Output Current	Size (mm) Dia. x Ht
15VA					
DH55K	15VA	19%	(1) 0-9V Red/Yellow (2) 0-9V Blue/Grey	830mA	62 x 37
DH56L	15VA	19%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	630mA	62 x 37
DH57M	15VA	19%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	500mA	62 x 37
DH58N	15VA	19%	(1) 0-18V Red/Yellow (2) 0-18V Blue/Grey	420mA	62 x 37
30VA					
YK08J	30VA	15%	(1) 0-6V Red/Yellow (2) 0-6V Blue/Grey	2.5A	70 x 37
YK09K	30VA	15%	(1) 0-9V Red/Yellow (2) 0-9V Blue/Grey	1.66A	70 x 37
YK10L	30VA	15%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	1.25A	70 x 37
YK11M	30VA	15%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	1A	70 x 37
YK12N	30VA	15%	(1) 0-18V Red/Yellow (2) 0-18V Blue/Grey	830mA	70 x 37
50VA					
YK14Q	50VA	13%	(1) 0-9V Red/Yellow (2) 0-9V Blue/Grey	2.78A	80 x 43
YK15R	50VA	13%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	2.08A	80 x 43
YK16S	50VA	13%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	1.67A	80 x 43
DH59P	50VA	13%	(1) 0-18V Red/Yellow (2) 0-18V Blue/Grey	1.38A	80 x 43
DH60Q	50VA	12%	(1) 0-25V Red/Yellow (2) 0-25V Blue/Grey	1A	80 x 43
80VA					
DH61R	80VA	10%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	3.33A	95 x 43
YK17T	80VA	10%	(1) 0-18V Red/Yellow (2) 0-18V Blue/Grey	2.22A	95 x 43
YK18U	80VA	10%	(1) 0-22V Red/Yellow (2) 0-22V Blue/Grey	1.82A	95 x 43
YK19V	80VA	10%	(1) 0-30V Red/Yellow (2) 0-30V Blue/Grey	1.33A	95 x 43
120VA					
DH62S	120VA	10%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	5A	90 x 56
DH63T	120VA	10%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	4A	90 x 56
DH64U	120VA	10%	(1) 0-18V Red/Yellow (2) 0-18V Blue/Grey	3.33A	90 x 56
DH65V	120VA	10%	(1) 0-22V Red/Yellow (2) 0-22V Blue/Grey	2.72A	90 x 56
YK86T	120VA	10%	(1) 0-24V Red/Yellow (2) 0-24V Blue/Grey	2.5A	90 x 56
DH66W	120VA	10%	(1) 0-25V Red/Yellow (2) 0-25V Blue/Grey	2.4A	90 x 56
YK20W	120VA	10%	(1) 0-30V Red/Yellow (2) 0-30V Blue/Grey	2A	90 x 56
YK33L	120VA	10%	(1) 0-24V Red/Yellow (2) 0-24V Blue/Grey (3) 0-100V Black/White	2.5A	90 x 56
156VA					
YZ23A	156VA	8%	(1) 12-0-12V Blue/Grey/Blue (2) 39-0-39V Red/Yellow/Red	166mA	110 x 50
160VA					
DH67X	160VA	7%	(1) 0-9V Red/Yellow (2) 0-9V Blue/Grey	8.89A	110 x 50
DH68Y	160VA	7%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	6.66A	110 x 50
YK21X	160VA	7%	(1) 0-35V Red/Yellow (2) 0-35V Blue/Grey	2.28A	110 x 50
225VA					
DH69A	225VA	6%	(1) 0-12V Red/Yellow (2) 0-12V Blue/Grey	9.38A	110 x 55
DH70M	225VA	6%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	7.5A	110 x 55
DH71N	225VA	6%	(1) 0-22V Red/Yellow (2) 0-22V Blue/Grey	5.11A	110 x 55
DH72P	225VA	6%	(1) 0-30V Red/Yellow (2) 0-30V Blue/Grey	3.75A	110 x 55
300VA					
DH73Q	300VA	6%	(1) 0-15V Red/Yellow (2) 0-15V Blue/Grey	10A	120 x 65
DH74R	300VA	6%	(1) 0-22V Red/Yellow (2) 0-22V Blue/Grey	6.82A	120 x 65
DH75S	300VA	6%	(1) 0-30V Red/Yellow (2) 0-30V Blue/Grey	5A	120 x 65
YK22Y	300VA	6%	(1) 0-35V Red/Yellow (2) 0-35V Blue/Grey	4.28A	120 x 65
YM45Y	300VA	6%	(1) 0-45V Red/Yellow (2) 0-45V Blue/Grey	3.33A	120 x 65
YM49D	625VA	4%	(1) 0-55V Red/Yellow (2) 0-55V Blue/Grey	5.68A	140 x 75
500VA					
DH76H	500VA	4%	(1) 0-25V Red/Yellow (2) 0-25V Blue/Grey	10A	135 x 65
YK23A	500VA	4%	(1) 0-35V Red/Yellow (2) 0-35V Blue/Grey	7.14A	135 x 65
YM46A	500VA	4%	(1) 0-45V Red/Yellow (2) 0-45V Blue/Grey	5.55A	135 x 65
YM47B	500VA	4%	(1) 0-55V Red/Yellow	4.44A	135 x 65

Continued on next page.

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			(2) 0-55V Blue/Grey	4.44A	
625VA					
YM48C	625VA	4%	(1) 0-45V Red/Yellow	6.94A	140 x 75
			(2) 0-45V Blue/Grey	6.94A	
YM49D	625VA	4%	(1) 0-55V Red/Yellow	5.68A	140 x 70
			(2) 0-55V Blue/Grey	5.68A	
1016VA					
XJ65V	1016VA	3%	(1) 0-70V Red/Yellow	7.2A	160 x 82
			(2) 0-70V Blue/Grey	7.2A	
			(3) 0-12V Black/White	640mA	

Mains Isolation Transformers

DH53H	120VA	10%	(1) 0-240V Red/Red	500mA	95 x 50
DH54J	240VA	7%	(1) 0-240V Red/Red	1A	110 x 60

Order Code	Type	Price each
DH55K	15VA 9V Toroidal	£11.99
DH56L	15VA 12V Toroidal	£11.99
DH57M	15VA 15V Toroidal	£11.99
DH58N	15VA 18V Toroidal	£11.99
YK08J	30VA 6V Toroidal	£13.49
YK09K	30VA 9V Toroidal	£13.49
YK10L	30VA 12V Toroidal	£13.49
YK11M	30VA 15V Toroidal	£13.49
YK12N	30VA 18V Toroidal	£13.49
YK14Q	A2 50VA 9V Toroidal	£13.99
YK15R	A2 50VA 12V Toroidal	£13.99
YK16S	A2 50VA 15V Toroidal	£13.99
DH59P	B2 50VA 18V Toroidal	£13.99
DH60Q	B2 50VA 25V Toroidal	£13.99
DH61R	C3 80VA 12V Toroidal	£14.99
YK17T	A2 80VA 18V Toroidal	£14.99
YK18U	A2 80VA 22V Toroidal	£14.99
YK19V	A2 80VA 30V Toroidal	£14.99
DH62S	A3 120VA 12V Toroidal	£16.99
DH63T	A3 120VA 15V Toroidal	£16.99
DH64U	A3 120VA 18V Toroidal	£16.99
DH65V	A3 120VA 22V Toroidal	£16.99
YK86T	A3 120VA 24V Toroidal	£16.99
DH66W	A3 120VA 25V Toroidal	£16.99
YK20W	A3 120VA 30V Toroidal	£16.99
YK33L	A3 120VA 100V Toroidal	£20.99
YZ23A	C4 156VA 39V Toroidal	£24.99
DH67X	C4 160VA 9V Toroidal	£21.99
DH68Y	C4 160VA 12V Toroidal	£21.99
YK21X	C4 160VA 35V Toroidal	£21.99
DH69A	C4 225VA 12V Toroidal	£23.99
DH70M	C4 225VA 15V Toroidal	£23.99
DH71N	C4 225VA 22V Toroidal	£23.99
DH72P	C4 225VA 30V Toroidal	£23.99
DH73Q	C5 300VA 15V Toroidal	£25.99
DH74R	C5 300VA 22V Toroidal	£25.99
DH75S	C5 300VA 30V Toroidal	£25.99
YK22Y	C5 300VA 35V Toroidal	£25.99
YM45Y	C5 300VA 45V Toroidal	£25.99
DH76H	E9 500VA 25V Toroidal	£34.99
YK23A	E9 500VA 35V Toroidal	£34.99
YM46A	E9 500VA 45V Toroidal	£34.99
YM47B	E9 500VA 55V Toroidal	£34.99
YM48C	E11 625VA 45V Toroidal	£37.99
YM49D	E11 625VA 55V Toroidal	£37.99
XJ65V	H17 1016VA 240V Toroidal	£74.99
DH53H	A3 120VA 240V Toroidal	£16.99
DH54J	C4 240VA 240V Toroidal	£23.49

TRANSFORMER KITS



At last you can wind your own mains transformers to your specification. Some power supply requirements might include an unusual secondary winding, which can be easily catered for by building a transformer kit, thereby obviating the tedious process of searching through the catalogues and adverts for a transformer to meet your needs, and having to settle for one having a higher specification or additional secondary taps which are expensive and which you don't really want. As an example, a digital frequency counter using a fluorescent multi-digit display will require +5V for its logic circuits, and then a 3 volts AC heater feed for the display. Or you may want a +5V, +12V and -5V supply for your home made microprocessor system, plus an additional 25V tap for programming EPROMS. The only other recourse would be to use two separate transformers, which use up space and money.

NOTE: Under no circumstances should you attempt to modify or rewind the mains primary winding if the transformer is to remain safe to use. The primary windings have been properly assembled and tested during manufacture and should not be interfered with.

Output Current Calculation Table

Wire Gauge	Wire Dia. s.w.g	Max Current	Max number of turns for -		
	mm.	Out	20VA	50VA	100VA
36	0.2	100mA	1664	2394	3300
34	0.224	150mA	1363	1938	2652
32	0.25	200mA	1092	1581	2135
30	0.315	300mA	714	1025	1421
26	0.4	500mA	459	660	897
24	0.56	1A	228	336	476
22	0.71	1.5A	150	209	286
21	0.8	2A	104	160	240
20	1.0	3A	77	104	144
18	1.25	5A	40	60	96
16	1.5	7.5A	28	40	60

Note that the total number of turns that can be accommodated on the former are reduced in proportion to increasing wire sizes and therefore to increasing wire current. Thus, you will not be able to achieve a high current high voltage output from a transformer kit that is too small.

NEVER attempt to use tinned copper wire in place of enamelled copper wire, regardless of how small the winding.

240 volt isolation transformers can easily be made (provided the factory wound primary windings are not used as the secondary), as follows:-

For 20VA 1,450 turns of 34 s.w.g. enamelled copper wire (80mA out).

For 50VA 1,150 turns of 31 s.w.g. enamelled copper wire (200mA out).

For 100VA 1,000 turns of 28 s.w.g. enamelled copper wire (400mA out).

20VA Transformer Kit

This 20VA transformer kit comprises a double section bobbin ready wound with a 120-240V mains primary winding, electrical steel core 'E' and 'I' laminations, end mounting 'frames' and clamping bolts. The number of secondary turns required can be found by multiplying the required secondary output in volts by 6.04 turns per volt, +1% for each multiple of 10VA loading. The maximum current output depends on the wire cross section of the secondary winding (see table left). The total power output of all secondaries must not exceed 20VA. Enamelled copper wire for winding the secondaries is not supplied with the kit.

Dimensions: Width 69mm x Depth 55mm x Height 58mm.

Weight: 660 gms.

Order Code	Type	Price each
YJ61R	A1 Transformer Kit 20VA	£7.99

50VA Transformer Kit

A transformer kit having a ready wound 120-240V mains primary winding, 'E' and 'I' laminations and end frames. Secondary windings can be wound for a total output not exceeding 50VA. The number of secondary turns required can be found by multiplying the voltage output required by 4.8, +1% for each multiple of 10VA loading.

To find wire gauge for current output required see table above. Wire for winding the secondaries is not supplied in the kit.

Dimensions: Width 79mm x Depth 62mm x Height 65mm.

Weight: 950 gms.

Order Code	Type	Price each
YJ62S	A2 Transformer Kit 50VA	£9.99

100VA Transformer Kit

A transformer kit having a ready wound 120-240V mains primary winding, 'E' and 'I' laminations, end frames and clamping bolts. Secondary windings can be wound using enamelled copper wire for a total power output not exceeding 100VA. To find the number of secondary turns required multiply output voltage required by 4.16 turns per volt, +1% for each multiple of 10VA loading. To find wire gauge for the output current required see table left. Wire for winding the secondaries is not supplied in the kit.

Dimensions: Width 89mm x Depth 68mm x Height 75mm.

Weight: 1400g.

Order Code	Type	Price each
YJ63T	A3 Transformr Kit 100VA	£13.49

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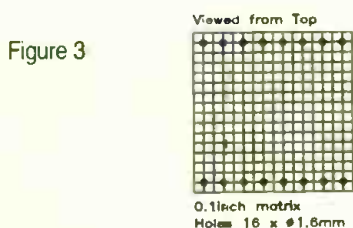
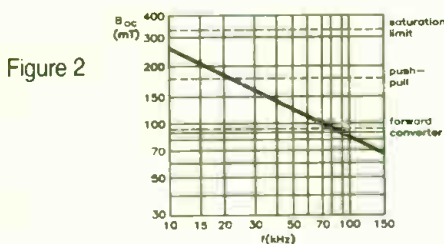
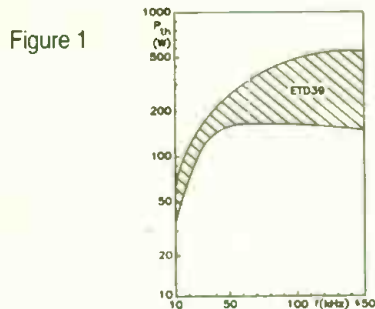
ETD39 Ferroxcube Transformer Core



A high performance ferroxcube core with performance optimised for switched mode power supply use. The 3C8 ferroxcube core is suitable for use at frequencies ranging from 20kHz to 150kHz. Maximum power throughout depends on operational frequency and construction of windings. Figure 1 shows power throughout versus operating frequency. Figure 2 shows the maximum working flux versus frequency. Figure 3 shows PCB mounting information. Former is manufactured from polyteraphthalate and designed for PCB mounting. Assembly of the core and former is very easy due to the use of sprung stainless steel clips. Dimensions of assembled transformer (overall including pins): 44.5 x 47.5 x 41.25mm. Core halves, former and assembly clips are available separately. Note: to make one transformer two core halves, one former and two clips are required.

Core Specifications (pair)

Absolute maximum power throughput at 150kHz:	500W
Absolute maximum power throughput at 25kHz:	150W
Effective total loss at 25kHz:	<2.2W
Ambient operating temperature:	60°C
Maximum operating temperature:	100°C
Length of the mean turn:	69mm
Effective magnetic path length:	92.2mm
Effective Area of magnetic path:	125mm ²
Effective magnetic volume:	11500mm ³
Minimum centre pole area:	117mm ²
Nominal Specific Inductance:	2700nH
Saturation limit at 100°C:	320mT
Maximum working flux:	see Figure 2



Former Specification

Material:	Glass fibre filled polyteraphthalate
Terminations:	16 copper nickel alloy pins
Minimum window area:	177mm ²

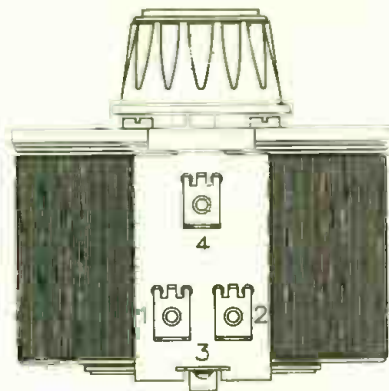
Length of mean turn: 69mm
 Flammability: UL94-V0
 Solderability: 400°C for 4 seconds

Order Code	Type	Price each
JR81C	HFXfmr 3C8 Core	£1.35
JR82D	HFXfmr Former	£1.55
JR83E	HFXfmr Clip	29p

Variable Transformers



A range of three robust, open style variable auto-transformers which enable a 250V AC 50Hz voltage supply to be varied between 0 and 270V AC. These units are ideal for testing over- and under-voltage operation of mains equipment, as the range 240V ±10% can be covered. Three units are available, each with a different rating, to provide a cost-effective and versatile range. They can be used for reducing AC voltages for testing continental equipment, and as lighting controllers, for stage use. All feature smooth operation with single layer non-saturating windings and a toroidal iron core. The 0.75A version features 0 to 100% and 0 to 110% ranges that can be hard-wired depending on which is required. All units are specifically designed for panel mounting. Please note that these units have exposed live parts and must therefore be used in a suitable enclosure, and are only suitable for connection to a 250V AC 50Hz supply.



0.75A Version

	Terminal	Connection
0 to 240V AC operation:	1:	Input & output negative
	2:	Input positive 240V AC
	3:	Output positive 0 to 240V AC
0 to 270V AC operation:	1:	Input & output negative
	4:	Input positive 240V AC
	3:	Output positive 0 to 270V AC

Dimensions: 90 x 84 x 97mm (H x Dia x L)
 Two 4mm holes on 28mm PCD,
 3mm hole for shaft

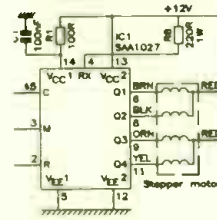
2A and 8A Versions

Rated input voltage:	250V AC 50Hz
Rated output voltage:	0 to 270V AC
Ratings:	2A and 8A continuous
Dimensions	
2A unit:	120 x 107 x 128mm 92 x 92mm / 4-hole fixing centres
8A unit:	185 x 145 x 155mm 146 x 146mm / 4-hole fixing centres

Order Code	Type	Price each
GL42V	CS 0.75A Variac	£29.99
DM96E	B4 2A Variac	£39.99
DM97F	G3 8A Variac	£79.99

MOTORS

Stepper Motor



A 12V 4-phase, unipolar stepping motor suitable for small robots and all kinds of applications requiring medium torque at low current drains. A suitable driver is the SAA1027 and a kit is available which contains the motor, the IC and the passive components required, together with a pcb.

Specifications:

Step angle:	7.5°
Current per phase:	130mA
Resistance per phase:	94Ω
Inductance per phase:	43mH
Dynamic torque, @ 10pps:	80gm/cm (8mNm)
Response frequency:	300pps
Rotor inertia:	4gm/cm ²
Weight:	57gm
Dimensions:	35 dia. x 25mm deep.
Drive Shaft:	3mm dia x 11mm long
Max width across mounting tabs:	50mm.
Fixing centres:	42mm x 6BA/M3.

The motor is provided with six colour coded wires 230mm long.

Order Code	Type	Price each
FT73Q	Stepper Motor Size 1	£16.99

Stepper Motor Kit

A kit comprising the Stepper Motor FT73Q, SAA1027 stepper motor driver IC (see Semiconductors) and all passive components required to make a working module, together with a pcb. The pcb is also available separately. Full construction details may be found in Best of Maplin Projects Book 5.

Order Code	Type	Price each
LK76H	Stppr Mtr + Dvr Kit	£22.99
GD14Q	Stepper Motor PCB	£1.39

Small Motor

A small 20mm diameter motor with a 2mm dia shaft. Overall length: 30mm excluding shaft. Shaft length: 7.5mm. The motor casing is flattened for easy mounting. Distance across flats 15mm.

Operating voltage:	1.5 to 3V
No load speed:	8700rpm
No load current:	320mA
Speed at max efficiency:	5800 rpm
Current at max efficiency:	760mA
Torque at max efficiency:	5.3gm cm
Output at max efficiency:	310mW
Efficiency:	32%
Stall torque:	16gm cm

Order Code	Type	Price each
YG13P	Small Motor	£1.69

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HOW TO ORDER IN THE UK

Use our order form whenever possible. The blank one returned with your previous order will have your customer number and your name and address already printed on it. Please keep a note of your customer number and always use it on any order or correspondence. Send all mail to Maplin Electronics, P.O. Box 3, Rayleigh, Essex SS6 8LR. Keep an accurate copy of your order so that you can check that we have sent you exactly what you have ordered. We will send an itemised invoice with your order which shows exactly where your money has been used.

Please do not write queries or anything other than your order on the order form unless the query is about something you are ordering this time. If you have any other enquiry, write it on a separate piece of paper with your name and address and customer number if known.

Please use the Order Code

Using our order codes helps us to deal with your order quickly and efficiently. Each item has its own code number which (except for resistors) is a five character code in the format: Two letters, two numbers then one letter. No further description is necessary, but if you wish, to assist you identify the codes, you can also write a brief description of the item, and to help you we have put this description in brackets after the five character code. Details of how to order resistors are given at the beginning of the Resistor Section.

Prices

All prices shown in this catalogue are valid until 28th February 1995, excluding the Computer and Semiconductor sections. After this date please write or phone for a free copy of our Price Change Leaflet (CA99H).

Prices shown in this catalogue include VAT at 17.5% where applicable and are for the quantity shown, i.e. each, per pack, per metre etc. Items marked NV are rated at 0% (at the time of going to press – see note below) and the price shown applies both to inland and export orders. Overseas customers please see 'How to Order if You Live Outside the UK' on page 827.

All prices are the same in our shops and by mail order. A £1.50 charge is levied on every mail order to go towards the cost of handling and packing. On large, fragile or heavy items a charge is made to contribute towards the cost of carriage, up to a maximum of £6.00 per order. For example, if an item is marked A next to its order code, then the carriage charge is £1.55.

The carriage charges are as follows:

A	£1.55	B	£2.20	C	£2.80	D	£3.30
E	£3.90	F	£4.45	G	£5.35	H	£6.00

Maximum charge per order for carriage is £6.00, in addition to the £1.50 handling charge. If there are numbers, or numbers and letters in the box, please ignore the numbers; they are for overseas customers only.

Note: VAT will be applied at whatever rate is legislated by the government at the time we receive your order.

Trade Prices

Bona fide trade customers should contact our sister company Maplin Professional Supplies, P.O. Box 777, Rayleigh, Essex SS6 8LU. Tel: 01702 554171.

Price Change List

The price change list for 1995, will be available from 1st March to 31st August. For a free copy of this list, write CA99H on your order. Copies are also available in our shops.

Despatch

All orders having a total weight of less than 1kg are despatched by first class letter post. Orders having a total weight over 1kg are despatched by 48-hour fast service. For faster delivery services, please see page 6.

Payment

Payment may be made by Cheque, Credit Card, Postal Order, Giro transfer or Transcash. Cheques and postal orders should be made payable to "Maplin Electronics plc". In your own interest cross all cheques or postal orders sent in the post with two straight lines across the centre. For details of the Credit Cards we accept and details of Transcash and Giro transfers, see Credit Cards below.

Do not send cash unless the envelope is registered at the Post Office. If you send cash in an ordinary envelope the Post Office may compulsorily register it and we regret that we cannot accept such letters.

Remember to enclose with your order the numbered credit note if you are claiming credit.

Please remember to add the £1.50 handling charge on every order. See 'Prices' for details or charges for heavy, large or delicate items.

Telephone Your Order

If you intend to pay for your order by credit card, you

can telephone your order to us. We shall require your credit card number, the expiry date of your credit card and the cardholder's address and full name. We shall normally be able to despatch on the same day all orders received by telephone before 5 p.m. subject to approval by the credit card company.

When you telephone be as brief as possible. Please give your order in the following manner: state the five digit order code only and then the quantity you require. If possible always quote your customer number.

Please ensure you know the order codes for the goods you wish to order before phoning. If you are having difficulty finding an order code please ask for Customer Services not Sales.

Please note that the moment you ring off, your order is accepted by the system and it is no longer possible for the sales staff to reconnect with it. It will have joined thousands of other orders passing through the system that day and it is simply impossible to manually find it again within a reasonable time. So please do not ring back to add to or delete items from that order as this is impossible for us to do.

The Maplin Sales Desk is available Monday to Friday from 9 a.m. to 5.15 p.m. For orders only (no enquiries please) ring 01702 554161. For enquiries or orders with enquiries ring 01702 552911. Please do not call our shops; they will not be able to help you with a mail order enquiry or order.

Methods of Payment for UK Customers

Payment may be made by Cheque, Postal Order, Cash in a Registered Envelope, Credit Card, Giro Transfer, Transcash or Credit Terms.

Credit/Direct Debit Cards

We are pleased to accept orders with payment by any of the following credit/direct debit cards: Access, American Express, Barclaycard, Connect, Eurocard, Mastercard, Visa and Switch (by mail order later in the year). NEVER send your card to us. Simply write the number and expiry date of your credit card on your order, sign it and send it to us. Do not include any money.

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If you're fed up with having to buy Postal Orders then you'll be pleased to hear about TRANSCASH – a service from the National Girobank. Simply ask for a form in your Post Office and write your order on it along with our TRANSCASH number. You then pay

the amount due to us to the cashier at the Post Office (plus a small fee to the Post Office) and that's it. No stamps to buy, no letters to post, no fiddly Postal Orders. We receive your order within four to five days and can despatch it immediately. Please do not include enquiries; orders only.



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Paying by Giro Transfer

You can transfer money from your Giro account directly into our Giro account by completing and sending to the National Giro Centre, in one of your National Giro postage paid envelopes, one of your own National Giro transfer/deposit forms. Write your order and your customer number (if you know it) on the back of the form. We receive your order in three to four days and can despatch it immediately. National Girobank looks after your money safely and simply.



Make a note of Maplin's National Girobank account number now. It's shown in the panel above. Please do not send Giro transfers to us as this will cause considerable delay. Use a crossed Girocheque if you wish to send money directly to us.

Special Note for Customers in the Channel Isles

Customers in the Channel Isles do not have to pay British VAT, and should mark their orders "Export", or if using our order form, tick the Export box. To calculate the value of your order, total all items except those marked *NV*, divide by 1.175, add the *NV* total, add the £1.50 handling charge, and any carriage charge if applicable.

How To Order From BFPO Addresses

If your BFPO address is in Northern Ireland you must use the ordinary inland prices, but if your BFPO address is elsewhere in the world you do not have to pay VAT and there are no additional postage charges unless you require air mail – see table, note 4 on page 828.

However if any item is too large or heavy for despatch by BFPO you must supply a civilian address and pay extra for carriage at cost.

Channel Isles and BFPO Customers

Should the rules pertaining to VAT change due to government legislation, VAT will be charged at whatever rate is in force at the date we receive your order.

Credit

When we are out of stock of an item that you have ordered we may issue a numbered credit note. If you do not want to buy anything further from us, simply put the credit note with your name and address and your request for a refund in the reply paid envelope and we will send a cheque refund by return of post. We regret that we cannot refund by Postal Order and we can only refund cash if you provide a Post Office registered envelope prepaid with the correct stamp. If you do not have a bank account, you can pay cheques made out to you into P.O. savings accounts or anyone who has a bank account will be able to cash the cheque for you.

If any item on your invoice is marked 'to follow' then we will automatically send it to you as soon as it comes into stock. As before, however, if you wish to cancel then you can do so at any time until we despatch the goods and we will refund your money as described above.

Business Reply Envelopes

Our prepaid envelopes are provided for your convenience when ordering. If you are returning small faulty goods or goods sent in error, please do not send them in the envelope, but pack them carefully in a padded bag and attach the envelope to the outside. (We have heard, from several customers, that Post Offices have refused to accept packets under 750 grammes paid with the Business Reply Envelope. If you encounter this problem, let us have the address of the Post Office at once and we will inform their local Operations Branch so that matters can be corrected immediately.)

If a box is used or the total weight of the packet is over 750 grammes, please pay for 2nd class parcel post and we will refund the charge, or ask us for a special pre-paid label, to be sent to you, for you to use on the package. Please do not return goods by carrier. Authorisation must be given by our Returns Manager before goods can be returned by any method other than by the Royal Mail.

Returns

You may return damaged goods or goods sent in error, but please do not return goods otherwise, without advising us first in writing and waiting for our consent. Damaged goods or goods sent in error will be replaced as soon as we receive them, provided that they have been carefully packed (see Business Reply Envelopes above) and provided that we have stock. If you have to pay for postage then we will refund it.

We do not operate an "on approval" system, therefore if goods purchased by you from mail-order or one of our stores, are not damaged and were not supplied in error, and you return them to us, we will make a charge to cover our administration costs. The charge is normally 10% of the value of the goods, subject to a minimum charge of £1. Please do not return goods under £1 as we will not refund. Providing the condition of the goods, when we receive them, is as new, we will normally refund the remainder.

VAT

All our prices include VAT and zero rated items are marked *NV* in our price lists to help our overseas customers. See note under 'Prices' on page 824.

TERMS OF BUSINESS

Every order placed is subject to the following terms and conditions.

Method of Payment

Payment is by cash with order, credit card, Transcash, Giro transfer or 30 days net account to approved trade customers only. Cheques, Post Office Giro Cheques, Postal Orders and Money Orders should be crossed and made payable to "Maplin Electronics plc". Do not send banknotes in the reply paid envelope.

Carriage & Packing

There is a £1.50 handling charge on all mail orders. On all items marked with a letter next to the order code, e.g. **A**, there is a charge to contribute towards the cost of carriage. The charge levied is in accordance with the following table.

A £1.55	B £2.20	C £2.80	D £3.30
E £3.90	F £4.45	G £5.35	H £6.00

The maximum charge per order for carriage is £6.00, in addition to the £1.50 handling charge.

Guarantee

Maplin Electronics plc guarantees that all goods described in this catalogue are brand new and meet the manufacturer's published specifications. Goods returned to us faulty will normally be replaced at the discretion of Maplin Electronics plc provided that the goods have not been misused or damaged in any way. Maplin Electronics plc shall not be liable in respect of defects in goods supplied for any injury, loss or damage resulting from such defects. At our discretion goods returned to us faulty (especially integrated circuits) may be referred to the manufacturer for their decision. Integrated circuits are not guaranteed if they have been soldered (excluding quad-in-line types and types where we recommend direct soldering). If you wish to take advantage of the guarantee you must use sockets.

This statement does not affect your statutory rights.

Guarantee for Kits

All the components in our kits carry the guarantee that they meet the manufacturer's specifications. We guarantee that the kits, correctly built, using components supplied by us, will work to the specifications published in our advertising and construction details. The guarantee does not cover damage caused during construction or errors in construction. We have no control over the constructor's ability and recommend that if after studying the construction details you feel that the project is more complicated than you expected, please contact our sales department who will arrange for you to return the kit for a refund subject to our 10% handling charge. This offer only applies to kits where construction has not started.

This statement does not affect your statutory rights.

Returns

Except for faulty goods or goods sent in error, none may be returned without our prior consent in writing.

Lien

We shall have a general lien in respect of all sums due from you upon all goods to be supplied to you or upon which work has been done on your behalf and upon twenty-eight days, written notice to you, may sell such goods and apply the proceeds towards the satisfaction of the sums due to us.

Despatch

Orders will normally be dealt with on the day of receipt. Items out of stock will normally be considered cancelled and a credit note issued to the full value (but see "Credit" on this page). Credit notes are redeemable on demand and repaid by cheque.

Specifications & Illustrations

Specifications and illustrations in this catalogue are given in good faith, but they should be regarded as for guidance only as goods are subject to alteration without notice in order to maintain delivery or price levels.

Prices

The price charged will be that ruling on the day your order is entered on our computer. In general prices are reviewed every six months, at which time some may change. In between review dates prices are as shown in this catalogue, or on the current Price List after 1st March 1995.

CASHTEL ON 01702 552941

How To Use Cashtel

Once you have the appropriate hardware and software, simply dial 01702 552941 and listen for the tone. When you hear it, switch the modem to "online" and replace the telephone handset. Our modem sorts out which speed you are sending at automatically.

1. Your TV screen will now display the welcome message.
2. Enter your customer number and the FIRST line as displayed on your last address label. This must match exactly the details on file. A command menu is then displayed.
3. Option 1 enables you to place orders. You will be asked for the stock number and quantity of the item you require, then the description, unit price and total price will be displayed. You are then asked for the next stock code and so on until you type 'END', as shown in Screen C. Your whole order is then displayed line by line and you choose to order or not by typing 'Y' or 'N' (Yes or No). You are also told at this time if any item is unavailable and if you still leave the order for the item outstanding, then it will be sent on to you by the computer as soon as it becomes available.

When all items on order have been displayed, and you do not want to add to this the screen displays the total value of all the items ordered. Only if you key 'Y' (Yes) to the whole order will the order actually be sent. You now enter your Access, Visa or American Express card number (or account number for trade customers only) and the order is printed out by the computer ready to be collected and despatched.

4. Option 2 allows you to check the price and availability of any item.
5. Option 3 allows you to search for any consecutive group of letters through a list of stock descriptions.
6. Option 4 allows you to check your previous orders (whether placed by mail, phone or Cashtel).
7. The other options are for regular users, who will find them clearly explained as they use them.
8. If you enter option 9, the call is terminated – you may leave a message with any suggestions or explaining any problem you have had.
The system then disconnects and awaits the next call.

The full system is available continuously, 24 hours a day except when the main computer is closed for essential maintenance. During shutdowns you will receive a message explaining why the system is closed and our estimate of when it will be open again.

Repairs and Get-You-Working Service

We will undertake to repair or get working any of the complete projects published in our constructional articles, Heathkits, and Velleman Kits, providing that they are built on our ready-etched printed circuit boards, and use a majority of components that we have supplied. Items marked "Datafile Project", Circuit Maker ideas and Mini Circuits in this catalogue and in our magazine are excluded because they are essentially technical information articles for 'building block' type circuit and IC applications, and their correct functioning depends on the surrounding circuitry over which we have no control and probably cannot easily reproduce. Therefore we cannot offer the service on such projects. Also we cannot offer the repairs and get-you-working service for magazine projects, other than those in our own publications, even if we are mentioned as suppliers of the parts or supply a pcb for

the project. Please return the whole completed project, not just the faulty board (if it is a large project), as faults on one board are often caused by problems on another board in the project. Enclose a cheque or P.O. based on the retail price of the kit as shown in the table (subject to minimum cost of £17). If the boards arrive damaged by the Post Office, they will be returned to you with a refund after deducting the return postage. Under no circumstances will we be liable for damage to goods sent to us. In addition we will not attempt a repair if the quality of construction is so poor that the only answer is a complete rebuild. Again the package will be returned to you with your money after deducting the return postage. If the fault is due to faulty components, or incorrect instructions or any error on our part which could have led to the fault, we will repair the project free of charge and return it to you carriage paid with a refund of your postage to us.

If the fault is due to an error or errors you have made we will charge you for our time at a reasonable rate (see table below) and for the cost of any parts replaced. If this is less than the amount you sent, we will refund the difference after deducting the cost of postage to you. If the cost including return postage is more than the amount you sent, we will ask you to pay the difference before the goods are returned. But remember that it can take our engineer up to an hour (or much more on large projects) to set up the necessary test jig that will enable him to start testing your particular project and then take him some time to find the fault. So if you are not actually prepared to pay our very reasonable charges then please do not return your projects for repair!

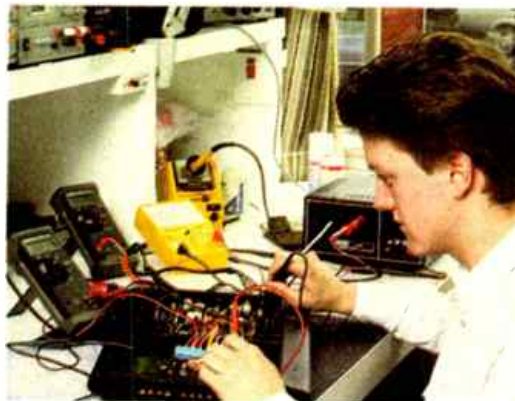
Kit Retail Price	Standard Servicing Cost
Up to £24.99	£17.00
£25 to £39.99	£24.00
£40 to £59.99	£30.00
£60 to £79.99	£40.00
£80 to £99.99	£50.00
£100 to £149.99	£60.00
Over £150	£60 min.

If no fault can be found with the project, a charge of £17 will be raised to cover the cost of setting up any equipment needed and the subsequent testing. All repairs are carried out by skilled technicians at our Head Office. Please note that staff at our shops are unable to undertake repairs, however products for repair can be handed in at the shop for transfer to our Head Office Service Centre. We will carry out the repair as fast as we possibly can, but please allow up to four weeks. We will acknowledge receipt of your returned kit by return of post.

Ready-made goods which are faulty should be returned to us immediately and providing we have stocks we will either repair or replace them as quickly as possible.

Technical Enquiries and Fault Finding

If you have a technical problem with one of our projects or components, please telephone 01702 556001. Between 9 a.m. and 5.30 p.m. each day (Mon to Fri) an



engineer will be available to try to help. It will save time if you have all relevant details to hand, e.g. catalogue page number for components, project book number for kits, and if replacement or additional parts are required, your customer number and post code. If you write, please keep technical enquiries separate from any other enquiry or order. Address your letter Technical Dept.,

Maplin Electronics plc, P.O. Box 3, Rayleigh, Essex. We will do our utmost to answer your enquiry within 2 working days of our receiving it. We cannot answer queries which do not relate to items in our catalogue or 'Electronics – The Maplin Magazine'. Also we are unable to offer the service on projects where the kit has been discontinued for over one year. Priority will be given to those enquiries accompanied by an sae. Enquiries about projects appearing in magazines must be addressed to the magazine concerned. Before you write try to narrow down the fault; it's hard to help you if you just say it doesn't work, since in most cases the fault could be almost anything. Most designs follow a logical sequence, so if possible check to see if any parts of the circuit are operating correctly, and make a note of every test you make. You will undoubtedly require a multimeter and in audio circuits a crystal earpiece can be useful as only the tip need be connected to enable you to hear what is happening throughout the circuit and the extremely high impedance of this monitor will not cause the existing conditions to change. Always check the power supply voltages and voltage rails in the circuit, and check that all points that should be at earth potential are correct, especially when you have several seemingly unconnected faults. Hums and buzzes are almost always caused by incorrect earthing, poor layout or interconnecting wires that are too long. Poor soldering is one of the most common causes of faults. Keep the soldering iron tip clean and free from build-ups of flux by wiping it on a damp rag or sponge, but ensure that it is always tinned (covered with a layer of molten solder – with a new iron, tin the new bit by wiping the molten solder over it with a piece of card or rag). It is most important that both sides of a joint are heated together by the iron. If one side is cold the flux from the solder will flow around it and insulate it from the other side, exactly the opposite to what is wanted.

EXPORT TERMS OF BUSINESS FOR MAPLIN ELECTRONICS PLC

Maplin Electronics plc referred to hereinafter as "Maplin" All export business is subject to the following terms and conditions, unless otherwise agreed in writing or by specific contract.

Offers and Acceptance

No obligation on Maplin shall arise as a result of a catalogue quotation or any other offer until Maplin accepts a purchaser's order. Maplin reserves the right to cancel or amend orders without penalty depending on stock availability.

In the event of any inconsistency between Maplin and the purchaser's terms and conditions, the Maplin terms and conditions of sale shall prevail, unless and until variation by express agreement is accepted in writing by both parties.

Prices

Maplin reserves the right to change prices at any time without prior notice. In general, prices are reviewed every six months, at which time some prices may change. The price charged for all goods will be that ruling at the date of acceptance of the order by Maplin. No changes to prices will be made following acceptance of an order by Maplin.

Whilst every effort has been made to ensure accuracy of prices quoted, Maplin does not accept responsibility for any error or omissions. Written quotations shall be valid for a period of thirty days.

Payment Terms

Export orders must be paid for in advance by one of the following methods:

1. Internationally recognised credit card, stating type of card, card number and expiry date.
2. Bank draft or cheque in Pounds Sterling, with order, drawn on a UK bank.
3. Where approved and established with Maplin, net monthly account terms.
4. Letter of Credit (for order value exceeding £2,000), provided that it conforms to the following conditions:

- (i) Irrevocable and confirmed on a major UK bank
- (ii) Negotiable for payment, at sight in Sterling.
- (iii) Must conform exactly in detail for price, description of contents, despatch method etc., as given in Maplin quotation or pro-forma invoice.
- (iv) All bank charges, commissions, etc. are to be to the account of the customer.
- (v) Transshipment and part-shipment must be allowed.
- (vi) Must be open for a period of six months.
- (vii) Must allow reasonable time for despatch of goods and subsequent preparation and presentation of documents.
- (viii) Must specify if Country(ies) of Origin are to be shown.
- (ix) Must be subject to the uniform Customs and Practice for Documentary Credits (1993 Revision ICC Publication UCP500) or as the same may be amended from time to time.

Small Orders

A handling charge of £2.00 will be applied to credit account customers' orders having an ex-works value of less than £20.00.

Delivery, Insurance, Importation

In general, Maplin delivery terms are CIF.

Freight/Insurance charges are at cost and estimated as separate items on quotations and pro-forma invoices.

All duties, importation and other costs related to import legislation in the destination country are the responsibility of the customer. The customer shall indemnify Maplin against any expenses or losses incurred by Maplin in connection with the importation of goods into the destination country. The customer is responsible for obtaining any necessary import licences.

Delivery Discrepancies and Returns

Any queries regarding non-delivery or incorrect delivery should be made in writing to Maplin within twenty-one days of the date of despatch, quoting all relevant details, otherwise Maplin cannot accept liability.

No goods may be returned to Maplin, for whatever reason, without prior written consent, unless they were sent by Maplin in error or received by the purchaser in damaged or faulty condition. If goods are under guarantee, refer to section entitled "Warranty" for correct procedure.

Despatch

Maplin reserves the right to handle or transport goods by any means or method available to us, and that gives best service to our customer. However, Maplin will endeavour to meet the customer's specific requests regarding transportation of goods, but does not guarantee to do so. Special courier services are available at cost, as and when requested.

Certificates of Origin

Maplin undertakes, as necessary, to obtain, complete and submit Certificates of Origin to Chambers of Commerce and overseas consulates for certification and legalisation. Maplin cannot arrange for certification or obtain other documentation from outside the UK.

Documentation

Maplin standard documentation comprises an invoice and a despatch note. Other documentation which, from time to time, may be required to accompany or support entry of orders into certain countries, e.g., Chamber of Commerce or Consular Certification of Legislation, will be charged at cost unless previously specified on Maplin quotation or pro-forma invoice. Maplin will quote such charges, if requested to do so, at the time of any quotation. All such charges will be detailed separately.

Additional Documentation - Charges

The following handling and administration charges for additional documentation will apply:

* Confirmed Irrevocable Letter of Credit:
(Minimum order value £2,000) Bank charges to the account of the customer.

Order value £2,000 to £4,999: Charged at £125
Order value £5,000 and over: Charged at £100

* Certificate of Origin:

Charged at £50 (in addition to Consular Legalisation charge)

* Hazardous Goods Document:

Charged at £30

VAT

UK Value Added Tax at the standard rate of 17.5% is normally added to catalogue prices, quotations or pro-forma invoices for all customers resident in EC member states. Goods to EC customers may be zero rated provided that the customer's VAT registration number is indicated on the sales invoice.

In order to zero rate goods supplied to UK addresses for onward shipment overseas, e.g., to freight forwarders, a "Proof of Shipment" certificate and other necessary evidence of shipment may be required. Goods for export to areas outside the EC and including the Channel Islands are VAT zero rated.

Patents and Copyright

Products offered for sale by Maplin may be covered by patent or copyright in relation to a manufacturer or publisher.

Maplin maintains full copyright protection in respect of its catalogues, price details and other literature, which may not be reproduced wholly or partially without Maplin prior consent in writing.

Warranty

Maplin will, at its discretion, repair or replace a product in which, under proper use within 12 months of despatch, defects appear due to faulty materials or workmanship.

All products should be returned at the purchaser's risk, suitably packaged, carriage paid within 12 months of despatch, accompanied by an advice note stating the original invoice number against which the goods were supplied, the nature of the fault and any other supporting information Maplin may require. If any of these requirements are not complied with, Maplin shall be discharged from all liabilities arising from the supply of faulty goods, and our warranty shall not apply.

Liability

Maplin shall have no liability in respect of damage, expense or consequential loss resulting from the failure or delay in delivery or in performance of any obligations under any contract, due to any cause within or beyond Maplin control. This shall be considered Force Majeure and shall include, but not be limited to, Act of God, fire, floods, war, civil disturbances and industrial disputes.

Law

Any business transacted by Maplin, subject to the foregoing terms and conditions, shall be governed solely by English law and be within the exclusive jurisdiction of English courts.

OVERSEAS DISTRIBUTERS

HONG KONG

Aries Electronics Company, 13D Prime Mansion No 1 Fleming Road, Wanchai, HONG KONG
Tel: 891 4116 Fax: 891 4122

LEBANON

N and Y Controls, PO Box 175414, Beirut, LEBANON
Tel: (01) 443091-397467
UK Office Tel: (44) 1702 347614
Fax: (44) 1702 77161

GIBRALTAR

Mail Order International, c/o Medsun, PO Box 225, 93-99 Irish Town, GIBRALTAR
Tel: 79797 Fax: 74664

MALTA

Cam Services, Cam Centre, Off Cannon Road Qormi, QRM 09, MALTA
Tel: 484650 Fax: 447174

PAKISTAN

Link Pakistan, Suite No 2, 2nd Floor, I-R Plaza Markaz F-10, Islamabad, PAKISTAN
Tel: 51 281130 Fax: 51 282319

SINGAPORE & MALASIA

Tech-Con Electronics & Trading, BLK 1013 Geylang East Avenue, 302-144 (Geylang East Industrial Estate), SINGAPORE 1438
Tel: (65) 7419918 Fax: (65) 8411228

SOUTH AFRICA

Maplin South Africa (Pty) Ltd, PO Box 1846 Somerset West 1846, REPUBLIC OF SOUTH AFRICA
Tel: (024) 515124 Fax: (024) 512507

UNITED ARAB EMIRATES (U.A.E.)

(Bahrain, Kuwait, Oman, Qatar)

Maplin Middle East Company, PO Box 47019 Hamdan Street, ABU DHABI, U.A.E.
Tel: (971) 2 760332 Fax: (971) 2 760317

HOW TO ORDER IF YOU LIVE OUTSIDE THE UK

Whenever possible, please use our order form and send your order to Maplin Electronics, P.O. Box 3, Rayleigh, Essex, United Kingdom SS6 8LR. To order an item, write the quantity you require and the five character code shown for that item, printed under the heading Order Code. If a number is shown beside the five character code (ignore any letters), multiply this number by the quantity you are buying and then write the result in the Carriage Charge column. For resistors, write the code letter for the type you require and the resistance value – for more information see Resistors Section.

All prices in this catalogue (except items marked NV beside their price) include British VAT. Since January 1st 1993, all customers within the E.C. have to be charged VAT, unless the purchaser has a VAT number. This will normally be at the British rate, which is currently 17½%, although in some cases VAT will be applied at the rate ruling in the country of import. When the goods arrive in your country, no duty on those goods should have to be paid. VAT will be applied at whatever rate is legislated by the government of the appropriate E.C. state at the time we receive your order. If you have a VAT number, please make sure it is clearly visible on your purchase order form. VAT will not be applied in these cases.

Carriage will be charged at a standard rate in accordance with the table on page 828. All goods are despatched by airmail except for one or two countries where a full air service is not available. Full details are shown in the table below.

The carriage you have to pay is calculated as follows:

- i) If you have not had to write any numbers in the Carriage Charge column, the carriage charge you have to pay is the minimum charge shown in the table for your country. For example, if you are ordering from the Republic of Ireland, you will use rate A, and the charge is £3.00.
- ii) If you had to write numbers in the Carriage Charge column, add up the numbers and multiply the total by the multiplication factor shown in the table for your country. For example, if you live in the Republic of Ireland and the Carriage Charge column adds up to say, 5; then the amount you have to pay for carriage is 5 x £1.00 = £5.00 plus the minimum charge, so total is £8.00.
- iii) If the value of goods in your order is over £100.00, please add a minimum 20% only to the cost of your goods. Postage will be charged at cost. If the amount you send exceeds the cost, we will refund the difference, or contact you if it is insufficient. If you are just ordering one of one item which costs over £100, use the table to calculate the correct postage.

Continued on next page.

Continued from previous page.

Rate	Minimum charge	Multiplication factor in addition to minimum charge	Handling charge
A	£3.00	£1.00	—
B	£3.75	£1.50	—
C	£4.50	£1.80	—
D	£5.00	£3.00	—
E	£5.00	£3.50	—
F	£5.00	£4.20	—
G	£1.25	£1.00	—
H	—	—	£1.50

You do not have to pay the £1.50 handling charge applicable in the UK. All goods are sent by AIR MAIL unless shown in the notes at the foot of the table. Please note that hazardous goods such as aerosols and lead-acid batteries, cannot be sent by air parcel post. Extra charges will be made if air freight is requested. Carriage for catalogues and magazines are charged as follows:

Europe (including Republic of Ireland) and Surface Mail			
Outside Europe			
Catalogue	Single Magazine	Magazine Subscription	
£7.30 or 18 IRC's	£3.00 or 7 IRC's	£15.00 or 37 IRC's	
Catalogue (only) outside Europe by surface mail			
£6.50 or 16 IRC's.			
Air Mail Outside Europe			
Catalogue	Single Magazine	Magazine Subscription	
£12.30 or 30 IRC's	£4.00 or 10 IRC's	£22.50 or 55 IRC's	

IRC - International Reply Coupon

Methods of payment

There are basically seven different ways in which you can send the money for your order to us. In all cases, cheques etc., should be made payable to Maplin Electronics plc.

1. Uniform Eurocheques

If you have a Eurocheque book, then simply write the amount in pounds sterling and sign the cheque. You must write your Eurocheque guarantee card number on the back of the cheque.

2. Bank Draft

Go to any local bank and buy a bank draft drawn on a British bank for the exact amount in pounds sterling. We shall be able to despatch your goods on the day we receive your order because our money is guaranteed by the British bank printed on the draft.

3. Credit Card

If you have a Eurocard/Mastercard/Access, Visa/ Carte Bleue or American Express Card, then simply write your card number on your order also stating which type of card it is and its expiry date and sign the order. Do not send your card with the order. We will be able to despatch your order immediately.

4. Postal Orders and International Reply Coupons

We can accept postal orders provided they are in pounds sterling and issued in one of the following countries only:

Anguilla, Antigua, Ascension, Bahamas, Barbados, Belize, British Antarctic Territory, British Virgin Isles, Brunei, Chatham Isles, Cook Isles, Dominica, Falkland Isles and Dependencies, Fiji, Gambia, Gibraltar, Grenada, Hong Kong, Malaysia, Malta, Montserrat, New Zealand, Niue Isle, Penrhyn Isle, Pitcairn Isle, St. Helena, St. Kitts & Nevis, St. Lucia, St. Vincent, Seychelles, Singapore, Tonga, Trinidad and Tobago, Tristan da Cunha, Turks and Caicos Isles, Western

RATE	COUNTRY	RATE	COUNTRY	RATE	COUNTRY
F	Afghanistan	C	Iceland	E	Philippines
C	Albania	E	India	E	Pitcairn Island
F	Algeria	E	Indonesia	C	Poland
C	Andorra	F	Iran	B	Portugal
F	Angola	F	Iraq	F	Puerto Rico
F	Anguilla	A	Ireland (Republic of)	F	Qatar
F	Antigua & Barbuda	F	Israel	F	Reunion
F	Argentina	B	Italy	C	Romania
F	Aruba	F ⁶	Ivory Coast	F	Rwanda
C	Ascension	F	Jamaica	C ¹	St. Helena
E	Australia	E	Japan	F	St Kitts & Nevis
C	Austria	G	Jersey	F	St Lucia
B	Azores	F	Jordan	F	St Pierre & Miquelon
F	Bahamas	F	Kenya	F	St Vincent & the Grenadines
F	Bahrain	E	Kiribati	E	Samoa (USA Territory)
B	Balearic Islands	E	Korea (Republic of)	C	San Marino
F ⁶	Bangladesh	F	Kuwait	F	São Tomé & Príncipe
F	Barbados	C	Latvia	B	Sardinia
B	Belgium	E	Laos	F	Saudi Arabia
F	Belize	F ³	Lebanon	F	Senegal
F	Benin	F	Lesotho	C	Serbia
F	Bermuda	F	Liberia	F	Seychelles
H ⁴	BFPO	F	Libya	B	Sicily
F	Bhutan	C	Liechtenstein	F	Sierra Leone
F	Bolivia	C	Lithuania	E	Singapore
C	Bosnia	B	Luxembourg	C	Slovakia
F	Botswana	E	Macao	C	Slovenia
F	Brazil	C	Macedonia	E	Solomon Islands
F	British Virgin Islands	F	Madagascar	F	Somali Dem Republic
E	Brunei	B	Madeira	F	South Africa
C	Bulgaria	F	Malawi	B	Spain
F	Burkina Faso	E	Malaysia	F	Spanish Territories of N. Africa
F	Burundi	F	Maldives	C ¹	Spitzbergen
F ²	Cambodia	F	Mali	F	Sri Lanka
F	Cameroon	C	Malta	F	Sudan
D	Canada	E	Mariana Islands	F	Suriname
C	Canary Islands	E	Marshall Islands	F	Swaziland
C	Cape Verde Islands	F	Martinique	C	Sweden
F	Cayman Islands	F	Mauritania	C	Switzerland
F	Central African Republic	F	Mauritius	F	Syria
F	Chad	F	Mexico	E	Taiwan
F	Chile	E	Micronesia	F	Tanzania
E	China (People's Republic of)	B	Monaco	E	Thailand
E	Christmas Is (Indian Ocean)	E	Mongolia	F ²	Tibet
C	CIS	C	Montenegro	F	Togo
E	Cocos (Keeling) Island	F	Montserrat	E	Tonga
F	Colombia	F	Morocco	F	Trinidad & Tobago
F	Comoros	F	Mozambique	F	Tristan da Cunha
F	Congo (People's Republic of)	E	Myanmar (Burma)	F	Tunisia
B	Corsica	F	Namibia (SW Africa)	C	Turkey
F	Costa Rica	E	Nauru Island	F	Turks & Caicos Islands
C	Croatia	F	Nepal	E	Tuvalu
F	Cuba	B	Netherlands	F	Uganda
C	Cyprus	F	Netherlands Antilles	F	United Arab Emirates
B	Denmark	E	New Caledonia	F	Uruguay
F	Djibouti	E	New Zealand	D	USA
F	Dominica	E	New Zealand Island Territories	E	Vanuatu
F	Dominican Republic	F	Nicaragua	C	Vatican City State
E	East Timor	F	Nigeria	F	Venezuela
F	Ecuador	F	Niger Republic	E	Vietnam
F	Egypt	E	Norfolk Island	F	Virgin Islands (USA)
F	El Salvador	C	Norway	E	Wake Island
F	Equatorial Guinea	F	Oman	E	Wallis & Futuna Islands
C	Estonia	F	Pakistan	E	Western Samoa
F	Ethiopia	F	Panama	F	Yemen
C ¹	Falkland Islands and Dependencies	E	Papua New Guinea	F	Zaire
C	Farøe Isles	F	Paraguay	F	Zambia
E	Fiji	F	Peru	F	Zimbabwe
C	Finland				
B	France				
F	French Guiana				
E	French Polynesia				
C ¹	French Southern and Antarctic Territories				
F	Gabon				
F	Gambia, The				
F	Gaza & Khan Yunis				
B	Germany				
F	Ghana				
C	Gibraltar				
B	Greece				
C	Greenland				
F	Grenada				
F	Guadeloupe				
F	Guatemala				
G	Guernsey				
F	Guinea				
F	Guinea-Bissau				
F	Guyana				
F	Haiti				
F	Honduras				
E	Hong Kong				
C	Hungary				

1. Parcels over 2kg to Ascension, Falkland Islands and Dependencies, Spitzbergen and St. Helena are despatched by Surface Mail.
2. Maximum weight of packets to Cambodia and Tibet is 1kg. Customers must send an import licence with order.
3. Maximum weight of parcels to the Lebanon is 5kg.
4. Outside Northern Ireland, goods over 1/2kg are despatched by Surface Mail. If you require Air Mail, use the standard rate for the country you are in.
5. Maximum weight of packets to the French Southern and Antarctic Territories is 2kg and goods are despatched by Surface Mail.
6. Customers from Bangladesh and the Ivory Coast must send an import licence with orders over £50.



International Telephone No. + 44 1702 554000
for enquiries and orders

Samoa, Yemen (except Kamaran Isles). Do not affix extra stamps to Postal Orders as the stamps have no value in the UK, unless they are actually current British Post Office issues. For very small orders, catalogues and magazines

we can accept International Reply Coupons (IRC). Each IRC is worth 40p.

5. Currency

We can accept currency (but no coins) only if sent by registered post at your risk.

6. C.O.D.

We can send goods (but not catalogues or magazines, unless included with goods) Cash on Delivery to the following countries only: Austria, Azores, Balearic Isles, Belgium, Corsica, Cyprus, Czechoslovakia, Denmark, Farøe Isles, Finland, France, Gibraltar, Germany, Hungary, Iceland, Italy, Liechtenstein, Luxembourg, Madeira, Malta, Monaco, Montserrat, Netherlands, Norway, Portugal, San Marino, Sweden and Switzerland. You will be charged for the goods despatched, the standard carriage charge and the C.O.D. charge at cost. At present the C.O.D. charge is £5.00 per £200, but if the order is under £100, the charge is £9.00. Thus for example in addition to any other charges due, the additional amount you have to pay for C.O.D. is as follows:

Order Value	C.O.D. Charge
Up to £100	£9.00
£100 to £200	£5.00
£200 to £400	£10.00

You must write C.O.D. in large letters across your order.

7. Letter of Credit

If you cannot use any of the above methods, then usually the only other method we can accept is the "irrevocable Letter of Credit". Again, this can be arranged through any bank, part-shipment and trans-shipment must be allowed and you must pay all charges. Using this system, we do not receive payment until the goods are despatched. But it is a very slow system and because of the large amount of documentation, we cannot accept it with orders worth less than £750.

Please do not use any other form of payment without our prior consent. In particular, we cannot accept Money Orders or personal cheques except Uniform Eurocheques. In any event, please write on your order which method of payment you are using.

COMMENT PASSER UNE COMMANDE SI VOUS HABITEZ EN DEHORS DU ROYAUME-UNI

Dans la mesure du possible, il convient d'utiliser notre formulaire de commande. Pour commander un article, inscrire la quantité dont vous avez besoin ainsi que le code à cinq caractères qui se rapporte à l'article en question. Si la petite case située à côté du code à cinq caractères contient un nombre (ne pas tenir compte de toutes lettres pouvant se trouver dans la case), multiplier ce nombre par la quantité que vous desirez acheter en ensuite inscrire le résultat dans la colonne "Carriage Charge" (frais de port). Pour des résistances, inscrire la lettre code du type dont vous avez besoin ainsi que la valeur de la résistance – pour de plus amples renseignements, voir le chapitre Résistances.

Tous les prix indiqués dans le présent catalogue (à l'exception des articles portant la mention "NV" à côté de leur prix) comprennent la T.V.A. britannique. Depuis le premier janvier 1993, tous les pays de la C.E. doivent faire l'objet de T.V.A. sauf si l'acheteur possède un numéro de T.V.A. Cela sera normalement au taux appliqué au Royaume-Uni, qui est actuellement de 17,5%, bien que dans certains cas, la T.V.A. soit appliquée au taux en vigueur dans le pays d'importation. Lorsque les marchandises arrivent dans votre pays, aucun droit sur ces marchandises ne doit être payé. La T.V.A. sera appliquée au taux adopté par le gouvernement de l'état de la C.E. approprié lors de la réception de votre commande. Si vous avez un numéro de T.V.A., veuillez vous assurer de l'indiquer clairement sur votre bordereau d'achat. La T.V.A. ne sera pas appliquée dans ces cas.

Le port que vous devrez payer se calcule comme suit.

- i) Si vous n'avez pas eu à inscrire un nombre quelconque dans la colonne "Carriage Charge" les frais de port que vous devrez payer sont les frais minimaux indiqués sur la table de la page 828 pour votre pays. A titre d'exemple, si vous habitez en France, les frais sont de 3.75 livres sterling.
- ii) Si vous aviez inscrit des nombres dans la colonne "Carriage Charge", additionner les nombres et multiplier leur total par la facteur de multiplication indiqué sur la table de la page 828 pour votre pays. A titre d'exemple, si vous habitez en France, et la colonne "Carriage Charge" de votre formulaire de commande indique un total de, disons, 5; le montant que vous devrez payer pour le port est de 5×1.5 livre sterling = 7.5 livres sterling + (i) 3.75 livres sterling = 11.25 livres sterling.

Vous n'aurez pas à payer le montant de £1.40, frais de manutention, applicable au Royaume-Uni.

Toutes les marchandises sont expédiées par avion sauf dans le cas d'un ou deux pays ne disposant pas d'un service aérien complet. (En Europe, les colis dépassant 1,5 kg à destination du Spitzberg sont expédiés par voie de terre). Pour tous renseignements, consultez le tarif page 828.

Les catalogues et magazines commandés séparément des marchandises sont facturés et expédiés à part. Veuillez vous référer à la page 828.

Il existe essentiellement sept manières différentes de nous régler le montant de votre commande. Dans tous les cas, le chèques et autres documents doivent être rédigés à l'ordre de Maplin Electronics plc.

1. Eurochèques Uniformes

Si vous avez un carnet d'Eurochèques, inscrivez simplement le montant en livres sterling et signez le chèque. Vous devez inscrire le numéro de votre carte de garantie Eurochèque au dos de votre chèque.

2. Traite Bancaire

Achetez dans la banque la plus proche une traite bancaire prélevée sur une banque britannique pour le montant exact en livres sterling. Nous pourrions vous envoyer vos marchandises le jour même où nous recevons votre commande parce que notre argent se trouve garanti par la banque britannique dont le nom figure sur la traite.

3. Carte de Crédit

Si vous avez l'une des cartes de crédit suivantes, Eurocard/Mastercard/Access, Visa/Carte Bleue ou American Express, il vous suffit d'indiquer le numéro de votre carte sur votre commande ainsi que le nom de la carte et la date d'expiration et de signer la commande. N'envoyez pas votre carte avec la commande. Nous pourrions vous adresser immédiatement vos marchandises.

4. Mandats Postaux et Coupon-Réponse Internationaux

Nous acceptons les Mandats Postaux à conditions qu'ils soient exprimés en livres sterling et proviennent d'un pays listé sous l'en tête Mandats Postaux à cette page 828. Nous vous renvoyons à cette Section pour un complément d'information. Pour de très petites commandes, de catalogues ou magazines, nous acceptons les Coupon-Réponse Internationaux (CRI). Ceux-ci valent 40 pence pièce.

5. Argent Liquide

Nous acceptons l'argent liquide (mais pas les pièces) à condition qu'il soit envoyé en recommandé et à vos risques.

6. Paiement à la Livraison

Nous pouvons envoyer des marchandises avec Paiement à la Livraison dans la plupart des pays d'Europe. Vous serez redevables du montant de

la commande, de frais de port standard et des frais de livraison contre remboursement à prix coûtant. Actuellement ces derniers frais s'élèvent à £5.00 par £200. Vous devrez inscrire les lettres "C.O.D." (cash on delivery) en grands caractères en travers de votre commande. Le régime de Paiement à la Livraison ne s'applique pas aux pays européens suivant: l'Albanie, Andorre, la Bulgarie, les Iles Canaries, les Iles du Cap Vert, l'Allemagne de l'Est, la Grèce, le Groenland, la Pologne, la Roumanie, l'Espagne, le Spitzbergen, la Turquie, l'URSS, l'Etat du Vatican et la Yougoslavie.

7. Lettre de Crédit

Si vous ne pouvez pas utiliser les solutions indiquées ci-dessus, il reste une dernière possibilité acceptable qui est la "Lettre irrévocable de Crédit". Là encore, vous pourrez utiliser n'importe quelle banque comme intermédiaire. La Lettre de Crédit doit être ouverte pour six mois, confirmée par une banque Londonienne, le transbordement doit être prévu et vous devez vous acquitter de tous les frais bancaires. Avec ce système nous ne recevons notre paiement qu'à l'envoi des marchandises, mais c'est une solution très lente et en raison des frais de documentation élevés, nous ne l'acceptons que pour des commandes de plus de £750.

Nous vous prions de ne pas utiliser d'autres formes de versement sans nous consulter au préalable. En particulier, nous ne pouvons pas accepter de mandat ni de chèque personnel à l'exception d'Eurocheques. Quel que soit votre mode de règlement, veuillez l'indiquer sur votre commande.

SO MACHEN SIE IHRE BESTELLUNG, WENN SIE AUSSERHALB GROSSBRITANNIENS WOHNEN

Benutzen Sie möglichst unser Auftragsformular. Um einen Artikel zu bestellen, tragen Sie die von Ihnen benötigte Menge und den für diesen Artikel angeführten Fünf-Zeichen-Code ein. Ist in dem kleinen Kästchen neben dem Fünf-Zeichen-Code eine Zahl angegeben (alle Buchstaben in dem Kästchen außer Acht lassen), diese Zahl mit der Menge multiplizieren, die Sie kaufen, und sodann das Ergebnis in die Spalte "Carriage Charge" (= Frachtkosten) eintragen Für Widerstände den Kennbuchstaben für den von Ihnen benötigten Typ und den Widerstandswert eintragen – weitere Informationen siehe Abschnitt 'Widerstände'. Alle in diesem Katalog aufgeführten Preise (ausgenommen Artikel, die neben ihrem Preis mit "NV" bezeichnet sind) verstehen sich einschließlich britischer Mehrwertsteuer (VAT). Seit dem 1. Januar 1993 muß allen Ländern innerhalb der EG MwSt berechnet werden, es sei denn, der Käufer hat eine MwSt-Nummer. Diese MwSt wird gewöhnlich zum britischen Satz – gegenwärtig 17,5% – berechnet, obgleich MwSt in einigen Fällen zu dem im Einfuhrland geltenden Satz berechnet wird. Wenn die Waren in Ihrem Land eintreffen, sollte auf diese Waren kein Zoll bezahlt werden müssen. MwSt wird zu jeglichem Satz berechnet, der durch die Regierung des jeweiligen EG-Staates zu dem Zeitpunkt, zu dem wir Ihren Auftrag erhalten, durch Gesetzgebung vorgeschrieben ist. Falls Sie eine MwSt-Nummer haben, stellen Sie bitte sicher, daß sie auf Ihrem Bestellformular deutlich lesbar ist. In diesen Fällen wird keine MwSt berechnet. Die von Ihnen zu zahlenden Frachtkosten errechnen sich folgendermaßen:

- i) Falls Sie keinerlei Zahlen in die Spalte "Carriage Charge" (= Frachtkosten) eintragen mußten, sind die von Ihnen zu zahlenden Frachtkosten die in der Tabelle auf Seite 769 für Ihr Land aufgeführten

Mindestkosten. Wohnen Sie beispielsweise in Deutschland, beträgt die Mindestgebühr £3.75.

- ii) Falls Sie doch Zahlen in die Spalte "Carriage Charge" (= Frachtkosten) eintragen mußten, die Zahlen zusammenrechnen und die Gesamtzahl mit dem in der Tabelle auf Seite 828 für Ihr Land angegebenen Multiplikationsfaktor multiplizieren. Wohnen Sie beispielsweise in Deutschland, und addiert sich die Spalte "Carriage Charge" (= Frachtkosten) auf – sagen wir – 5, beträgt der von Ihnen für Fracht zu zahlende Betrag $5 \times £1.50 = £7.50 + (i) £3.75 = £11.25$.

Die in Großbritannien geltende Bearbeitungsgebühr in Höhe von £1.50 brauchen Sie nicht zu zahlen.

Alle Waren werden mit Luftpost versandt; eine Ausnahme bilden ein oder zwei Länder, in denen kein voller Luftpostdienst besteht. (In Europa werden Pakete nach Spitzbergen, deren Gewicht 1,5kg übersteigt, mit gewöhnlicher Post versandt.) Nähere Einzelheiten finden Sie in der Tabelle auf Seite 828.

Von Waren getrennt bestellte Kataloge und Magazine werden auf andere Weise berechnet und versandt. Bitte auf Seite 828 Bezug nehmen.

Es gibt grundsätzlich sieben verschiedene Arten, auf die Sie das Geld für Ihren Auftrag an uns senden können. In allen Fällen sind Schecks usw. an Maplin Electronics plc zahlbar zu machen.

1. Einheitliche Euroschecks

Wenn Sie ein Euroscheckbuch haben, schreiben Sie einfach den Betrag in Pfund Sterling auf und unterzeichnen den Scheck. Sie müssen Ihre Euroscheck-Garantiekartenummer auf die Rückseite des Schecks schreiben.

2. Bankwechsel

Gehen Sie zu irgendeiner Bank am Platze und kaufen Sie einen auf eine britische Bank für den genauen Betrag in Pfund Sterling gezogenen Bankwechsel. Wir können Ihre Waren dann an dem Tag zum Versand bringen, an dem wir Ihren Auftrag erhalten, da unser Geld durch die auf den Wechsel aufgedruckte britische Bank garantiert ist.

3. Kreditkarte

Falls Sie eine Eurocard/Mastercard/Access, Visa/Carte Bleue oder American Express Karte haben, schreiben Sie einfach Ihre Kartennummer auf Ihre Bestellung, die Art der Karte und ihr Verfalldatum, und unterzeichnen den Auftrag. Nicht Ihre Karte mit der Bestellung mitschicken. Wir können Ihre Bestellung sofort zum Versand bringen.

4. Postanweisungen und Internationale Postantwortscheine

Wir können Postanweisungen mit der Maßgabe annehmen, daß sie in Pfund Sterling und in einem Land ausgestellt sind, das unter der Überschrift Postal Orders auf Seite 828 aufgeführt ist. Wegen weiterer Informationen bitte ebenfalls auf diesen Abschnitt Bezug nehmen. Für sehr kleine Aufträge, Kataloge und Magazine können wir internationale Postantwortscheine (IRC) annehmen. Jeder IRC hat einen Wert von 40 Pence.

5. Zahlungsmittel

Wir können Zahlungsmittel (jedoch keine Münzen) nur dann annehmen, wenn sie auf Ihr Risiko per Einschreiben geschickt werden.

6. Zahlung bei Lieferung

Wir können Waren gegen Zahlung bei Lieferung an die meisten europäischen Länder versenden. In Rechnung gestellt werden Ihnen die zum Versand gebrachten Waren, die normale Transportgebühr und die Nachnahmegebühr zum Selbstkostenpreis. Gegenwärtig beträgt die Nachnahmegebühr £5,00 pro £200. Sie müssen C.O.D. in großen Buchstaben über Ihre Bestellung schreiben. Wir können keine

Nachnahmesendungen zu folgenden europäischen Ländern vornehmen: Albanien, Andorra, Bulgarien, Kanarische Inseln, Kap Verdische Inseln, Ostdeutschland, Griechenland, Grönland, Polen, Rumänien, Spanien, Spitzbergen, Türkei, Sowjetunion, Vatikanstadt und Jugoslawien.

7. Akkreditiv

Können Sie keine der vorstehenden Methoden benutzen, bleibt gewöhnlich als einzige andere, für uns akzeptable Methode das "unwiderrufliche Akkreditiv", das wiederum durch jede beliebige Bank eröffnet werden kann. Das Akkreditiv muß sechs Monate lang offen sein, durch eine Londoner Bank bestätigt sein, Teillieferungen und Umladungen müssen erlaubt sein, und Sie müssen alle Gebühren bezahlen. Bei Anwendung dieses Zahlungsmodus erhalten wir das Geld erst nach erfolgtem Versand der Waren. Es ist jedoch ein überaus langsames Verfahren, und wegen des großen Umfangs von Dokumenten können wir diese Zahlungsart nur für Bestellungen im Werte von mehr als £750 annehmen.

Bitte ohne unsere vorherige Zustimmung keine andere Zahlungsart benutzen. Insbesondere können wir keine Postanweisungen oder persönliche Schecks, ausgenommen einheitliche Euroschecks, annehmen. Schreiben Sie bitte in jedem Fall auf Ihre Bestellung, welche Zahlungsart sie benutzen.

MODALITA DI ORDINAZIONE PER I RESIDENTI FUORI DALLA GRAN BRETAGNA

Quando sia possibile, usare il nostro modulo di ordinazione. Per ordinare un articolo, scrivere la quantità richiesta e il codice di cinque caratteri indicato per quell'articolo. Se, oltre al codice di cinque caratteri, nella casella è riportato un numero (ignorare eventuali lettere contenute nella casella), moltiplicare questo numero per la quantità che si desidera acquistare e poi scrivere i risultati nella colonna "Carriage Charge" (addebito per trasporto). Per i resistori, scrivere la lettera di codice del tipo richiesto e il valore della resistenza, per maggiori informazioni, vedere la sezione Resistori.

Tutti i prezzi riportati nel presente catalogo (ad eccezione degli articoli recanti il contrassegno NV accanto al prezzo), sono comprensivi di IVA britannica. Dal 1 gennaio 1993, tutti i prodotti esportati nell'ambito della Comunità europea sono soggetti ad IVA, a meno che l'acquirente non abbia già un numero di partita IVA. In linea di massima, l'IVA viene addebitata al tasso vigente in Gran Bretagna, attualmente del 17,5%, sebbene in certi casi venga applicato quello vigente nel paese di importazione. Nessun dazio è quindi imponibile all'arrivo delle merci a destino. L'IVA viene calcolata al tasso in vigore nel paese Cee competente al momento del ricevimento dell'ordine del cliente. Qualora il cliente fosse già in possesso della partita IVA, il relativo numero di codice fiscale deve essere chiaramente indicato sull'ordine di acquisto, nel qual caso l'IVA non verrà applicata.

Il costo del trasporto da pagare viene calcolato come segue.

- i) Se nella colonna "Carriage Charge" non è stato necessario scrivere alcun numero, l'addebito per il trasporto da pagare è il costo minimo indicato nella tabella a pagina 828 per il proprio paese. Per esempio, per i residenti in Italia, il costo è di £st3,75.
- ii) Se nella colonna "Carriage Charge" è stato necessario scrivere dei numeri, sommarli e moltiplicare il totale per il fattore di moltiplicazione indicato nella tabella a pag. 828 per il proprio paese. Per esempio, se si vive in Italia e la colonna "Carriage Charge" sull'ordine raggiunge un totale di 5, l'importo da pagare per il trasporto è $5 \times £st1,50 = £st7,50 + (i) £st3,75 = £st11,25$.

Non occorre pagare l'addebito fisso di £st1,50 in

vigore per la Gran Bretagna.

Tutte le merci vengono spedite via aerea ad eccezione di quelle destinate ad uno o due paesi per i quali non esiste un servizio aereo completo. (In Europa i pacchi di peso superiore a Kg 1,5 destinati a Spitzbergen vengono spediti via terra.) Troverete tutti i particolari a pagina 828.

I cataloghi e le riviste ordinate separatamente dalle merci sono soggette a tariffe e tipo di spedizione differenti. Vedasi pagina 828.

Ci sono sette modi diversi per inviarcì il denaro relativo al vostro ordine. In ogni caso, assegni ecc devono essere emessi a favore di Maplin Electronics plc.

1. Eurocheques Uniformi

Se siete in possesso di un libretto di Eurocheques, basterà scrivere la somma in lire sterline e firmare l'assegno. Dovrete scrivere sul retro dell'assegno il numero della carta di garanzia degli Euroassegni.

2. Cambiale Bancaria

Recatevi in una banca qualsiasi e acquistate una cambiale bancaria spiccata su una banca britannica per l'ammontare esatto in sterline.

Potremo spedirvi la merce il giorno stesso in cui riceveremo l'ordine, in quanto il pagamento è garantito dalla banca britannica il cui nome figura sul documento.

3. Carta di Credito

Se siete in possesso di una Eurocard/Mastercard/Access, Visa/Carte Bleue o American Express Card, scrivete semplicemente il numero della vostra carta sull'ordine, precisando anche di quale tipo di carta si tratta e la data di scadenza, e firmate l'Ordine. Non spedite la carta con l'ordine. Potremo spedirvi la merce immediatamente.

4. Vaglia Postali e Cuponi Internazionali di Risposta

Possiamo accettare vaglia postali a condizione che siano in sterline e emessi in un paese il cui nome compaia in un elenco intitolato "POSTAL ORDERS" a pagina 828. Consultate quella parte per ulteriori informazioni. Per ordini di valore molto esiguo, cataloghi e riviste, possiamo accettare cuponi internazionali di risposta (IRC) ognuno dei quali vale 40p.

5. Valuta

Possiamo accettare valuta (ma non monete) solo se spedita per raccomandata, e a vostro rischio.

6. Pagamento Alla Consegna

Possiamo spedire merci con pagamento alla consegna nella maggior parte dei paesi europei. Vi addebiteremo il costo delle merci, la tariffa tipo per il trasporto, e la spedizione contrassegno a prezzo di costo. Al momento attuale la tariffa è di £st 5,00 per £st 200. Non possiamo spedire con pagamento alla consegna nei seguenti paesi europei: Albania, Andorra, Bulgaria, Isole Canarie, Isole del Capo Verde, Germania Orientale, Grecia, Groenlandia, Polonia, Romania, Spagna, Spitzbergen, Turchia, URSS, Stato Città del Vaticano e Jugoslavia.

7. Lettera di Credito

Se non avete la possibilità di usare uno dei modi sopra menzionati, l'unico altro modo che generalmente possiamo accettare è una "lettera di credito irrevocabile". Anche questo potrà farsi a mezzo di qualsiasi banca. La Lettera di Credito deve rimanere valida per sei mesi, confermata da una banca di Londra, deve consentire la spedizione parziale e il trasbordo, e sarete tenuti a pagare tutte le spese. Con questo sistema non riceviamo il pagamento fino a dopo la spedizione delle merci, ma si tratta di un sistema molto lento, e dato il gran numero di documenti occorrenti non potremo accettarlo per ordini di valore inferiore a £st 750.

Siete pregati di non usare altra forma di pagamento, senza nostra previa autorizzazione. In particolare non

possiamo accettare mandati di pagamento né assegni personali, eccetto Eurocheques Uniformi. In ogni caso, siete pregati di scrivere sull'ordine il modo di pagamento scelto.

BESTELPROCEDURE ALSU BUITEN HET VK WOONT

Indien mogelijk, altijd ons bestelformulier gebruiken. Een artikel bestellen door de vereiste hoeveelheid en de vermelde uit vijf karakters bestaande code op te schrijven. Als een getal staat aangegeven in het kleine rechthoekje naast de uit vijf karakters bestaande code (eventuele letters in het rechthoekje negeren), dit getal vermenigvuldigen met het aantal dat u aanschaf en het resultaat in de kolom "Carriage Charge" (transporttarief) vermelden. Voor weerstanden, de codeletter opschrijven voor het door u gewenste type en ook de weerstandswaarde. Voor aanvullende informatie het hoofdstuk over Weerstanden raadplegen.

Alle prijzen in deze catalogus (behalve de artikelen met "NV" naast de prijs), inclusief Britse BTW. Sinds 1 januari 1993 zal in alle landen binnen de EG BTW in rekening worden gebracht, tenzij de koper over een BTW-registratienummer beschikt. Dit zal gewoonlijk geschieden tegen het Britse tarief dat momenteel 17,5% bedraagt, hoewel in bepaalde gevallen BTW zal worden berekend tegen het tarief dat geldt in het land van import. Als de goederen in uw land arriveren, dienen geen tarieven op die goederen te zijn betaald. BTW zal worden berekend tegen het tarief dat wettelijk is vastgesteld door de regering van het betreffende EG land dat geldt op het moment dat wij uw bestelling ontvangen. Als u beschikt over een BTW-registratienummer, wordt u verzocht om ervoor te zorgen dat dit duidelijk zichtbaar is op uw bestelformulier. In dergelijke gevallen zal geen BTW worden berekend.

De transportkosten die u dient te voldoen, worden als volgt berekend:

- Als in de kolom "Carriage Charge" (transporttarief) geen getallen moesten worden opgeschreven, dan zijn de door u te betalen transportkosten gelijk aan het minimum tarief vermeld in de tabel op pagina 769, van toepassing op uw land. Voorbeeld: als u in Nederland woont, dan bedraagt het tarief £3,75.
- Als in de kolom "Carriage Charge" (transporttarief) wel een getal moest worden opgeschreven, tel de afzonderlijke cijfers dan bij elkaar op en vermenigvuldig het totaal met de vermenigvuldigingsfactor in de tabel op pagina 828 voor uw land. Voorbeeld: als u in Nederland woont terwijl de kolom onder de titel "Carriage Charge" (transporttarief) op uw bestelling in totaal, bijvoorbeeld 5 bedraagt, dan bedraagt het bedrag aan transportkosten dat door u moet worden voldaan: $5 \times £1,50 = £7,50 + (i) £3,75 = £11,25$.

Het hanteringstarief van £1,50, dat van toepassing is in het VK, hoeft door u niet te worden voldaan.

Alle goederen worden per luchtpost verzonden, behalve naar één of twee landen die niet altijd overal door de lucht kunnen worden bereikt (in Europa worden pakketten zwaarder dan 1,5 kg naar Spitzbergen verzonden per oppervlaktepost). Complete details staan vermeld op de tabel op pagina 828.

Catalogi en tijdschriften die afzonderlijk worden besteld worden anders in rekening gebracht en verzonden. U wordt verwezen naar pagina 828.

Er zijn eigenlijk zeven verschillende manieren waarop u het bedrag voor uw order aan ons kunt overmaken. In alle gevallen moeten de cheques enz. uitgemaakt worden aan Maplin Electronics plc.

1. Normale Eurocheques

Als u in het bezit bent van een Eurochequeboek, schrijf dan het bedrag in Pond Sterling en teken de cheque. U wordt verzocht om het nummer van uw Eurocheque kaart achterop de cheque te vermelden.

2. Bankwissel

Bij een lokale bank koopt u een ankwissel getrokken op een Britse bank voor het juiste bedrag in Pond Sterling. Wij kunnen dan uw goederen versturen op de dag dat wij uw order ontvangen want ons geld is gegarandeerd door de Britse bank die op de wissel vermeld staat.

3. Kredietkaart

Bent u in bezit van een Eurocard/Mastercard/Access, Visa/Carte Bleue of American Express kaart, dan schrijft u het nummer van uw kaart op uw order plus het type kaart en de vervaldag ervan en teken de order. Niet uw kaart met de order verzenden. Wij kunnen uw order meteen versturen.

4. Postwissels en Internationale Antwoordcoupons

Wij accepteren postwissels als ze in Pond Sterling zijn uitgemaakt en uitgegeven in een land vermeld onder het opschrift Postal Orders op pagina 828. Zie de verdere informatie in dat deel. Voor heel kleine orders, catalogi en tijdschriften accepteren wij ook Internationale Antwoordcoupons. Ieder coupon is 40p waard.

5. Valuta

Wij accepteren valuta (maar geen munten) uitsluitend indien verzonden op uw risico per aangetekende post.

6. Rembours

Wij kunnen de goederen naar de meeste landen van Europa onder rembours verzenden. Voor de verzonden goederen zullen u het standaard verzendtarief en het C.O.D. tarief, tegen kostprijs, in rekening worden gebracht. Momenteel bedragen de rembourskosten £5,00 per £200. Schrijf C.O.D. in grote letters dwars over uw order. Rembourssending is mogelijk naar de volgende Europese landen: Albanie, Andorra, Bulgarije, Canarische Eilanden, Griekenland, Groenland, Joegoslavië, Kaap Verde Eilanden, Oost Duitsland, Polen, Roemenie, Spanje, Spitsbergen, Turkije, U.S.S.R en de Vaticaanse Stad.

7. Kredietbrief

Als het niet mogelijk is een van de bovenstaande methoden te gebruiken, dan is gewoonlijk de enige andere voor ons accepteerbare manier de "onherroepelijke kredietbrief". Dit kan door iedere bank geregeld worden. De kredietbrief moet een looptijd van zes maanden hebben, bevestigd door een bank in Londen, Gedeeltelijke verzending en overlading moet geoorloofd zijn en u bent verantwoordelijk voor alle kosten. Als u dit systeem gebruikt, ontvangen wij geen betaling totdat de goederen verzonden zijn, maar het is een uiterst langzaam systeem en vanwege de grote hoeveelheid documentatie, kunnen wij dit systeem niet accepteren voor orders beneden de £750.

Gelieve geen andere vorm van betaling te gebruiken zonder onze voorafgaande toestemming. Vooral postwissels of persoonlijke cheques met uitzondering van de Normale eurocheques, kunnen wij niet accepteren. Schrijft u in ieder geval uw methode van betaling op uw order.

SLIK BESTILLER DU HVIS DU BOR UTENFOR STORBRITANNIA

Bruk vårt beställingsformulär hvis mulig. For å bestille en artikkel, skriver du ønsket mengde og koden på fem tegn som står vist for aktuell artikkel. Hvis det står et tall i den vesle ruten ved siden av koden på fem tegn (se bort fra eventuelle bokstaver i ruten), multipliserer du dette tallet med det kvantum du kjøper, deretter skriver du resultatet i "Carriage Charge" (frakt) spalten. For motstander skriver du kodebokstaven for den type du ønsker, samt motstandsverdien – se

Motstandsavsnittet for nærmere opplysninger.

Alle priser i denne katalogen (unntatt dem som er merket "NV" ved siden av prisen) inkluderer VAT (britisk m.v.a.). Fra 1. januar 1993 må alle land innen EF betale merverdiavgift medmindre kjøperen har et mva-nr. (VAT nr.). Denne avgiften er normalt den britiske satsen, som for tiden er 17 1/2%, selv om den i noen tilfeller vil være den sats som gjelder i importlandet. Når varer ankommer Norge skal det ikke være nødvendig å betale avgift på varene. Mva vil pålegges med den sats som er bestemt av regjeringen i det aktuelle EF-land på det tidspunkt vi mottar Deres ordre. Hvis De har et mva-nr. må dette være lett og klart synlig på ordreskjemaet. I så fall bortfaller merverdiavgiften.

Frakten du må betale regnes ut slik:

- Hvis du ikke måtte skrive noe tall i "Carriage Charge" spalten, er frakten det minstebeløp som står vist i tabellen på side 828 for aktuelt land. For Norge er frakten £4,50.
- Hvis du måtte skrive tall i "Carriage Charge" spalten, legger du disse sammen og multipliserer så totalen med den multiplikasjonsfaktor som står vist i tabellen på side 828 for aktuelt land. Hvis du f.eks. bor i Norge og "Carriage Charge" spalten på din bestilling beløper seg til 5, så er frakten $5 \times £1,80 = £9,00 + (i) £4,50 = £13,50$.

Du behøver ikke betale håndteringsavgiften på £1,50 som bare gjelder i Storbritannia. Alle varer sendes med luftpost, unntatt noen meget få land hvor dette ikke er mulig. (I Europa sendes pakker over 1,5 kg til Svalbard ikke som luftpost). Nærmere opplysninger står i tabellen på side 828.

Kataloger og tidsskrifter som bestilles helt adskilt fra varer, er underlagt andre avgifter og sendes på en annen måte. Se side 828.

Stort sett kan De betale en bestilling på syv forskjellige måter. Alle sjekker e.l. gjøres betalbare til Maplin Electronics plc.

1. Vanlige Eurosjekker

Hvis De benytter Eurosjekker, skriver De ganske enkelt beløpet i pund sterling og underskriver sjekken. De må skrive Deres Eurocheque garantinummer på baksiden av sjekken.

2. Banktratte

Kjøp en banktratte hos Deres egen bank, trukket på en britisk bank, som lyder på det nøyaktige beløp i pund sterling. Vi kan da sende varene samme dag vi mottar Deres bestilling, fordi beløpet er garantert av den britiske banken som står oppgitt på tratten.

3. Kredittkort

Hvis De har Eurocard/Mastercard/Access, Visa/Carte Bleue eller American Express Card, skriver De ganske enkelt Deres kortnummer på ordren, med opplysning om korttype og kortets utløpsdato. Skriv så under ordren. Vi kan da sende varene omgående.

4. Postanvisninger og Internasjonale Svarkuponger

Vi tar i mot postanvisninger, forutsatt at disse er utstedt i pund sterling, og utstedt i et land som står oppført under overskriften Postal Orders på side 828. Se det avsnittet for nærmere opplysninger. For meget små bestillinger, kataloger og tidsskrifter tar vi i mot internasjonale svarkuponger. Hver slik kupong er verd 40 pence.

5. Penger/Valuta

Vi kan ta i mot penger/valuta (men ikke mynter) - men utelukkende hvis disse sendes rekom mendert og på Deres risiko.

6. Kontant ved Levering

Vi kan sende varer kontant ved levering (pr. etterkrav) til de fleste europeiske land. De vil bli belastet for de varer som sendes, fraktavgiftene og C.O.D. (kontant ved levering). For tiden er disse

omkostningene £5,00 pr. £200. De må skrive C.O.D. med store bokstaver tvers over bestillingen. Vi kan ikke sende varer mot etterkrav til følgende land i Europa: Albania, Andorra, Bulgaria, Kanariøyene, Kapp Verdeøyene, Øst-Tyskland, Hellas, Grønland, Polen, Romania, Spania, Svalbard, Tyrkia, Sovjet, Vatikanstaten og Jugoslavia.

7. Remburs

Hvis De ikke kan benytte noen av betaling småtene nevnt over, er den eneste alternative betalingsmåte vi normalt kan akseptere den som kalles "ugjenkallelig remburs". Dette ordnes også gjennom Deres bank. Rembursen må gjelde i seks måneder, være bekreftet av en bank i London, og del-forsendelse og omskipning kan komme på tale, og De må betale alle omkostninger. Ved remburs får vi ikke betaling før varene er levert, men på grunn av alt papirarbeidet forbundet med denne betaling småten, og fordi det tar lang tid å få pengene, kan vi dessverre ikke akseptere remburs i f.m. ordrer til et beløp under £750.

Vi ber Dem om ikke å betale på noen annen måte, uten at vi er blitt enige om det på forhånd. Vi ber Dem huske at vi ikke kan ta i mot det som på engelsk kalles Money Order, eller private sjekker – unntatt vanlige Eurosjekker. Vi ber Dem skrive på bestillingen hvilken betalingsmåte De ønsker å benytte.

HUR MAN BESTALLER, OM MAN BOR UTANFOR UK

Använd alltid vår orderblankett, när så är möjligt. Vid beställning av en artikel skall den erforderliga kvantiteten antecknas jämte koden med fem tecken för ifrågasvarande artikel. Om det finns en siffra i den lilla rutan bredvid femte teckenkoden (eventuella bokstäver i rutan ignoreras) skall denna siffra multipliceras med kvantiteten som inköps och resultatet antecknas i kolumnen "Carriage Charge" (fraktavgift). För motstånd skall kodbokstaven för den önskade typen och resistansvärdet antecknas. För utförligare upplysningar hänvisas till motståndsavsnittet. I samtliga priser i denna katalog (utom poster märkta "NV" intill priset) ingår brittisk moms. Sedan den 1 januari 1993 måste samtliga länder inom EG debiteras moms, såvida inte köparen har ett momsnummer. Denna skatt utgår vanligen efter brittisk taxa, som f.n. är 17,5%, men i vissa fall kommer moms att utgå enligt den i importlandet gällande taxan. När varorna anländer till Ert land, bör ingen skatt på dessa varor behöva erläggas. Moms påläggs efter den taxa som fastställts av statsmakten i ifrågasvarande EG-land vid det tillfälle då vi mottar Er order. Om Ni har ett momsnummer, ombeds Ni tillse att detta är klart synligt på Er inköpsorder. I dylika fall kommer VAT ej att debiteras. Frakten som skall betalas uträknas på följande sätt.

- Om Ni inte behövt anteckna några siffror i kolumnen "Carriage Charge" är fraktavgiften som skall betalas den minimiavgift som anges i tabellen på sidan 828 för Ert land. För den som bor i Sverige t.ex. är avgiften £4,50.
- Om Ni behövt anteckna siffror i kolumnen "Carriage Charge", skall dessa läggas ihop och summan multipliceras med den multiplikationsfaktor som framgår av tabellen på sidan 828 för Ert land. För den som bor i Sverige t.ex. och om kolumnen "Carriage Charge" i ordern sammanlagt uppgår till exempelvis 5, utgör beloppet som skall betalas för frakt $5 \times £1,80 = £9,00 + (i) £4,50 = £13,50$.

Den expeditionsavgift på £1,50, som gäller i UK, behöver ej erläggas.

Alla varor sänds med flygpost utom ifråga om en eller två länder med ofullständig flygtrafik. (I Europa skickas paket vägande över 1,5 kg och adresserade till Spetsbergen ytledes.) Utförliga upplysningar återfinns i tabellen på sidan 828.

Kataloger och tidskrifter, vilka beställts separat från andra artiklar, debiteras och expedieras på annat sätt. Se sidan 828.

Det finns sju olika sätt att skicka in betalningen. Checker

etc. ska alltid vara ställda på Maplin Electronics plc.

1. Enhetliga Eurochecker

Om kunden har en Eurocheckbok, så var vänlig och skriv helt enkelt summan i pund Sterling och skriv under checken. På baksidan av checken måste köparen anteckna numret på sitt Eurocheque-kort.

2. Bankcheck

Gå till närmaste bank och köp en bankcheck dragen på en brittisk bank och med det exakta beloppet utskrivet i pund Sterling. Vi kan då expediera beställningen samma dag vi erhåller den, eftersom våra pengar garanteras av den brittiska bank som finns på checken.

3. Kreditkort

Om kunden har Eurocard/Mastercard/Access, Visa/Carte Bleue eller American Express, så var vänlig och skriv helt enkelt kortnumret på beställningen och ange vilken sorts kort det är samt "expiry date" och skriv under beställningen. Skicka inte kortet med beställningen. Vi kan expediera beställningen genast.

4. Postanvisningar och Internationella Svarkuponger

Vi godtar postanvisningar förutsatt att de är utskrivna i pund Sterling och att de har utfärdats i ett land som finns med i listan under överskriften Postal Orders på sid 828. Se även den sektionen för ytterligare information. För mycket små beställningar, kataloger och tidskrifter kan vi godtaga internationella svarkuponger (IRC). Varje IRC är värd 40 pence.

5. Kontanter

Vi kan godtaga sedlar (men inga mynt) bara om de skickas rek på kundens egen risk.

6. Postförskott

Vi kan sända beställningar mot postförskott till de flesta europeiska länder. Köparen kommer att debiteras avsant gods, normalfraktavgift och postförskott till kostnadspris. För närvarande är postförskottsavgiften £5,00 per £200. Kunden måste skriva C.O.D. med stora bokstäver tvärs över beställningen. Vi kan inte sända mot postförskott till följande europeiska länder: Albanien, Andorra, Bulgarien, Kanarieöarna, Cap Verde-öarna, Osttyskland, Grekland, Grønland, Polen, Rumänien, Spanien, Spitzbergen, Turkiet, USSR, Vatikanstaten och Jugoslavien.

7. Kreditiv

Om ingen av ovanstående metoder kan användas, är "oäterkalleligt kreditiv" vanligtvis den enda annan metod vi kan acceptera. Detta kan också arrangeras genom en lokal bank. Kreditivet måste stå öppet i sex månader, det måste bekräftas av en Londonbank, dellastning och omlastning måste medges och alla avgifter betalas. Med detta system erhåller vi inte betalning, förrän varorna har expedierats, men det tar mycket lång tid och på grund av dokumentkostnaderna kan vi inte godta detta system för beställningar som understiger £750.

Var vänlig och använd ingen annan betalningsmetod utan att först ha fått tillstånd av oss. I synnerhet kan vi inte godta penningförsändelser eller privata checker annat än enhetliga Eurochecker. I vilket fall som helst var vänlig och ange på beställningen vilken betalningsmetod som används.

TILAAMINEN ISON-BRITANNIAN ULKOPUOLELTA

Tilaamiseen on mahdollisuuskien mukaan aina käytettävä tilauslomaketta. Jonkin tuotteen tilaamiseksi kirjoitetaan lomakkeelle haluttu lukumäärä sekä ko. tuotteen kohdalla annettu viisimerkkinen koodi. Jos viisimerkkisen koodin vieressä olevassa pienessä ruudussa on jokin numero (ruudussa mahdollisesti olevat kirjaimet jätetään huomiotta), kerro tämä luku

tilaamallasi määrällä ja kirjoita saatu tulo sarakkeeseen "Carriage Charge" (toimitusmaksu). Vastusten tapauksessa kirjoitetaan halutun tyyppin koodikirjain sekä vastusarvo – lisätietoja osassa Vastukset. Kaikki hinnat tässä luettelossa (paitsi artikkelit jotka merkitty NV) sisältävät Britannian arvonlisäveron. Tammikuun 1. päivästä 1993 alkaen on kaikissa EY-maissa ollut pakollista lisätä laskuihin arvonlisävero (VAT), paitsi siinä tapauksessa, että ostajalla on oma VAT-numeronsa. Normaalisti arvonlisävero perustuu Isonsa-Britanniassa voimassa olevaan veroprosenttiin, joka on tällä hetkellä 17,5 %, mutta on myös tapauksia, joissa sovelletaan tuontimaan veroprosenttia. Kun tavarat tulevat perille, niistä ei pitäisi veloittaa mitään tullimaksuja. Arvonlisävero veloitetaan ko. EY-maassa voimassa olevien määräysten mukaisesti tilauksen vastaanottoajankohtana käytössä olevan prosentin perusteella. Jos Teillä on oma VAT-numero, pyydämme huolehtimaan siitä, että se on nähtävissä selvästi ostotilauslomakkeessa. Silloin emme veloita Teiltä arvonlisäveroa.

Suoritettava toimitusmaksu lasketaan seuraavasti:

- Jos et ole joutunut kirjoittamaan mitään numeroita sarakkeeseen "Carriage Charge", silloin toimitusmaksu, jonka joudut suorittamaan, on se minimiveloitus, joka oman maasi osalta mainitaan taulukossa sivulla 828. Esimerkiksi Suomen osalta tämä veloitus on £4,50.
- Jos olet jo kirjoittanut numeroita sarakkeeseen "Carriage Charge", laske kyseiset luvut yhteen ja kerrp summa oman maasi osalta sivun 828 taulukossa mainitulla kertoimella. Jos asut esim. Suomessa ja sarakkeessa "Carriage Charge" olevat luvut ovat yhteissummaltaan vaikkapa 5, silloin on toimitusmaksuna suoritettava $5 \times £1,80 = £9,00 + (i) £4,50 = £13,50$.

Tällöin ei tarvitse maksaa pelkästään Isoa-Britanniaa koskevaa yhden punnan (£1,50) palvelumaksua. Kaikki tuotteet lähetetään lentopostitse lukuunottamatta joitakin maita joihin lentopostipalvelua ei ole käytettävissä (Euroopassa yli 1½ kg:n painoiset paketit Spitzbergeniin lähetetään maapostitse). Tarkemmat tiedot löytyvät sivulla 828 olevasta taulukosta.

Ilman tuotteita tilatuista luetteloista ja lehdistä veloitetaan erikseen ja ne myös lähetetään erikseen. Tarkemmat tiedot löytyvät sivulta 828.

On olemassa kaikkiaan seitsemän eri tapaa, joilla voit toimittaa meille tilaustasi kiskevän maksusuorituksen. Kaikissa tapauksissa šekkeihin ynnä muihin on maksun saajaksi merkittävä Maplin Electronics plc.

1. Yksimuotoiset Euroškit

Jos sinulla on Eurošekkivihko, voit yksinkertaisesti kirjoittaa summan puntamääräisenä ja allekirjoittaa šekin. Muistakaa kirjoittaa Eurošekki-kortin numero šekin kääntöpuolelle.

2. Pankkiasete

Mene johonkin paikalliseen pankkiin ja osta pankkila jollekin brittiläiselle pankille asetettu tratta tarkalleen oikealle summalle, puntamääräisenä. Me lähetämme tilaamasi tavarat heti kun saamme tilauksesi, sillä trattaan painettu brittiläinen pankki takaa maksusuorituksen.

3. Luottokortti

Jos sinulla on Eurocard/Mastercard/Access, Visa/Carte Bleue tai American Express luottokortti, voit kirjoittaa pelkästään korttisi numeron tilaukseen, mainiten samalla mistä kortista on kysymys ja mihin asti se on voimassa, ja allekirjoittaa tilauksen. Älä lähetä korttiasi tilauksen mukana. Me toimitamme tilauksesi välittömästi.

4. Postiosoitukset ja Kansainväliset Vastauskupongit

Me hyväksymme postiosoitukset edellyttäen että ne ovat puntamääräisiä ja peräisin jostakin sivulla 770 olevassa, otsikolla "Postal Orders"

varustetussa luettelossa mainitusta maasta. Samassa kohdassa on annettu myös lisätietoja. Hyvin pienien tilausten, kuten luetteloiden ja lehtien osalta me hyväksymme myös kansainväliset vastauskupongit (IRC). Kunkin IRC-kupongin arvo on 40p.

5. Ulkomaan Valuutat

Me hyväksymme ulkomaan valuuttaa (ei kolikoita) vain jos se lähetetään kirjattuna ja lähettäjän omalla vastuulla.

6. Postiennakko

Me voimme lähettää tavaraa postiennakkolla useimpiin Euroopan maihin. Postitse lähetettävien tuotteiden lähetysmaksu on vakio, rahtiteitse kuljetettavista tuotteista maksu määräytyy toimituksen mukaan ja se peritään tavarantoimituksen yhteydessä. Tällä hetkellä postiennakkomaksu on 5,00 puntaa 200 punnalta. Sinun on kirjoitettava suurin kirjaimin poikittain tilauksesi yli kirjaimet 'C.O.D.'. Me emme toimita tavaraa postiennakkolla seuraaviin Euroopan maihin: Albania, Andorra, Bulgaria, Espanja, Grönlanti, Huippuvuoret, Jugoslavia, Kanarian saaret, Kap Verde, Kreikka, Neuvostoliitto, Puola, Romania, Saksan demokraattinen tasavalta, Turkki ja Vatikaanivaltio.

7. Remburssi

Jos et pysty käyttämään mitään yllä mainituista maksutavoista, silloin on yleensä käytettävissä ainoastaan "peruuttamaton luottokirje", joka myös voidaan järjestää minkä tahansa pankin välityksellä. Luoton on oltava auki kuusi kuukautta ja jonkin lontoolaisen pankin vahvistama; osatoimitusten ja kauttakuljetusten on oltava luovallisia, ja sinun on maksettava kaikki kulut. Tällä järjestelyllä me saamme maksun vasta, kun tavarat on lähetetty, mutta menetelmä on kovin hidas ja suuren asiapaperimäärän vuoksi me hyväksymme sen käytön vain, jos tilaus on arvoltaan vähintään 750 puntaa.

Älä käytä mitään muuta maksutapaa ennen kuin olet saanut meidän suostumuksemme. Me emme hyväksy varsinkaan maksuosoituksia emmekä henkilökohtaisia šekkejä yksimuotoisia Eurošekkejä lukuun ottamatta. Mainitse aina tilauksessasi mitä maksutapaa käytät.

COMO EFECTUAR PEDIDOS SI VIVE FUERA DEL REINO UNIDO

Siempre que sea posible, por favor utilice el formulario de pedidos. Para encargar un artículo, escriba la cantidad que desea y el código de cinco caracteres para ese artículo. Si un número aparece en el pequeño recuadro al lado del código de cinco caracteres (ignore cualquier letra que pueda aparecer en el recuadro) multiplique este número por la cantidad que desea comprar y escriba el resultado en la columna "Carriage Charge" (gastos de envío). Para resistores, escriba la letra del código para el tipo que requiere y el valor de la resistencia – para más información, vea la sección Resistores.

Todos los precios en este catálogo (excepto los marcados "NV" al lado del precio) incluyen el IVA británico (Impuesto al Valor Añadido). Desde el 1º de enero de 1993, todos los países de la C.E. deberán imponer I.V.A., a menos que el comprador posea un número de I.V.A. Este será normalmente al valor Británico, que actualmente es de 17,5%, aunque en algunos casos el I.V.A. será aplicado según el valor establecido en el país importador. Cuando las mercaderías arriben a su país, no debería pagarse derechos aduaneros sobre esas mercancías. El I.V.A. será aplicado conforme a cualquier porcentaje que fuere legislado por el gobierno del estado de la C.E. pertinente en el momento en que recibamos su pedido. Si usted tiene un número de I.V.A., por favor

asegúrese de que esté claramente visible en su formulario de orden de compra. El I.V.A. no será aplicado en estos casos.

Los gastos de envío son calculados como sigue:

- i) Si no ha tenido que escribir ningún número en la columna de "Carriage Charge", los gastos de envío que debe pagar son el mínimo cargo indicado en la tabla en página 828 para su país. Por ejemplo, si vive en España, el cargo es 3,75 libras esterlinas.
- ii) Si ha tenido que escribir números en la columna de "Carriage Charge", sume los números y multiplique el total por el factor multiplicativo mostrado en la tabla en página 828 para su país. Por ejemplo, si vive en España y la columna de "Carriage Charge" en su pedido suma, digamos, 5, entonces la cantidad que debe pagar en gastos de envío es $5 \times 1,50 = 7,50 + (i) 3,75 = 11,25$ libras esterlinas.

No tiene que pagar el cargo de £1.50 para gastos de manejo que es aplicable en el Reino Unido.

Toda la mercadería se despacha por vía aérea salvo para uno o dos países donde no existe todavía un servicio aéreo completo. (En Europa los paquetes para Spitzbergen que pesen más de 1½ kg son despachados por encomienda postal terrestre o marítima).

Los catálogos y revistas que se pidan por separado de la mercadería, se facturan y despachan de manera diferente. Ver detalles en la página 828.

Fundamentalmente hay siete maneras diferentes en las que usted nos puede enviar su dinero. En todos los casos, cheques etc., deben de hacerse pagaderos a Maplin Electronics plc.

1. Eurocheques

Si usted posee un talonario de Eurocheques, simplemente escriba la cantidad en libras esterlinas y firme el cheque. Sírvase escribir al dorso de su Eurocheque el número de su tarjeta de garantía.

2. Letras de Cambio

Vaya usted a cualquier banco en su localidad y compre una letra de cambio librada en un banco inglés por la cantidad exacta de libras esterlinas. nos será así posible enviar su pedido el mismo día que recibamos su orden porque nuestro dinero está garantizado por el banco inglés impreso en la letra de cambio.

3. Tarjetas de Crédito

Si usted posee una Eurocard/Mastercard/ Access, Vias/Carte Blue o American Express Card, entonces simplemente escriba el número de su tarjeta en su pedido declarando qué tarjeta es y la fecha de caducidad, y firme el pedido. No envíe su tarjeta con el pedido. Su pedido será despachado inmediatamente.

4. Giro Postal y Cupones Internacionales

Aceptamos Giros Postales siempre que sean hechos en libras esterlinas y emitidos en un país que aparezca en la sección Postal Orders en la página número 828. Véase esa sección para más información. Para pedidos pequeños, catálogos y revistas aceptamos Cupones Internacionales. Cada Cupón vale 40 peniques.

5. Pago en Metálico

Aceptamos dinero (no monedas) sólo si se manda por correo certificado bajo su responsabilidad.

6. Páguese contra Reembolso

Podemos mandar artículos cobrando a reembolso a la mayoría de los países europeos. Se le cobrará a usted el importe de la mercadería despachada, la tarifa de porte normal establecida, o si es encomienda para pago contra entrega, el porte al costo. En este momento, el precio de envío es 5,00 libras esterlinas y veinte peniques

por cada 200 libras esterlinas. Debe usted escribir C.O.D. en letras de molde en su pedido. No podemos hacer envíos contra reembolso a los siguientes países europeos: Albania, Andorra, Bulgaria, I. Canarias, I. de Cabo Verde, Alemania Oriental, Grecia, Groenlandia, Polonia, Rumania, España, Archip. de Spitzbergen, Turquía, U.R.S.S., Ciudad del Vaticano, y Yugoslavia.

7. Carta de Crédito

Si usted no puede usar ninguno de los métodos anteriores, en ese caso normalmente el único método que aceptamos es "La Carta de Crédito Irrevocable". De nuevo, esto se puede arreglar por medio de un banco. La Carta de Crédito debe de permanecer abierta por seis meses, confirmada por un banco inglés, permitiendo transbordo, pagando usted todos los gastos. Usando este sistema, nosotros no recibimos el pago hasta que el pedido se envíe, pero es un sistema muy lento y debido a la gran cantidad de documentación no lo podemos aceptar con órdenes que valgan menos de 750 libras esterlinas.

Por favor no use ninguna otra forma de pago sin permiso previo. En particular, no podemos aceptar giros o cheques excepto Eurocheques. En cualquier caso, por favor escriba en su pedido qué forma de pago va usted a usar.



VISIT A MAPLIN SHOP FOR PERSONAL SERVICE

Belfast (NEW)	Catalogue Shop	01232 683929
Birmingham	Self Service Store	0121 348 8411
Brighton	Catalogue Shop	01273 620930
Bristol	Self Service Store	0117 923 2014
Cardiff	Catalogue Shop	01222 464554
Chatham	Catalogue Shop	01634 818588
Coventry	Catalogue Shop	01203 550504
Dudley (NEW!)	Catalogue Shop	01384 485051
Edgware	Self Service Store	0181 951 0969
Edinburgh	Catalogue Shop	0131 313 5551
Forest Hill	Catalogue Shop	0181 291 9192
Glasgow	Catalogue shop	0141 353 3323
Hammersmith	Catalogue Shop	0181 748 0926
Ilford	Catalogue Shop	0181 599 0100
Leeds	Self Service Store	0113 244 9200
Leicester	Catalogue Shop	0116 262 3288
Liverpool (NEW!)	Catalogue Shop	0151 230 0366
<i>Manchester</i>		
Cheetham Hill	Catalogue Shop	0161 832 2550
Oxford Road	Self Service Store	0161 236 0281
Middlesbrough	Catalogue Shop	01642 242900
Milton Keynes	Catalogue Shop	01908 692720
Newcastle-upon-Tyne	Catalogue Shop	0191 488 9555
Northampton	Catalogue Shop	01604 756726
Nottingham (NEW!)	Catalogue Shop	0115 941 0242
Portsmouth	Catalogue Shop	01705 654411
Preston (NEW!)	Catalogue Shop	01772 258484
Reading	Self Service Store	01734 566638
Sheffield	Catalogue Shop	0114 285 5492
Slough	Catalogue Shop	01753 551419
Southampton	Self Service Store	01703 225831
Southend-on-Sea	Self Service Store	01702 392000
Stockport	Catalogue Shop	0161 480 4900
Stoke-on-Trent	Catalogue Shop	01782 749947

See the following pages for details of each shop

Shop Enquires: Please call our Customer Services Department on (01702) 552911 for shop enquiries as in most cases they will be able to answer your enquiry more efficiently.

Shopping the Easy Way

When you next pop out . . . pop into a Maplin store and take a look at our amazing range of electronic products and components.

In our regional stores you'll find the personal service that has become synonymous with Maplin Electronics, and by using one of our many stores nationwide, you will be able to save on postage costs and enjoy the benefit of viewing the products before you purchase.

We make every effort to ensure that the majority of our product range is constantly available, but some items may need to be ordered specially by our staff at customer request. By giving your local store a quick telephone call prior to making a trip, our staff will not only be able to tell you if a particular item is in stock, but also reserve an item or two for you. Alternatively, an order can be collected in readiness for your visit, but in this instance customers need to provide a credit card number before orders can be prepared.

Since the introduction of our Electronic Point of Sale system (EPOS), it would help us to serve you more quickly if you are able to provide the stock codes for each item you need. This requirement is useful at all our stores, but is essential at those locations which operate a catalogue shop style of service. Your assistance with this request will help us to process your order smoothly and efficiently.

Our stores are pleased to accept Access, Mastercard, Visa, Barclaycard, Connect, Switch, American Express and cheques up to a value of £5,000 with a cheque guarantee card.

We'll even accept ordinary money as well! If you do pay by cheque, we shall require you to provide your name and address on the back of the cheque so that we can contact you if your cheque is returned for whatever reason by the bank. Your personal details are guaranteed confidential and will not be used for any other purpose.

Company cheques for trade customers can be accepted at weekends, but goods can only be provided using an account facility on a Saturday or Sunday by prior agreement.

To receive free product information literature and special offers, just leave your name and address with our staff and your details will be added to our mailing list.

Sunday Opening

The opportunity to browse at leisure is seen as a real benefit by many (after struggling through a busy Saturdays shopping). In addition, parking is easier and our staff are able to spend more time providing you with technical advice.

Naturally, we are closely following legislation regarding Sunday opening and we only open provided there is no opposition from the local authorities. There are currently six stores operating on Sundays, they are; Brighton, Edinburgh, Gateshead, Glasgow and Manchester (Cheetham Hill and Oxford Road). If you would prefer to visit us on a Sunday, please keep in touch with your local branch who can keep you updated on the Sunday opening situation.

Opening Times

All Maplin stores are open 9am to 5.30pm Monday to Saturday (9.30am Friday). Plus! As stated above, subject to local authority rulings, there are four stores opening Sundays. For Sunday store opening details please telephone your local store. Closed on Public Holidays.

Maplin Electronics . . . The easy way to shop. A fast, friendly service can be found at all Maplin stores nationwide and our helpful staff may often be able to help you with a technical problem or construction difficulty with a Maplin kit.

Next time you pop out . . . Pop in! You won't be disappointed!

BELFAST

357-359 Lisburn Road,
Belfast, BT9 7EP.
Tel: 01232 683929.
Opening hours:
9 to 5.30 Monday to Saturday.
Closed till 9.30 a.m. Friday for staff
training. Closed all Public Holidays.

The new Belfast store provides a service for all our Northern Ireland customers. It is suitably located on the busy Lisburn Road (A1) in an area where there is plenty of on-street parking. If travelling by train, the Botanic Avenue Station is two minutes from Shaftesbury Avenue Station, two minutes from Shaftesbury Square at which point the Number 59 Citybus Link is available. The Oxford Street Bus Station is directly opposite the Central Railway Station from where buses 23, 38, 51 and 103 depart, all of which pass the door. Alternatively, travellers can change at Central Station, which is just 300 yards from the store. (Note: exit this station to the left; it is also important to remember that this station is a "stop on request" only). Following the familiar catalogue style of operation, our staff look forward to providing both product and technical advice.

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



BIRMINGHAM

Junction of Sutton New Road and
Summer Road, Erdington,
Birmingham, B23 6TH.
Tel: 0121 384 8411.
Opening hours:
9 to 5.30 Monday to Saturday.
Closed till 9.30 a.m. Friday for staff
training. Closed all Public Holidays.

Our Birmingham store is located in Erdington on the main roundabout at the junction of Sutton New Road and Summer Road. We're on the A5127 just 3 minutes north of Spaghetti Junction (junction 6) on the M6. Our private free car park has over 50 spaces so there's always plenty of room for you. If you are travelling by bus the 11, 28, 68, 102, 104, 110, 112, 115, 165, 901A and 966 all stop close to the store. This store features a self-service area where you can browse through our large range, whilst counter service is available as well.

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



BRIGHTON

65 London Road, Brighton, BN1 4JE.
Tel: 01273 620930.
Opening hours:
9 to 5.30 Monday to Saturday.
10 to 2.00 Sunday. Closed till
9.30 a.m. Friday for staff training.
Closed all Public Holidays.
Note: open Sundays if local
conditions permit.

The Brighton store is ideally located for ease of access from all around the Sussex area. Parking is not difficult, either in the street or in the large multi-storey London Road car park at the rear of the store. Street parking is by vouchers which are available in the store. Many bus routes serve the area with the 5, 5A, 5B, 5C, 107, 770 and 773 stopping at the London Road Co-op just 100 yards away. Also the 35, 44, 44A, 58, 59, 59A, 82 and 83 stop nearby at Preston Circus. The shop is only a few minutes' walk from the railway station, down Trafalgar Street, left into York Place and a short distance up London Road. This new style catalogue shop provides all the benefits of large displays plus the personal attention of technical assistants.



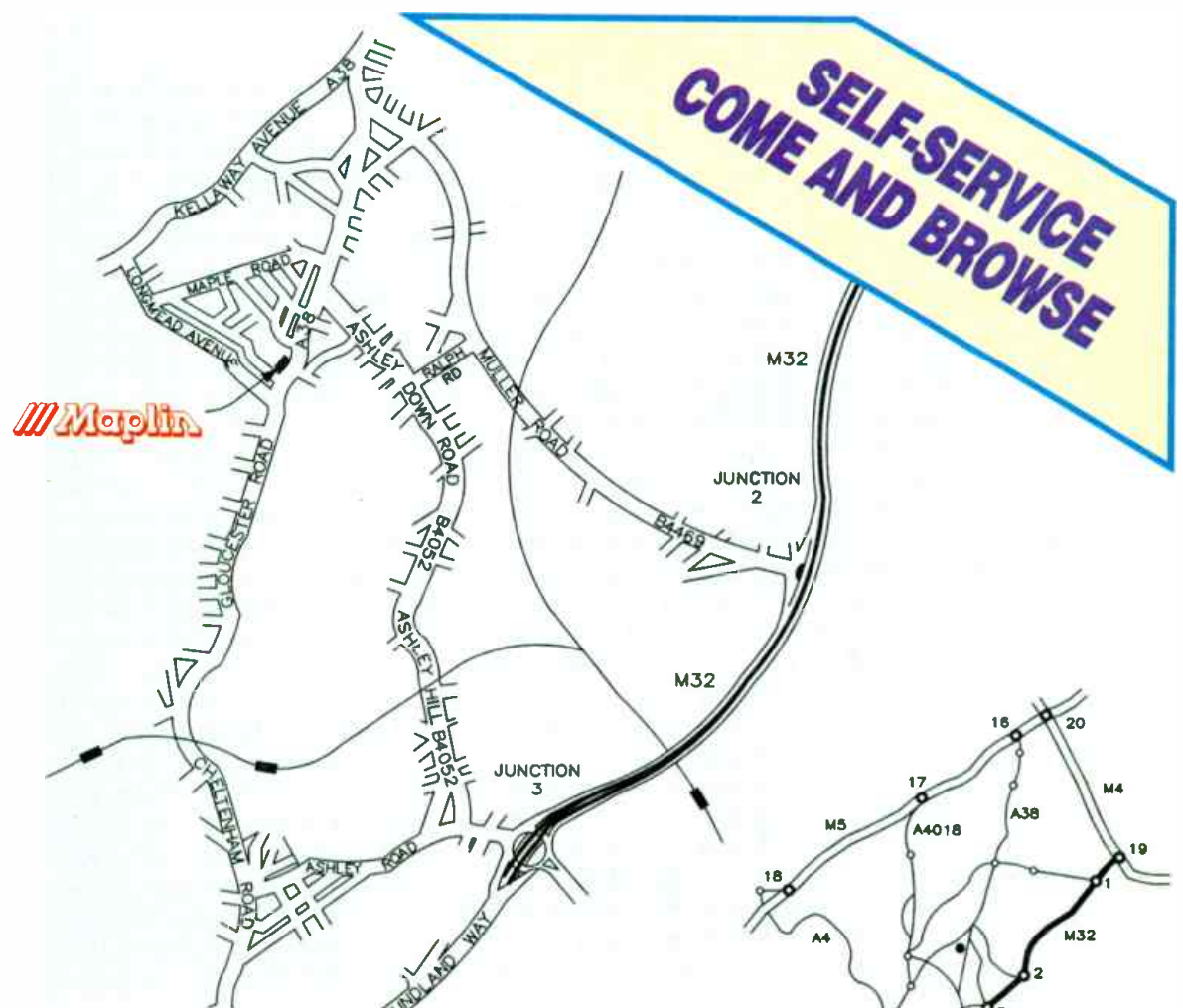
N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

BRISTOL

302 Gloucester Road, Horfield, Bristol, BS7 8PD.
Tel: 0117 923 2014.
Opening hours:
9 to 5.30 Monday to Saturday.
Closed till 9.30 a.m. Friday for staff training. Closed all Public Holidays.

Serving the West country is our well-established shop in Bristol. We're on the main Gloucester Road about halfway between the city centre and Filton Airfield opposite the Esso Garage 'Premier Service Station'. Car parking is free for one hour in front of the shop or there is limited parking space just around the corner in Thomleigh Road. Buses which travel up Gloucester Road are the 72 to 78. This shop features a self-service area where you can browse through our large range, whilst counter service is available as well.

6 DAY OPENING



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

CARDIFF

29-31 City Road, Cardiff, CF2 3BH.
 Tel: 01222 464554.
 Opening hours: 9 to 5.30
 Monday to Saturday.
 Closed till 9.30 a.m.
 Friday for staff training.
 Closed all Public Holidays.

Providing a service to our customers in South Wales, our Cardiff shop is conveniently located on City Road about 200 yards from its junction with Newport Road. The shop is easily accessed from the M4, either from Junction 29 to the East, or Junction 32 from the West. On arrival there is plenty of parking in the streets or in our private car park at the end of Bedford Place and to the rear of the shop. The City Centre shopping area is only a short distance away. By train the shop is about ten minutes' walk from Cardiff Queen Street which is one stop away from Cardiff Central on the valley line. Buses which pass the door are the 8 and 9. In addition, buses 19, 30, 61, 62 and 65 travel down Newport Road from Central Station.

This catalogue shop has some interesting displays and a friendly team of technical sales staff.

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES



CHATHAM

2 Luton Road, Chatham, Kent, ME4 5AA.
 Tel: 01634 818588.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. on Friday for staff training.
 Closed all Public Holidays.

Ideally located, the Chatham shop can be found alongside the Luton Arches at its junction with the High Street and Chatham Hill. Being only a short drive from the M2, this site is easily accessed from anywhere in the Medway Towns, Maidstone or North Kent. There is plenty of free parking at the rear of the store, either in a car park or side roads. The main shopping centre is only a short walk up the High Street and the shop is a little over ten minutes' from Chatham railway station by walking up New Road. Buses which travel up Luton Road are the 166, 181 and 186. In addition, the 132 and 183 travel along Chatham Hill. There are plenty of displays in this catalogue style shop with friendly staff ready to provide any technical advice.

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES



COVENTRY

12 Bishop Street, Coventry,
CV1 1HU.

Tel: 01203 550504.

Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.

Friday for staff training.

Closed all Public Holidays.

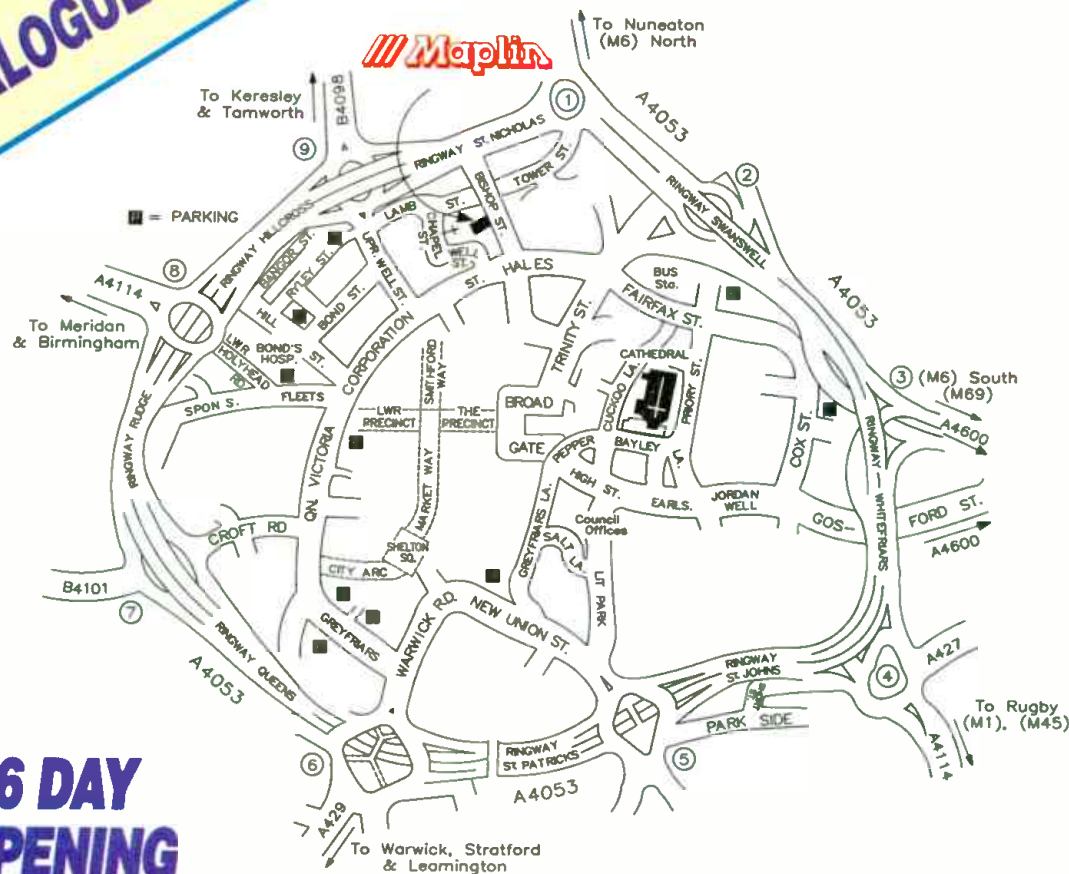
The shop is situated inside the ring road, just to the north of the West Orchard shopping centre.

If you're coming by car, there's one hour on-street parking in Bishop Street and a Pay & Display car park 50 yards away on the corner with Tower Street. In addition, there is free car parking to the side of the Maplin store in a private road.

Bus travellers can use numbers 20, 20A, 20W, 37, 40, 47, 50, 57, 58, 157, 158 and 535, all having stops within a few yards of our front door; whilst the main bus terminals of Pool Meadow and Broadgate are both about 5 minutes walk away.

If you use the train, the station is about a 20 minute walk, though buses run frequently from the station into the city centre. In the store there are plenty of informative displays and helpful technical staff to assist you.

CATALOGUE SHOP



**6 DAY
OPENING**

N.B. SHOPS CANNOT HELP

DUDLEY

Unit 7, Sterling Park,
Pedmore Road, Dudley, DY5 1TB.
Tel: 01384 485051.

Opening hours:

9 to 5.30 Monday to Saturday.

Closed till 9.30 a.m. Friday for staff training.

Closed all Public Holidays.

This new store can be found within the Sterling Business Park, which is a prominent location on the Pedmore Road A4036 in the Brierley Hill District. Access by car is very easy and on arrival there is plenty of free on-site parking. Buses which pass down Pedmore Road on the Metro West route are 264 and 265. In addition there are numerous buses to the Merryhill shopping centre which is located immediately alongside and only a few minutes walk from the Sterling Business Park. As with all other catalogue stores, the full range of products are available in addition to interesting displays. Our staff look forward to meeting new customers and providing whatever technical assistance is required.

**NEW
CATALOGUE SHOP**



**6 DAY
OPENING**

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

EDINBURGH

126 Dalry Road,
Edinburgh, EH11 2EZ.
Tel: 0131 313 5551.
Opening hours: 9 to 5.30
Monday to Saturday, 10 to 4.30
Sunday. Closed till 9.30 a.m. on
Friday for staff training.
Closed all Public Holidays.

The Edinburgh store is located on Dalry Road approximately a quarter of a mile from the Haymarket Railway Station. This is an excellent location, being easily found alongside a Comet and Gateway supermarket. One of the benefits associated with this store is the large free car park which is immediately behind the premises. The buses which pass the door, approximately every 10 minutes, are 2, 3, 4, 20, 22, 25, 30, 33, 43, 65, X66, 74 and 79. In addition, all the airport buses pass the end of the road by the Haymarket. This store follows the catalogue style of operation with plenty of interesting displays and technical staff to assist when required.

7 DAY OPENING

*N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES*



GLASGOW

264-266 Great Western Road,
Glasgow, G4 9EJ. Tel: 0141 353 3323.
Fax: 041 353 1838. Opening hours:
9 to 5.30 seven days a week. Closed
till 9.30 a.m. on Friday for staff
training. Closed all Public Holidays.

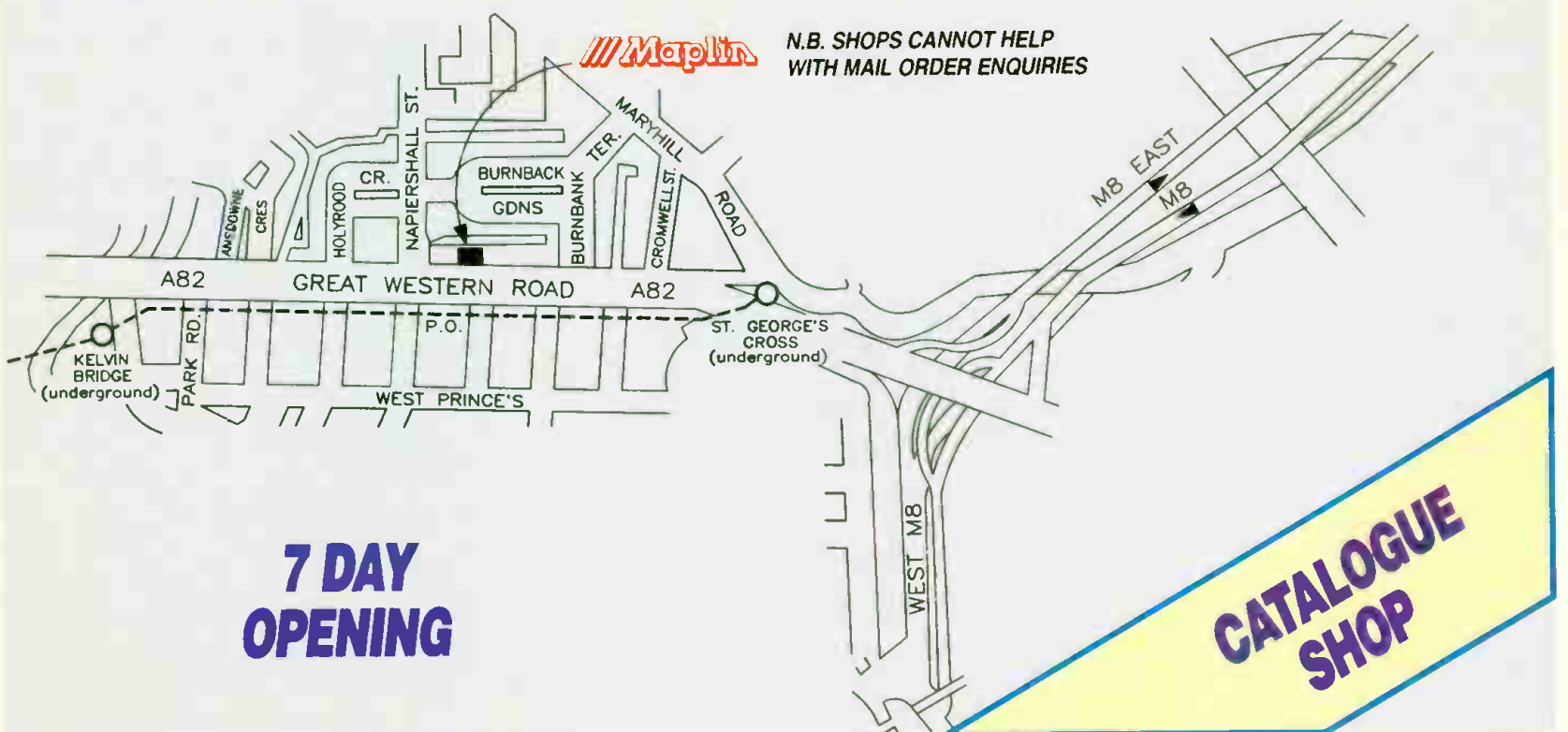
Our Glasgow shop benefits by being in one of the few areas in Glasgow where on-street parking is reasonable. There is also a small amount of parking to the rear of the shop. Our shop can be easily found on the

Great Western Road, only a short distance from the M8. Buses which travel up the Great Western Road are the 3B and 18. Alternatively, the shop is only a few minutes' walk from St. George's Cross underground station.

In Glasgow, too, our shop follows the Maplin tradition by providing interesting displays and technical sales staff to assist customers with our products.

7 DAY OPENING

*N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES*



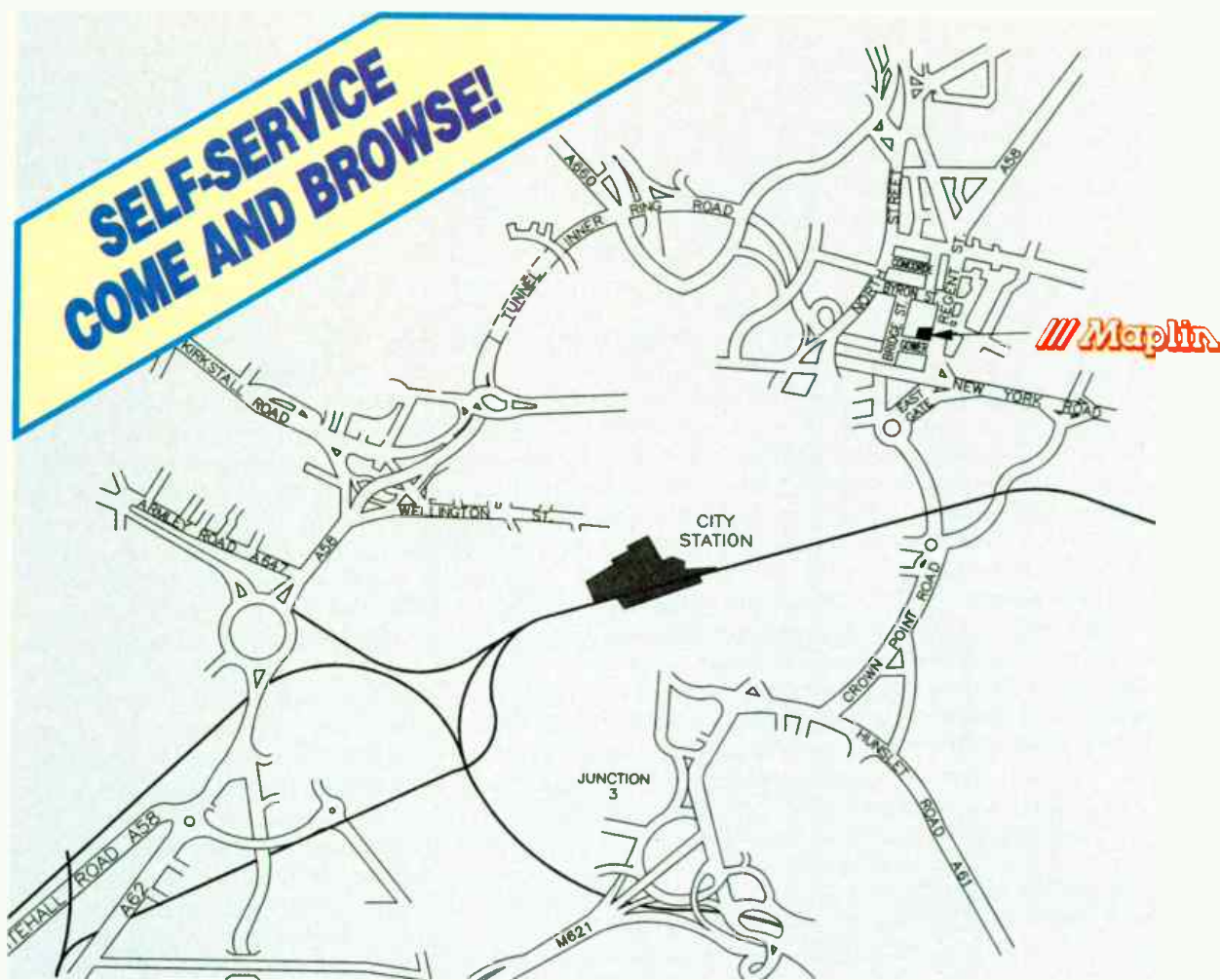
LEEDS

Carpet World Building,
3 Regent Street, Leeds, LS2 7QN.
Tel: 0113 244 9200.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

Just a few minutes' walk from the city centre our shop in Leeds is easy to find in Regent Street. We are just 1½ miles from the end of the M1 and M621 to the south. Leeds City Railway Station is about 1 mile away. There are plenty of parking spaces available in the large car park located behind the shop. Buses which pass our shop are the 26, 34, 35, 42, 42A, 88A and 88B. This shop features a self-service area where you can browse through our large range, whilst counter service is available as well.

**6 DAY
OPENING**

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



LEICESTER

Office World Building, Burton
Street, Leicester, LE1 1TE.
Tel: 0116 262 3288.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

Conveniently located by the roundabout at the junction of Humberstone Road (A47), St. George's Way (A594) and St. Matthew's Way (A47) on the inner ring road, opposite St. George's Retail Park. It is midway between St. Margaret's Bus Station and the Railway Station and is a few minutes' walk from the City centre. There is ample on-site parking with over 20 spaces immediately in front of the shop in the Office World Building car park.

If travelling from the M1 via Junction 21 or 22, follow the signs to the City centre and then the A47 towards Peterborough on the eastern side of the City centre using the inner ring road. From the A1, the A47 brings you directly to the shop.

27 different bus services allow access to the shop – numbers 9, 12, 12A, 17, 19, 20, 21, 23, 32, 33, 36, 36B, 38, 38A, 39, 47, 52, 53, 55, 56, 57, 58, 62, 94, 96, 141 and 253.

You can relax and browse through the interesting displays in this catalogue shop and technical staff are available to assist with all enquiries.

**6 DAY
OPENING**



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

LIVERPOOL

354 Edge Lane, Fairfield,
Liverpool, L7 9LG.
Tel: 0151 230 0366.
Opening hours:
9 to 5.30 Monday to Saturday.
Closed till 9.30 a.m. Friday for staff
training.
Closed all Public Holidays.

Many customers within the Merseyside area will be pleased to see the new Liverpool store, located on the busy A5047 which is an extension of the M62 motorway from Manchester. The store is on the north side of Edge Lane opposite the GPT site (formerly Plessey) and about 100 yards west of the Retail Park. Customers travelling towards Liverpool City Centre will need to drive past the store and do a "U" turn at one of the following intersections. There is plenty of free on-site car parking. Buses which pass the door are numbers 6 and 40. These buses travel from the centre of Liverpool and are therefore suitable for any customers travelling from either Lime Street or Central railway stations. Alternatively, Edge Hill Station is on the local line from Lime Street; this is a walk of approximately 20 minutes from the store. Our technical sales staff look forward to welcoming you.

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES



**6 DAY
OPENING**

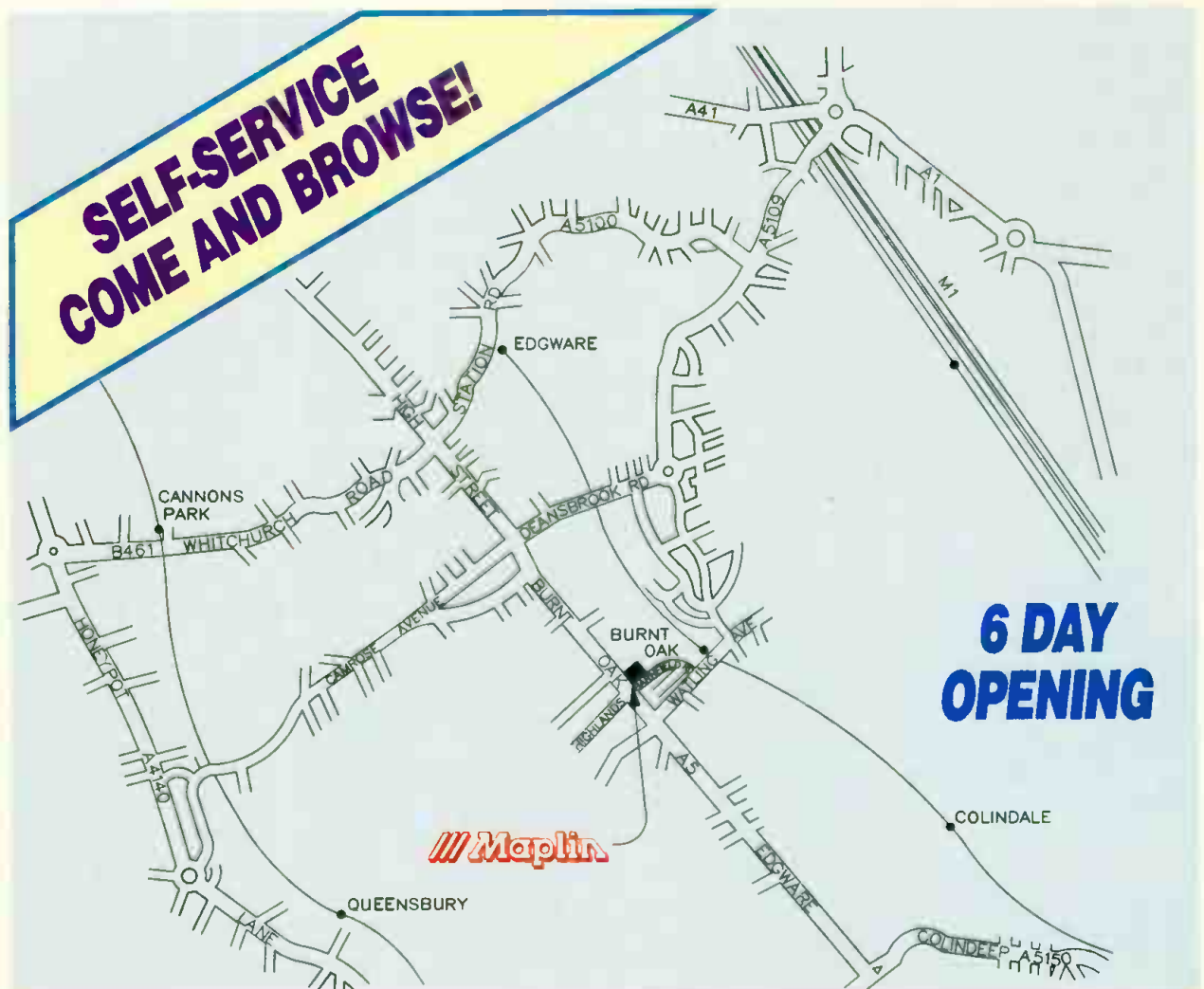
**NEW CATALOGUE
SHOP**

LONDON (EDGWARE)

146-148 Burnt Oak, Broadway,
Edgware, HA8 0AX.
Tel: 0181 951 0969.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

Our Edgware shop is on the A5, the Edgware Road at Burnt Oak, on the corner of Bamfield Road. We are just a few minutes from the M1 junction 4, and the A1 is also close by, being reached either from Northway Circus or Watford Way. Parking is reasonable in the many side roads. Burnt Oak tube station on the Edgware branch of the Northern Line is conveniently situated just around the corner from the shop in Watling Avenue. Buses which pass the door are the 32, 142, 204, 251 and 292. The shop features a self-service area where you can browse through our large range, whilst counter service is available as well.

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES



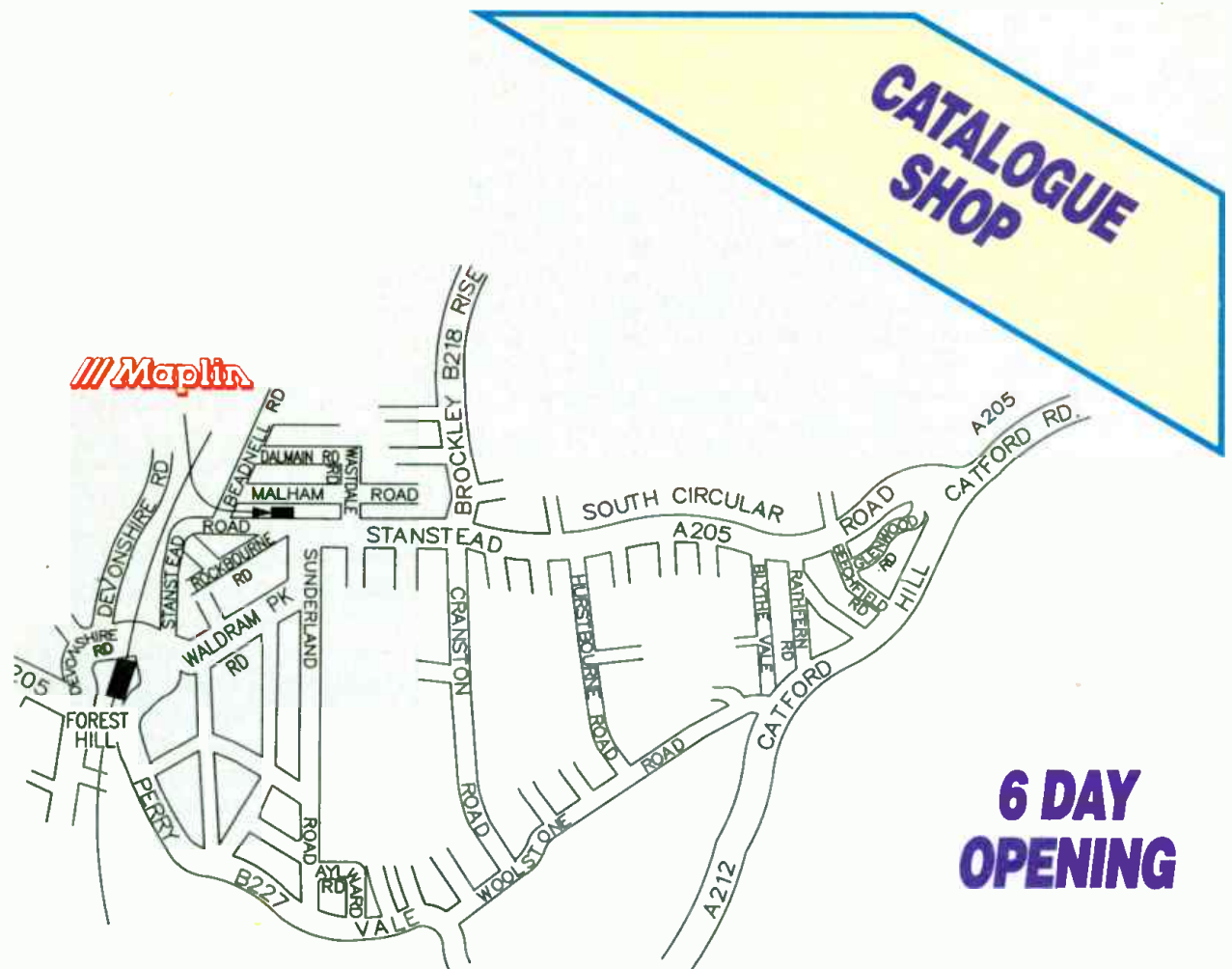
**SELF-SERVICE
COME AND BROWSE!**

**6 DAY
OPENING**

LONDON (FOREST HILL)

107-113 Stanstead Road, Forest Hill, London, SE23 1HH.
 Tel: 0181 291 9192.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. Friday for staff training.
 Closed all Public Holidays.

This South London store is centrally located and easy to access by road. Situated just off the South Circular ring road in Stanstead Road, there is ample on-site free car parking. Forest Hill railway station is approximately 5 minutes' walk away, where the following buses are available 115, 194, 78, 312, 176. There are also buses travelling along Stanstead Road, which are the 122, 171 and 185. This store uses the now familiar catalogue style of operation, providing many interesting displays of the extensive product range.



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

LONDON (HAMMERSMITH)

120-122 King Street, Hammersmith, London, W6 0QU.
 Tel: 0181 748 0926.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. on Friday for staff training.
 Closed all Public Holidays.

Situated just to the west of the pedestrian shopping centre in Hammersmith, the shop is within easy walking distance of Hammersmith Underground Station, for District, Piccadilly and Metropolitan lines. Buses No. 27, 91, 260, 267 and 290 pass the door. By car we're just 2 miles from the end of the M4. Continue straight along the Great West Road, turning left just before the Hammersmith flyover. On the roundabout, turn left into King Street and Maplin is approx. 300 yards on the right, past the Kings Mall Shopping Centre. There is metered parking close by. The shop features a catalogue shop style of service with the benefit of large displays and friendly staff to assist with product advice.



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

LONDON (ILFORD)

302-304 Green Lane, Ilford, IG1 1XT.
 Tel: 0181 599 0100.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. Friday for staff training. Closed all Public Holidays.

This super store is easily found on the busy Green Lane, about half a mile from the Ilford shopping centre. The shop is easily accessed from all round the East side of Greater London whether by road, train or bus. There is plenty of free car parking either immediately outside the shop, or in the adjoining side streets. There is also a limited number of spaces in a car park to the side of the premises. By train, the store is about 5 minutes from Seven Kings station, by walking a short way up the High Road and then down Highbury Gardens to Green Lane. Several buses pass the door including the 25, 129 and 148. This is a catalogue shop with many interesting displays and technical sales staff are on hand to assist.

**6 DAY
OPENING**



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

MANCHESTER (CHEETHAM HILL)

169 Cheetham Hill Road,
 Cheetham Hill,
 Manchester M8 8LG
 Tel: 0161 832 2550
 Opening hours: 9 to 5.30 Monday to Saturday. 10 to 4.30 Sunday. Closed till 9.30 Friday for staff training. Closed all Public Holidays.

This new Manchester store ideally complements the busy self-service Oxford Road branch. The Cheetham Hill store presents the catalogue shop format with plenty of interesting displays. Located close to the popular retail park on Cheetham Hill Road this store is easily reached from all parts of North Manchester and surrounding districts. Situated on the A665 the store is accessed from the Bent Street entrance. There is plenty of parking either in the street or on the Store forecourt. Many buses pass this location and Manchester Victoria station is little more than half a mile down Cheetham Hill Road.

**7 DAY
OPENING**



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

MANCHESTER (OXFORD ROAD)

8 Oxford Road, Manchester, M1 5QA.
 Tel: 0161 236 0281.
 Opening hours: 9 to 5.30 seven days a week. Closed till 9.30 a.m. Friday for staff training.
 Closed all Public Holidays.
 Note: open Sundays if local conditions permit.

Our Oxford Road shop is directly opposite the BBC, just off the Mancunian Way, between Piccadilly and the University complex. We're just a few steps from Oxford Road Station, or by car, about 5 minutes from the end of the M602 or junction 10 on the M63. There is a large NCP car park just behind the shop, or plenty of meters in side roads all around. There are many bus routes from various parts of the city with convenient bus stops only a few yards from the shop. This shop features a self-service area where you can browse through our large range, whilst counter service is available as well.



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

MIDDLESBROUGH

Unit 1, The Forbes Building,
 309-321 Linthorpe Road,
 Middlesbrough, TS1 4AW.
 Tel: 01642 242900.
 Opening hours:
 9 to 5.30 Monday to Saturday.
 Closed till 9.30 a.m. on Friday for staff training.
 Closed all Public Holidays.

The store is centrally situated on the corner of Linthorpe Road and Gresham Road. This is only a short distance from the A66 at its junction with the A1032. From the A66 the store can be reached by travelling down Heywood Street and then Ayresome Street to Linthorpe Road. It is only a short walk from the busy shopping centre and yet this location benefits from on-street parking and a customer car park directly behind the store. The Railway Station is on the other side of the shopping centre just under a mile away. Buses frequently pass the store, but it will be necessary to check locally as there are several bus companies. Again, this store is a catalogue style operation with plenty of interesting displays and helpful staff to assist when required.

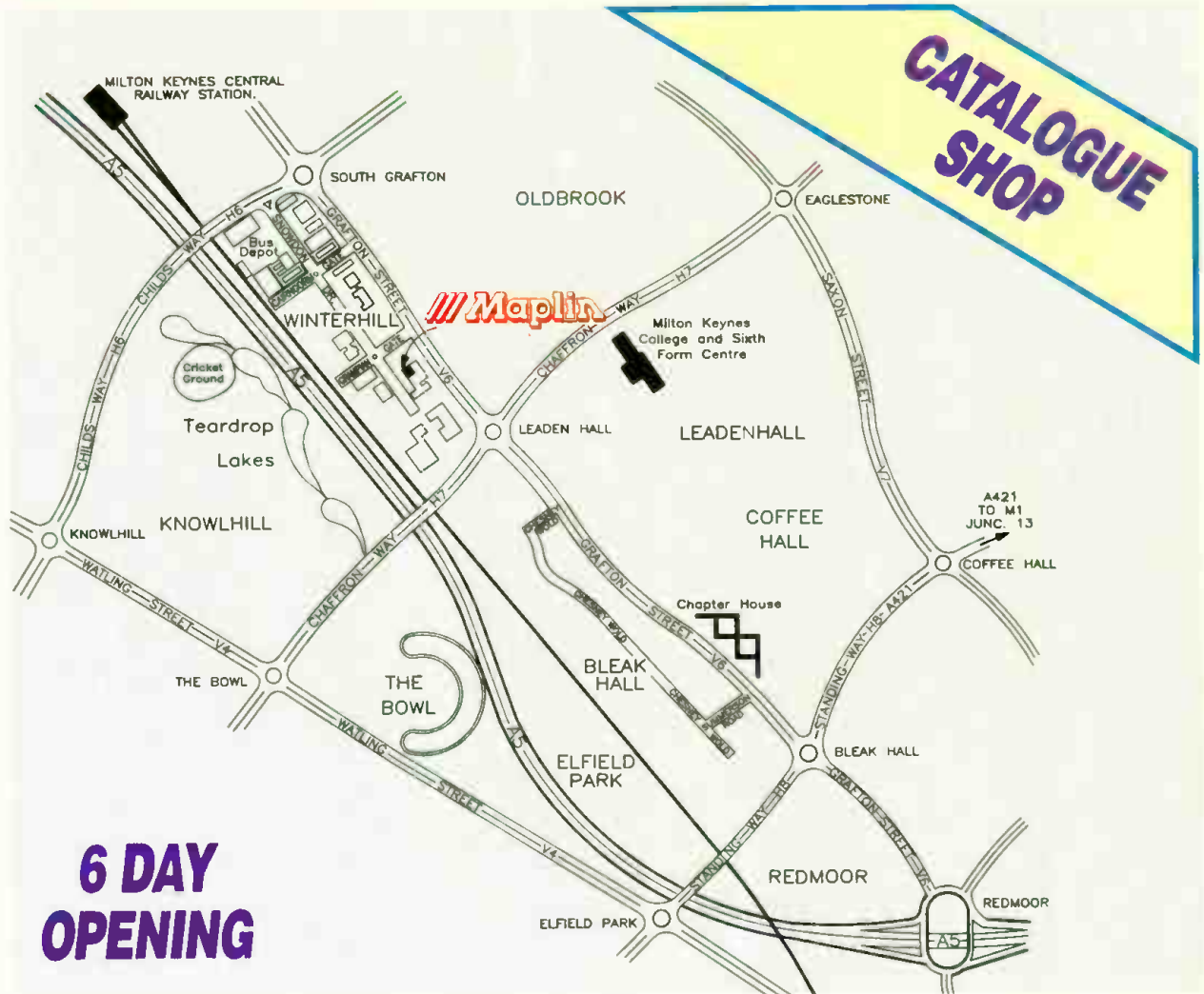


N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

MILTON KEYNES

Unit 2, Office World Building,
Snowdon Drive,
Winter Hill,
Milton Keynes, MK6 1BH.
Tel: 01908 692720
Opening hours: 9 to 5.30
Monday to Saturday.
Closed till 9.30 Friday for staff
training.
Closed all Public Holidays.

Maplin is pleased to announce that its Hi-Tech range of products will now be available from a new store in the Hi-Tech City of Milton Keynes. Prominently located alongside Office World, the new store sits between Grampian Gate and Snowdon Drive. This central position is located only a few hundred yards from the Winterhill Retail Park and just over half a mile from both the Central Railway and Bus stations. Like most of Milton Keynes, parking is made easy in the large car park adjoining the store. The new store provides a vast range of products and knowledgeable sales staff to assist with technical enquiries.



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

NEWCASTLE-UPON-TYNE

Unit 4, Allison Court (beside The Metro Centre), Gateshead, NE11 9YS.
Tel: 0191 488 9555.
Opening hours: 9 to 5.30 Monday to Saturday. 10 to 4.30 Sunday.
Closed till 9.30 a.m. Friday for staff training. Closed all Public Holidays.
Note: open Sundays if local conditions permit.

Serving the North East this shop could not be easier to find, being within sight of the A1 and alongside the A1 exit which leads to the Metro Centre. There is a car park adjoining the shop. If travelling from the South and East, leave the A1 at the Metro Centre exit, turn right at the first set of lights then across the next set of lights and left at the following set. From the North, as you enter the slip road towards the Metro Centre keep in the right hand lane up the slope towards the traffic lights, turn left, go past the left hand slip lane and turn left again at the next set of lights which leads towards the Allison Court entrance. There is a railway station and bus terminal at the Metro Centre Mall which is between five and ten minutes' walk from Allison Court. Trains are at regular intervals to Newcastle Central and the following buses stop at the Centre — 7, 51, 63, 66, 100, 183, 188, 301, 305, 602, 605, 606, 608, 609, 640, 641, X12, X36, M1-9.



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

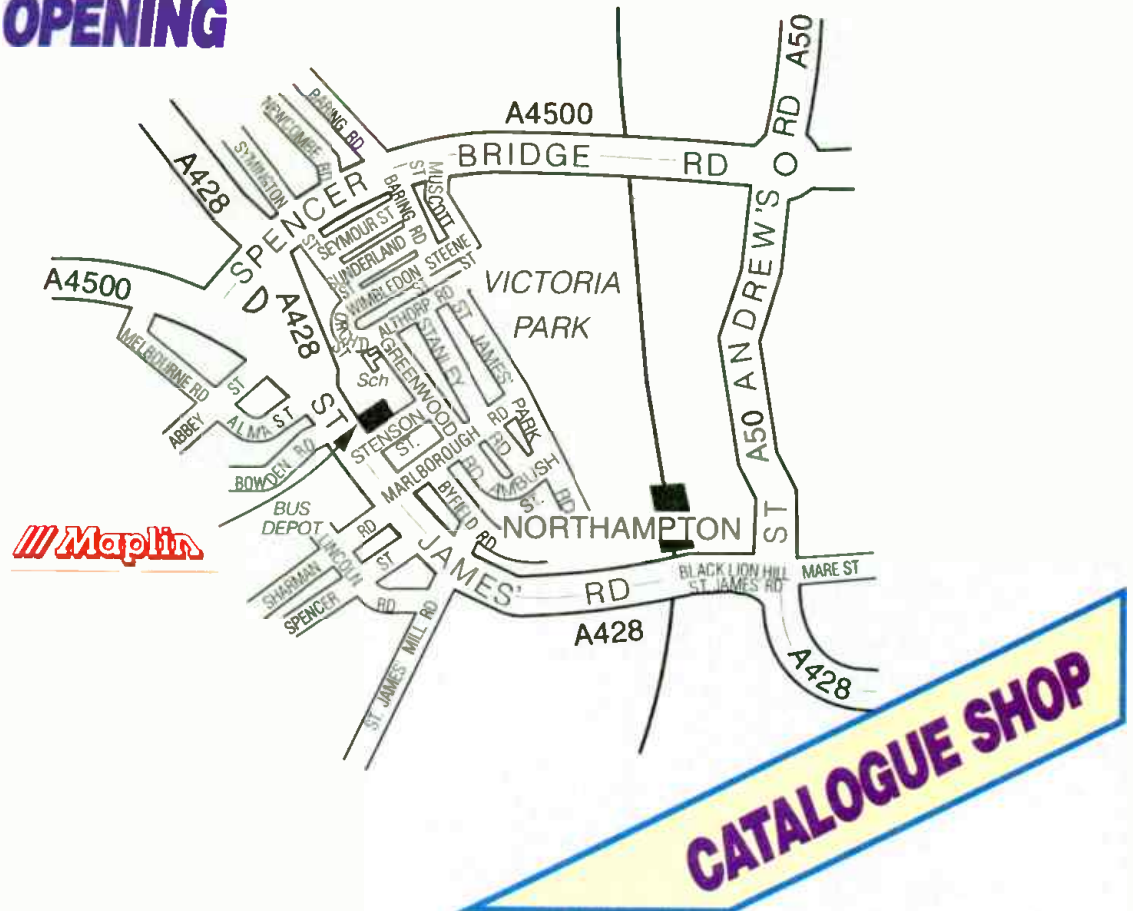
NORTHAMPTON

139 St. James Road,
Northampton, NN5 5LE.
Tel: 01604 756726
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

The recently opened Northampton store is conveniently located on the A428, about a half mile west of the city centre. This store is easily reached, being about five miles from junction

16 on the M1. It is worth noting that customers to this store benefit from being able to use a large car park which also provides access to the adjoining Co-op superstore.

**6 DAY
OPENING**



N.B. SHOPS CANNOT HELP

NOTTINGHAM

86-88 Lower Parliament Street,
Nottingham, NG1 1EH.
Tel: 0115 941 0242.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training. Closed all
Public Holidays.

Our shop in Nottingham is easily found on the north-east corner of the city's ring-road just a few minutes' walk from the city centre. The shop is about ten minutes' drive from the M1, take junction 25 if coming from the south or junction 26 from the north. Parking is quite good, free outside the shop or in the adjoining streets, or alternatively there is a car park nearby in Brook Street alongside Lower Parliament Street. If you are coming by train, you will find us just over half a mile north of the railway station and by bus the shop is only a short walk from Victoria shopping centre. This shop is the favoured catalogue style of operation and boasts numerous displays featuring many products.



**6 DAY
OPENING**

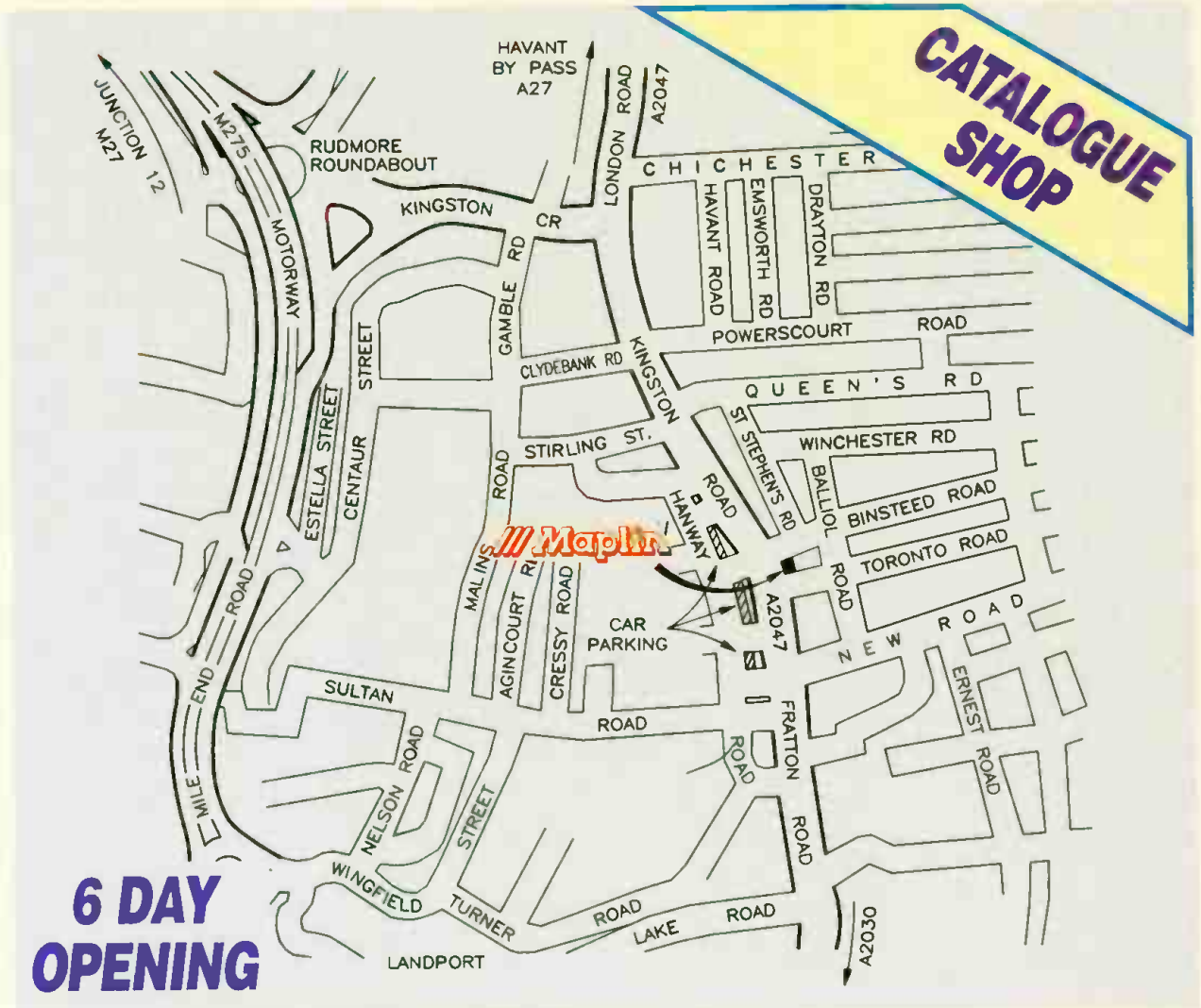
N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES

PORTSMOUTH

98-100 Kingston Road,
Portsmouth, PO2 7PA.
Tel: 01705 654411.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m. on
Friday for staff training.
Closed all Public Holidays.

The Portsmouth store is easily found within Kingston Road on the corner of Binstead Road. This is very central and only a short distance from the M275. Kingston Crescent links the M275 to the junction of London Road and Kingston Road in North End, Portsmouth. Car parking is reasonably good in this area with on-street parking both outside the shop and in the adjoining side streets. There are also several free car parks behind the shops on the opposite side of Kingston Road (west side), Kingston Road leads into Fratton Road at the end of which is Fratton Railway Station, a distance of just under a mile. Buses which pass the door are 1, 3, 3A, 12, 19, 40, 42, 43, 44, 44D, 65 and 67. The bus stops are located approximately 100 yards away in either direction. The friendly staff will be pleased to answer any enquiries or you can browse among the interesting and varied displays which this catalogue shop provides.

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



PRESTON

Unit 1, Corporation Street,
Preston, PR1 2UQ.
Tel: 01772 258484.
Opening hours:
9 to 5.30 Monday to Saturday.
Closed till 9.30 a.m. Friday for
staff training.
Closed all Public Holidays.

Centrally located, the new Preston store can be found on Corporation Street immediately beside Globus Office World which is sited at the Penwortham Bypass/Ring Way junction and close to the Corn Exchange. Ease of access is complemented by excellent parking facilities in the adjoining free customer car park. Preston Railway station is only 3 minutes walk down Corporation Street. The Central Bus Terminus is less than 5 minutes walk along the Ring Way and buses include the 158 from Blackpool, 152/163 from Blackburn, 125/6 from Chorley, 109/111 from Leyland and 100/102 from Southport. A warm welcome awaits customers at this catalogue style shop which boasts interesting product displays and sales staff who are able to provide technical advice.

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



READING

129-131 Oxford Road, Reading, RG1 7UU. Tel: 01734 566638.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. Friday for staff training. Closed all Public Holidays.

The Reading shop follows the traditional Maplin self selection format with technical assistance at hand. Located on the Oxford Road the shop is only a few minutes' walk from the centre of town. There is limited on-street parking, but parking is easiest in the multi-storey car park in Eaton Place about 200 yards from the shop. Alternatively, there is a car park on top of the Broad Street shopping mall. Conveniently positioned on the A329 to the west of the town centre, access to the shop from the north is via Bridge Street which leads over the River Thames. From the west the shop can be reached either down the Oxford Road or from junction 12 on the M4 and then up the A4. From the south the A33 crosses the M4 at junction 11 and from the east the A329M links the M4 junction 10 with the town centre.

The shop is situated between Reading Central and Reading West railway stations although Reading West is slightly nearer, being about a half mile to the west down Oxford Road. The following buses pass the door: Reading Transport 17, 18, 35 and 36;



and B Line 5 and 100. This shop features a self-service area where you can browse through our large range, whilst counter service is available as well.

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

6 DAY OPENING

SHEFFIELD

413 Langsett Road, Hillsborough, Sheffield, S6 2LL.
 Tel: 0114 285 5492.
 Opening hours: 9 to 5.30 Monday to Saturday. Closed till 9.30 a.m. Friday for staff training. Closed all Public Holidays.

Our shop in Sheffield can be found in Hillsborough on the busy Langsett Road (B6079) opposite the Hillsborough Barracks shopping centre. From the West the shop can be reached by leaving the M1 on Junction 34 and travelling down to the A6102 and heading towards Hillsborough. Note that some temporary one-way systems have been introduced during work on the new tram system. Please telephone the store staff for further advice. Parking is excellent, including forecourt parking in front of the shop. Sheffield station is just south of the city centre which is about two miles away. Local buses are the 13, 14, 57, 65, 81, 83, 84, 86, 87, 88 and 487. We hope our South Yorkshire customers will enjoy the catalogue style shop with informative displays, and technical staff to provide that personal service.



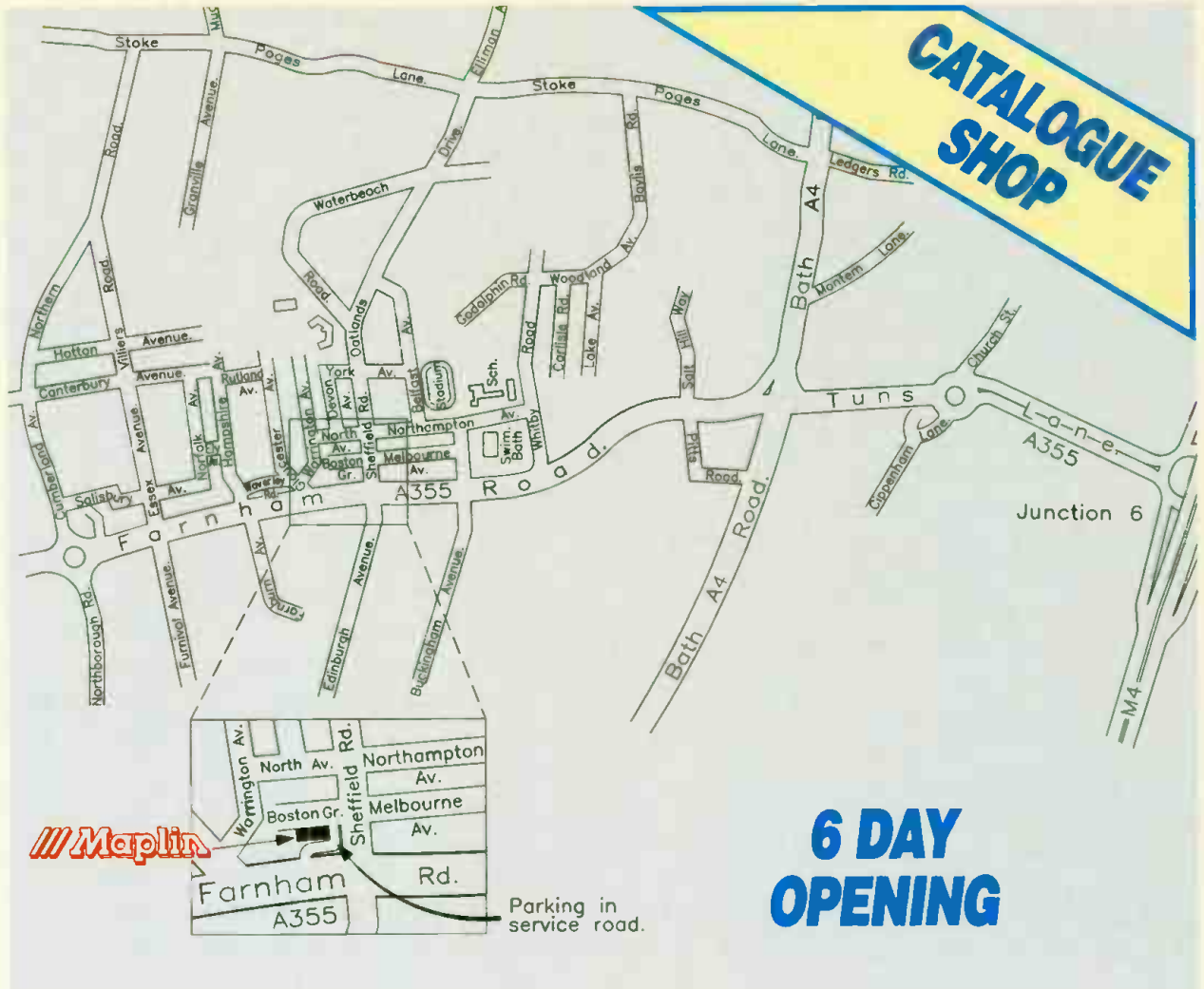
6 DAY OPENING

N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

SLOUGH

216-218 Farnham Road,
Slough, SL1 4XE
Tel: 01753 551419.
Opening hours: 9 to 5.30
Monday to Saturday. Closed till
9.30 Friday for staff training.
Closed all Public Holidays.

We are pleased to announce the opening of our new store in Slough. Located on the busy A355, the store can be easily found on the Farnham Road at the junction with Edinburgh Avenue and Sheffield Road. Parking is either to the front or at the side of the store. Several buses pass the shop which is a little over 1½ miles from the Slough railway station. Conveniently located and easily accessed, this new branch displays many of the Maplin products. And, like all the other branches, this store boasts friendly sales staff with the ability to assist with technical enquiries.



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

SOUTHAMPTON

46-48 Bevois Valley Road,
Southampton, SO2 0JR.
Tel: 01703 225831.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

Situated in the Bevois Valley area in Southampton, we are conveniently placed for easy access from all parts of Hampshire and surrounding counties. The A33 needs to be followed if travelling from London, then continue down The Avenue, turning left into Lodge Road. Turn right at the next traffic lights and the shop is 400 yards on the left. From the East or West leave the M27 at Junction 5 (signed to Portswood and Swaythling). Travel down Stoneham Way and then left at the second set of traffic lights to the City Centre. At the end turn left into Bevois Valley Road and our shop is approximately 200 yards on the left. There is a small car park in Earls Road opposite the shop. There is also on-street parking available about 100 yards along Earls Road, but as this is one way, it needs to be accessed from Lodge Road. From Southampton railway station, a No. 10 bus will bring you to the shop or from the city centre take the No. 13. This shop features a self-service area where you can browse through our large range, whilst counter service is available as well.



N.B. SHOPS CANNOT HELP WITH MAIL ORDER ENQUIRIES

SOUTHEND

282-284 London Road,
Westcliff-on-Sea, Essex, SS0 7JG.
Tel: 01702 392000.
Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training. Closed all
Public Holidays.

Serving Essex, our Southend shop is situated on the A13 (London Road), within easy walking distance of Westcliff and Southend Victoria stations. By road we're only 30 minutes from the M25 (junction 29). There is free parking outside the shop (except during Clearway times) or in the road opposite. Buses which pass the shop are the 1, 2, 3, 3A, 4, 5, 25, 27, 28 and the X1. This store features a selfservice area where you can browse through our large range, whilst counter service is available as well.

6 DAY OPENING

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



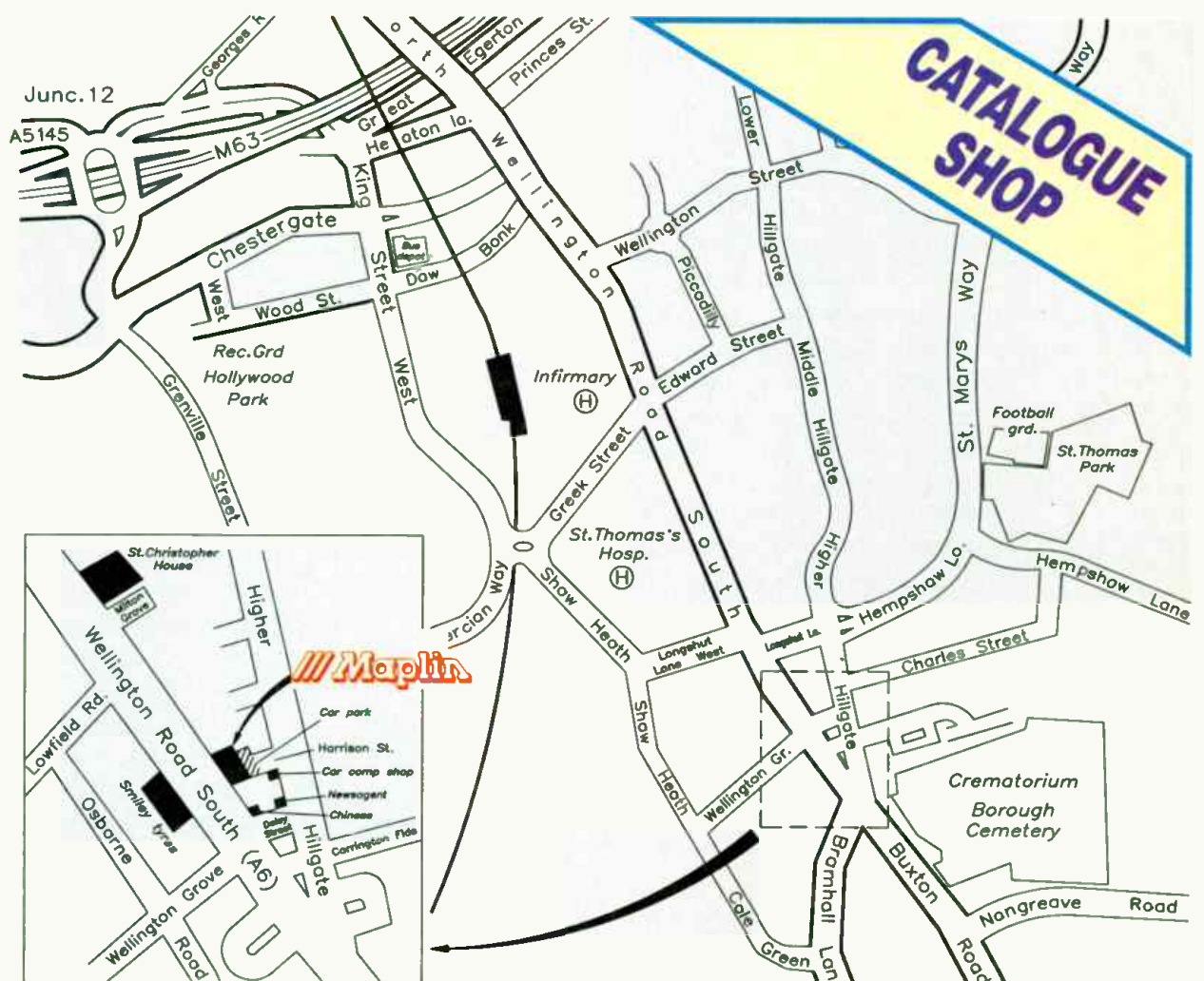
STOCKPORT

259-261 Wellington Road South,
Stockport, SK2 29NG.
Tel: 0161 480 4900.
Opening hours: 9 to 5.30
Monday to Saturday. Closed till
9.30 Friday for staff training.
Closed all Public Holidays.

The new Stockport store is centrally located on the busy A6 (Wellington Road South). It can be found approximately 100 yards north of the junction with Buxton Road and Bramhall Lane. The store is a little over half a mile from the centre of Stockport and the railway station. Junction 12, on the M63 is a little more than 1 mile away. Parking is plentiful, either outside the front of the shop, or in the large private car park which is accessed from Higher Hillgate at the rear of the store. Many buses pass the door. Again this store follows the catalogue shop style providing interesting displays and supported by technical sales staff to assist with enquiries.

6 DAY OPENING

**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**



STOKE-ON-TRENT

39-45 London Road,
Stoke-on-Trent,
Staffordshire, ST4 1NB.
Tel: 01782 749947.

Opening hours: 9 to 5.30 Monday
to Saturday. Closed till 9.30 a.m.
Friday for staff training.
Closed all Public Holidays.

The latest store to open is located just off the A52 on the B5041 in the centre of Stoke-on-Trent. This unit is easily found opposite the Royal Doulton factory on the London Road at its junction with Fleming Road. Although this store is close to the busy retailing area, there is an adjoining private car park for MPS customers which is accessed via Spark Street.

6 DAY OPENING



**N.B. SHOPS CANNOT HELP
WITH MAIL ORDER ENQUIRIES**

THE ENTIRE MAPLIN STOCK RANGE AT YOUR FINGERTIPS!

Yes, the new state-of-the-art Maplin key call system means that you can now place your orders directly onto our computer, 24 hours a day, seven days a week by simply using your telephone keypad or a pocket tone dialler (see card inside back cover).

Anyone with a tone dial (DTMF) telephone can use this system. The majority of exchanges in this country will accept tone dial telephones which are readily available from Maplin and other telecomms retailers. An alternative is to use our pocket tone dialler which is the size of a key-ring fob and may be easily carried with you. When you dial 01702 556751, our computer will speak to you and ask you various questions to which you reply using your telephone keypad. The digits 1 through to 0 are used as well as the * and # buttons. You will be given several opportunities to abort an order so feel free to make a few trial orders without the risk of actually ordering any goods.

To make it easier, and save your telephone call charges, a removable order card is provided at the rear of this catalogue (see card inside back cover), please photocopy this and use it to prepare your order before making your call. A space is provided on this card for you to write down the order confirmation number, which is given at the end of an order. You should quote this number if you contact us with any queries regarding that order.

To use this system, Maplin alpha-numeric stock codes have to be converted into all digit form and details of how to do this are shown below. When you call this system you will first be asked for your customer number and personal identification number (PIN). If you have previously used our mail order service, you will find your customer number on the invoice/delivery note sent with each order. Phone us on 01702 552911 or 01702 554161, quote your customer number and you will be given your PIN number. Future invoice/delivery notes will show both numbers. If you are a new customer or are unable to find your existing customer number, simply phone us on 01702 552911 to obtain your customer and PIN numbers. Payment for orders placed on this system is by

credit card. Orders will only be accepted if the credit card holder's address is the same as the delivery address associated with the customer number. You will be asked to enter your credit card number and expiry date each time you place an order, so have it to hand before you make the call.

The Seven Steps To Placing Your Fingertip Order

1. Write your customer number, PIN number and credit card details on your copy of the order preparation card.
2. Select the items you wish to order from the catalogue, write down the order codes and quantities. Remember to ignore the last letter of standard order codes, but not fixed resistors (see Resistors Section).
3. Using the charts, convert the order codes into digital format and write these down. Don't forget that fixed resistors use a special conversion chart.
4. Dial 01702 556751 and enter your order details from the preparation card when prompted by the voice; it may help to tick each item once ordered.
5. When you have finished entering all your order codes and quantities, the computer will read each item back to you with its standing order code, the quantity you have ordered and the price. Check these items are correct and re-enter or delete any that have been entered in error.
6. When you are happy that all the items you have ordered are correct and you have accepted them, the computer will give you the total amount that will be charged to your credit card, make a note of this for your reference in the space provided on the card.
7. When you have finally accepted the order, you will be given an order confirmation number, write this on your card and quote this number if you ever need to contact us regarding the order.

MAPLIN KEY CALL STOCK CODE CONVERSION TABLE

Standard Order Codes

To use the Maplin key call system, standard Maplin alpha-numeric order codes must be converted into an all digit format. The following table enables each letter of the alphabet to be replaced by a two digit number. *The last letter of the order code is always ignored when converting to digital form.*

NOTE: Fixed resistors use a separate coding system, see RESISTORS on page 636 for a breakdown of the special codes required. All resistor Starter Packs are ordered by the standard order codes shown here.

Order Code	Digit Code
RW 67 X	28 33 67
ZA 11 M	36 11 11

R converts to number 28, W converts to number 33, 67 is the number from RW67X and don't forget to ignore the last letter, in this case it's the X. So, the final digital code will be 28 33 67.

A = 11
B = 12
C = 13
D = 14
E = 15
F = 16
G = 17
H = 18
I = 19
J = 20
K = 21
L = 22
M = 23
N = 24
O = 25
P = 26
Q = 27
R = 28
S = 29
T = 30
U = 31
V = 32
W = 33
X = 34
Y = 35
Z = 36

852 • Order Code Index



A	637	AB99	73	AG90	47	AY24	125	BL82.83	470	BZ12-17	628	CM72.73	78	DC07	780	FB12	498	FG45.46	799
AA00-03	424	AD00-07	696	AG91-93	42	AY25	487	BL85.86	470	BZ18	22	CM81	69	DC08	777	FB15	498	FG47-49	792
AA04	433	AD08-13	697	AG97.98	69	AY26	656	BL88	470	BZ19	361	CM83.84	70	DC09	778	FB18	498	FG50-52	785
AA05	431	AD15.16	697	AG99	70	AY27	717	BL90	470	BZ21.22	546	CM87-93	71	DC10	759	FB22.23	498	FG53-55	786
AA06	414	AD17	688	AH00-10	657	AY29.30	658	BL92	470	BZ23.24	542	CP00-04	72	DC11	776	FB25	498	FG61	786
AA07	432	AD18-20	691	AH11.12	658	AY31	689	BL94.95	470	BZ25	36	CP09-15	73	DC17	544	FB30	498	FG66-68	526
AA08	405	AD21	692	AH13-20	468	AY32	690	BR02	721	BZ27-30	574	CP17-22	73	DC17.18	782	FB38.39	498	FG79	587
AA09	406	AD22	691	AH21-24	813	AY33	735	BR48	348	CP23.24	124	CP23.24	74	DC19.20	689	FB43	498	FG84-87	532
AA11	415	AD23	689	AH25	71	AY35	756	BR49	349	BZ32	299	CP25-28	75	DC22	691	FB48.49	498	FG94	82
AA12	416	AD24-26	690	AH26-38	613	AY36.37	757	BR51	348	BZ33.34	281	CP29-31	76	DC26.27	693	FB51	498	FH00-08	790
AA13	409	AD27-31	692	AH39	748	AY38	711	BR52.53	355	BZ39.40	273	CP32	77	DC30-32	693	FB60-62	498	FH30.31	792
AA14	415	AD32-49	687	AH40	757	AY39	756	BR58	349	BZ43-47	618	CP35-42	77	DC42	806	FB68	498	FH34	792
AA15	402	AD50-55	688	AH41	758	AY40	711	BR63.64	365	BZ48	619	CP43-50	545	DC52	806	FB71-74	498	FH35.36	798
AA16	447	AD56	710	AH42	754	AY41.42	730	BR65.66	377	BZ49	620	CP51	35	DC58	809	FB81-84	498	FH38	796
AA17.18	450	AD57-59	713	AH44	754	AY43	714	BR71	356	BZ50-52	619	CP52-55	609	DC72-74	802	FB90-92	498	FH39	791
AA19	413	AD60.61	723	AH45	740	AY44.45	616	BR85-87	377	BZ53	361	CP56-57	605	DC77	806	FB96	498	FH40	796
AA20	427	AD62-64	727	AH46-48	685	AY46.47	654	BR91	359	BZ54-56	98	CP58-63	568	DC80	806	FB98	498	FH41	800
AA21	449	AD65	771	AH49-51	696	AY49-51	654	BR94.95	360	BZ57	99	CP67-76	570	DE62.63	792	FB00-04	498	FH42-45	794
AA22	439	AD66	710	AH52-54	719	AY53-57	654	BR96	361	BZ58	361	CP77-81	657	DE76	12	FD07	236	FH46-48	796
AA23	449	AD67.68	774	AH56.57	656	AY59	736	BT09	296	BZ59	353	CP86.87	510	DE77	710	FD10	595	FH50-51	796
AA24	427	AD69-71	777	AH58-61	698	AY97.98	753	BT11	290	BZ61	60	CP88	722	DE78	214	FD11	236	FH52.53	797
AA25	430	AD72	775	AH62	699	BT0M	637	BT15	294	BZ63	45	CP89	724	DF17.18	397	FD12	620	FH55	797
AA26	450	AD73	714	AH63-68	658	BA00	487	BT16	293	BZ64	19	CP90	725	DF91	475	FD14	620	FH57	794
AA27	446	AD74-79	715	AH69	750	BA01-06	486	BT18	293	BZ65	129	CP91	502	DH04	355	FD15	498	FH59.80	798
AA28	429	AD80.81	716	AH70	721	BA07	396	BT32.33	61	BZ66	100	CP93.94	749	DH24-33	817	FD20	177	FH61.62	804
AA29	449	AD82-90	761	AH71-73	765	BA08.09	395	BT33	261	BZ68	261	CP95	751	DH35-38	817	FD23	819	FH66	800
AA37	435	AD91-94	771	AH74	762	BA11-13	396	BT34	63	BZ69	147	CP96	681	DH39-44	818	FD26	55	FH67-69	804
AA52	415	AD95-97	684	AH75.76	763	BA14	383	BT39	273	BZ70.71	335	CP97	15	DH45-49	819	FD28	85	FH75.76	804
AA53	404	AD98	697	AH77	764	BA15-20	387	BT41.42	570	BZ72-77	576	CP98	21	DH50-52	818	FD29-33	627	FH78	804
AA54	425	AD99	713	AH78.79	762	BA21	357	BT43.44	600	BZ78	317	CP99	682	DH53-76	822	FD34.35	303	FH80	804
AA55	415	AE00.01	713	AH80-82	752	BA22	380	BT46	600	BZ80	133	CR00	757	DH83	390	FD36-41	88	FH84	804
AA56	401	AE02.03	708	AH83.84	753	BA25-27	378	BT47.48	601	BZ81-84	456	CR01	653	DH85	256	FD44.45	88	FH91	799
AA57	449	AE04	766	AH85.86	760	BA36-44	471	BT49	600	BZ88-90	285	CR05	642	DJ28	502	FD51.52	90	FH92.93	800
AA58	405	AE05-08	769	AH87	761	BA51	285	BT50-53	601	BZ91.94	473	CR06	23	DJ31.32	502	FD54	794	FH94	799
AA59	404	AE09.10	770	AJ55-58	707	BA53-55	285	BT54-56	603	BZ95-97	42	CR07-10	694	DJ37.38	502	FD56	357	FH95	797
AA60	417	AE11.12	732	AJ59	735	BA64.65	31	BT57-59	602	BZ99	632	CR11	704	DK19.20	569	FD65-68	590	FH97-99	790
AA61	447	AE13.14	734	AJ60.61	736	BA66-70	366	BT60-65	603	C	437	CR12	756	DK21	12	FD69-74	523	FJ00	512
AA62	450	AE15	731	AJ62	737	BA80	370	BT66-75	602	CR03-06	78	CR13	766	DK26	336	FD75	585	FJ01-04	532
AA63	415	AE17-19	743	AJ63.64	683	BA83	370	BT76-94	601	CC00	93	CR14-16	767	DK27	488	FD76	590	FJ05	515
AA64	425	AE20	681	AJ67-71	269	BA86	374	BT95-97	602	CC01	85	CR17-20	687	DK28	279	FD77	567	FJ06	90
AA65	446	AE21	662	AJ72-75	270	BA88	372	BT99	601	CC02	91	CR21	771	DK29	286	FD78	161	FJ08	90
AA66	425	AE22	665	AJ76	269	BA89	374	BU00	601	CC03	85	CR23.24	773	DK30	285	FD79-84	512	FJ10	90
AA67	449	AE23	662	AJ96	21	BA90.91	372	BU04	601	CC04	95	CR25-27	780	DK31.32	275	FD85.86	547	FJ12	90
AA68	425	AE24	673	AJ97	386	BA93-97	373	BU06-11	602	CC07-09	467	CR28.32	781	DK33.34	281	FD88.89	300	FJ13-17	531
AA69	447	AE25	669	AK07-13	570	BB18	169	BU12-18	601	CC10	465	CR34	97	DK62	563	FD90.91	783	FJ19.20	80
AA72	446	AE26	666	AK16	533	BB20	169	BU20-26	601	CC20.21	473	CR35	335	DK63-68	614	FD92	770	FJ23	80
AA73	445	AE27	663	AM03	170	BB72.73	251	BU28	379	CC22	480	CR36	29	DK69	615	FD93-95	107	FJ27	66
AA74	450	AE28	667	AM04.05	168	BE75	259	BU30	375	CC24.25	487	CR37	28	DK70	614	FD96-98	572	FJ30	66
AA75-77	407	AE29.30	668	AM06	179	BF00-10	594	BU31.32	376	CC26-29	479	CR38	29	DK73	385	FD99	487	FJ31.32	67
AA77	39	AE31	666	AM08.09	192	BF12-14	594	BU34	376	CC31	521	CR39	30	DK74	499	FE00	487	FJ33	68
AA78	423	AE40	661	AM10	197	BF16-29	594	BU36	389	CC36-39	514	CR40	29	DK83.84	802	FE01.02	488	FJ34	66
AA80	445	AE41	662	AM11	200	BF36.37	593	BU39	371	CC40	520	CR41-44	30	DK85	794	FE10	547	FJ38.39	118
AA81	410	AE42	665	AM12	239	BF39-45	593	BU40-42	816	CJ03	41	CR43	29	DK87	794	FE11	611	FJ40	119
AA85	416	AE43	662	AM13	241	BF51.52	593	BU44	816	CJ04	36	CR45	215	DK95	34	FE15	534	FJ41	520
AA86	438	AE44	679	AM14	245	BF58	593	BU55-60	814	CJ05	296	CR46	24	DM09	478	FE16-23	302	FJ42.43	807
AA88	417	AE45	673	AM17	248	BF62	593	BU62	814	CJ06	39	CR47	23	DM10	391	FE25	612	FJ44	381
AA89	435	AE46	664	AM18	174	BF64-69	595	BU63-66	815	CJ07.08	36	CR48	48	DM11	818	FE26	611	FJ47	530
AA90	429	AE48	670	AM19-21	175	BF70-73	594	BU67	477	CJ09.10	34	CT02.03	89	DM12	23	FE27	161	FJ51	530
AA91	412	AE49	669	AM22	259	BF75.76	594	BU68.69	89	CJ11	37	CT09	89	DM13	818	FE28	160	FJ53.54	237
AA92	410	AE50	666	AM23	260	BF79-80	594	BU70	358	CJ12	35	CT23.24	89	DM21.25	691	FE29	362	FJ55	630
AA93	432	AE51	670	AM24	261	BF82-84	594	BU71	357	CJ13.14	599	CT26.27	89	DM26	818	FE31	546	FJ61	529
AA94	448	AE52	679	AM26	28	BF86-90	485	BU72	359	CJ15	132	CT40	89	DM27.28	817	FE32	585	FJ62	533
AA97-99	417	AE53.54	666	AM27.28	238	BF91-93	487	BU73	358	CJ19	125	CW16-18	586	DM29-31	818	FE33-35	216	FJ63-69	783
AB01	677	AE55	667	AM33.34	73	BF94	488	BU74	356	CJ20	126	FW90	587	DM37	26	FE36-41	582	FJ70	520
AB02	675	AE56	663	AM35	76	BH00	487	BU75	359	CJ21	124	CW33	477	DM50	352	FE42	521	FJ72	545
AB03	661	AE57	668	AN00	417	BH02.03	487	BU77	354	CJ23	244	CW40	489	DM50.51	24	FE43	796	FJ73	550
AB04.05	663	AE58	667	AP00	479	BH06	487	BU78	55	CJ35	463	CW41-43	476	DM51	603	FE44	795	FJ74	516
AB06	664	AE59-61	670	AP01	631	BH08.09	487	BU79.80	51	CJ35.36	619	CW44-45	288	DM53	820	FE45-47	598	FJ76	521
AB07	662	AE62	671	AP05	650	BH12	487	BU81	56	CJ37.38	620	CW44.45	475	DM54	819	FE48-52	377	FJ77-84	549
AB08	664	AE63	675	AP07	560	BH14.15	487	BU82	52	CJ40-43	619	CW50.51	14	DM55	597	FE59	467	FJ85	509
AB09	679																		

FL44,45	396	FS63	90	FY34-37	362	GE85	260	GW33	367	HL16-19	533	JC75,76	593	JL47	498	JU58,69	385	KC17	396
FL46	395	FS65-71	629	FY41,42	363	GE86	231	GW34	359	HL20	536	JC81	593	JL49	498	JU85	159	KC19-21	396
FL56	782	FS73-76	456	FY45,46	362	GE87	251	GW35	360	HL23	537	JD16	593	JL51	498	JU86	380	KC22-37	545
FL58	785	FS77-79	621	FY55-57	364	GE88	194	GW36-38	354	HL27-28	537	JD59-63	593	JL56,57	498	JU87,88	379	KC38	20
FL77	788	FS80,81	532	FY59	368	GE89	248	GW39	357	HL33,34	538	JD74-78	593	JL62	548	JU89-91	372	KC39,40	21
FL78	785	FS82-85	526	FY62	382	GE90	217	GW40,41	350	HL36,37	538	JD94-98	593	JL63	332	JU93,94	374	KC41-48	486
FL79	789	FS86,87	521	FY63	381	GE91,92	200	GW41	537	HL39,40	538	JE15	621	JL72,73	813	JU96-99	372	KC49-52	542
FL80	625	FS88	90	FY64-67	385	GE93	255	GW43	369	HL42,43	536	JE16	613	JL74	260	JV08	340	KC53-58	519
FL82	625	FS89	84	FY68,69	382	GE94	174	GW44	820	HL44	536	JG00	394	JL76	394	JW04	371	KC60	65
FL85,86	530	FS90,91	524	FY70,71	388	GE95	210	GW45	388	HL45-50	537	JG04,05	539	JL77,78	215	JW05	372	KC61	579
FL91	529	FS95	302	FY72	391	GE96	174	GW46	369	HL51	538	JG06	387	JL83,84	215	JW06	374	KC62-64	285
FM00	539	FS96	364	FY73	303	GE98	174	GW47	350	HL54-58	552	JG07	324	JL87,88	215	JW07-11	373	KC66	285
FM01	538	FS98	366	FY74	304	GE99	230	GW48	358	HL61-64	553	JG09	324	JL89	214	JW16	371	KC68-71	560
FM03,04	454	FS99	811	FY78-87	501	GH00	172	GW49	356	HL65,66	554	JG13	324	JL92	396	JW18,19	373	KC72,73	559
FM07-09	455	FT00-06	385	FY89	613	GH01,02	259	GW51,52	44	HL67-69	555	JG16,17	389	JL94	819	JW20	372	KC75	564
FM10	123	FT08	384	FY93	543	GH03	251	GW54	27	HL71,72	555	JG18	250	JL95,96	214	JW22	372	KC76-81	553
FM11	521	FT09	382	FY94	544	GH06	248	GW55	50	HL73	556	JG19	242	JL97	388	JW25,26	372	KC83,84	461
FM12	514	FT10	385	FY95-97	382	GH08	228	GW56	51	HL76	557	JG20	595	JL99	524	JW27,28	787	KC87,88	478
FM18	455	FT11,12	384	GA17	170	GH09	232	GW57	55	HL78	557	JG22	809	JM00	541	JW29,30	786	KC89,90	574
FM24	455	FT13	383	GA19	191	GH10	214	GW58	53	HL83	557	JG23	232	JM01	798	JW31	788	KC91-93	573
FM28-33	456	FT14,15	784	GA26,27	194	GH11	194	GW59	54	HL86,87	557	JG28	233	JM02	624	JW33,34	520	KC96	576
FM34	626	FT17-19	394	GA28,29	170	GH12	178	GW61	547	HL89-92	558	JG30	557	JM03-06	625	JW35	95	KC98	575
FM35,36	456	FT20-25	397	GA42	209	GH13,14	229	GW62	605	HL95	550	JG31,32	558	JM07	572	JW36,37	94	KC99-99	487
FM37	521	FT26-28	383	GA43	230	GH16	198	GW63	611	HQ00	789	JG33,34	559	JM08	289	JW38	95	KP46	198
FM38	610	FT29	384	GA72,73	242	GH17	250	GW64	613	HQ01	469	JG36,37	560	JM09	802	JW39,40	547	KP47	178
FM40	505	FT30	263	GB22	252	GH18	248	GW65	608	HQ02-08	377	JG38	561	JM10,11	147	JW41,48	530	KP48	228
FM41	506	FT31	572	GB30,31	253	GH19	200	GW66-73	797	HQ10	377	JG39	561	JM12	148	JW49-51	531	KP49	677
FM42	505	FT34	496	GB52	206	GH20	207	GW74	793	HQ12	377	JG40,41	558	JM13,14	160	JW49-52	359	KP50	603
FM43	506	FT35	566	GB54	230	GH21	199	GW75-77	43	HQ14	377	JG42,43	555	JM16	578	JW53-56	573	KP51	544
FM44	505	FT36	535	GB61	206	GH22,23	201	GW78-85	461	HQ16	377	JG47-49	235	JM17-19	807	JW57,58	289	KP52-54	499
FM47	540	FT37	534	GB66	222	GH24	210	GW86	313	HQ18	377	JG51,52	808	JM20	510	JW59-62	544	KP56,57	388
FM50-54	516	FT38	542	GB67	237	GH26	252	GW87	321	HQ22	377	JG53,54	809	JM21,22	511	JW63-65	528	KP58	210
FM59	391	FT40	242	GB71	241	GH27	213	GW88-92	324	HQ26	377	JG57-60	809	JM23	510	JW66-68	544	KP59	252
FM77	393	FT44	364	GB77	222	GH28,29	224	GW93	799	HQ29	377	JG62-64	809	JM26	808	JW69-74	530	KP62	46
FM80	394	FT45	64	GB79	247	GH31	224	GW94,95	358	HQ31-34	569	JG65-70	808	JM27,28	304	JW75,76	793	KP63	388
FM81	393	FT46-50	64	GB85	250	GH32,33	166	GW96	356	HQ38	782	JG71	365	JM29	628	JW77,78	528	KP64	231
FM82	394	FT51,52	64	GB86	199	GH34	256	GW97	357	HQ40	579	JG72-80	469	JM30,31	349	JW79,80	533	KP65,66	209
FM83	498	FT53	242	GB87	242	GH35	232	GW98	356	HQ49	483	JG83	456	JM34	79	JW81-85	528	KP67	254
FM84	397	FT54	354	GB89	192	GH36	254	GW99	358	HQ54,55	516	JG87,88	455	JM38,39	72	JW86	527	KP68	236
FM85	300	FT55	815	GB93	192	GH39	201	GX00	356	HQ58-60	516	JG90	455	JM43-46	541	JW87,88	526	KP69	213
FM87	304	FT56	794	GD02,03	199	GH41	242	GX01	58	HQ61	618	JG97,98	355	JM47	798	JW89	529	KP70	231
FM89,90	805	FT60	532	GD10	178	GH46	246	GX05	684	HQ63,64	621	JH00	355	JM48-50	289	JW90	530	KR00	19
FM91,92	806	FT61	612	GD11	176	GH47	208	GX06	776	HQ68	168	JH03,04	355	JM51-52	288	JW91-93	527	KR02-06	89
FM97	378	FT62	534	GD13	223	GH49	209	GX07	747	HQ69,70	787	JH06	355	JM66-68	807	JW94	528	KR07	87
FM98	299	FT63-65	535	GD14	823	GH50	247	GX09	747	HQ76,77	782	JH08,09	793	JM69-84	640	JW95,96	505	KR10-16	580
FM99	47	FT66	525	GD18,19	236	GH51	207	GX10	758	HQ79,80	785	JH11	793	JM85-88	641	JW97-99	506	KR17	570
FP00,01	549	FT70,71	532	GD20,21	230	GH52	173	GX11	755	HQ81	787	JH12,13	810	JM89	390	JX00	506	KR18	27
FP02	585	FT72	531	GD25	178	GH53	215	GX12,13	25	HQ82	80	JH15,16	810	JM90	368	JX01-20	508	KR20	159
FP03,04	588	FT73	613	GD26	236	GH54	206	GX22	346	HQ83	80	JH19	359	JM91	511	JX21	786	KR21,22	340
FP05	237	FT74	533	GD27	246	GH59,60	167	GX23,24	685	HQ84	80	JH20	356	JM92	515	JX22-35	82	KR23	187
FP06,07	641	FT75	369	GD28,29	206	GH61	172	GX25-27	346	HQ87-49	82	JH21,22	488	JM94	815	JX38	542	KR23-25	556
FP11,12	19	FT76	367	GD30	237	GH62	258	GX29-36	656	HQ88	82	JH22,23	596	JM97,98	784	JX39	388	KR26	385
FP13	505	FT78	500	GD31	171	GH63	246	GX38-43	656	HQ89	82	JH24	96	JP02,03	254	JX40	340	KR27,28	388
FP14	528	FT85	547	GD34	177	GH64	234	GX45	703	HQ90	82	JH25	96	JP04	175	JX41,42	234	KR29	366
FP15	512	FT87	532	GD41	241	GH66	190	GX46	702	HQ99	82	JH26	98	JP05-11	386	JX43	216	KR30	489
FP16-20	487	FT89	532	GD44	252	GH67	259	GX47	761	HQ04-07	570	JH29-32	499	JP12	597	JX45,46	45	KR31-33	471
FP21-23	488	FT92	516	GD56	248	GH68	197	GX48	729	HQ12	521	JH34,35	499	JP14,15	385	JX47	47	KR34	45
FP24	505	FT93,94	539	GD59	253	GH69	231	GX49	720	HQ13	570	JH36,37	532	JP16	346	JX48	602	KR35,36	561
FP26	505	FT95	517	GD60	250	GH70	217	GX50	747	HQ17	813	JH38-41	783	JP19	534	JX50	46	KR37	556
FP27-29	527	FT96	539	GD61	232	GH71	213	GX53	755	HQ20-04	632	JH42	364	JP20	541	JX52	214	KR38,39	559
FP31	527	FT97	540	GD63	250	GH74	191	GX54	735	HQ06-08	812	JH58	137	JP22	541	JX53	603	KR40	284
FP32,33	386	FT99	533	GD68,69	218	GH75	209	GX55-60	732	HQ09-11	813	JH59	366	JP24-36	585	JX56	575	KR41	280
FP34	511	FV01,02	798	GD70	242	GH76	245	H	638	HQ30-35	501	JH60-66	522	JP38	585	JX57	572	KR42	281
FP36-38	389	FV03,04	509	GD71	241	GH78	236	HB10	616	HQ36-43	616	HX42,43	523	JP39	511	JX58,59	253	KR43,44	368
FP39	625	FV05,06	412	GD72,73	210	GH79	254	HB22	596	HQ44	633	JH91,92	522	JP40	532	JX59	594	KR45,46	367
FP40	632	FV08-12	136	GD75	228	GH80	209	HB23	589	HX46,47	633	JH93	517	JP41	585	JX60,61	597	KR47	25
FP41-45	797	FV16	81	GD76	222	GH81	205	HB26	590	HX49	633	JH94	516	JP42	578	JX62-66	596	KR48-51	346
FP48-50	797	FV18	81	GD77	233	GH82	191	HB51	570	HX60	502	JH95	517	JP43	703	JX67-71	597	KR55-57	579
FP51-54	801	FV20	82	GD78	235	GH84	235	HB58,59	544	HX62	501	JH96	518	JP44	136	JX72,73	596	KR59,60	489
FP55	347	FV22-24	82	GD79-82	171	GH85	191	HF01	552	HX63,64	633	JH98,99	512	JP45	529	JX74,75	597	KR61,62	364
FP57,58	237																		

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KW07-08	324	LM57	172	LT07	164	PB00-02	471	QO56	666	QY75	701	RK47	161	RX99	589	UF91-93	610	UL60	744
KW09	319	LM59	179	LT08	198	PB03-05	474	QO64	653	QY76	745	RK49	147	RY06	117	UF96	605	UL61	502
KW10	314	LM60-64	235	LT09	164	PB06-09	476	QO71	651	QY77-79	772	RK50	497	RZ00-05	65	UF97-99	639	UL62	693
KW11	315	LM65	175	LT10	200	PB10-12	477	QO79-11	652	QY81	655	RK51	511	RZ06	62	UH00-22	639	UL63	193
KW12	316	LM66	261	LT11	170	PB13	479	QR12	653	QY83	607	RK52-54	520	RZ07	462	UH23-29	640	UL64	751
KW15-17	373	LM67	211	LT12	207	PB14	480	QR14	655	QY86-89	609	RK55	516	RZ08	520	UH30-33	717	UL66	693
KW23-25	365	LM68	173	LT13	250	PB15-16	483	QR17	652	QY90-91	377	RK56-58	511	RZ09	271	UH34	653	UL67	744
KW26	364	LM69	239	LT14	201	PB17	481	QR19-22	651	QY94-95	377	RK59	487	RZ10	463	UH35	708	UL68	568
KW27	363	LM71	260	LT15	199	PB18	480	QR23	652	QY96-99	606	RK60-62	526	RZ13	307	UH36	757	UL69	781
KW29-33	397	LM72-73	224	LT16,17	201	PB19,20	484	QR24	653	RA01-13	568	RK64	505	RZ14	462	UH37	749	UL70-71	544
KW35	583	LM75	197	LT18	210	PB21-27	485	QR26-32	651	RA14-15	569	RK65-66	543	RZ15	296	UH40	696	UL73	329
KW36	513	LM76	165	LT19	213	PB28-38	487	QR34	651	RA17-20	569	RK68	543	RZ16	295	UH42	701	UL74	782
KW37	281	LM77	180	LT20	252	PB39	481	QR35	653	RA22-23	569	RK69	544	RZ17	293	UH43	700	UL75	737
KW41-46	787	LM78,79	260	LT21,22	224	PB40-41	482	QR36	654	RA24-32	639	RK71	95	RZ18	463	UH44	701	UL76	734
KW47-49	788	LM80	174	LT23,24	166	PB42,43	484	QR38	654	RA33-50	492	RK72	542	RZ25	560	UH45	674	UL77	735
KW50	787	LM81	179	LT25	251	PB44-48	483	QR39-42	651	RA52	492	RK80	513	RZ26-28	562	UH46-53	652	UL78	725
KW51-53	788	LM83	253	LT26	256	PB49	481	QR50	654	RA53-55	497	RK82	799	RZ29	561	UH54	653	UL79-80	740
KW54	787	LM85,86	175	LT28	215	PB50	480	QR54	609	RA56	616	RK84	520	RZ30	563	UH55,56	651	UL81	726
KW55	788	LM87,88	215	LT29	242	PB52	482	QR55	747	RA57	615	RK86,87	520	RZ31	562	UH57	726	UL82	642
KW56	251	LM89	221	LT30	254	PB53-55	474	QR56	653	RA59	616	RK89-91	591	RZ32-35	561	UH58	801	UL88	604
KW61	583	LM90	215	LT31	173	PB57	484	QR59	653	RA61	569	RK92-93	136	RZ36	553	UH59	748	UL89	605
KW62	14	LM95	237	LT32	247	PB58	473	QW00	694	RA64	569	RK99	88	RZ37	552	UH60	746	UL92	782
KW65	259	LM96	214	LT33	207	PB59	484	QW03	694	RA66-72	714	RL06	420	RZ43	55	UH66	737	UL96	771
KW66	617	LM98	254	LT34	206	PB60	472	QW07,08	653	RA73,74	709	RL27	423	RZ44	48	UH74-77	801	UL99	301
KW69	783	LM99	211	LT35	232	PB61	473	QW12	695	RA76	682	RL43	437	RZ45	566	UH78	722	UM00-05	301
KW70	381	LP00	263	LT36	246	PB62	480	QW14	678	RA84	755	RQ01	411	RZ46	28	UH84	814	UM05-07	816
L	638	LP01	251	LT37	258	PB63	481	QW15,16	669	RA85	760	RQ23	420	RZ48	20	UH85	501	UM08-11	814
LB10	147	LP02	261	LT39	209	PB64,65	483	QW17	664	RA86-88	767	RQ28	435	RZ53	54	UH86	815	UM10	813
LB11	148	LP03	165	LT40	208	PB66	481	QW18	669	RA95-97	791	RQ29	436	RZ54	795	UH87	199	UM20-23	814
LB12	147	LP05	175	LT41	209	PB67-70	485	QW19,20	670	RB03	88	RO54	422	RZ55	15	UH88	700	UM24-27	815
LB14	819	LP06	176	LT42	234	PB71	474	QW23	671	RB10	437	RR28	422	RZ56	149	UH93	697	UM28-34	816
LB17	812	LP07	194	LT43	231	PB72,73	476	QW25	668	RC06,07	289	RR39	434	RZ57-61	486	UH94	501	UM35-44	487
LB19,20	812	LP09	262	LT44,45	167	PB72-75	288	QW27	671	RC08-11	282	RT20	56	RZ62-64	374	UJ00,01	387	UM47	487
LB23-25	101	LP11	211	LT46	190	PB74,75	475	QW29,30	667	RC22-41	634	RT21	54	RZ65-70	486	UJ02-10	501	UM54	724
LB35	136	LP12	200	LT47	246	PB76,77	478	QW32	680	RC42,43	635	RT22	208	RZ75	67	UJ11	526	UM56	738
LB42	812	LP13	237	LT48	172	PB78	474	QW34	675	RC45	20	RT31	278	RZ77	368	UJ14	526	UM57	701
LB44	812	LP14	221	LT50	259	PB79	476	QW35,36	676	RC53	554	RT33	278	RZ78	513	UJ15-18	653	UM58-60	702
LB62	812	LP15	256	LT51	197	PB80	474	QW39	674	RC57	564	RT35,36	277	RZ79	531	UJ21	653	UM62	700
LB63	560	LP16	165	LT52	231	PB82	476	QW40	671	RC59	19	RT39	280	RZ80	520	UJ24-31	653	UM63	699
LB68	131	LP18	262	LT53	217	PB82,29	655	QW41	677	RC70	568	RT43-45	274	RZ81	563	UJ32-33	654	UM64-65	732
LB69	132	LP20	263	LT54	245	PB83-33	651	QW42	675	RC74	704	RT46-50	278	RZ82	564	UJ34	708	UM66	733
LB80	299	LP21	179	LT55	213	PB87-40	652	QW43	663	RC75	107	RT51,52	279	RZ83,84	563	UJ36	712	UM68	697
LB92	130	LP22-24	193	LT56	191	PB88-49	652	QW44	662	RC79	107	RT53-56	273	RZ84	18	UJ37,38	718	UM69-71	652
LB93	131	LP28	233	LT57	209	PB89-57	651	QW45	663	RC81	107	RT57	88	RZ85	341	UJ40-43	732	UM72	696
LB96	138	LP30	221	LT58	236	PB90-62	651	QW46	668	RC82-84	108	RT58	247	RZ85,86	554	UJ44	731	UM73	624
LB97	123	LP31	234	LT59	205	PB93	652	QW47	664	RC87-89	109	RT59	91	RZ90-92	486	UJ45	733	UM74-77	657
LB99	595	LP32	171	LT60	191	PB95-70	652	QW48,49	662	RC90	110	RT60,61	102	RZ93	35	UJ48	733	UM78-84	653
LF01	572	LP36	199	LT63	191	PB72	652	QW53	664	RC91,92	113	RT63	489	RZ94	42	UJ49-51	742	UM85,86	652
LF02	580	LP37	252	LT64	214	PB73	651	QW54	669	RC93	114	RT65	154	RZ95,96	41	UJ53	751	UM89	652
LF08	579	LP38	216	LT65	193	PF00-01	651	QW57	668	RC94	115	RT66	149	RZ97	42	UJ54-57	767	UR05	731
LF10-16	579	LP39	192	LT70	254	PF03	652	QW61	671	RC95	116	RT67-70	158	RZ98	38	UJ70,71	602	UR06,07	707
LM08	587	LP41	220	LT71,72	167	PF05-07	652	QW64	664	RC96	117	RT71	154	RZ99	40	UJ72	600	UR10	707
LM10	579	LP42	172	LT73	235	PF08,09	653	QW65	666	RC97,98	103	RT72	158	S	638	UJ73-98	568	UR12,13	741
LM11	587	LP43	168	LT73	169	QF16	654	QW68	671	RC99	104	RT77	456	SK00	164	UJ99	569	UR15	759
LM12-13	589	LP44	173	LT73,33,34	818	QF18,19	654	QW73	667	RD17-19	792	RT79	488	SK01	138	UJ00-13	569	UR16	730
LM14	572	LP45	230	LT73	168	QF27-29	652	QW83	670	RD20	800	RT82-84	487	SK01-03	353	UK14-17	609	UR17	773
LM20-23	574	LP46	231	LT73	165	QF30	618	QW84	674	RD51	386	RT85	488	SK04	164	UK18	604	UR18	710
LM37-42	580	LP48	260	LT73,62	242	QF31	655	QW85	673	RD52-59	387	RT86	487	U	636	UK19-20	605	UR19,20	711
LM50-51	578	LP49	230	LT73	209	QF32	653	QW87	670	RD74,75	369	RT88-90	487	UB00	661	UK21-24	607	UR23-24	657
LM56,57	572	LP50	248	LT73	817	QF39	653	QW89	671	RD76	371	RT92-94	62	UB01	662	UK25-29	608	UR25-31	658
LM59	572	LP51	251	LT74	438	QF42	655	QW90	673	RD77	374	RT95	63	UB03,04	665	UK30-34	604	UR33-39	658
LM63-67	576	LP52	178	M	637	QF44	655	QW93	696	RD79	365	RT96-98	64	UB06	662	UK35-37	606	UR40,41	654
LM68-69	577	LP53	214	MJ00,01	150	QF75	652	QW94,95	779	RD80	377	RU00-03	69	UB10	664	UK38-42	607	UR42	657
LM70-74	581	LP54	210	MJ02	161	QH00-02	656	QW96	608	RD81	353	RU04-07	70	UB13	663	UK43-47	608	UR43-50	654
LM77-78	377	LP55	222	MJ03	156	QH03-25	657	QX01,02	662	RD82-86	351	RU10,11	70	UB15	663	UK48-50	606	UR58-65	697
LM79	375	LP56	170	MJ04	152	QH26	741	QX03	669	RD87-90	352	RU12-21	71	UB19	666	UK51	605	UR67	732
LM87	131	LP58	175	MJ05	94	QH28,29	712	QX04	666	RD91,92	353	RU22-27	72	UB23	663	UK52	607	UR68	733
LM88	136	LP59,60	259	MJ09	91	QH30	657	QX05-06	661	RD93	352	RU31	73	UB26	679	UK53	608	UR69	618
LM90	575	LP61	251	MJ13	458	QH36,37	707	QX07	666	RD95,96	355	RU38-50	73	UB29	664	UK54-56	658	UR70	739
LM99	149	LP65	192	MJ18-35	90	QH38	720	QX08	676	RD99	358	RU52,53	74	UB30	662	UK57	811	V	638
LMK03	170	LP66	193	MJ37-44	91	QH40													

VF15.16	257	WP94	434	WT39	414	WZ75	410	XP09	148	XY41	580	YK27	580	YR87	627	YX64.65	792	ZB41	556
VF17.18	180	WP96	408	WT41	417	WZ76	435	XP13	375	XY43.49	580	YK28	580	YR88	805	YX73	157	ZB42.48	454
VF19	182	WP98	409	WT42	446	WZ77	447	XP15.16	378	XY59.60	582	YK33	582	YR90	570	YX76.80	88	ZB49	557
VF20	239	WP97	419	WT43	404	WZ82.83	419	XP17	379	XY14.18	589	YK39	589	YR95	340	YX79.91	505	ZB50	454
VF23.24	195	WO13	600	WT44	439	WZ84	406	XP18	374	YB20	582	YK40	582	YR96	560	YX82	806	ZB51	558
VF28	195	WO20	739	WT45.46	411	WZ85	429	XP19	370	YB21	582	YK43	582	YR97	554	YX84	806	ZB52	454
VF30.31	195	WO21	712	WT47	408	WZ86	436	XP20.21	371	YB23	582	YK50	582	YR98	555	YX86	806	ZB53.60	455
VF32	203	WO22.23	657	WT48	402	WZ87	430	XP25	112	YB28	582	YK69	582	YR99	367	YX97.99	807	ZB61	558
VF34	227	WO24.25	658	WT49	421	WZ88	419	XP27	819	YB73	582	YK71.72	582	YR99.09	286	YX00.02	600	ZB62	455
VF35	227	WO29.31	712	WT50	426	WZ89	419	XP70.72	76	YB76	582	YK74.75	582	YR99	45	YX06	600	ZB63	454
VF36.37	227	WO32	756	WT52.53	408	WZ91	411	XP73.76	72	YB78.79	582	YK78	582	YR99	522	YX06	600	ZB64	565
VF38	197	WO33	720	WT55.56	423	WZ92	431	XP77	76	YB81	582	YK79	582	YR99	365	YX07.11	483	ZB65.67	454
VF39	182	WO35	723	WT56	552	WZ93	425	XP81	77	YB88	582	YK81	582	YR99	148	YX24.25	483	ZB68.71	456
VF40	180	WO38	775	WT57	425	WZ95	425	XP84	124	YB88	582	YK86	582	YR99	148	YX29.37	483	ZB73.74	456
VF41	227	WO39	683	WT58	426	WZ96	406	XP89.10	582	YB91	582	YK91	582	YR99	60	YX38	604	ZB75	559
VF42	257	WO40	749	WT60	413	WZ97.99	424	XP93	148	YF00	582	YK96.99	582	YR99	87	YX39.40	609	ZB76.77	456
VF43	190	WO41	750	WT61	433	XA25.26	266	XP95	149	YF02	582	YK98	582	YR99	85	YX45.46	609	ZB78.79	565
VF44	187	WO46	686	WT65	437	XA29.31	266	XP98	152	YF03	582	YK99	582	YR99	147	YX48	609	ZB80	566
VF45.47	182	WO48	696	WT68	437	XA37	266	XP99.31	152	YF04.05	582	YK99	582	YR99	361	YX51.58	609	ZB81	456
VF49.50	183	WO51	653	WT69	401	XA40.77	266	XP99.37	152	YF06	582	YK99	582	YR99	106	YX59.60	610	ZB82	556
VF51.52	182	WO54	708	WT70	405	XA60.62	266	XP99.46	153	YF08	582	YK99	582	YR99	105	YX62.63	615	ZB84.85	561
VF53	183	WO56	680	WT71	406	XB00	127	XP99.55	155	YF09	582	YK99	582	YR99	285	YX65.66	610	ZB86	562
VF54	203	WO57.58	665	WT72	403	XB21	127	XP99.58	155	YF12	582	YK99	582	YR99	282	YX68	610	ZB87	456
VF55	203	WO63	719	WT73	405	XB28	117	XP99.63	155	YF14	582	YK99	582	YR99	133	YX70	721	ZB88	552
WO00.01	W	WO66.67	721	WT74	401	XB38	117	XP99.74	100	YF15	582	YK99	582	YR99	122	YX72	741	ZB89	558
WO6	638	WO70	615	WT75	434	XB45.46	137	XP99.82	476	YF18	582	YK99	582	YR99	136	YX74	748	ZB91	35
WO6	422	WO71.74	652	WT77	418	XB56	580	XP99.85	477	YF20	582	YK99	582	YR99	104	YX74	766	ZB92	36
WO13	422	WO77.79	767	WT78	450	XB67.68	580	XP99.87	474	YF21	582	YK99	582	YR99	105	YX75	757	ZB97.98	34
WO14	421	WO85.90	767	WT79	442	XB69	579	XP99.88	481	YF21	582	YK99	582	YR99	104	YX87	725	ZC02	133
WO15.17	817	WO83	719	WT80	432	XB71	579	XP99.91	482	YF31	582	YK99	582	YR99	632	YX94	751	ZC09	48
WO24.26	817	WO84	721	WT81	432	XB73.74	579	XP99.91	482	YF31	582	YK99	582	YR99	386	YX96.97	750	ZC10	48
WO26.05	817	WO85	721	WT82	432	XB75	579	XP99.91	482	YF31	582	YK99	582	YR99	631	YX99	749	ZC11	45
WO29.31	817	WO86	721	WT83	432	XB77	579	XP99.91	482	YF31	582	YK99	582	YR99	67	YX99	749	ZC12	47
WO36.09	817	WO87	721	WT84	432	XB79	579	XP99.91	482	YF31	582	YK99	582	YR99	291	YX00.02	581	ZC12	45
WO38.51	640	WO88	721	WT85	432	XB81	579	XP99.91	482	YF31	582	YK99	582	YR99	66	YX00.02	581	ZC14.17	17
WO39.94	105	WO89	721	WT86	432	XB83	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO42	105	WO90	721	WT87	432	XB85	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO43	105	WO91	721	WT88	432	XB87	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO44	105	WO92	721	WT89	432	XB89	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO45	105	WO93	721	WT90	432	XB91	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO46	105	WO94	721	WT91	432	XB93	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO47	105	WO95	721	WT92	432	XB95	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO48	105	WO96	721	WT93	432	XB97	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO49	105	WO97	721	WT94	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO50	105	WO98	721	WT95	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO51	105	WO99	721	WT96	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO52	105	WO99	721	WT97	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO53	105	WO99	721	WT98	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO54	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO55	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO56	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO57	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO58	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO59	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO60	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO61	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO62	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO63	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO64	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO65	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO66	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO67	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO68	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO69	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO70	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO71	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO72	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO73	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
WO74	105	WO99	721	WT99	432	XB99	579	XP99.91	482	YF31	582	YK99	582	YR99	332	YX04.09	630	ZC18	46
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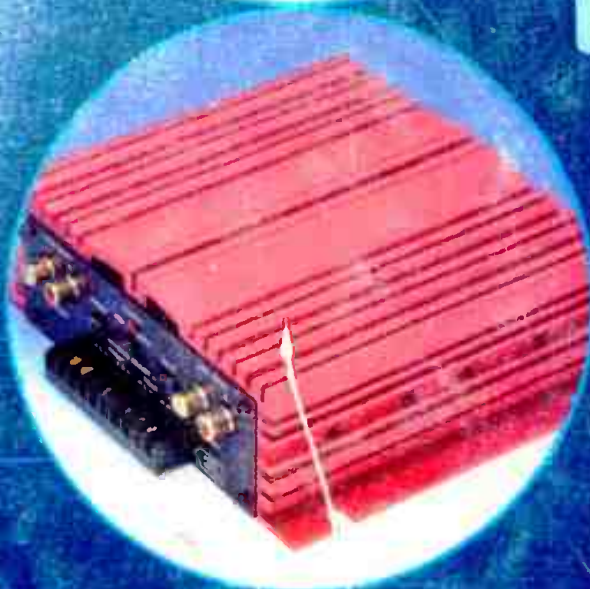
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