Amateur and professional antennas by

Jaybeam Limited

Moulton Park Industrial Estate,
Northampton NN3 1QQ
Telephone: (0604) 46611
IT'S SHOW TIME AGAIN AND YOUR CHANCE TO SEE ON STAND No. 20 AT GRANBY HALLS, LEICESTER. THAT'S BEST FROM THE FOREMOST INTERNATIONAL PRODUCTS - DON'T FORGET THAT WE ARE THE PEOPLE WORDS ALL ITEMS EXHIBITED ARE IMPORTED BY US HERE'S A FEW EXAMPLES OF WHAT YOU WILL BE

HERE'S YOUR CHANCE TO GET ONE OF THE BRAND-NEW MODEL FT-221R

OR PERHAPS YOU HAVE DECIDED TO FOLLOW THE EXAMPLE OF COUNTLESS THOUSANDS AND SETTLE FOR AN FT-10IE?

WHO KNOWS? YOU MAY BE ONE OF THE LUCKY ONES TO SECURE THE MUCH SOUGHT-AFTER FRG-7 GENERAL COVERAGE RECEIVER

AND IF YOU DON'T MAKE IT TO LEICESTER THEN YOU CAN ALWAYS CONTACT — KEN McINNES, G3FTE, AMATEUR ELECTRONICS UK • COASTAL, 316-318 NORTHDOWN ROAD, CLIFTONVILLE, KENT. THANET (0843) 22060 OR • WALES & WEST • ROSS CLARE, GW3NWS, CAERLEON 422232
AMATEUR ELECTRONICS UK

EQUIPMENT BY THE WORLD'S TOP MANUFACTURERS
AMATEUR ELECTRONICS UK WILL BE FEATURING 'ALL MANUFACTURERS PLUS SOME OTHER EXCITING NEW WITH DIRECT AGENCY APPOINTMENTS - IN OTHER DIRECT FROM THE FACTORY - JUST TO REMIND YOU SEEING ON STAND No. 20.

The Sensational
ATLAS-210-215X
DON'T MISS THE CHANCE TO GET THE RIG EVERYONE'S TALKING ABOUT!

Swan
ELECTRONICS
YOU'LL NEVER GET ANOTHER OPPORTUNITY TO BUY SWAN'S 700CX 700 WATTER AT THIS PRICE!

LAST BUT NOT LEAST, MAYBE WE CAN TEMPT YOU WITH AN OSKER POWER METER OR SOME OTHER EXCELLENT STATION ACCESSORY.

REMEMBER EVERYTHING ILLUSTRATED WILL BE EX-STOCK WITH IMMEDIATE CREDIT FACILITIES AVAILABLE FOR YOU TO WALK AWAY WITH YOUR PURCHASE.

508-514 ALUM ROCK ROAD
BIRMINGHAM 8
021-327 1497
Telex 337045 6313
A special arrangement with the manufacturers enables us to offer the IC-22A, for this batch only, at a particularly attractive price. These sets carry the full THANET warranty.

**ICOM IC-22A**

11 CHANNELS WITH A CRYSTAL CONTROLLED AUTOMATIC TONE BURST

£164-00 including VAT (or £33-00 deposit)

11 CHANNELS WITH FACTORY FITTED R/C AUTOMATIC TONE BURST

£158-00 including VAT (or £32-00 deposit)

HOW ABOUT TREATING YOURSELF TO AN IC-22A IN ORDER TO GET THE BEST FROM ALL THE NEW 2 METRE REPEATERS WHICH ARE OPENING UP?

WITH THE OPENING UP OF THE REPEATERS IN NORTH WALES, LANCASHIRE, BIRMINGHAM, KENT AND CORNWALL THE COVERAGE IN THE U.K. IS GROWING ALL THE TIME.

The IC-22A is the most suitable mobile rig for repeater use. Both the crystal controlled and the factory fitted R/C tone burst are arranged by us to be entirely automatic, operating only on repeater channels when a burst of tone is given at the start of each transmission. There is no need to press buttons while driving!

The audio tailoring and limiting are ideal for repeater use, giving the characteristic clear sound associated with the IC-22A and the receiver is of top quality design giving high sensitivity and hard IF limiting. The filter provides excellent adjacent channel rejection which is so important with today's 25 kHz channel spacing.

In fact the IC-22A is good solid value for money. Maybe it does lack some fancy gimmicks—but it doesn’t need them. The Rx light comes on when a signal is received and the squelch opened—not just to tell you that there is a crystal in the socket. (You know that crystals are there on the 11 most important channels.) You can work the chap next to you in the car park without pulling any plugs out and he won’t blow your head off! What you get is what you want—plenty of expensive crystals and a no-fuss tone burst which doesn’t demand that you press an extra button when driving. (The no-fuss THANET warranty is worth thinking about too.)

By the way, the size of the IC-22A is 2 3/8” high x 6 1/4” wide x 8 1/2” deep and it fits into the excellent quick-release mobile mounting bracket which is supplied with the rig.

Your IC-22A comes fitted with SIX simplex channels, SO, S20, S21, S22, S23 and S24 PLUS the FIVE U.K. Repeater channels R3, R4, R5, R6 and R7.

Look at this list and find where your nearest repeater is (those shown in capitals are already in operation).

- **R3** SUFFOLK and YORKSHIRE
- **R4** Central Scotland, DERBYSHIRE AND CHESHIRE, Devon, and KENT
- **R5** HAMPSHIRE, BIRMINGHAM and CORNWALL
- **R6** CAMBRIDGE, SOUTH WALES, NORTH WALES AND LANCASHIRE
- **R7** LONDON, WORCS., Aberdeen, N. LANCS. and W. Wales.

**COMING SHORTLY FROM THE ICOM STABLE**

We are pleased to give you advance warning of the ICOM IC-215 which will be here in early December. It is a 3 WATT, 15 CHANNEL, FM PORTABLE with a generous supply of crystals. It resembles the IC-202 in size and appearance and the design is to the usual high quality ICOM standard. A demonstration model and further data will be available at the Leicester show.
ELECTRONICS

ICOM

IC-201

THE MULTI-MODE RIG THAT SETS THE PACE IN LUXURY AND QUALITY

£357.75 inc. VAT

The luxury multi-mode rig which was described in full in our advertisement in May, providing full 2 metre coverage on FM, SSB and CW using its ultra stable VFO. Full facilities for Repeater and reverse repeater use at the flick of a switch, built in automatic crystal controlled one burst facility fitted by us, full break-in facilities on CW and VOX are a few of the excellent facilities found on the increasingly popular IC-201. Send for further details or leave a message on our ansafone during the evenings.

ICOM IC-202 £161.10 inc. VAT (rechargeable batteries £18 extra)

This new rig from the ICOM stable is going to be another winner. You have a hand-held portable, giving 3 watts output on SSB or CW, with VXO tuning giving you continuous coverage from 144.0 to 144.4 and the option of other frequencies if you use crystals in its spare sockets. Add a linear and you have a beefy base station. To introduce this excellent transceiver it is offered at a price of £161.10 INCLUDING VAT. Send for a data sheet for further details—just the thing for going portable this summer! See AUGUST RAD COM AND JUNE SWM FOR REVIEW.

ICOM IC-3PA £42.18 inc. VAT

The perfect companion to convert your ICOM mobile into a base station. Provides 13-6v at 3-5A. Well regulated, with automatic electronic overload.

ICOM IC-225 £250.00 inc. VAT (still some at £225 without crystal controlled tone burst)

The ultimate luxury in 2 Meter mobiles. Comes FITTED with 80 channels to suit the 2 meter band-plan, complete with crystal controlled tone burst and repeater facility. Nothing else to buy unless you want reverse repeater which can be obtained by adding ONE extra crystal. Covers all the UK simplex and repeater channels and provides a very clean signal by virtue of its excellent PLL circuitry. Send for further details of this and the rest of the excellent range of ICOM equipment.

We also stock MICROWAVE MODULES products and REVCO antennas for mobile

HIRE PURCHASE TERMS AVAILABLE

THANET ELECTRONICS

143 Reculver Road, Beltinge, Herne Bay, Kent
(02273) 63859
South Midlands

SMC PROUDLY PRESENTS

The New SMC73 general coverage receiver

The New KLM 160W., 144 MHz Linear Amplifier

The SMC73 New General Coverage Receiver

The SMC73 is an all Solid State, mains and 12v., communications receiver covering 550 kHz to 30 MHz (without gaps) in four ranges. Frequency readout is by seven segment LED's. Selectable 10 or 1 watt output, for simplex or duplex (up and down shifts), across 144-146 MHz (from a tiny 6½” x 2” x 7½”. Easily underdashed mounted with the supplied mounting brackets, or slipped in place of the broadcast wireless.

For strong signal handling and low noise the R.F. mixer, first IF (16.9 MHz) second mixer (and LO) are all FET’s. The front end is tuned by varicaps fed by the DC output of the P.L.L., with superb selectivity provided by a 15 pole (±13 kHz at -6dB ±15 kHz at -70dB) Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 channel block construction (for serviceability and screening). Selective calling socket (nicelS/P/PTT etc.) on rear panel.

Introductory Price £225 (+VAT) Ex-Stock

NEW FROM SMC AMPERE & KLM SOLID STATE LINEARS (VHF & UHF)

SIX CHANNELS fitted S20 and S22 and any 4 of SO, S21, S23, 524, 7k".

SSB/CW/FM, 12v. DC 10W. drive, RF sensing with manual override—"micro-

stripine techniques."

NEW HIGH POWER MODEL—

PA114/116/BL 160W. output, £155 + VAT.

COAX SLIDE SWITCHES

Up to 500W. 40dB BNC sockets £118.25

AEC METERS

SWR, Power (Pr), Field Strength (F.S.) (P & P. 40p.)

Unless stated —SWR (±10%), 1-5 to 160 MHz, 50/75 ohm)

SWR10 (TLH) single meter horizontal type...

SWR20 (BH) 50 ohm F.S., Pr. 10 and 100W. F.S.D. (±10%)...

SWR40 (Centre) single meter Vert. type with F.S. ...

SWR50A (TRH) SWR (±0.5%) X 5 MHz up, Pr to 1 kW (±20%)...

SWR50 (BRH) as SWR50A (300µA) but 100µA meters...

PLEASE NOTE THESE PRICES DO NOT INCLUDE VAT (6% or 121%)

Terms —Cash with order or credit card holders use phone in for, if possible, same day dispatch. Immediate H.P. available or card owners or amounts up to £225. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared or normal H.P. at competitive rates is available.
The FT22IR design offers an unparalleled level of technical sophistication, combining latest "state of the art" techniques with extreme reliability and ease of operation. One look at the construction : plug in boards throughout (with presets positioned for easy access) and one glance at the circuitry and you will be convinced that the FT22IR may have rivals but no peers.

The Final Frequency is Derived via Single Signal Frequency Mix from 10.7 MHz. The Tunable Component of the RF and Mixer Stages Followed Directly by a Roofing Filter for Sensitivity Coupled with Dynamic Range. The sensitive receiver offers a remarkable immunity to overload. The transmitter employs a balanced FET mixer, RF derived ALC (which is fed to the two first mosfet TX I.F. amplifiers) preventing over driving and allowing operation at full rated output on low DC supply. The driver is generously rated and the PA stage is the newly developed 2N5991, a device with high linearity and an amazing 70W power dissipating capability that is rated by its manufacturer to withstand any VSWR irrespective of phase angle. The sensitive receiver offers a remarkable immunity to overload. The Mosfet RF stage is AGC controlled, the FET mixer feeds a transistor I.F. amplifier. This band limited signal is presented to the noise blanker gate (before any serious pulse stretching occurs) and hence to either the quality crystal filter or SSB, or the 10.7 MHz to 455 kHz mixer for F.M. operation in 500 kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with MDX) and P.P.I., semi break-in keying with side tone, clarifier with separate ON OFF switch, 11" x 5" x 133", 25 kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

The New FT-301 transceiver range (with options installed) offers:- Full solid state, 12V, DC working, external matching mains power supplies with speaker, and an external VOX are available. Plug in construction, 160-10m, operation in 500 kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with MDX) and P.P.I., semi break-in keying with side tone, clarifier with separate ON OFF switch, 11" x 5" x 133", 25 kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

The new FT301D Ex-Stock in Totton
The FT301D, 200W, PIP, with digital readout (to 100 Hz), SSB (2.4 kHz SF 1.7 kHz 10 kHz 455 kHz 2.1 kHz), AM (kHz), CW and FSK (600 Hz), Passband I.F. tuning (rejection), 3 position AGC, optional mains PSU with, if required, a 12V/24V digital clock and a programmable CW identifier.

The New FT22IR Ex-Stock in Totton
The FT22IR design offers an unparalleled level of technical sophistication, combining latest "state of the art" techniques with extreme reliability and ease of operation. The final frequency is derived via single signal frequency mix from 10.7 MHz. The tunable component of the RF and mixer stages followed directly by a roofing filter for sensitivity coupled with dynamic range. The sensitive receiver offers a remarkable immunity to overload. The transmitter employs: a balanced FET mixer, RF derived ALC (which is fed to the two first mosfet TX I.F. amplifiers) preventing over driving and allowing operation at full rated output on low DC supply. The driver is generously rated and the PA stage is the newly developed 2N5991, a device with high linearity and an amazing 70W power dissipating capability that is rated by its manufacturer to withstand any VSWR irrespective of phase angle. The sensitive receiver offers a remarkable immunity to overload. The Mosfet RF stage is AGC controlled, the FET mixer feeds a transistor I.F. amplifier. This band limited signal is presented to the noise blanker gate (before any serious pulse stretching occurs) and hence to either the quality crystal filter or SSB, or the 10.7 MHz to 455 kHz mixer for F.M. operation in 500 kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with MDX) and P.P.I., semi break-in keying with side tone, clarifier with separate ON OFF switch, 11" x 5" x 133", 25 kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

Mic. supplied
Adjustable VOX
AC or 12v. DC
CW sidetone
Semi break-in
100 kHz calibration
11", 5", 11"
Rigid 22 lbs.
South Midlands
ESTABLISHED 1958 — OVER '18

SMC PROUDLY PRESENTS

The new QTR24 World Time Battery Clock
The new YC500 MHz Frequency Counter

The New Astro 200, Digital synthesiser solid state 200W. transceiver

Astro 200 Revolutionary H.E. Transceiver

To pack an entirely modular construction, 10-80m digital readout transceiver in a box 2.8" x 9.5" x 12.3" is remarkable enough, but with a 0.2µV sensitivity and 100w output from transistors with the head of — stability better than 20 Hz/hour, from an electronically tuned (press switches with no other moving parts) 100 Hz digital synthesiser, good RX front end filtering, TX TVI proofing, unwanted sideband at -60dB, carrier at -50dB, RIT, clarifier (-200Hz intubled SWR bridge, semi break in CW with sidetone, etc., etc. The ASTRO 200 surely establishes a new plateau of sophistication.

The MULTI UII A New Dimension in Seventy Cms.

A unique combination of frequency control by either external VFO, 23 switchable or 4 instantly selectable auto scanning channels. Both the Tx deviation and the Rx bandwidth are switchable for 50 or 25 kHz spacing.

The main dial is channel numbered (e.g. 16 = 433.4, 20 = 433.5 etc.) and is illuminated only when a channel is crystallised up. "Two R.F. stages in the receiver provide great sensitivity (0.5µV for 30 dB NQ). The use of a band pass first IF (CF 45 MHz) gives high image immunity and low channel crystal drift. Further conversions to 10.7 and 455 prevent IF image whilst providing good pass and skirt selectivity." The transmitter of switchable 10/1W output draws only 2.5 or 1.3A (0.6 or 0.3A Rx) and has a netting of new crystal facility.

Other features include, diode RF switching, R.I.T., "on the air" lamp, PO meter, S meter, AFP, reverse polarity protection etc.

With 8 Channels from :-SU (0, 8, 12, 16, 18, 20) and RU (0, 2, 4, 6, 10, 14)

INTRODUCTORY PRICE ONLY £200 + VAT Ex-Stock

RF SPEECH PROCESSOR KPI2
Audio to audio, via 107 MHz mains powered, illuminated meter. FT101, FT2 plugs suitable all phone modes superb on FM.
Ex-Stock in Totton £53.50 P. & P. 40p (+ 8% VAT)

CRYSTALS and CRYSTAL FILTERS
VAT 12½% Post 20p + 8%
FILTERS — 318, 9, 10-7 MHz C.F.
350 Hz, 600 Hz, 2-4 kHz, 12 kHz.
S.A.E. details.
CRYSTALS £3.75 pair. £2.00 Single
FT224, FT2AUTO, FT2FB, FT2P, TR200, C146A, CR26MB, etc., etc.
and FT211 FT75, etc., etc. £2-20 each.

QTR24 WORLD TIME CLOCK
Battery powered, gives local time around the world.
Only £13.00 (+ 8%) This month post free.

THE RINGO RANGER ARX2, 6dB, 144 MHz, 9' 6" tall 1/2 lbs. only £21.50 + 12½% (Carr. 90p + VAT 8%)
Communications Ltd
YEARS OF PROFESSIONAL EXPERIENCE

**YAESU MUSEN**

**2-YEAR GUARANTEE**

**24 HOUR SECURICOR SERVICE**

S M C looks forward to your company at Leicester to examine the fine range of Yaesu products.

Failing this send 20p stamps or large S.A.E. forYaesu catalogue, our price list, etc. etc.

Yaesu now offer you the choice of 5 frequency counters with an upper frequency limit of 35 MHz, 220 MHz and now 500 MHz. This latter model is available in three versions, with an accuracy of 10 ppm (J), 1 ppm (G) 0-2 ppm (E Model). All provide an eight digit readout (dual range system from 5 or 6 tubes), 50 f/IMf2 switchable inputs (in the basic unit) and offer reliable operation and complete portability with built in mains and 12v. DC power supplies.

The **FRG7, General Coverage Receiver** Ex-Stock

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley triple mix drift cancelling loop for continuous, spin tuned, inclusive coverage of 0-5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0-3 µV) for 10 dB, S+N/N (SSB) and stable (within 500 Hz for any 30 minutes after warm up) with AM, SSB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required, 8 dry cells are automatically switched in.

The **FT-101E, Complete HF Station** FT101E (EE-EX) EX-STOCK

The FT-101E a complete mains or 12v, DC station contained in a compact 30 lb. package, 260W. P.I.P. of SSB (with in-built R.F. speech processor) 180W, CW and 80W. or AM 10 to 160m. (inc. 10 MHz RX).

The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers:– three hold adjustable noise blanker, switchable 25 and 100 kHz calibrator, f.5k clarifier (with separate on/off switch), etc., etc.

The VFO is stable and linear (readout to 1 kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for: tune up, AM and for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600 Hz filter installed is of a high order. Linear and transformer provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF, heater links and switches, etc., etc.

FTV VHF Transvertors

**FTV250** Ex-Stock

The FTV-250 is a complete automatic matching transverter with good image rejection and RF gain control on front panel. 10W, P.I.P. (A3 and A1) 4W, (A3 and F3) metered; power output, and drive level (3V RMS at 29 MHz) 12 lbs., 11" x 8½" x 6".

**FTV (6)SOB** Ex-Stock

The FTV600B now styled to match the FT-101, etc. Modified to 70 MHz. 50W, P.I.P. (A3 and A1) 10W (A3 and F3) metered—cathode current power out and drive level (3V RMS at 29 MHz) 9 lbs., 11½" x 8½" x 6".

**FTV VHF Transvertors**

- **FTV250** Ex-Stock
- **FTV600B** Ex-Stock

**SOUTH MIDLANDS COMMUNICATIONS LTD.**

Head Office, Main Showrooms and all Mail Order enquiries

**OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN**

Osborne Road is off Rumbridge Street

Hours of Business: 9-5.30. Saturday 9-12.30

Telex 477351 SMCOMMG. Tel. (04216) 4930 & 2785

Northern Branch:

**THE CHAMBERS, No. 3 THE PARADE NORTH LANE, HEADINGLEY**

Tel. (0532) 78 2326

Hours of Business: 9-5 Tuesdays-Saturdays

9-8 p.m. Thursdays
UNIDEN 2020. AC/DC power supplies. CW filter. Noise blanker, Blower. Digital and analogue display give direct readout. 6146B in PA. 80-10 metres. Receiver is pre-mixed single conversion using phase lock loop oscillator circuit. Separate filters for USB/LSB.

UNIDEN 2030. 144-146 MHz FM Transceiver. 12 channels. 12v. DC operation. 10 watt or 1 watt output. Antenna impedence 50 ohm. Complete with microphone and mounting bracket.

Mk. 1 MULTI TUNER. Designed and manufactured by us. 50 tunable switched positions for antenna lengths over 5 metres in the 2-30 MHz range. Five different circuits to give an excellent match between your receiver and antenna. Now in use in over 35 countries.

ELECTRONIC DEVELOPMENTS

PLEASE NOTE AS FROM SEPTEMBER 1st WE HAVE DISCONTINUED THE MANUFACTURE OF THE ELECTRONIC DEVELOPMENTS RANGE OF EQUIPMENT. OUR NEW RANGE OF EQUIPMENT WILL BE ON SHOW AT THE LEICESTER EXHIBITION.

See our full range of equipment at the Leicestershire Exhibition. Full HP, Credit, Access and Barclayscard facilities will be available.

Accessories
- Single Meter SWR Bridges (post 45p) £8.50
- Twin Meter SWR Bridge (post 50p) £12.20
- Osker SWR200 SWR Power Meter (post 75p) £27.00
- Auto-Cq-Sender (post free) £41.11
- Eddystone 896 Dial Assembly (post 25p) £15.00
- Drake Low Pass Filter (post 50p) £15.00
- Omega TE-701 Antenna Noise Bridge (post 25p) £21.00
- Omega TE-702 Antenna Noise Bridge (post 25p) £24.00
- Whip antenna gutter bracket (post 25p) £2.81
- UR43 Co-ax 18p metre; UR76 45p metre, post 2p metre; 75 and 300 ohm twin feeder 10p metre, post 1p metre; Heavy duty 75 ohm twin feeder 20p metre. PL269 46p SW239 46p, Cable reducers 15p.

Secondhand Equipment
(Stock at time of going to press)
- Yaesu FR10ID Receiver £375.00
- SPR4 Drake Receiver with two sets crystals and noise blanker £375.00
- Yaesu FR5OB with 160m. £80.00
- Lafayette HA500 £25.00
- Swan 700CX Transceiver £375.00
- Swan 350 Transceiver £235.00
- Sommerkamp FTDC500 Transceiver VFO £275.00
- Electronic Developments 2m. Transmitter £65.00
- Eddystone 730/4 Receiver £150.00
- Eddystone 770R Receiver £150.00
- KW220 Receiver £225.00
- TS10 Transceiver £185.00

We can supply nearly all the equipment from stock. All equipment is sold at the premises. We do NOT supply any agents or agents of agents. All equipment is air tested and carries the normal guarantee. If you want any information on any equipment please send a large envelope or if you prefer send stamps and we will provide the envelope. No use asking for a Yaesu catalogue and sending a 6" x 3" envelope. Part exchanges are very welcome or we will sell your equipment for you on commission. Our secondhand equipment changes rapidly. If you are coming for something you saw advertised 3 MONTHS ago please give us a ring first. We try and maintain full stocks of all the equipment we advertise but we do occasionally run out of the popular lines.

PLEASE NOTE ABOVE PREMISES WILL BE CLOSED OCT. 26th NOV. 2nd.
During the last two years the popularity of the range of equipment by S.T.E. has been growing. The ARAC 102 receiver has been a "Best Seller" (have you seen any second-hand?). Later in the year the Atal Transmitter came into stock and all reports have been good. Now we are offering the complete range of modules for the D.I.Y. enthusiasts. Transmitters, receivers, etc. The construction of these modules are first class - the P.C.B.'s are the finest we have ever seen.

Price List (includes postage)
ARAC 102 Receiver... £100.00
Atal 228 Transmitter... £126.00
ASAP 154 AC PSU with speaker £35.50
AR10 Receiver Module ... £37.50
AAI Audio Amplifier ... £4.10
AD4 FM Discriminator ... £5.50
AL8 Linear Amplifier ... £27.00
AT22 Transmitter ... £50.00
AR20 C.C. Receiver ... £50.00
AT23 C.C. Transmitter ... £36.00
AS 15 Stabilised psu D.C. ... £10.00
AG 10 Tone Generator ... £4.50
AC2A Converter 28-30 MHz... £20.00

Two new models from S.T.E.
ARAC 170 Receiver. Two bands 28-30 MHz — 430-440 MHz AM-FM-SSB/CW. Tuning 10 MHz from 430-440 MHz in 5 bands. SSB: 0.2 mV (10dB S.N.) FM 0.3 mV (20dB S.N. 12v DC OP. £127.50
AK20 FM Transceiver. 12 channel FM operation. Tone burst. 4 watts output. Sensitivity 0.2 mV (10dB Quieting) 0.35 mV (20dB Quieting) Complete with microphone. From £123

455 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or — 3 kHz.

Linear Amplifier. Frequency 144-146 MHz output 10 watts FM, 8 watt PEP SSB, 8 watts AM. Input power 1 watt FM, 25 watt AM, SSB. Input impedance 50 ohm output impedance 50-75 ohm, 12v, DC.
The Leaders

announce two NEW MODELS

The outstanding NEW GOLD LINE FT-301D

ALL SOLID STATE

300W PEP

DIGITAL DIAL

6-Digit Readout  All Modes—SSB/CW/AM/FSK  160—10 metres  TX & RX Clarifier  RF Feedback  3-position AGC  Rejection Tuning  Built-in DC Power Supply  Optional AC Power Supply and Speaker unit, 24 Hr. Digital Clock  Noise Blanker  RF Speech Processor  Computer Type Plug-In Module Construction  Size : 11 in. (w.) x 5 in. (h.) x 13½ in. (d.)  Light Weight : 22 lbs.

The Model FT-301D is a precision-built, all solid-state, compact high performance transceiver of advanced design. All circuits are fully transistorised with ICs and FETs for reliability. A wide-band tuning system with preset pass band tuning combined with wide-band amplifier eliminates final amplifier tuning for band change. Also available as an option is an automatic CW identifier (programmable).

Whether you judge it on price, performance or operational features, the FT-301D comes out a winner!

(The new FT-301D does not replace the FT-101E but we are stocking the "D" model instead of the low power "S" model intended for the Japanese home market. Price : FT-301D, £624.37 incl. VAT.)

and the new 2m. FM/AM/SSB FT-221R Ex-stock £403.76 (inc. VAT)

BUYING A FRG-7? (£162 incl. VAT)

We despatch within 6 HOURS!

from our

NEW LARGE YAESU STOCK
OF ALL MODELS

FREE SECURICOR DELIVERY

and

SUPERB AFTER-SALES SERVICE

It pays to deal with "WESTERN"
STANDARD's
superb "3-in-1" Transceiver

YOU CAN . . .
1. "STICK IT UP YOUR JUMPER" (or put it in your pocket !)
2. FIT IT INTO A MINI MINI CAR (and yet it's still easy to service)

or
3. USE IT AS A BASE STATION Either way . . .
   for the serious FM Repeater operator—
   There's no other choice !

the STANDARD C828!
(Price: £151.88 inc. VAT and 10 channels)

ADD A
NEW DIMENSION
to your hobby with SSTV

SS-727M MONITOR ... £405.00
SS-727C CAMERA ... £303.75
SS-303M MONITOR ... £236.25
is all you require to send and receive SSTV pictures when connected to your SSB transmitter.
(Prices inc. VAT and Carr.)

HERE IS ONE BARGAIN YOU SHOULDN'T MISS!

THE FDK MULTI-2000

2m. SSB/FM, CW 200 Ch. SYNTHESISED AC/DC TRANSCEIVER

- Full cover 144-6 MHz.
- VXO gives full coverage between 10 kHz spacing.
- Rapid change of frequency and mode is possible.
- RIT (Receiver Incremental Tuning) allows receiver to be tuned without moving the transmit frequency.
- 600 kHz Repeater shift works on all frequencies.
- Tone access built-in.
- Fitted narrow FM Filter.
SUPERB VALUE AT £365.62 inc. carriage (Securicor) and VAT

Western Electronics (UK) Ltd
HEAD OFFICE (All Mail/Enquiries)
FAIRFIELD ESTATE
LOUTH, LINCS, LN11 0JH
(Tel. Louth (0507) 4955/6)
Whether you wish to...

**Elevate**... with Westover Telescopic Towers

**BUYING A TELESCOPIC STEEL TOWER?**

... then here are a few facts which you should consider:

Firstly, the head load (horizontal load due to wind) which will be placed on the top of the tower should be determined and the manufacturer of your antenna can tell you what the head load will be at a particular wind speed, e.g. 100lbs (45Kg) at 75 m.p.h. This means that when the wind is blowing at 75m.p.h., you would need a HORIZONTAL pull of 45Kg. to restrain the antenna. The actual weight of the antenna is usually a factor of much less importance and is ignored. If you wish to have an installation which is rated at 100 m.p.h. — then the wind load on the antenna will be much greater than 100lbs, 176lbs. in fact. Obviously, a stronger tower would be required to take this additional load.

But there is the second consideration. At what wind speed would you like the structure to be safe? No doubt the answer you have in mind is “about 150 m.p.h.” That way, it will never fall down! However, economics must come into the picture and the costs go up very considerably in achieving strength.

There is a British Standard Code of Practice (CP3. Ch5. Pt2.), which relates to the “Wind Loading on Structures” and they recommend Basic Windspeeds of about 85 m.p.h. for the London Area to as high as 110 m.p.h. for Edinburgh and 120 m.p.h. for the North of N. Ireland. This “Basic Windspeed” is the maximum gust speed likely to be exceeded on the average only once in 50 years at 10m. above ground in open level country. An average figure for England is about 100 m.p.h. Commercial installations are designed to this standard and we recommend a minimum design speed of 75 m.p.h. for an amateur installation. Most towers currently advertised in this magazine carry the stated headload at 60 m.p.h. ONLY! Oh! Yes, we could mislead you into thinking that the WESTOWER is considerably stronger by saying, “Withstands winds of 100 m.p.h. plus.” So it may with no aerial on! But what good is that? Remember, “AT WESTERN’ OUR AIM IS YOUR SATISFACTION.” So, if you want a good sound installation you’ll be wise to deal with “WESTERN”; we’ll be pleased to advise. This is why they blow down with no aerial on or when only partly raised!

Because of our considerable experience in this field we have now designed and manufactured our superior quality product AND — IT COSTS LESS! QUALITY UP and PRICE DOWN—that can’t be bad!

- Designed by Chartered Engineers to BS CP3. Ch5. Pt2.
- Constructed of High Quality Special Alloy Steel
- Fabricated Using the Latest Electronically Controlled Techniques

**HERE’S HOW THE “WESTOWER” COMPARES:**

<table>
<thead>
<tr>
<th>HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>40’</td>
</tr>
<tr>
<td>60’</td>
</tr>
<tr>
<td>80’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>“WESTOWER”</strong></th>
<th></th>
<th><strong>Brand X</strong></th>
<th></th>
<th><strong>Brand Y</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD LOAD</td>
<td>PRICE</td>
<td></td>
<td>HEAD LOAD</td>
<td>PRICE</td>
<td>HEAD LOAD</td>
</tr>
<tr>
<td>A</td>
<td>£208</td>
<td>185lbs.</td>
<td>A</td>
<td>£250</td>
<td>+ 50lbs.</td>
</tr>
<tr>
<td>B</td>
<td>£246</td>
<td>125lbs.</td>
<td>B</td>
<td>£280</td>
<td>+ 50lbs.</td>
</tr>
<tr>
<td>C</td>
<td>£366</td>
<td>60lbs.</td>
<td>(+Carr. extra)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Prices include carriage. Headloads taken from manufacturers’ current literature)

FROM THIS YOU WILL SEE THAT A 60’ “WESTOWER” IS 40% STRONGER AND COSTS LESS!

THEN THERE IS THE “WESTOWER” HEAVY DUTY WHICH TAKES ITS FULL HEAD LOAD AT 100 M.P.H.

**Rotate...**

**FEATURES:**
- Superior braking torque
- Constant beam indication
- Less power loss than low voltage types
- Robust design
- Stainless steel hardware

**PRICES (Carr. paid, inc. VAT):**

<table>
<thead>
<tr>
<th>COMPARE PRICES (Carr. paid, inc. VAT)</th>
<th>CDE model</th>
<th>Torque</th>
<th>Emoto model</th>
</tr>
</thead>
<tbody>
<tr>
<td>102 LBX</td>
<td>AR30</td>
<td>655</td>
<td>1100MXX</td>
</tr>
<tr>
<td>1100 MXX</td>
<td>AR40</td>
<td>475</td>
<td>1100 MXX</td>
</tr>
</tbody>
</table>

**COMPARISON OF ROTOR BRAKE TORQUE FIGURES**

<table>
<thead>
<tr>
<th>(kg/cm.)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AR30</td>
<td>920</td>
<td></td>
</tr>
<tr>
<td>CD44</td>
<td>1,152</td>
<td></td>
</tr>
<tr>
<td>HAM-2</td>
<td>4,025</td>
<td></td>
</tr>
</tbody>
</table>
Electronics (UK) Ltd

Radiate... with Western Antennas

THE FIRST OF A NEW PENETRATING RANGE OF ANTENNAS!

YET ANOTHER 'Western' PRODUCT WITH QUALITY UP AND SAVE £££s!

NEW 5-WAY ANTENNA SWITCH

* Handles 1.2 kW.
* Earths antennas not in use.
* Fitted YAESU style knob.
* Mounting holes for wall or equipment.
  £8.85 (incl. VAT/P. & P.)

ARE YOU INTERESTED IN SSB?

IF SO, THEN DON'T FORGET TO VISIT US AT LEICESTER AND SEE WHAT'S UP OUR SLEEVE FOR YOU!

The WESTERN “PENETRATOR”

DX-33 for 10-15-20m.

(illustrated left) £73.12 (inc. VAT and Carr.)

* 3 elements on each band.
* Heavy duty 2 kW. rated.
* Gain up to 8dB.
* Broadband operation.
* Stainless steel hardware.
* SWR less than 1:3 : 1

HY-GAIN (Prices inc. Carr. and VAT)

HY-GAIN (Prices inc. Carr. and VAT)

JAYBEAM (Prices inc. Carr. and VAT)

DON'T MISS OUR BARGAIN. Still at the old price!

NEWTONICS

BARGAIN. Still at the old price!

Showrooms at:

LOUTH: Open 9-10, 2-5 p.m. MON.-FRI., Sat. by appointment.
SOUTHAMPTON: 1 WEST PARK ROAD, Tel. 0703 27464. Open TUES.-FRI. 9-1, 2-5, 30, SAT. 9-4.
LEICESTER: MAY'S HI-FI, CHURCHGATE, Tel. 58662. Open MON.-SAT. 9-6 p.m., CLOSED THURS.
THE ULTIMATE!!
THE NEW MMT432/144 DOUBLE CONVERSION 432MHZ LINEAR TRANSVERTER

We at MICROWAVE MODULES LIMITED have been aware for some time now that a great demand exists for a linear transverter, capable of converting 144 MHz signals up to 432 MHz.

After extensive research and development involving various techniques, we have successfully produced a transverter which offers the owner of any 10 watt 144 MHz transceiver a relatively inexpensive route to 432 MHz operation.

This new product features low distortion transmit mixers and a low noise receive converter incorporating a gold metallised 1.5 dB noise figure device, yielding a true overall system noise figure of better than 3.0 dB.

The incorporation of a built-in 10 watt RF termination network and an RF VOX transmit/receive switching system enables complete transceive operation through a single socket on the transverter, thus reducing the interconnection necessary between the transverter and the associated 144 MHz transceiver.

The conservatice 10 watts development by the linear transmit section is switched by an internal PIN diode aerial changeover relay, which has a through-loss in the transmit or receive mode of less than 0.2 dB. The inclusion of these high technology features makes the unit ideal for all modes of transmission at 432 MHz, particularly where a high degree of linearity, stability and sensitivity are of prime importance.

SPECIFICATION

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>432-434 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input modes</td>
<td>SSB, FM, AM or CW</td>
</tr>
<tr>
<td>Input frequency range</td>
<td>144-146 MHz</td>
</tr>
<tr>
<td>First IF</td>
<td>28 MHz</td>
</tr>
<tr>
<td>DC power requirements</td>
<td>12 volts nominal</td>
</tr>
<tr>
<td>Currents consumption</td>
<td>2.2 Amps peak</td>
</tr>
<tr>
<td>Power output</td>
<td>10 watts continuous rating</td>
</tr>
<tr>
<td>Drive requirements at 144 MHz</td>
<td>10 watts (Built in RF termination network)</td>
</tr>
<tr>
<td>Relative 404 MHz output</td>
<td>-65 dB</td>
</tr>
<tr>
<td>Other spurious outputs</td>
<td>-65 dB</td>
</tr>
</tbody>
</table>

First oscillator:
Second oscillator:
Receive converter gain:
(Through transceive port)
Receive converter gain:
(Through independent port)
Receive converter noise figure:
Power connector:
RF input/output connectors:
Size:
Weight:
Price:

101 MHz
116 MHz
10 dB
25 dB
Better than 3-0 dB
5 pin DIN
50 ohm BNC
187 x 120 x 53 mm.
900 g.
£126 inc. VAT

N.B. Transmit/receive switching is achieved by an internal RF VOX sensing network.

Any further information on this product and others from our extensive range may be obtained by contacting our sales department, who will be only too pleased to help.

Incidentally, this and all of our other products will be available and on display at the Leicester Exhibition in October. See YOU there!

MICROWAVE MODULES LIMITED
BROOKFIELD DRIVE, AINTREE, LIVERPOOL
TEL.: 051-523 4011
FAST AND FRIENDLY MAIL ORDER

BY PHONE
Simply telephone your Barclaycard or Access No. for immediate despatch.

BY POST
State clearly your requirements enclosing cheque or postal order.

CALLERS
You are always welcome to come and inspect the equipment at our showrooms.

FOR ALL ENQUIRIES PLEASE ENCLOSE STAMPED ADDRESS ENVELOPE.

WATERS & STANTON ELECTRONICS

MAIL ORDER & HEAD OFFICE: Stockley Audio, 31 Spa Road, Stockley, Essex. Tel.: 03-704 6835 (2 lines)

ALL PRICES INCLUDE VAT

CARriage CHARGE IN BRACKETS

AGENTS: G3XTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex.
Tel.: Romford (0700) 89956

G3OQT Bredhurst Electronics, Willowbrook, School Lane, Barnby.
Chester. Tel.: (0624) 260078

Monday to Saturday 9 a.m.-5.30 p.m. Early closing Wednesday
The new Heathkit catalogue is now out. Full as ever with exciting, new models. To make building a Heathkit even more interesting and satisfying.

Clip the coupon now (enclosing a 10p stamp for postage) and we'll send you your copy to browse through.

With the world's largest range of electronic kits to choose from, there really is something for everyone.

Including our full range of test equipment, amateur radio gear, hi-fi equipment and many general interest kits.

And, if you happen to be in London or Gloucester, call in and see us. The London Heathkit Centre is at 233 Tottenham Court Road. The Gloucester showroom is next to our factory in Bristol Road.

Heath (Gloucester) Limited, Dept. SW-106, Bristol Road, Gloucester, GL2 6EE. Tel.: Gloucester (0452) 29451.

A 5/8 Wave 'Stainless Steel' Mobile Whip Antenna — precision manufactured to this standard of excellence for LESS THAN £10 is good value by any stretch of imagination. Look at these features and judge for yourself.

* Non-corrosive waterproof fixing.
* Detachable for car wash and against theft.
* Nominal coverage 130—174 MHz VHF.
* Strong (tensile strength 90—100 tons per sq. in.) shock spring mounting at base, heavily braided through shock spring to maintain electrical length.
* Loading coil to match electrically at 50Ω and resonant at desired frequency.
* Only 10mm hole required for fixing.
* Supplied with blank cover, 2BA Allen Key and cutting chart (for desired frequency).

ELECTRICAL SPECIFICATION
Gain: +3dB relative to ¼ wave.
Bandwidth: 5MHz
Power Rating: 160W
Frequency Range: 130—174MHz
V.S.W.R.: Better than 1.5:1
Input Impedance: 50Ω nom.

undeniable value
£8—10 +12½% VAT

A 1/4 wave model is also available priced at £3-65 + 12½% VAT. Blank cover 50p extra.

These antennae plus a multitude of other interesting equipment, components and construction kits may be found in Doram's new Edition 3 catalogue price 60p inc. p&p and Doram's construction kit brochure 25p inc. p&p or both together for a special reduced price of 70p inc. p&p.

Doram Electronics Limited,
P.O. Box TR8;
Leeds LS12 2UF.

An Electrocomponents Group Company.
## ADVERTISERS' INDEX

<table>
<thead>
<tr>
<th>Advertiser</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero &amp; General Supplies</td>
<td>506</td>
</tr>
<tr>
<td>Amateur Electronics (G3FK)</td>
<td>449</td>
</tr>
<tr>
<td>Amateur Radio Retailers Association</td>
<td>497</td>
</tr>
<tr>
<td>Baginton Electronics</td>
<td>503</td>
</tr>
<tr>
<td>B. Bamber Electronics</td>
<td>500</td>
</tr>
<tr>
<td>British National Radio and Electronics School</td>
<td>501</td>
</tr>
<tr>
<td>C. &amp; C. Electronics</td>
<td>507</td>
</tr>
<tr>
<td>Cambridge Kits</td>
<td>509</td>
</tr>
<tr>
<td>Catronics Ltd.</td>
<td>504</td>
</tr>
<tr>
<td>Chromasonic Electronics</td>
<td>507</td>
</tr>
<tr>
<td>Colomor Electronics</td>
<td>508</td>
</tr>
<tr>
<td>Datong Electronics</td>
<td>498</td>
</tr>
<tr>
<td>Derwent Radio</td>
<td>511</td>
</tr>
<tr>
<td>Doram Electronics</td>
<td>464</td>
</tr>
<tr>
<td>G3HSC (Rhythm Morse Courses)</td>
<td>506</td>
</tr>
<tr>
<td>G5RV-G2DYM Aerials</td>
<td>507</td>
</tr>
<tr>
<td>G.W.M. Radio Ltd.</td>
<td>511</td>
</tr>
<tr>
<td>Hamgear Electronics</td>
<td>464</td>
</tr>
<tr>
<td>Heath Ltd.</td>
<td>512</td>
</tr>
<tr>
<td>Heller Electronics</td>
<td>512</td>
</tr>
<tr>
<td>D. P. Hobbs Ltd.</td>
<td>510</td>
</tr>
<tr>
<td>I. N. Cline</td>
<td>511</td>
</tr>
<tr>
<td>Jaybeam Ltd.</td>
<td>502</td>
</tr>
<tr>
<td>J. Yu</td>
<td>511</td>
</tr>
<tr>
<td>K.W. Communications Ltd.</td>
<td>499</td>
</tr>
<tr>
<td>Lee Electronics Ltd.</td>
<td>501</td>
</tr>
<tr>
<td>Lowe Electronics 479, 480, 481, 482, 483, 498</td>
<td></td>
</tr>
<tr>
<td>Lowe Electronics 479, 480, 481, 482, 485</td>
<td>498</td>
</tr>
<tr>
<td>S. May Ltd.</td>
<td>512</td>
</tr>
<tr>
<td>M.H. Microwave Modules Ltd.</td>
<td>507, 512</td>
</tr>
<tr>
<td>Modular Electronics, G8CQS</td>
<td>502</td>
</tr>
<tr>
<td>Mosley Electronics</td>
<td>511</td>
</tr>
<tr>
<td>Partridge Electronics Ltd.</td>
<td>505</td>
</tr>
<tr>
<td>P.M. Electronic Services</td>
<td>503</td>
</tr>
<tr>
<td>Radio Shack Ltd.</td>
<td>466</td>
</tr>
<tr>
<td>R. T. &amp; I. Electronics Ltd.</td>
<td>499</td>
</tr>
<tr>
<td>Small Advertisements</td>
<td>505-510</td>
</tr>
<tr>
<td>Solid State Modules</td>
<td>496</td>
</tr>
<tr>
<td>South Midland Communications Ltd.</td>
<td>452, 453, 454, 455</td>
</tr>
<tr>
<td>Spacemark Ltd.</td>
<td>509</td>
</tr>
<tr>
<td>S.S.B. Products</td>
<td>512</td>
</tr>
<tr>
<td>Stephens-James</td>
<td>456, 457</td>
</tr>
<tr>
<td>S.W.M. Publications</td>
<td>462</td>
</tr>
<tr>
<td>Tape Talk</td>
<td>512</td>
</tr>
<tr>
<td>Technical Associates</td>
<td>504</td>
</tr>
<tr>
<td>Teleradio Electronics</td>
<td>512</td>
</tr>
<tr>
<td>Telford Communications</td>
<td>450, 451</td>
</tr>
<tr>
<td>Thanet Communications</td>
<td>510</td>
</tr>
<tr>
<td>Reg Ward &amp; Co. Ltd.</td>
<td>463</td>
</tr>
<tr>
<td>Waters &amp; Stanton Electronics</td>
<td>458, 459, 460, 461, 462</td>
</tr>
<tr>
<td>Western Electronics Ltd.</td>
<td>510</td>
</tr>
<tr>
<td>W. H. Westlake</td>
<td>511</td>
</tr>
</tbody>
</table>

## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>467</td>
</tr>
<tr>
<td>Communication and DX News, by E. P. Essery, G3KFE</td>
<td>468</td>
</tr>
<tr>
<td>Basic Spectrum Generator</td>
<td>473</td>
</tr>
<tr>
<td>Sixteen-Element Array for Seventycem</td>
<td>474</td>
</tr>
<tr>
<td>Do You Know That?</td>
<td>476</td>
</tr>
<tr>
<td>Measurement of Sideband Power</td>
<td>477</td>
</tr>
<tr>
<td>Further R.A.E. Courses, 1976/77</td>
<td>477</td>
</tr>
<tr>
<td>The Eiscat Project</td>
<td>483</td>
</tr>
<tr>
<td>VHF Bands, by N. A. S. Fitch, G3FPK</td>
<td>485</td>
</tr>
<tr>
<td>Useful Test Unit, by W. H. Jarvis, GM8APX</td>
<td>490</td>
</tr>
<tr>
<td>The Month with The Clubs — From Reports</td>
<td>491</td>
</tr>
<tr>
<td>New QTH's</td>
<td>495</td>
</tr>
</tbody>
</table>

---

**Managing Editor:** AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

**Advertising:** Charles Forsyth

Published at 34 High Street, Welwyn, Herts., AL6 9EQ, on the last Friday of the month, dated the month following. Telephone: 04-3871 5206 & 5207

Annual Subscription:
- Home: £4.80, 12 issues, post paid
- Overseas: £4.80 ($10.00 U.S.), post free surface mail

**Editorial Address:** Short Wave Magazine, Buckingham, MK18 1RQ, England

**Prices shown in advertising in this issue do not necessarily constitute a contract and may be subject to change.**

**AUTHORS' MSS**

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention—see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

© Short Wave Magazine Ltd.

E. & O. E. VAT Reg. No. 239 4864 25 465
## SSR-1 COMMUNICATIONS RECEIVER

- **Built-in Telescopic Antenna**
- **Synthesized**
- **General Coverage**
- **All Solid State**
- **Built-in AC Power Supply**
- **Selectable Sidebands**
- **Excellent Performance**

**TRIED AND TESTED WITH MANY THOUSANDS ALREADY IN USE. (SAE FOR DETAILS).**

### £202.50 inc. SECURICOR DELIVERY

### DRAKE RECEIVERS & ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-4C</td>
<td>Receiver SSB, AM, SW, RTTY</td>
<td>£423.00</td>
</tr>
<tr>
<td>FL250</td>
<td>Filter for R-4C (0-250 kHz)</td>
<td>£37.12</td>
</tr>
<tr>
<td>FL500</td>
<td>Filter for R-4C (0-500 kHz)</td>
<td>£37.12</td>
</tr>
<tr>
<td>FL1500</td>
<td>Filter for R-4C (1-5 kHz)</td>
<td>£37.12</td>
</tr>
<tr>
<td>FL4000</td>
<td>Filter for R-4C (4-0 kHz)</td>
<td>£37.12</td>
</tr>
<tr>
<td>FL6000</td>
<td>Filter for R-4C (6-0 kHz)</td>
<td>£37.12</td>
</tr>
<tr>
<td>4-NB</td>
<td>Noise Blanker for R-4C</td>
<td>£49.50</td>
</tr>
<tr>
<td>MS-4</td>
<td>Matching Speaker for R-4C</td>
<td>£18.90</td>
</tr>
<tr>
<td>SPR-4</td>
<td>Receiver—general purpose</td>
<td>£63.75</td>
</tr>
<tr>
<td>AL-4</td>
<td>Loop Antenna for SPR-4</td>
<td>£20.25</td>
</tr>
<tr>
<td>5-NB</td>
<td>Noise Blanker for SPR-4</td>
<td>£49.50</td>
</tr>
<tr>
<td>SACC-4</td>
<td>100 kHz Calibrator for SPR-4</td>
<td>£13.95</td>
</tr>
<tr>
<td>TA-4</td>
<td>Transceiver adaptor for SPR-4, T-4XC</td>
<td>£25.20</td>
</tr>
<tr>
<td>DC Power Cord for SPR-4</td>
<td>£6.45</td>
<td></td>
</tr>
<tr>
<td>Amateur Bands Crystal Kit for SPR-4</td>
<td>£22.50</td>
<td></td>
</tr>
<tr>
<td>Time and freq. Crystal Kit for SPR-4</td>
<td>£18.45</td>
<td></td>
</tr>
<tr>
<td>MARS Crystal Kit for SPR-4</td>
<td>£18.45</td>
<td></td>
</tr>
<tr>
<td>Teletype Commercial Kit for SPR-4</td>
<td>£16.42</td>
<td></td>
</tr>
<tr>
<td>Aeronautical Crystal Kit for SPR-4</td>
<td>£25.42</td>
<td></td>
</tr>
<tr>
<td>Marine Crystal Kit for SPR-4</td>
<td>£24.42</td>
<td></td>
</tr>
<tr>
<td>Tropical Bands Crystal Kit for SPR-4</td>
<td>£11.25</td>
<td></td>
</tr>
<tr>
<td>TY-4</td>
<td>Teletype adaptor for SPR-4</td>
<td>£13.05</td>
</tr>
<tr>
<td>DSR-2</td>
<td>Digital Receiver</td>
<td>£204.70</td>
</tr>
<tr>
<td>SSR-1</td>
<td>Receiver—general coverage</td>
<td>£202.50</td>
</tr>
</tbody>
</table>

### DRAKE TRANSCIEVER AND ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR-4C</td>
<td>Transceiver—SSB</td>
<td>£423.00</td>
</tr>
<tr>
<td>3-PNB</td>
<td>Plug-in Noise Blanker</td>
<td>£69.75</td>
</tr>
<tr>
<td>AC-4</td>
<td>115/240V. P.S.U. for TR-4C, T-4XC</td>
<td>£83.25</td>
</tr>
<tr>
<td>DC-4</td>
<td>12v. P.S.U. for TR-4C, T-4XC, R-4C</td>
<td>£69.50</td>
</tr>
<tr>
<td>MMK-3</td>
<td>Mobile mounting kit</td>
<td>£57.17</td>
</tr>
<tr>
<td>RV-4C</td>
<td>Remote V.F.O. for TR-4C</td>
<td>£68.25</td>
</tr>
<tr>
<td>FF-1</td>
<td>Crystal Control for TR-4C</td>
<td>£32.62</td>
</tr>
</tbody>
</table>

### DRAKE TRANSMITTER & ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-4XC</td>
<td>Transmitter—SSB 2-30 MHz</td>
<td>£423.00</td>
</tr>
<tr>
<td>L-4B</td>
<td>Linear Amplifier and power supply</td>
<td>£623.25</td>
</tr>
<tr>
<td>MN-4</td>
<td>Antenna Match Network</td>
<td>£77.40</td>
</tr>
<tr>
<td>MN-2000</td>
<td>Antenna Match Network</td>
<td>£154.12</td>
</tr>
<tr>
<td>W-4</td>
<td>RF Wattmeter 2-30 MHz</td>
<td>£50.62</td>
</tr>
<tr>
<td>WV-4</td>
<td>RF Wattmeter 20-200 MHz</td>
<td>£28.50</td>
</tr>
<tr>
<td>C-4</td>
<td>Station Control Console</td>
<td>£292.50</td>
</tr>
</tbody>
</table>

### DRAKE ADDITIONAL ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV42LP</td>
<td>Low Pass Filter 100V</td>
<td>£69.00</td>
</tr>
<tr>
<td>TV3200LP</td>
<td>Low Pass Filter 2kW</td>
<td>£14.62</td>
</tr>
<tr>
<td>RP-500</td>
<td>Receiver Protector</td>
<td>£63.00</td>
</tr>
<tr>
<td>7072</td>
<td>Desk Microphone</td>
<td>£13.27</td>
</tr>
<tr>
<td>7075</td>
<td>RF Wattmeter 2-30 MHz</td>
<td>£27.00</td>
</tr>
<tr>
<td>Accessory Crystal for R-4C, T-4XC, SPR-4</td>
<td>£64.05</td>
<td></td>
</tr>
<tr>
<td>Fixed Frequency Crystals</td>
<td>£68.75</td>
<td></td>
</tr>
<tr>
<td>Spare Operating Manuals</td>
<td>£3.00</td>
<td></td>
</tr>
<tr>
<td>Spare DSR-2 Operating Manuals</td>
<td>£12.00</td>
<td></td>
</tr>
<tr>
<td>RCS-4</td>
<td>Remote Control Antenna Switch</td>
<td>£83.25</td>
</tr>
</tbody>
</table>

### DRAKE ADDITIONAL ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV42LP</td>
<td>Low Pass Filter 100V</td>
<td>£69.00</td>
</tr>
<tr>
<td>TV3200LP</td>
<td>Low Pass Filter 2kW</td>
<td>£14.62</td>
</tr>
<tr>
<td>RP-500</td>
<td>Receiver Protector</td>
<td>£63.00</td>
</tr>
<tr>
<td>7072</td>
<td>Desk Microphone</td>
<td>£13.27</td>
</tr>
<tr>
<td>7075</td>
<td>RF Wattmeter 2-30 MHz</td>
<td>£27.00</td>
</tr>
<tr>
<td>Accessory Crystal for R-4C, T-4XC, SPR-4</td>
<td>£64.05</td>
<td></td>
</tr>
<tr>
<td>Fixed Frequency Crystals</td>
<td>£68.75</td>
<td></td>
</tr>
<tr>
<td>Spare Operating Manuals</td>
<td>£3.00</td>
<td></td>
</tr>
<tr>
<td>Spare DSR-2 Operating Manuals</td>
<td>£12.00</td>
<td></td>
</tr>
<tr>
<td>RCS-4</td>
<td>Remote Control Antenna Switch</td>
<td>£83.25</td>
</tr>
</tbody>
</table>

**SALES * SERVICE * ACCESS * BARCLAYCARD * HP**

**RADIO SHACK LTD.**

**OPEN 5 DAYS 9—5. CLOSED 1—2 P.M.**

**SAT. 9—12.30 P.M.**

**Giro Account No. 588 7151**

**188 BROADHURST GARDENS**

**LONDON, NW6 3AY**

Just around the corner from West Hampstead Underground Station

Telephone: 01-624 7174 Cables: Radio Shack, London, N.W.

Telex: 23718
The contemporary press is giving a good deal of space to the matter of what is called “Citizen’s Band” radio—meaning use of the ether for private communication purposes, two-way. This has become very popular in several countries, notably the U.S.A., where CB operators are now numbered by the million, a large proportion of whom are on the air without benefit of licence—for there is a licensing system (note-of-hand alone, four dollars down, and away you go). The frequency band used is only 300 kHz wide, around 27 MHz, and is divided into crystallised channels in zones spaced across the country. Though there are power and aerial limitations, these are commonly ignored—U.S. CB stations can often be heard in the U.K. when the 10-metre band is open to the West.

There is widespread abuse of the CB Radio system itself, which the FCC admits it is now powerless to control. Apart from unlicensed operation, interference is severe on all channels and a good deal of the traffic is of a very dubious character.

What, in this country, should be our attitude to CB Radio? In the first place, recognising that it would be virtually uncontrollable by regulation, it would certainly lead to the same abuses that disfigure CB Radio in America. Secondly, the incidence of BC1/TVI would be enormously increased, and such interference would inevitably be blamed on licensed Amateur Radio operators. Thirdly, it would make a nonsense of the present system of granting U.K. amateur licences.

However, there are other factors involved. CB Radio would open up a big new equipment market and could conceivably produce a flow of recruits for what might be called legitimate Amateur Radio. So long as authorised CB Radio was kept outside any of our present band allocations, it could not be said to be directly harmful to Amateur Radio. It would also establish the principle that the ether should be free for all to use, subject to reasonable safeguards and limitations in the common interest—as we have always proclaimed about Amateur Radio itself.

CB Radio is probably a movement that cannot now be stopped—it is too attractive in the public sense, and would seem to most people to be quite harmless. Though we do not at all favour the introduction of CB Radio in the U.K., one must face realities and appreciate the pressures that are building up.

In fact, one might as well realise that there is really nothing—except price and import duty—to prevent CB Radio equipment being imported from the U.S.A. and used over here, with or without a licence, right now! Many of the CB Radio sets on sale in America are very fine examples of modern transceiver design and engineering, as is evident to anyone following the American non-amateur radio press, which regularly gives much space to CB Radio and everything connected with it.

The authorities in this country have some very difficult decisions to make on this subject. Let us hope they will be the right ones.
EVEN T UALLY, one could predict, the long hot summer of our discontent would have to cease—but it needn't have been quite so sudden about it! And, one might have added, the Clerk of the Wx could have had the decency to hold on until all the jobs “up aloft” were completed, like freeing the pulley and new halyards, ready for a trial of the “Easy Quad” by GW2DDX, which as far as this writer is concerned represents the Definitive Answer to the problem of how to get a Quad up in this garden without first cutting down the apple-tree, which has been puzzling him for years. So Easy, so Simple, so Practical! Why ever didn't someone think of this ploy before? Of course, the pundits will say that by using this shape as against the more usual square configuration one will lose 0-9 dB of forward gain as measured on a range; but one has more than a suspicion that this loss would not in fact be apparent at DX. What is really needed is for someone to plot three-dimensional polar diagrams at UHF (to approximate the freespace condition), in order to see just what really does happen at the angles of interest to the DX'er. In any case, the neighbours will probably be far happier with a beam that “disappears” to ground level when not in use!

Conditions

Allowing for the state of the sunspots, not too bad; there were times in August when the daily sunspot count was up in the thirties, and W4UMF predicating Above Normal for days on end. On the debit side, there has been the problem of the Electronic Banyan Tree which has been infesting 14 MHz of late. It has been claimed to be a jammer and thought to originate in the Ukraine. However, whether it is in fact a jammer is debatable, and an alternative suggestion is that it may be some sort of propagation-study monitoring by the Russians. Whatever it is, it is strong enough to pin S-meters in Europe, and to wipe everything out as far afield as W6-land when it is in full song. It is understood that protests from various countries have been sent to Russia about this signal.

Readers of WCDXB or Geoff Watts' excellent DXNS will have not failed to observe how accurately W4UMF pitches his short-term propagation predictions; however, it is now understood that the WWV hourly up-date, on which the predictions are largely based, is to cease from September 30. On the other hand, it is believed that ARRL are looking into ways and means by which the information required can be propagated by the ARRL Hq. station, W1AW. It would indeed by a shame if, having at last got into the position in which one can reasonably plan for an evening at the workbench when DX conditions are flat, at least a week ahead, we should find ourselves, as it were, back to Square One.

**Ten Metres**

Let G2BY (Wroxall, I.o.W.) open the batting here; Bert tried all bands during the period under review, but on Ten largely drew a blank in terms of DX save for one UI8 and a clutch of Europeans.

GM3YOR (Kirkcaldy) at 1 the time of his rather early letter was preparing for his trip to G1. However, he did use the bands above 7 MHz quite a bit as time offered, and on Ten tangled with C31JX and ON6KO, CW—as indeed were G2BY’s contacts.

No actual contacts are recorded by G3NOF (Yeovil), albeit Don did hear the odd South American in the early evenings and Europeans during the day.

Then there is GW4BLE (Newport, Gwent) who brought his band total to nearly 130 countries with a quick 59 QSO on SSB with 6W8FP, and was so surprised that he confined himself for the rest of the time to working local G’s and GW’s.

**21 MHz**

Down at Horndead, ex-G2XC has been playing with aerial arrays, and even noting the incidence of sunspots. At which point, for any new reader, we should repeat the old warning about not trying to look straight at the sun with the naked eye. Project its image on to a suitable surface, with a neutral density filter to reduce the brightness to an acceptable level, and look at the image that way—never, ever, directly. Anyhow, back to ex-G2XC and his receiver; the routine has been, basically, a listen-round in the early evening, and then for an hour or so before turning in, plus the odd check on 15 metres around morning tea-break time—and it was on one of these that he heard a couple of JA’s and VU2BO on CW, plus VQ9HCS on SSB. Africa and South America have been heard at reasonable strength. Africans heard included EL, TU, ZD8, ZE, ZS’s, 9J and 9Q, while the South American parade include CE, CX, LU, OA, PY, PZ, and ZP, with H1 and W’s a bit further north; on one day W5UAN was noted at workable strength, and G5AFA was heard to mention a QSO with 9M2DQ around midday.

Possibly the main event of the month for G4EAN (Nottingham) was the “up-grading” of his Versa-tower from 40 to 60 feet—there were too many other things to be done to get in much operating, but just to show all was well, PY3ZAJ was worked on SSB.

G2BY found the opening to South America pretty good, with the reports between S7 and S9 both ways; but otherwise it was just EU’s at short-skip distances.

GM3YOR stuck to CW, to knock off UT5AB/UF6 (the sting was in the tail, as it were!), UK9AAA, ZS3LK and 4J6A.

G3NOF, after his enthusiastic words of the past few months, reverts to a rather more pessimistic tone about Fifteen; Don, it seems, found EU’s during the day and some South Americans in the early evenings.

On the other hand GW4BLE was rather pleased with the band, noting that he got a thirty-over-nine report from VQ9HCS, while the latter was on Astove using just the Argonaut rig—and the QRP was...
producing a meter deflection at Newport of between S7 and S9. It really is amazing just what real QRP can do when the bands give it half a chance. Other SSB contacts included KP4DHW, C6AEY, CE1HD, CE2BC, CE3PY, CE5BF, CT2BB, CX4BD, C31HD, C31MS, D2ALB, D2AWR, EA8LD, EL1A, FM7AV, HC1GN, HC1KY, HC2YL, H18EJH, JY6ZZ, KC4AAC, KP4DHW, KV4AD, KZ5AS, KZ5RL, LU5PB, LU9DVA, PT2VI/2, PZ1DR, SM4ARJ/4U (in the Sinai desert), VE2AQ5/TG9, VP5RP/MM (running two watts p.e.p. from the Caribbean), YV, ZE's, ZS's, 4U1ITU, 4Z4TH, 5Z4NH, GW8AAD, 9G1GE, 9J2WS, 9Q5DM and 9X5RK.

As for old 'KFE, for part of the period he was away from home without a rig—during which period his only contact with Amateur Radio activity was the sight of a most elegant Quad—there was no other term to describe this one, which so lacked the usual rather droopy mien of the Quad and which stood so regimentally erect, on parade right at the junction of A37 and A303. For him at home it was also largely a matter of EU and South Americans.

**Twenty**

Here, undoubtedly, the over-riding theme has been that of the previously mentioned electronic Banyan Tree, with various interesting descriptions being offered. It was likened to a motor-boat punting around the band, while G2BY felt it had more affinity to one of those nice old gas-engines, happily bumping away at 300-400 r.p.m. W6PN, late director of engineering for Radio Free Europe in Munich, does not look at it as a jammer but reckons its millisecond pulses, overmodulated at about 5 kHz, would be more suitable for propagation studies or some wide-band operation, though nothing of any such mode as the latter is known.

G4DIY (St. Helen's, Lancs.) makes a first report; Ron uses a vertical aerial, to which he has recently added some 600 feet of copper wire below ground, to a rig described as a “DX-cum-KW-100” which is mainly used on Twenty CW at 100 watts. This gear yielded contacts on the key with all JA areas, all W call areas with the exception of W7, also CM2HB, VP9's, VE1, VE2, VE3 and most of Europe; not, G4DIY reckons, much for the Quad merchants but good enough for his vertical! On a different line, the query about CX1EK/AC4 by G4DJY recently can be dealt with, Ron having worked Luis twice and received two QSL's—no more doubt there!

G4EVO stuck to his QRP on Twenty CW, according to the copy log received, and his five watts and Joystick are spreading their wings a little more as confidence is gained; we notice a UA6 and a brace of W's this time, not to mention most of Europe.

Another Joystick user is G4DIY (St. Annes-on-Sea), though he tacks it to 120 watts and plays the contests with it. This way of life yielded contacts with all W call areas in one week, at 579 or better reports, Asians, South Americans and of course Europeans, with a nice even scattering of DX throughout the log from these areas, not to mention a lone ZE at 599 both ways; adding up to some 93 countries worked (in five Continents, over the month reviewed).

GW4BLE says for him Twenty took second place to 21 MHz this time, but he did have his usual evening session, which gave PYOAW (Trinidad Is.) for an all-time new contact to which he has recently added some 600 feet of copper wire below ground, to a rig described as a “DX-cum-KW-100” which is mainly used on Twenty CW at 100 watts. This gear yielded contacts with various interesting descriptions...

THE LEICESTER EXHIBITION

This opens at noon on Thursday, October 28, at the Granby Halls, and will run for three days, as in previous years. The exhibition will be the fifth in the series staged by the ARRA (Amateur Radio Retailers Association). There will once again be a fine array of all that pertains to Amateur Radio, with everyone there who wants to see or be seen. Leicester, in the heart of the commercial Midlands, is reached easily from all parts of the country. The ARRA can be relied upon to organise a good show, for everyone interested in Amateur Radio, licensed or SWL.
discussed, and its antecedents for several generations back, that he clean forgot to mention his “scalps!”

G4EAN (Nottingham) says that his Versatower is now at 60ft.; but he only found time for a couple of tries, one of which resulted in a contact with OY2EL, while W6YH was a gotaway—he was S7, but G4EAN was not!

The DX Scene

The Bill Rindone, WB7ABK, expedition finally came to an end after the Geyser Reef effort; this last only gave 450 contacts in the first two days, and since the Comoros are so close Bill reckoned it would be easier to stay put for another couple of days, and so racked up another 1400 contacts. QSL’s for all the DX-pedition stops should go to Bill Rindone, WB7ABK, 3049 Doris Court, Lake Oswego, Oregon 97034. Band conditions, we understand, had a bearing on Bill’s decision to wrap up the Expedition, it being all but hopeless trying to work the W6/W7 people who were most eager.

If South Georgia comes into your “wanted” list, look out for VP8MS, around 14265 kHz on Sundays; as for South Shetlands, this one has been showing as CE9BSA, same frequency at 1130 and 1630z, with PY1ZAE usually somewhere on the scene—the latter puts a good signal into the U.K. Up a bit more and you may come across XT2AG. Taiwan will be a little elusive for a while; BV2A lost his aerial to a typhoon; despite taking all possible precautions as soon as the advance warning was received, the mast came down and replacements have to come from the States; meantime, there is a dipole with which to get on the air.

Obituary

Silent keys fall to be mentioned now; VK3JW, who will be recalled for his Mellish Reef operation back in 1972; John had had a long illness; another notable call to disappear from our bands is HZ1AB, killed in a helicopter crash in Saudi Arabia.

Much nearer home, and better known to many readers, we much regret to have to record the passing of Sydney Boakes, G3HXN, who died on August 14, at the age of 68, after having been in failing health for some time. He was closely connected with Amateur Radio for many years, first on the sales side with Heathkit, Gloucester, and latterly with Western Electronics (UK), Ltd., Louth, Lincs. For part of the time in his later years he was a keen worker for RAIBC, and was always ready to give unstinting help and advice to any radio amateur, aspiring or otherwise. He was well-known at exhibitions, and rallies up and down the country.

Sunset-Sunrise Times

ON4UN writes to tell us of his computer programme, which, given your latitude and longitude will print out for you sunrise and sunset times for all DXCC countries, all Canadian Provinces and seven VK call areas, at 15 day intervals—18,528 computed times—all in GMT. The general rule, of course, is that there are two short-path peaks, one at sunrise at the Eastern end of the path and sunset at the Western end being the other; for a long path the requirement is that sunrise at the Western end is later than sunset at the Eastern end of the path. It all adds up to 97 pages of data plus two of explanation and example. To get your chart you need to obtain your own latitude and longitude as accurately as you can, and order on John A. Devoldere, Poelastraat 215, 9220 Merelbeke, Belgium; to whom should also go any initial enquiries. This is an invaluable idea from the point of view of the LF-band DX operator planning skeds, and probably worth it too for the HF operators who are looking for particular countries to fill in gaps in their coverage. (As this offer could result in an avalanche of mail, please be sure to enclose a large addressed envelope, unstamped, with at least two IRC’s for return postage from Belgium.—Editor.)

First off in the Contest section of this piece, we have the results of 1975’s CQ WW 160 Contest from W1WY (who, incidentally entered himself a very respectable score—congratulations, Frank). By far the major entry was from OK, if we leave out of account the W’s, closely followed by the U.K. and JA. In the final Top-20 list, KV4FZ was leader, with K1PBW second; G3SZA was fourth, GD4BEG sixth, and GM3YOR/P seventeenth, there being precious little to choose between the scores of GD4BEG and GM3YOR/P so close was the scoring after the first two places. Congratulations to all.

Now, to the coming month, October 2/3 for Phone, and the following weekend for CW are the dates for the VK/ZL/Oceania Contest; 1000z to 1000z Saturday to Sunday, sending RS(T) plus a serial number starting at 001; two points for VK/ZL QSO’s, one point for other Oceania contacts. Final score is the QSO points total times the total of VK and ZL call areas worked on each band. Underline each new VK/ZL call claimed per band in your log, which should be accompanied by summary sheet and declaration, and be on a separate sheet for each band. Logs to be received not later than January 31, 1977, to NZART Contest Manager, P.O. Box 489, Wellington, New Zealand; and if you want the Jubilee Certificate available to each entrant who submits a log, then send an IRC to cover postage as well.

For the twelve-hour RSGB 21/28 MHz Contest on October 10 0700 to 1900z is the time. Even if you don’t make an entry get on the band—particularly Ten—and make some 28 MHz activity. Logs to M. Harrington, 123 Clensham Lane, Sutton, Surrey.

Then of course there is J-O-T-A, the annual Scout event, 1800 Friday to 2359 Sunday (local time) for contacts with individual amateurs and scouts or groups; 3740, 7090, 14290, and 21360 kHz are Phone frequencies to watch out on, with CW likely to be heard at 3590, 3740 (U.S. Novices) 7030, 14070, 21140 and 28190 kHz.

Noon Saturday to Noon Sunday on October 16/17 for Phone and on November 6/7 for CW is the time to be available if you are man enough to tackle a 7 MHz Contest—there is the RSGB 7 MHz Phone on those days, but the W1WY data isn’t all that clear about U.K. scoring, so we suggest a rapid line to G3HCT, QTHR. Logs also go to him, by
December 15 and December 30 respectively.
And, that is probable as good a lead in as any to:

**Forty Metres**

A few hours of serious operating on this band is warranted either to put hairs on your chest or drive you round the bend! But, for the hairy, the pickings are pretty good and, since there are so few beams, the dipoles and verticals are in there with a level chance. However, if anyone should have an RF Valve (or semi-conductor) millivoltmeter, anyone should have an RF Valve with a level chance. the dipoles and verticals are in there and, since there are so few beams, ones, the pickings are pretty good round the bend! But, for the hairy put hairs on your chest or drive you on this band is warranted either to respect.

**TOP BAND COUNTIES/COUNTRIES**

<table>
<thead>
<tr>
<th>Call</th>
<th>AM</th>
<th>CW</th>
<th>SSB</th>
<th>Countries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4CZE</td>
<td>85</td>
<td>76</td>
<td>77</td>
<td>11</td>
<td>249</td>
</tr>
<tr>
<td>G4EAX</td>
<td>58</td>
<td>50</td>
<td>84</td>
<td>10</td>
<td>202</td>
</tr>
<tr>
<td>G4CEQ</td>
<td>23</td>
<td>86</td>
<td>71</td>
<td>13</td>
<td>193</td>
</tr>
<tr>
<td>GM3YOR</td>
<td>2</td>
<td>130</td>
<td>18</td>
<td>28</td>
<td>178</td>
</tr>
<tr>
<td>G4AEJ</td>
<td>65</td>
<td>54</td>
<td>38</td>
<td>8</td>
<td>165</td>
</tr>
<tr>
<td>GW3WMY</td>
<td>71</td>
<td>80</td>
<td>—</td>
<td>10</td>
<td>161</td>
</tr>
<tr>
<td>G4EPL</td>
<td>17</td>
<td>46</td>
<td>78</td>
<td>10</td>
<td>151</td>
</tr>
<tr>
<td>G4AYS</td>
<td>43</td>
<td>86</td>
<td>—</td>
<td>7</td>
<td>136</td>
</tr>
</tbody>
</table>

Scoring is on the following basis: one point for a county on SSB, two per county on CW, and three points per county on AM. In the case of an AM/SSB contact, claim two points, scores in the AM column by the AM station and in the SSB column by the SSB station. No other cross-mode contacts permitted.

For almost as long as your scribe has been writing this piece, Don Radley has been a part of the African scene. As 9G1GE first, from 1967-9, then 9J2GE from 1969 to 1974, and back to 9G1GE since then; but this month he makes the last CQ from Ghana and starts to pack the rig for transportation to his new posting—he should be able to start up again from Athens with an SV call shortly after he gets there in November. Meantime there are plenty of QSL's for both callsigns, available from QSL manager (and brother-in-law!) G3USE, who is QTHR. And, if you hear G4ABI—you'll be hearing Don using his "other" call.

Ted, ex-G2XC, seems to have obtained a lot of pleasure from the trying out and tweaking-up of those to W8JK-type aerials in his loft. As if that were not enough of a man-trap up there, Ted has now added 51 feet of wire in a L-shape around the same loft to give him reception on the other bands. The original 8Jk's were put up with whatever was around, some of the feeder being 25 years old, and the velocity-factor and impedance just guessed. During the past month a transistor dip-meter has been built, and it has
shown that some of the assumptions were wrong and enabled them to be corrected; it was interesting to note that this resulted in a considerable change in the ATU tuning and, which is maybe more to the point, the removal of the ATU now makes very little difference to signal strength, which is a good sign.

And talking of aerials and GDO's, this old scribe made a transistor type years ago with an OC170, using as a basis an old Eddystone absorption wavemeter of such an age as to be calibrated for the 112 MHz band! Now, when this GDO was built, the junk box and the tin-bashing facilities were pretty poor, so one pot was fitted on the side of the box, and in the absence of an on-off switch a bit of wire and a croc-clip poked out of an opportune hole. Thus it stayed for 15 years, until last month we changed the battery (which has dropped to 8 volts from nine!) and got around to giving it a nice little toggle-switch in place of the croc-clip; and it has seen a fair amount of use over the fifteen years of its life; on the one hand we have a noise bridge, also home-built, and of course, lots of G's.

A new reporter is G3PKS (Wells) who has been interested in /P operating with a whip roof-mounted by means of a quick-fix gadget, initially on Top Band (largely CW) and more recently on Eighty. On Top Band, calculation gives an e.r.p. of around 0.05 watts for five watts of actual input RF to the whip (which is pretty fair for Top Band /M whip efficiency, at that). With this, and a rig giving all modes and designed by G3OTK, plus a homodyne (direct-conversion) receiver boasting an IC mixer and a couple of stages of audio filtering, all of the U.K., round GI, to Northern GM, PAØ, with a plum in the form of ET3USA/MM, getting 569 with a change to SSB making 57, while G3PKS was in Brough, Cumbria and theship was 150 miles east of Hull—a total distance of around 300 miles. Since this, and as yet not boxed up, a rig for Eighty has been built—a CO on 3-513 MHz drives a BD131 as PA stage; again the receiver is homodyne, covering just a few kHz around the "transmit" frequency. So far this has been very effective in working U.K. in daylight; the best being a call from JX6AF when the car was parked at Weymouth on holiday.

G2HKU (Sheppey) is still horizontally-polarised, it having been at last found that there is a broken bone right in the instep which the local hospital X-ray had failed to record but showed up on the Medway Accident Centre machine which Ted reckons must have had its linear connected! However, Ted still can't get up the ladder to the shack, so he is stuck with Eighty CW and about one watt, with which he has managed DK2YN, DF7FA, GM4CMO, GW3MPB, GW3RV, GW6AQ, ON4GU, ON4IE, ON6HJ, PA9GCM, PA9GRU, PA0MDG, PA0PN, PA0SA and, of course, lots of G's.

G4AEJ (Birmingham 25) managed to borrow a Sphinx transmitter from son G4AEK, to supplement his own AM and CW with some SSB scoring; on the other side of the coin his two /P expeditions with the Solihull Club rather cut into his home operating time. However, a satisfactory movement for the Tables is noted.

G2NJ (Peterborough) is a chap your conductor has been going to visit for so long—but, like G2BJY, we never seem to find the time. Anyhow, Nick still writes regularly, and this month has been no exception. G2NJ was operating at the Inland Waterways Association "meet" at Peterborough, under GB3IWA (and 'KFE didn't go because he thought there wouldn't be enough water to float on!) and worked G2CP with his half-watt, also G6PG with three watts, well enough to rattle the loudspeakers; then from home there was G4CLR, a 35-minute contact with a station using 750 milliwatts, G4FAI in London with one watt, GW5TW near Swansea with a watt, G4EVO Broadstairs on two watts, and G4CQK with an HW8 at 3.5 watts. As for Top Band, G2NJ heard ET3USA/MM rattling 'em off on CW, on the night of August 11, when the ship was about 150 miles East of Hull.

G4CZE/A (Droitwich) has been pretty inactive of late, mainly due to practising for the /M activity—but he remembered to put in a revised score for the Table, and also means to make a final burst before the end of the time.

GM3YOR has not been particularly active on either LF band from home; but there can be no doubt whatever about the way he stirred things up under his GI callsigns! We are promised the story for next time—must be the first GI DX-expedition for many years.

A final-final on the subject of the LF Bands (and indeed, all bands!). Let it be known by the whole world that there is such a place as the Scilly Islands, part of the Duchy of Cornwall; and please don't damn as a Pirate an operator who says he is from there. There are G3UZU and G3RPC on St. Mary's, and the latter has suffered considerably from poctical types rhyming his call letters into rude phonetics. Neither of these stations are pirates, both are genuine licensed radio amateurs. Far from being "silly" the islands are known through history as "the islands of the blest" and anyone who pays them a visit will realise why—this bit of information came from "Club Secretary" who was prospecting for a DX-expedition to one or more of the "off-islands" as they are called by the people of St. Mary's.

**Tables**

Final entries for the year are required to be made up to October-end, which means they should be sent in with the gen during November, for display in the December issue. If possible, we would appreciate table entries in early, at that, and above all, don't miss the last date even by one post!

We sign off for another month; deadline for which will be **October 12**, and for the month after the date to remember is **November 9**. Address, as always, to "CDXN," **SHORT WAVE MAGAZINE, BUCKINGHAM.**
Fig. 1. Circuit of the transistorised crystal-controlled calibrator and band edge marker. The CO side, Tr1, gives three outputs at known frequencies, which will be as exact as the calibration accuracy of the crystals used, provision is also made to switch in an external crystal, either for checking against the bars, or as an additional marker frequency. The section Tr2-Tr4 is a separate circuit, which gives strong harmonics through a wide frequency range from the 100 kHz bar at Tr2; the advantages of this are explained in the text. The wave shape, as obtained from the monitor point on the collector of Tr3, is shown in the diagram at Fig. 2.

Fig. 2. Referring to Fig. 1, this is the waveform seen on a CRO with the output taken from the monitor point when the blocking oscillator is switched to the 25 kHz setting, to give a 4:1 division of the fundamental frequency.

BASIC SPECTRUM
GENERATOR
FOR RECEIVER CALIBRATION,
BAND-EDGE MARKING AND
OTHER APPLICATIONS

The advantage of a pulse-type signal, as distinct from a square-wave (as would be obtained from a multivibrator), for frequency marking is that the fundamental power is less and the harmonic power very much greater. Adequate power can be obtained at the higher harmonics without blocking the receiver on the lower frequencies.

For the "pulse" section a crystal-controlled pulse generator, operating at a p.r.f. of 20, 25 or 100 kHz, provides markers at the selected intervals, covering the whole spectrum into the VHF region. The spectrum coverage will depend on the rise time of the pulse, which will be limited mainly by the transistor used.

In this case, with an OC170, the rise time was measured at 50 milli-micro-seconds using a commercial instrument, which itself has a rise time of approximately 50 milli-micro-seconds, so the pulse could well be shorter.

From the "crystal" section markers are provided at 5 MHz, 1 MHz and 500 kHz, or any frequency in the range 500 kHz—8 MHz, using external crystals.

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2</td>
<td>22 μF</td>
</tr>
<tr>
<td>C3, C7</td>
<td>250 μF</td>
</tr>
<tr>
<td>C4, C6</td>
<td>39,000 ohms</td>
</tr>
<tr>
<td>C8, C9</td>
<td>47,000 ohms</td>
</tr>
<tr>
<td>R1</td>
<td>1 MHz xtal</td>
</tr>
<tr>
<td>R2</td>
<td>1 MHz xtal</td>
</tr>
<tr>
<td>R3, R11</td>
<td>100 ohms</td>
</tr>
<tr>
<td>R4, R5</td>
<td>500 kHz xtal</td>
</tr>
<tr>
<td>R6</td>
<td>100 kHz xtal</td>
</tr>
<tr>
<td>R7, R12</td>
<td>6.8 V Zener diode</td>
</tr>
<tr>
<td>R8, R14</td>
<td>100 ohms</td>
</tr>
<tr>
<td>R9</td>
<td>2,000 ohms</td>
</tr>
<tr>
<td>R10</td>
<td>4,700 ohms</td>
</tr>
<tr>
<td>R13</td>
<td>1,200 ohms</td>
</tr>
</tbody>
</table>

COILS: L1 is on Ferroxcube LA3 former, winding L1A 180 turns 40g. tapped at 60th turn; L1B, 70 turns 40g., and L1C as L1B. L2 is on Ferroxcube E Core, winding L2A 15 turns 28g.; L2B 5 turns 28g., and L2C 3 turns 28g.

Circuit Description

The crystal circuit is a Colpitts crystal parallel-resonance oscillator, which can be made to oscillate over a range from 500 kHz to 8 MHz with suitable fundamental mode crystals. Replacing the OC44 with a VHF drift transistor permits operation of the oscillator...
in the range from 10 to 25 MHz with suitable overtone crystals. Provision is made on the switch for external crystals.

Output voltage of the crystal unit at 1 MHz is 1 volt R.M.S. open circuit, and approximately 80 millivolts into 100 ohms.

**Pulse Unit**

A crystal oscillator with a tuned collector circuit is used, and the crystal connected in series with the feedback winding, L1C. The output from this oscillator is squared by Tr3 and the square-wave is used to synchronize the blocking oscillator Tr4. The square-wave must have a short rise time to ensure reliable triggering of the blocking oscillator, particularly when working as a divider; for this reason an OC44 transistor is also used in this stage. The blocking oscillator transformer L2 is wound on a Mullard Ferroxcube “E” core.

The variable time constant in the emitter circuit of Tr4 determines the operating frequency of the blocking oscillator. In this case the circuit was adjusted to divide by 5, 4 and one by the resistor-condenser combination. The division was checked at the monitor point provided using an oscilloscope (see Fig. 2).

With the diode and damping resistor connected across the primary of the pulse transformer excessive overshoot is prevented (D1, R12, Fig. 2).

The power supply is stabilised by a 6.8v. Zener diode, to ensure stability of the blocking oscillator.

Transistors of similar types to those suggested may of course be used.

**Harmonic Output**

This was measured by injecting the signal from the generator into the low-impedance input of a SP600 receiver, tuning to the desired harmonic and noting a reference level, and then substituting a signal from a crystal receiver, tuning to the desired harmonic and noting a reference level, and then substituting a crystal.

The results are shown in the table.

<table>
<thead>
<tr>
<th>Harmonic Output Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freq.</strong></td>
</tr>
<tr>
<td>1 MHz</td>
</tr>
<tr>
<td>10 MHz</td>
</tr>
<tr>
<td>20 MHz</td>
</tr>
<tr>
<td>30 MHz</td>
</tr>
<tr>
<td>50 MHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The square-wave is used to synchronize the blocking oscillator, particularly when operating as a divider.

**Operation**

The Pulse/Crystal switch controls the DC supply and switches the output socket to the appropriate position. A two-way press switch operates in conjunction with the on/off switch. In the “on” position, flicking the key switches the unit for identification. In the “off” position, operation of the key brings the signal on.

**SIXTEEN-ELEMENT ARRAY FOR SEVENTYCEMS**

**NOVEL CONSTRUCTION WITH CHEAP MATERIALS**

This very effective—yet cheap and simple to construct—432 MHz beam originated from a supply of galvanized (zinc-coated) iron wire coat-hangers, as used by most local dry-cleaner firms who return each laundered garment on one, at no extra charge. Being non-returnable, the writer’s wardrobe was quickly over-burdened with spare galvanized (zinc) coat-hangers, which were duly pressed into radio service.

The total material complement for this beam is:

- 12ft., of coat-hangers, 12g. galvanized; 10ft., 26g. tinned copper wire; two 5ft. x ³⁄₈in. diam. bamboo canes; 10ft. of thin, strong cord (fishing line); 8in. of PVC sleeving, and one reel Arax cored solder.

Each hanger is made from a 42in. length of galvanized wire, which is very strong. Figs. 1 to 9 show clearly the construction, step-by-step. The first thing is to straighten out the hangers, using a strong pair of pliers, after which cut and bend two pieces to shape as in Fig. 1, and four pieces as in Fig. 2.

Now bind these six pieces together with thin tinned copper wire, and solder with Arax cored solder, taking care to arrange the overlaps so that the centre phasing-line spacing is not stepped. This is achieved by laying the sections on the ground and arranging the overlap joints so that one lies on top of the other, and not as shown in Fig. 3, which is drawn for clarity showing the overlaps side by side.

These six pieces combined form the radiating elements and phasing lines. It should be noted that the phasing line sections between the upper and lower radiator sets have cross-overs in them. The spacing between the lines is one inch, and the cross-over is achieved by a judicious bend around a broom shank, thereby forming a semi-spiral in each line. The two semi-spirals thus produced result in a cross-over with a constant one-inch spacing.

At this stage, strip 8 inches of the outer sheath of 1-inch coaxial cable, cut into one-inch lengths, and slip one over each radiator element, positioning them at the centres.

Fig. 4 shows the construction of the element supporting members, of which two are required. Each one consists of a 41in. length of 12g. copper wire and four pieces 6½ inches long. The 41in. piece is the vertical member and the 62in. pieces are fixed to it by twisting one end two complete turns in a downward direction. By giving two turns, the cross member is held rigidly at right angles to the vertical member. Now bend a downward hook on the remote end of each cross member, as shown in the drawing, forming an arm 5½ inches long.

At this stage, strip 8 inches of the outer sheath of 1-inch coaxial cable, cut into one-inch lengths, and slip one over each radiator element, positioning them at the centres.

Lay the two supporting pieces thus formed on the ground to ensure that all the cross members are in the same plane, and solder each spiral joint.

To form the reflector elements, cut 8 straight pieces
Fig. 1  2 off

Fig. 2  4 off

Fig. 3 Radiators and Phasing lines

Fig. 4 Element support 2 off

Fig. 5 Reflector mountings

Fig. 6 Bamboo reflector spacers

Fig. 7 Mounting canes

Fig. 8 Complete Assembly

Fig. 9 Balun transformer
of 12g. wire **13\(\frac{1}{4}\)** inches long, and fasten one to the underside of each cross member, hard up against the spiral joint, mutually at right angles to the vertical and cross members, and bind in position with thin tinned copper wire. Solder at each joint after binding—see Fig. 5.

Now cut four pieces of bamboo cane 3 inches long from the 5-ft. canes, by taking 6 inches from each one. These pieces will of course have holes through their centres.

Take the two sections of aerial which from the supporting members complete with reflector elements, and lay them side by side on the ground. Make a pencil mark 14 in. inwards from the inner end of each reflector, and push one 3 in. piece of cane over these ends of each pair as far as the pencil marks, as shown in Fig. 6. This should leave a centre spacing of 4 in. between the reflectors inside the cane spacers. Make sure that the spacers are a good tight fit by packing with scrap pieces of PVC sleeve if necessary.

Lay the two 44 ft. canes down the back of this section, with a spacing of about one inch, and bind them with cord at each intersection between the long canes and the cane spacers. Leave about 12 inches of cane overhanging at the bottom for fastening to the mast head—see Fig. 7.

The final stage is to take the radiator and phasing line assembly (which is in two sections) and insert each radiator into the hook formed in each cross member. The position of the hook should correspond to the centre of each radiator, and the hook is then nipped tight with the pliers. The one-inch PVC sleeving pieces form insulating bushes between the cross arms and radiators, so ensure that they are not nipped through. Theoretically, these insulating bushes are not necessary as the centre of the radiator is a low impedance point, but in practice it is preferable to have them.

The phasing lines should be equally spaced about one inch along their length; the radiating elements 12\(\frac{3}{4}\) inches long, spaced vertically 13\(\frac{1}{2}\) inches; the reflectors 13\(\frac{1}{2}\) inches long, spaced vertically 13\(\frac{1}{4}\) inches; and the reflector-to-radiator spacing is 5\(\frac{1}{2}\) inches, which is 1/5th of a wavelength. It can be seen that both the reflector and radiator are mounted below the cross arm in each case.

For extra rigidity, and to help keep the phasing line spacing symmetrical, a 3 x 1\(\frac{1}{4}\)-in. piece of perspex can be laid across the phasing lines between the top and bottom pairs of radiators, and fixed in position with PVC tape.

**Feeding**

The array is fed at the centre of the phasing lines, and has an impedance of about 300 ohms.

It can be connected either by 300-ohm tubular twin feeder, or by 75-ohm low-loss TV type coaxial cable, with a balun transformer. A suitable balun of simple construction is shown in Fig. 8.

In the author's case, the balun is made with 75-ohm semi-air spaced coax, the total length of the loop before bending being half-wavelength, which, after taking into account the velocity factor of the cable, is 11 inches for 433 MHz. The three braided ends thus formed are strapped together (preferably soldered, but care should be taken to avoid melting the inner insulant) and earthed. In practise, the earthing has no noticeable effect and need not be bothered with. The centre conductors are connected as shown, and should be soldered to the centres of the phasing lines, after which the ends are sealed against moisture by liberally coating the bare ends with polystyrene or Bostik. As a further precaution, arrange the feed cable so that it runs down to the feed point, by taping the coaxial cable to the canes about one foot above the centre. Finally, clean off all residual flux from the joints, and rinse with water, as this flux is mildly corrosive.

The complete 16-element 432 MHz stack, which took only a few hours to build (in spite of the apparent complications) is extremely strong, light in weight, has low windage and is durable. It can be clamped to a mast by the canes. The beam as described has survived many gales and much severe weather, 15 feet above the chimney, without damage or rusting, and has proved most effective, the performance being noticeably better than the previous array, which consisted of a dipole in a close-mesh 2 x 1 wavelength-sided corner reflector.

With only 10 watts RF into the array at a height of 30 feet, good distances have been worked on the 70-centimetre band. More recently, power has been increased to 100 watts.

Finally, it hardly needs mentioning that the same general design can be adapted to other materials—it is not likely that everyone, everywhere, has a fully supply of galvanized coat-hangers! Probably, 12 or 14g. wire would do as well, but would be more expensive.

**Do You Know That** —

— An almost professional-looking lettering job can be done on panels by using draughtsmen's Uno stencils, their size 1\(\frac{1}{2}\) or 2 being just about right. The inking can be white on dark panels, or black on grey or aluminium. Then by warming the panel and spraying it with one of the clear aerosol lacquers (obtainable from any good motor accessory stockist) a durable finish is given to the work. The Uno items are quite cheap and are always available from office equipment suppliers, and can often be had at large stationers.

— Standard plastic conduit, in sizes from \(\frac{3}{4}\) in. diameter upwards, can be used to make coil formers for almost any RF application, and is excellent for the purpose. Any electrical contractor, or the local Electricity Board sales office, can supply it—and may even have unwanted off-cuts to give away.

— Another use for empty ball-point pen cases is as lead-in insulator ducts. Drill a hole through the wall so that the case is a tight fit, and the wire can then be fed through; it will take up to 14g. quite comfortably. An obvious limiting factor is wall thickness, as these plastic cases are barely 5in. long. They also make neat formers for small coils, when cut to the required length.

— Spreaders for open-wire feeder lines can easily be made from insulated tag boards. Cut the board into strips so that there is a rivetted tag at each end, and pinch it over the wire with pliers; solder to make a solid job.

— An attractive "circular frosted" effect can be quickly and easily imparted to aluminium panels by inserting a small pad of steel wool in the chuck of a hand-drill. A few turns will produce a permanent pattern.
The first List under this heading appeared on pp. 429-430 of the September issue of SHORT WAVE MAGAZINE. The courses shown below have been notified since.

Readers who cannot see a course going in their locality, or within reach, may find that the local office of their Education Authority know of one which has not been otherwise publicised—quote "Subject No. 765, City & Guilds of London Institute, Radio Amateur's Examination" when making such enquiries.

If a sufficient number of candidates (usually, not less than ten) can be mustered, a course can sometimes be arranged by approaching the Principal of the local Technical College, Adult Education Centre, or College of Further Education. There are also very good correspondence courses for the R.A.E.

Deal: At Hilderstone House, Broadstairs, probably on Monday evenings. Information from the Principal or the course tutor J. R. Clarke, G3OWQ.

Glasgow: At the College of Nautical Studies, 21 Thistle Street, on Tuesday and Thursday evenings, 7.0-9.30 p.m. covering R.A.E. theory and Morse instruction. Fee for the course £3, free for under-18's.

Harlow: At the Technical College, The High. Details from the College, or the course tutor, E. P. Essery, G3KFE, QTHR, or ring Bishops Stortford 52501.

London (Islington): At the De Beauvoir Evening Institute, Tottenham Road, Ballspond Road, N.1, with courses for beginners on Monday and Wednesday evenings, and Advanced instruction on Tuesdays and Thursdays. The Institute has a workshop for constructional work and its own amateur station for all bands. Details from F. Barnes, G3AGP, senior instructor, at the Institute, or ring 864 5311, extn. 2283.

London (South Croydon): At Haling Manor High School, Kendra Hall Road, on Thursdays, 7.30-9.30 p.m. Full enrolment details on application to the School; tutor P. L. A. Burton, G3ZPB.

Northampton: At Weston Favell Upper School, Booth Lane, on Wednesday evenings 7.0-9.0 p.m., covering theory and Morse. Information from the School, or from the course tutor B. Hayes, G3JBU, QTHR, or ring 43020.

Nottingham: At the Hucknall Further Education Centre, Portland St., Hucknall, on Monday evenings 7.0-9.0 p.m. Course tutor Rev. G. C. Dobbs, G3RJV, Woodborough 3920.

Todmorden (Lanes.): At the Calder College of Adult Education, on Thursday evenings from 7.15 p.m., starting on Oct. 7.

The most satisfactory method of assessing the power rating of a linear amplifier is based on measurement of RF output power instead of DC input, and it is output power rating that is now generally used. Accordingly, a method of power assessment for amateur Side-band transmitters is now specified in which the permitted p.e.p. output from an SSB transmitter does not exceed that from a CW or AM Phone transmitter using the maximum permitted DC power input. This method, which should be used wherever appropriate in preference to the DC input method, can be set up as shown in the diagram herewith, but readers may find the following comments helpful.

Method of Measurement

The sketch shows how the various items of test equipment are connected during power measurements. The transmitter output is terminated in a resistive load of the appropriate impedance value (50, 72 ohms or whatever) and provided with an RF ammeter or rectifier/voltmeter to enable the power in the load to be calculated. The load should have low reactance at whatever frequency is used (say, a non-inductive carbon resistor) and should be surrounded by an earthed screen. A cathode-ray oscilloscope is set up to observe the output waveform in the load; with most oscilloscopes the necessary high-frequency response and high-impedance input can be obtained only by making a connection direct to one of the vertical deflection plates. A capacity potential-divider can be used for controlling the input to the oscilloscope, as shown.

The first step in the measurement procedure is to adjust the SSB Tx for suppressed carrier operation and to connect two audio-frequency tones of equal amplitude
Amateur SSB Tx Power Measurement

Set-up for the test equipment discussed in the article on SSB power measurement. When correctly adjusted under Condition 1, the waveform displayed on the oscilloscope should be "perfect," near enough.

Condition 1 E²/R or I²R = Mean RF Power output
(RF ammeter or voltmeter may be used)

Condition 2 Speech peaks should not exceed p.e.p level represented by V

Power Measurement of SSB Transmitters

The method now specified for power measurement of SSB transmitters is therefore as follows:

Suppressed or reduced carrier, single sideband operation. The radio frequency output peak envelope power (RF p.e.p.) must not exceed that from an A3 transmitter working at an overall efficiency of 66 per cent when supplied with the appropriate maximum permitted DC input power. The output power shall be measured, using a resistive dummy load, RF ammeter or voltmeter and oscilloscope, by the following method:

(i) Apply two non-harmonically related sinusoidal tones of equal amplitude to the SSB transmitter, with the carrier fully suppressed and adjust the input power to give a mean radio frequency output power under linear operation of 200 watts (see Note 1) when measured into a resistive load by means of an RF ammeter or voltmeter (see Note 2) or equivalent method. Under this condition note the peak-to-peak deflection on the cathode-ray oscilloscope (see Note 3).

(ii) Replace the tone by speech; the maximum vertical deflection on the cathode-ray oscilloscope shall not be greater than the previously recorded deflection obtained with the two-tone input.

Note (1) 200 watts mean radio frequency output power in the case of those bands limited to a maximum DC input power of 150 watts; 66 2/3 and 13 1/3 watts for those bands limited to a maximum DC input power of 50 watts and 10 watts respectively.

(Note 2) In the case of VHF and UHF measurements the RF ammeter or voltmeter may be replaced by a crystal rectifier and calibrated meter; for SHF measurements a bolometer may be used.

(Note 3) In the case of VHF, UHF and SHF measurements this use of an oscilloscope may not be practicable. In this case the test may be limited to a measurement of the mean radio frequency output power.

For this month's Reader Small Advertisements, see pp. 505-510
The TS520 is another outstanding example of TRIO design excellence. It produces one of the best sounding signals on the air—just listen for yourself on any band. The TS520 covers all bands 80-10 metres and even 2 metres using the matching TV502 transverter. It has all the features of equipment costing a good deal more at no extra cost—AC/12 volt operation, speech compression, 1 kHz readout, VOX calibrator, blower cooled PA using real transmitting valves, 4 function metering, etc. A full range of matching units allows you to build up a station which is second to none: VFO 520, SP520, TV502. Why not send for details today and find out what TRIO design is all about, or just call on us either at Matlock or one of our branches to try out the superb TS520 system for yourself. You are in for a pleasant surprise, particularly when you realise that its nearest competitor is a much older design and costs £100 or so more than the TS520.

The TS700G has earned the reputation of being the finest all mode 2 metre transceiver available today. TRIO design and inherent quality are outstanding in this equipment and the TS700G has become the standard by which other transceivers are judged. Full 2 metre coverage using VFO or crystal control. All modes FM, USB, LSB, CW, AM. Mains or 12v. DC operation. Simplex, repeater and reverse repeater use without retuning—ask us what that means. 15W. TX output. 0-25 microvolt sensitivity. European standard selectivity. TRIO exclusive tuning fork access generator. We are often asked “Why is it better than brand X?” There are many reasons, but they all stem from the basic excellence of TRIO design. The transmitter sounds better than all the others because of the high voltage supply to the driver and PA—even when operating from 12 volts. The operator can use repeater or reverse repeater without having to touch the main tuning dial. The tone burst is automatic and operates in the repeater modes only. So many more features but you need to see for yourself. Ask us for details right now, all it costs is 30p in stamps for the full catalogue.

The TR7010 sets new standards in receiver sensitivity and low spurious emission on transmit. Operating CW and SSB from 144.1-144.3 MHz, the TR7010 covers all CW, SSB and beacon activity. 40 5 kHz channels plus VXO and RIT provide continuous coverage. 8 extra channels can be used, without retuning, in the range 144-146 MHz by fitting auxiliary crystals. Single conversion using an IF of 10-7 MHz with a superb crystal filter provides outstanding selectivity. Wide range amplified AGC and newly developed FET devices in RF amplifier and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals.

Single conversion transmitter with new fully balanced mixer system generates a beautifully clean signal with crisp audio quality.

The TR7200G has set all 2 metre operators talking about its outstanding performance on both transmit and receive. Not only is it the best engineered transceiver on the market, but it’s also the most sensitive at 0.3µV for 15 dB quieting and has the cleanest transmitted signal both in and out of band (some economy transceivers simply lack the interstage filtering to ensure that the owner is not put off the air by the Home Office). Minimum TX output power of 10 Watts (normally 15W. when mobile) will give you the extra quiet signal into your repeater. The TRIO exclusive tuning fork access tone generator ensures repeater access first time every time even when the inside of the car is at elevated temperatures.

Supplied complete with microphone, mobile mount, power lead and spare fuse, the TR7200G also has factory fitted crystals for S20, S21, S22, R6 and R7. If ordered at the same time as the rig, we will fit three extra channels for £10 inc. VAT (normally £14-40) or six extra channels for £20 inc. VAT (normally £28-80).
SHOWCASE 1976

The newest FM handy transceiver from the TRIO range of top quality rigs for the discriminating amateur operator. Superb performance on the 70 cm. band, opening up new horizons for the repeater operator, 12 channel capability in the range 432-436 MHz with three channels fitted (SUB, SU18, SU20). Transmitter output switched 2W/400mW and incorporating the TRIO 1750 Hz tuning fork access tone generator. i-wave detachable antenna for high gain performance on both transmit and receive. Supplied complete with microphone, carrying case and shoulder strap, battery charger (for optional Nicad pack) and backed by the finest service in Europe. Also available is the quick release mobile mount MBI for using the TR3200 in your car.

TR3200

Completely solid state except for the driver and two 6146B fan cooled PA tubes (for that low intermod. signal that means real quality), the T599S has all that you could want. All mode operation SSB, CW, AM on all bands from 80m. to 10m. Built in vox with adjustable delay and anti-vox. Multi position metering for complete operator information. Break-in CW with built-in sidetone generator. Dual impedance microphone input system—and of course, TRIO quality of construction with a die cast front panel and rugged casing. Signal quality.

Guaranteed by TRIO's acknowledged leadership in the audio field; by the use of an 8 pole crystal filter; by the use of linear PA tubes and by the use of an amplified ALC system which gives signal punch without sacrificing signal quality. Measuring only 10" x 5" x 12" and weighing only 25 lbs., the T599S is a real mighty mouse. Able to sit on the smallest operating desk, it's a perfect match for the R5995 or the earlier JR599 receivers—or any receiver for that matter.

R300

The latest from the range of TRIO general coverage receivers AM, SSB and CW reception on LW (170-410 kHz), BC (525-1400 kHz), four SW bands covering the frequencies from 1.25-30 MHz with separate calibration for the commercial (75-11 metre) and radio amateur bands (80-10 metres) on the large back lit main tuning and bandspread dials.

Excellent cross modulation and spurious characteristics as well as high sensitivity. Between 18 and 30 MHz the R300 operates as a double superhet, giving typical sensitivities of 1 microvolt for AM and 0.5 microvolts for SSB.

The 500 kHz marker is built-in and included in the price. Switched filters give two I.F. bandwidths to suit all modes of operation. The R300 can be used on 110-240v, AC or DC external supplies or from internal batteries. Automatic changeover from one supply to another is a further feature of the R300. Contact your nearest branch for details.

TR2200 GX

Following on the most successful handy portable line ever produced, the TR2200GX leads the field once again. Higher performance all round with better selectivity from the receiver which is now fitted with additional crystal filters at 10.7 MHz. Higher power from the transmitter at 2 Watts (optional reduction to 400mW) and new styling to match the TR3200 UHF transceiver. Detachable i-wave antenna with optional flexible h.e.i-hiph. Available. VFO facility for addition of external VFO30G.

Supplied complete with all accessories as the TR3200 and factory fitted with crystals for 320, 322 and R7. Extra channels are available ex-stock for most I.A.R.U. frequencies at a cost of £4-80 per channel (inc. VAT). Also available is the new mobile mounting bracket MBI which gives quick mounting and removal of the TR2200GX from your car.

See the TR2200GX soon at Leicester or at one of our branches.
SHOWCASE 1976

A reasonably priced, compact, high performance linear for 2
metres. SSB/FM/CW operation. 10W of drive for around 180W
input gives your signal the extra kick to get it out of the noise.
Built in receive preamplifier with adjustable RF gain and helical
filters for increased selectivity and reduced intermod from out of
band signals. Built-in regulated 13v 2.5A supply for Liner 2 or any
similar driver.
The LA106 will match any rig such as the TS700, FT221, IC201 in
any mode provided that the drive level is around the 10W level.
Using a rugged valve in the PA allows you to get away with occasional
misuse (just try a high power solid state amplifier into a mismatched
load) and gives very low intermod products.

BELCOM
LA106

Two steps ahead comes the Liner 430. Already being used by us
to make mobile contacts with the U.S.A., the Liner 430 opens up a
whole new dimension of long distance contacts via the OSCAR
satellites.
Covering two 480 kHz bands in 20 kHz steps and using the
exclusive Belcom Auto watch system which detects the presence of
a signal anywhere within VXO range without tuning. No more
missing signals and worn out fingers from control twiddling.
10 watts output. Selectable USB/LSB/CW operation. Dual
conversion using 50 MHz and 7.8 MHz IF’s results in excellent
image rejection and highly sensitivity. Truly a new dimension in
amateur radio from the Liner 430.

BELCOM
LINEAR 430

BELCOM
FS 1007 P

LEICESTER SPECIAL OFFER £125 inc. VAT
See us for details

The home station FM transceiver with everything. *Mains or 12 volt
operation. *16 channel scanning * channel skipping facility * priority
channel with front panel crystal sockets * manual or auto scan
* switched high/low power * switched wide/narrow deviation
* S meter * RF output meter * centre zero tuning meter RX fine
tuning control * built in SWR bridge * built-in digital clock with
alarm and auto switch on * built-in loudspeaker * 10 watt TX
* 0.3 microvolt sensitivity * superb styling and finish.

BELCOM
RECEIVER

NR 56 FM

£54 inc. VAT Crystals £2.40

This remarkable little receiver gives the 2m. FM listener every-
thing he wants at a very reasonable price. Excellent sensitivity,
selectivity and selectivity coupled with a built-in VFO and very effective
squelch make it the ideal receiver for both beginner and keen
listener. Although the built-in VFO more than covers the entire
2m. band, crystal control of FM channels offers many advantages
(particularly in mobile operation), so crystals, which are ex-stock,
may be fitted for the popular channels and repeaters. It requires
12v. DC for operation and is thus an excellent mobile receiver for
mounting in the car, boat or caravan as well as for home use.
LOWECASE 1976

As you will realize, it is simply not possible to show in an advertisement of this type, all that is available from our ever-widening range of products for the radio amateur. We could not show, for instance, the TRIO TS820 (maybe when we have cleared the waiting list ... ) nor the RS995, nor the new 70 cm. mobile transceiver, the KP410, nor the Uniden 2020, nor the Uniden 2030, nor the AMRI04 2 metre scanner, nor the 2 metre pocket receiver, nor the RAK aerials, nor the Shinwa filters, nor the complete range of Microwave Modules products, nor the J-Beam aerials, nor the keys and keyers, nor the plugs and sockets, nor the HY-Gain range, nor the rotators, nor the complete range of TRIO station accessories—and so on and so on.

The answer of course is to come along to Leicester and see the lot all together. Alternatively, you can call at Matlock or one of our branches in order to try out any or all of the items in our catalogue. You could always send us 30p in stamps to receive sheets and sheets of information about all kinds of good things.

Remember that we operate a money-back guarantee scheme for all that we sell; we also operate the finest service system bar none; our advice is free, honest and based on the widest accumulated experience of amateur radio equipment available in this country. Those of you who are our customers will be aware of this already, those of you who may be contemplating becoming customers should ask around to find out if all we say is true—it is.

73
JOHN WILSON,
G3PCY

OUR LONG SUFFERING AGENTS

Our agents are constantly amazed when someone walks into their premises and says “Fancy Lowe Electronics having a branch here, it’s about time.” This occurs, naturally, after the branch has been in operation for at least a year with wide publicity in our adverts. So that there is no confusion in the future, we have full time branches in the following places:

LONDON
Run by Peter Burton, G3ZPB at —
Communications House,
20 Wallington Square,
Wallington,
Surrey.
Tel. 01-669 6700

BIRMINGHAM
Run by Peter Ward, G3XWX at —
Soho House,
362-364 Soho Road,
Handsworth,
Birmingham.
Tel. 021-554 0708

LEEDS
Run by Tom Beaumont, G4DVZ at —
27 Cookridge Street,
Leeds.
Tel. 0532-452657

In addition to the full time shops listed above, we also have patient part time agents who give up their evenings and weekends in order to show interested amateurs the latest expensive goodies. My heartfelt thanks to the wives who see a constant stream of visitors taking up their home life. The stalwarts in question are:

Alan, GW3YSA, 35 Pen-Y-Waun, Efail Isar, Near Pontypridd.
Tel. Newtown Llantwit 3809

John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex.
Tel. Ringmer 812071

Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Near Glasgow.
Tel. 041-771 0364

SERVICE

It’s worth remembering that we believe our service to our customers to be the best available in this country.

Our Japanese suppliers also think the same way—that’s why we were chosen to represent them.

When you buy equipment from Lowe Electronics, this is the hidden extra that you get as part of the deal.

LOWE ELECTRONICS
119 CAVERNISH RD., MATLOCK, DERBYSHIRE
Tel: Matlock (0629) 2817 or 2430 Telex: 377482
THE EISCAT PROJECT

FOR RESEARCH IN THE UPPER ATMOSPHERE AND THE IONOSPHERE

A NEW international project, EISCAT, was launched at the turn of the year with the signature by scientific agencies in France, Germany, Norway, Sweden and Finland, and the SRC, of an agreement to set up an organisation to build and operate a high powered radar system in Scandinavia. This will enable scientists from these countries to carry out research in the upper atmosphere and ionosphere in the auroral zone. This note gives the scientific background to the project and outlines the proposed facilities.

Historical Notes

Fifty years ago, Appleton and Barnett in Britain and Breit and Tuve in America carried out crucial experiments that demonstrated that radio waves can be reflected from the upper atmosphere. Soon afterwards, Watson Watt coined the term “ionosphere” for the reflecting layers which were soon found to possess a complex structure. With the ensuing decades, the ionosphere’s effect on radio waves became a topic of great scientific interest and practical importance. Even today, in the satellite era, a vast amount of communications traffic goes via the ionosphere. Meanwhile, the study of the ionosphere itself has become a well established branch of pure science, with a literature of dozens of books and thousands of papers.

Ionospheric science has told us more and more about the upper atmosphere as a whole: not just the ionized layers, but also the neutral air from which they are formed, and even something about the solar ultra-violet and X-radiation that produce the ionization. Though just a small fraction of air is ionized at any one time, in some ways the ionization acts as an easily observed “tracer” of the upper atmosphere. Thus ionospheric science (apart from its radio propagation aspect) has rightfully tended to merge into the larger field of aeronomy, Sydney Chapman’s term for the whole study of the upper atmosphere.

Our knowledge of the ionosphere is based on far more diverse kinds of information than could be provided by the radio echo sounding technique, a forerunner of radar, that originated in Breit and Tuve’s experiments of the 1920’s. Still the work-horse of ionospheric research, the radio sounder (ionosonde) has been used for decades at sites in every corner of the Earth. In the 1950’s, and especially during the International Geophysical Year of 1957-58, the extensive use of rockets and satellites enabled the ionosphere to be probed with a variety of instruments. Ground based experiments flourished too. An outstanding advance was the “incoherent scatter” technique, proposed in 1958 by W. E. Gordon of Cornell University and soon afterwards used by K. L. Bowles in Illionois, though apparently foreshadowed in a 1926 paper by the French physicist Fabry.

The Technique

The incoherent scatter technique uses very high frequency radio waves that can penetrate the ionosphere at ease, being not reflected at all in the conventional sense. There exists, however, the very weak “Thomson” scattering of the electromagnetic waves by charged particles, each free electron behaving more or less as an independent scatterer, 10^-24 cm^2 in area. A typical ionospheric incoherent scatter experiment requires the detection of the radiation scattered from a 1000 km^3 volume of ionosphere containing 10^24 electrons, so the “target area” is about 1 cm^2. Only about one part in 10^11 of the transmitted power is scattered in this way; of the rest, perhaps one part in 10 is scattered in the lower atmosphere before it ever reaches the ionosphere, and the rest escapes into space. Of the 1 part in 10^11, only about 1 part in 10^7 will be scattered into the receiving aerial, even if this is a big radio-telescope. So a 1 MW transmitter only gives about 1 pico watt (10^-15 watt) of available signal.

There are two basic types of incoherent scatter radar. The first type uses pulses in the conventional radar way: the transmitter and receiver can be located at the same place and, with suitable switching, can use the same aerial. The second type uses continuous waves which are normally transmitted vertically upwards from the transmitter site. The scattered signals are received at remote aerials, the observing height being selected by suitable pointing of the receiving aerial. This technique, pioneered in France and used in a recent UK experiment, is rather more complicated than the pulse technique, though the use of continuous waves gives the advantage of better definition of the spectrum of the scattered signal. For it is by detailed analysis of the spectrum that the incoherent scatter technique yields its vast wealth of information.

The incoherent scattering of radio waves by ionospheric electrons and ions is actually a very complicated process. Very roughly, the spectrum shows Doppler broadening due to random thermal motion of the ions and electrons, the detailed shape being determined by the mean molecular mass of the ions and the temperatures of the ions and electrons. The centre of the spectrum is displaced from the transmitted frequency by an amount representing a Doppler shift due to the large scale motions of the charged particles—i.e. a “wind” or “drift” in the ionosphere. This “drift” is a quantity of great interest to ionospheric physicists, and is difficult to determine reliably by any other technique.

In the lower part of the ionosphere, at heights around 100 km, the neutral air is sufficiently dense for collision between ions and neutral particles to affect the spectrum, and this provides a measure of neutral air density.

The electron density in the ionosphere can be found in several ways: in principle it could be determined from the strength of the scattered signal, but in practice it is more accurately determined in a way that utilises the Faraday rotation effect, or by an interesting plasma resonance phenomenon. If strong electric currents are flowing in the ionosphere, as happens in the auroral zone, it is possible in principle to estimate these currents from their effects on the incoherent scatter spectrum. Some indications of the influx of energetic charged particles entering the ionosphere can also be obtained from
incoherent scatter spectra.

In short, for the charged particles in the ionosphere, and to some extent for the neutral gas as well, as incoherent scatter radar acts as a thermometer, mass spectrometer, anemometer, densitometer, and sometimes a galvanometer and energetic particle detector as well. Not all this information may be obtainable at one and the same time by a given radar, but nevertheless the wide range of information produced cannot be matched by any other technique.

Equipment Considerations

Because of the expensive equipment necessary—large aerials, powerful transmitters, sensitive receivers—only a few incoherent scatter stations have ever been built. Most of them have been situated in North America or Western Europe, where the ionosphere behaves fairly conventionally. But even in the early 1960's one radar was located at a geophysically more exciting place, namely at Jicamarca on the magnetic equator in Peru. As the scientific problems of the mid-latitude ionosphere, and even of the equatorial ionosphere, have become better understood, scientific interest has shifted to high latitudes, where the ionosphere is linked by the Earth's magnetic field lines to the outer magnetosphere and even to inter-planetary space. The high latitude ionosphere therefore taps some of the energy carried away from the Sun by the stream of particles known as the solar wind.

It is this energy source that produces the fascinating scientific phenomena of the high latitude ionosphere. The aurora is certainly its most spectacular manifestation, but the accompanying strong electric currents, ionospheric variations, and atmospheric heating all form part of a scientific jigsaw puzzle of cause and effect. The heating sets up winds and waves that spread the energy around the globe, so that in a sense the upper atmosphere is "driven" from high latitudes. This is particularly marked during the complex event known as a "magnetic storm," which follows an intensification of the solar wind.

EISCAT is to have two radar systems, both using transmitters located at Tromsø, Norway. One will be a UHF system operating at 933 MHz (32 cm. wavelength), with a peak power of 2 MW and mean power of 250 kW. There will be three receivers, one each at Tromsø, Kiruna (Sweden) and Sodankyøya (Finland). This UHF system will be able to measure electron densities, electron and ion temperatures, and drift velocities at heights of about 90-500 km; in many ways it will be a larger version of the existing French system. Unlike the latter, however, it will have to use pulses instead of continuous waves, because one of the receivers is located close to the transmitter, and pulses are therefore needed to obtain height discrimination. The Kiruna and Sodankyøya receiving systems, respectively 210 and 400 km from Tromsø, will select their observing heights by suitably pointing their aerials.

Frequency and Power

The VHF system will operate at 224. MHz (134 cm. wavelength) with a peak power of 5 MW and mean power of about 600 kW. The same aerial will be used for transmitting and receiving, and will to some extent be movable, to enable a range of latitudes to be studied. The VHF system will measure ion density, electron and ion temperature, and line-of-sight drift velocity at heights from 90 to over 2000 km. Hence the VHF system can monitor conditions along the lower parts of the geomagnetic field lines linking the Tromsø ionosphere to the outer magnetosphere, besides being useful for studying the lower ionosphere. Thus, the UHF and VHF systems will complement each other very well in the range of information they will provide.

There is a German proposal to build a powerful medium frequency transmitter near Tromsø for ionospheric heating experiments; EISCAT will provide an excellent diagnostic facility for monitoring the resultant phenomena.

All in all, there is no doubt that EISCAT offers excellent facilities for tackling the exciting science of the high latitude ionosphere, and ten UK university departments and research institutions have already expressed interest in using EISCAT.

From the SCIENCE RESEARCH COUNCIL BULLETIN
July 1976.
VHFCC Award

There are now several YL/XYL operators to be heard on the VHF bands and it is a pleasure to record that Ann Buckby, G4EYL, has been awarded VHFCC No. 266 for 2m. operation, initially under the call G8KMB, and more recently using the Class-A licence, which arrived on April 8 last. Ann has been very active since first being licensed in August, 1975, and runs a Liner 2 for SSB and Trio TR2200G licensed in August, 1975 and runs using the call G8KMB and more recently a Liner 2 for SSB and Trio TR2200G for FM. The aerials are a 4-ele. Quad and a colinear for working mobiles passing along the M1, near to the Spondon, Derby, QTH. With OM Richard, G3VGW, Ann has operated as ZB2YL last June but did not catch any of the E’s openings. Her country score from the home station is eleven and she reports that she did not catch any of the E’s openings.

Beacons

The new Cornish beacon, GB3CTC, is now operating on 144.915 MHz running 75 watts e.r.p. omni-directionally from a two-stack clover-leaf aerial system. The keying is FL1, FL1 and the call and QTH locator of ZK64a are sent. The old GB3CTC will continue to operate for a while on 144.128 MHz. Applications are in for 70 and 432 MHz beacons at this location. The much missed Durham beacon, GB3DM, has been repaired and converted to its new QRG of 144.935 MHz. The aerials were found to be damaged and are being replaced by two 4-ele. Yagis firing north and south simultaneously with 50 watts e.r.p. The QTH locator is ZO12a and ‘DM may be operational by the time this issue reaches you. Our thanks to G3COJ for this information.

The 3 cm. men will be pleased to learn that GB3LBH is now QRV from Romford, Essex. Nominally on 10.1 GHz, it is at present about 4 kHz low. Reports to G4ALN please (QTHR). It is understood that the Lerwick beacon, GB3LER, may be back soon. In the September “Region 1 News” from IARU, its QRG is listed as 145.925 MHz. G4EYL reports that ZB2VHF on 4m. was not operational in July, when she was on the Rock, but that the 2m. one should be on.

VHF Bands

Norman Fitch, G3FPK

Contests

Winners of this year’s VHF NFD were the March & District Radio Amateur Society, runners up being the Martlesham Radio Society, with the South Dorset Radio Society (operating from Alderney) in third place. Band leaders were: 70 MHz, Isle of Man Radio Society; 144 MHz, Hull & District Amateur Radio Society; 432 MHz, Stockport Radio Society and 1.3 GHz, March & District Radio Amateur Society. The Fixed section of the 144 MHz QRP contest on July 25 was won by G8DXE with 895 points, with G4ASR in second place, whilst GW3WRA/P won the portable section with 1150 points, G3PIA/P being runners up.

During the 144 MHz Open contest on Sept. 4/5, your scribe could only spend short periods on the band and only 27 contacts were made. Conditions seemed quite good, activity high and the quality of the great majority of signals, good. Many operators running high e.r.p. from populous areas seemed very concerned to radiate the best possible signals, often almost impeding other stations to tell them if there was the slightest cause for criticism. It seems that some 16 countries were available. In addition to all the British Isles countries, DL, EA, F, HB9, LX, ON, OZ and PA were worked, and likely a few others we have not heard about.

Best conditions seemed to be in a north/south axis and G8HQJ (Crawley) is one who noted the diminished activity from the London area; Barry’s log shows a predominance of northern stations in his 276 contacts worth 1638 points, his best DX being GM8FFX and G3NNY/P (Scillies). The south coast stations worked well down into France into ZD square (F1EGK), whilst several stations raised EA1CR running QRP in XD. G4BAH (London) mentions that DC8RLA gave a serial number of 681 with 40 minutes to go and G3SEK told us that G3PIA/P, the A.E.R.E. Harwell Group, made 519 contacts. G3VC/P, the Crystal Palace & District Radio Club made 391 contacts from AK11a, whilst the Martlesham Radio Society, G4BPO/P, managed 12 countries in their 443 QSO’s but their spokesman, G4DKK, reckoned that conditions were very poor with not much Continental activity noted, although they did work OZ.

Two correspondents have mentioned the four-metre Open contest on August 7/8. GM3YOR (Fife), operating portable in Tayside Region, made 38 contacts worth 410 points and mentions a pleasing amount of activity from Scotland. Drew reports favourable conditions with G4ADV/P in Cornwall, heard, G3PFM/P in Dorset and G4BWH/P near Sevenoaks worked, plus GI, GD and GW. He feels that some incentive is required in the scoring system to encourage operators in outlying areas to participate; may be a countries multiplier? By contrast, Ned Cartwright, G4DKK, who, along with G3NYK and G3XDY operated G4BPO/P in this event, from Suffolk, found the Sunday activity to have been, “... abysmal; just like Field Day!”

Forthcoming Events: Oct. 2/3, 1600-1800Z is the Region 1 UHF/SHF event, 432 MHz and above with a one-point-per-kilometre scoring basis and multiplier of 5 for 70 cm. and 25 for 23 cm. contacts. The 70 MHz Fixed contest is on Oct. 24, a six hour affair starting at 0900z. The 432 MHz. Cumulative contest starts on Oct. 11 from 2030-2230z followed by further sessions at the same time. On Oct. 19 and 27, then Nov. 4, 12, 20 and 28.

Microwave World Record

A new World record distance of 521 kms. was achieved on August 14 by GW3PFF, operating G4BRS/P from Pendeen Watch in Cornwall, 15 kms. west of St. Iver, and GM3OXX/P located at Port Patrick on the Mull of Galloway in Dumfries and Galloway Region. Using 10-15 mW. to dish aerials, contact was
DX-Peditions

Upon his return to England, G3SCP told your scribe that his portable operation from Luxembourg did take place as planned but that not one U.K. signal was heard, not even the expected "big guns." Gregg had 185 QSO's in nine operating sessions and found conditions very good to the north coast of France and along the Dutch coast, but nothing from across the water. Blessed with more success was G3NYY's trip to the Scilly Isles. Walt took the trouble to find a good portable site and was a welcome participant in the 2m. Open on September 4/5.

From EI9Q, your conductor heard that EI9V has plans to activate the rare "U" QTH squares in early October. Nothing very definite concerning times and frequencies but well worth pointing the beams to southwest Ireland. G3BOC will be in Brora in Sutherland (Highlands) in the last week of October in the rare YS square, so listen for it in the London area as they seem to have been in East Anglia and the Bournemouth area on 70.26 MHz using vertical polarisation. Wally suggests that the proposed new FM channels may mean that the locals will build VFO's and start doing some serious listening. He asks if there are any London stations on 4m. FM? G3BW (Whitehaven) has been concentrating mainly on 4m. this year as his 61 counties and 7 countries shows. Bill praises the efforts of the expedition types and says, "...bless them for going into such remote parts as Fermanagh and Tyrone, and to such people as GM3JIJ/P who trounces up to Stornaway..." We will second that, OM.

G3YOR's 4m. transverter packed up during NFD but another one was borrowed for the GI trip. Drew tells that his calling frequency is now 70.17 MHz which he hopes will be clearer down south for those listening for him.

Two Metres

During much of the period covered by this report the VHF/UHF bands have been wide open for weeks at a time. For some that is. Crudely summing up, it appears that stations in south-east England, and those on the eastern side of England and Scotland enjoyed fine conditions, whereas the further west one went, the worse they became. G2AXI (Hants.) does not mention any Continental DX worked but did manage GW3JXN/P in rare XM square on both SSB and CW. G3BW found little Euro-DX about apart from the occasional F and PA. Even G3COJ (High Wycombe) says he was just a little too far west to get in on the act. For example, on one occasion he heard G3POI in Kent giving S9-plus-10 dB to an LA who was inaudible at G3COJ.

Although the Scandinavian stations were not as numerous and strong in the London area as they seem to have been in East Anglia and eastern Scotland, nevertheless conditions were very good. Many stations were heard working SM and LA using 10-15 watts. At G3FPK, 14 countries were worked from the
The beginning of August and 46 QTH squares. It was fascinating to note how the openings varied from day to day. Late on Aug. 14, a couple of portable OZ's from EP square were quite strong. On the 15th, the OZ's were weaker but the SM's were stronger, the loudest signals being the LA's. On the 16th, the OZ's were about again, also on the 18th with some northern DL's in EO square. Best signals were from the EQ, FQ, ER and FR region. On the 19th, the band was full of strong DL's from DL, EM, EN squares particularly and the DL8PR beacon on 144-910 MHz was extremely loud. On the 20th, best propagation was towards PA, ON and northern DL. After that, things quietened down somewhat until the 25th when the SM5 and SM6 stations were quite strong with SM5BUZ in HS36e the best DX. The night of the 26th brought a number of GM's, including GM8FFK/P, Elgin, in YR24j. A single "CQ GM" on 144-160 MHz at 2210z resulted in a dozen QSO's with GM and northern G stations. G3XCS (Cornwall) and G(W) 3JXN who was in Cardigan on holiday, both confirm that the opening was non-existent with them.

Robert Matthews, G3ZNZ (Dartford, N. Humberside) worked no less than 256 continental stations in the period 8-21 August, including DM, HB and SP on SSB! G8BBP (Worcester) suggests it is much more fun to work the DX with QRP and mentions raising F, G, GD, GW, ON and PA whilst operating pedestrian mobile with his I2G-202 from the Malvern Hills, near the GB3MH repeater. Keith's prize getaway was a pedestrian mobile DL!

A welcome new contributor to the QTH squares table is G8LLG (Dorset) who started with a Liner-2 but now has an FT-221 with pre-amp. on receive, the aerial being an 8-elle. Yagi. GM4CXZ (Borders) took advantage of the good weather and conditions to go out portable with the IC-202. From the home station, Derrick worked "the locals" like DL, F, ON, OZ, PA and SM between the 10th and 25th! GM8FFX (Aberdeen) confirms how excellent the conditions have been in eastern GM. Graham reports that GM8CMY (Fife) worked SM1BSA on the Island of Gotland (JR22e) at 5-and-9 both ways, and that LA3EQ has worked "hundreds" of British stations, mostly on SSB. From the Elgin area, GM8's AZS, FFK, KMO and LHE are very active and have been working the DX. This group is on most evenings from 2100z on 144-188 MHz. GM8LVG is on from Lossiemouth and GM8DKQ from Thurso.

**Puzzle Corner:** G8KXX (Northants.) says he heard a station at S9 at 0645Z on Aug. 20 signing LZ4KI on 144-245 MHz. Our suggestion is that it could have been OZ4KI, who is listed in the Call Book but Roy wonders if anyone else heard this station?

There was an Aurora alert for Aug. 9/10 which did not happen. However, G8LRN (Sunderland) says that at midnight on Aug. 24/25, OZ stations reported a brief period of auroral reception from LA.

Reverting to the E's events of the summer, the last opening was a very brief one on Aug. 9, when IBDV was heard at 1824z. IT9TAI has...
forwarded copies of his logs covering eight days of E's propagation, an analysis of which reveals 50 QTH squares worked at least, from WM in the west to HM in the north, representing some 14 counties. Dom wonders about the calls of two GC3's worked on June 23 at 1810 and 1811z. His log shows YBI and YOA which cannot be right. He also has GM6...? logged at 0922 on June 29 but that cannot be, surely? Has any reader a solution to the mystery? Dom writes that his brother to the mystery? Dom writes that his sure?...  

Just too late for last month was another very interesting report from Piero, IR9ZGY in Trapani and IW9ACH, IT9EUR, IT9ISP and from Palermo province. Others QRV from Palermo include IW9AD, IW9ACH, IT9EUR, IT9ISP and IT9LUP. IT9TDN is in Messina province, IT9GYR in Trapani and IT9PLT in Siracusa, whilst a lot of Sicilians are on FM.

Much the same pattern of conditions has obtained on 70 cm. over this period as on 2m. their frequency being better on the higher band. G3BW was very disappointed that the "fantastic DX" on 70 cm. did not reach into Cumbria. Bill finds that the band needs careful treatment and that beams have to be correctly aligned, much more so than on 2m. G4BAH (London) has devoted considerable time to 70 cm., increasing his squares score from 14 to 32. Bob found conditions to have been very fine for many days in this period. Converning his previous comments on the low level of activity, John Tye, G4BYV (Norfolk) asks, "Does he call 'CQ' or, like so many of us, tune the band and conclude that it is dead?" G4BYV (Liverpool) has only recently got going on 70 cm. so was pleased to have a 15-minute contact on the morning of Aug. 19 with DC3EQ on SSB with not a word missed.

G4DKX (Ipswich) is now QRV on 70 cm. with less than one watt RF output from a DJ6ZZ-type transverter, suitably tamed, and transistor linear. Ned has a 4CX250B amplifier built awaiting completion of a 2kV power supply. With a 46-ele. Multi-beam at 25ft. he says it is amazing what QRP will achieve and 10 kms. per milliwatt seems normal under good tropo. conditions. However, Ned agrees with G4BAH about the low activity, even when OZ2UHF is in R5 copy at 67 kms.

"In the last two months of excellent conditions, two watts of 70 cm. SSB into a 48-ele. Multi-beam have produced nearly 100 contacts, about half of them G. Best DX so far is SM5CCY at about 1180 kms." So writes Paul Melbourne, G8GML, from Cambridge. Another newcomer to 70 cm. is G8IWA (N. Humberside) who used a TS-700 as driving source in a QQVO2-6 running 829B amplifier. He has frequent QSO's with SVIAB and six SM.

with 20 watts of SSB to Quad Loop Yagis and has increased his All Time score to 11 counties and 5 countries. G8GML hopes to have
a few watts of FM on 23 cm. any time now. GM6XI reports that GM4DJI and GM8BJF have been assiduously developing equipment and aerals for the band. With it, GM8BJF (Edinburgh) worked SK6AB for the first GM/SM 23 cm. QSO. GM8FFX also mentions this feat and that GM3ZBE, using about three watts output from a varactor tripler to an indoor aerial, worked G3LQR and several PA's in addition to G4BYV.

**Thirteen Centimetres**

G4BYV managed his 4th QTH square on the band thanks to DC0DA at a QRB of 472 kms. John got a 5/5 report, whilst the German was 5/6. G4BEL is also on this band and has been heard by John and G3LQR.

**The Repeater Scene**

In compiling a feature such as this, we have to try to please most readers most of the time. From time to time, requests are received that we devote a special section to repeaters in view of the large number of VHF/UHF operators using them. Whilst not wishing to detract from the ingenuity and expertise of those who design repeater hardware, and from the efforts of those stalwarts who install and maintain them, the question must be asked, “How does the user of a repeater advance his ‘... self training ... in communication by wireless telegraphy’ ... mentioned in his licence?” The original, prime case for the establishment of a repeater service was to enable the very limited range of mobile stations to be extended. It appears to the writer that the only knowledge required of a repeater user is to which channel number his transceiver should be switched.

In this feature, it is the policy to give prominence to the more scientific aspects of VHF operation, which is why E’s, auroral and extended tropo. openings are dealt with in detail. Analyses of these events can only be of value when such data as possible are published. The results are that, through the work of G2FKZ on auroral, and F8SH on Sporadic-E phenomena, for example, a very large body of scientific data are produced to the credit of the Amateur Service as a whole. Any amateur participating in a period of anomalous propagation, and reporting it, is actively training himself in the art of radio communication. With the greatest respect to repeater users, as opposed to designers, it would appear difficult on this basis to make out a case for there being much space devoted to repeater topics, in this feature. It is hoped that the foregoing remarks will not be misconstrued for it is not the intention to ignore repeater activity. It is hoped that regular readers will let us have their views on the amount of repeater news they would like to read here, bearing in mind that most repeater groups produce news letters (some of them very good indeed) whilst the Amateur Radio Mobile Society’s journal, *Mobile News* attempts to knit the whole repeater scene together nationally and internationally.

Now for some hard news. The UHF repeater, GB3ER, at Danbury in Essex is now operational on RB10 and full information can be obtained from G3WCO (QTHR). There are now 12 VHF and 12 UHF repeaters operational in the U.K. The East Midlands Repeater Group’s GB3ME, located at Clifton Road, Rugby (ZM54b) was put into service on July 17 on RB6 and consists of a modified *ITT* base station. Information from G8DLX (QTHR). It seems that the Tyne and Wear group will site their GB3TW, 2m. repeater on R5 at the Burnhope IBA site. The Durham beacon, GB3DM, will operate from the same site only 190 kHz from the repeater’s input frequency. G3URE (QTHR) will divulge details of this group. GM6XI infers that the Central Scotland FM Group’s repeater GB3CS should be on any time on R6; details from GM8FM (QTHR).

GB3HU on RB10 is licensed but, according to G8IWA from whom all details can be obtained, it has suffered yet another set-back; the Post Office “lost” the receiving converter! With a bit of luck, Tony thinks it could be on the air in the latter part of October. Gordon Adams, G3LEQ, is the secretary of the U.K. FM Group (Western) responsible for GB3MP on 2m. and GB3LL, GB3MR and GB3ST on 70 cm. The group has now submitted plans for GB3CR. Chester on RB6 and GB3LI, Liverpool, on RB10. In addition, they are proposing a linear repeater, GB3LR, 432-225 MHz input and 145/825 MHz output for near Mold in Clwyd. Gordon was able to access GB3LL near Colwyn Bay from East Belfast during a recent trip to GI.

**Satellite News**

IARU News Bulletins are now transmitted via Oscar 6 on alternate Wednesdays. These originate from the Budapest control station, HG5BME, and can be heard on 29-490 MHz SSB in the 10m. band. The next bulletins should be as follows:—Oct 13, orbit No. 18265, AOS/LOS 0716/0735 and 18271, AOS/LOS 1822/1843. Oct. 27, 18441, AOS/LOS 0834/0855 and 18466, AOS/LOS 1748/1808; all times GMT. The intersatellite tests on Aug. 9 were a fiasco due to users clobbering both 0-6 and 0-7, The U.K. Oscar 6 telecommand station at the University of Surrey in Guildford became fully operational on Sept. 8. Following last month’s plea, G8CSI has received an offer of assistance in assembling software for the Intel 8080 micro-processor from G8KWR.

JAMSAT, the Japanese satellite group have sent their 145/435 MHz transponder to the U.S.A. It is hoped to fly this on the next ITOS launch in June, 1977, probably the last ITOS launch, by the way, along with the AMSAT-USA 4-O-D which is another 0-6 type 145/29 MHz transponder. If successful, 0-7 will then be switched to Mode B permanently.

New stations on the satellites include A4XGB on SSB 29-44 MHz, ST2SA on 29-475 CW, UJDP on 29-456 CW and very fast at that! UQ2W on 145-94, UV2R on 29-473 and 9L1JM. 5X5FS is EI9G in Uganda and reports his call being pirated by certain I and DL stations. Those wanting 9XSS cards should QSL via DL80A. YV5ZZ on 29-485 is ex-DL3GD, QSL via P.O. Box 76093 Caracas, Venezuela. EA6BK on 29-46 SSB and KG4PU on 29-457 CW are more new ones.

**Deadlines**

That’s it. How about some MS news next time? Everything by Oct. 8 for the November column and Nov. 5 for the next one, to "VHF Bands." *Short Wave Magazine*, BUCKINGHAM, MK18 1RQ. 73 de G3FPK.
USEFUL TEST UNIT
FOR SOLID-STATE CIRCUITRY
W. H. JARVIS (GM8APX)

THIS article describes a small mains-powered box which contains most facilities, apart from a 'scope and a multimeter, needed by those who regularly experiment with solid-state circuitry.

A 6-month survey showed that the author seldom needed anything other than AC and DC supplies at about 12 volts, a wide-range audio source, and a crude amplifier to ascertain whether low level AF's are present.

All these facilities have been combined in a tough plastic box 9 x 6 x 3 inches. The general layout is not critical. Fig. 1 shows the oscillator circuit board, which gives sine, triangular, and square outputs at 20 to 20,000 Hz in one range, using the 8038CC integrated circuit. Fig. 2 shows the audio amplifier, and virtually any two n.p.n. transistors could be used instead with suitable resistance changes. Fig. 3 shows the unstabilised DC supply circuit, which could hardly be simpler.

The controls and terminals are on one of the 9 x 3 inch sides, and the box sits all day at the back of the shack bench with this side up, thus clearing the table of many separate instruments.

Readers will immediately note the lack of an RF source; but ten turns of insulated wire wrapped round any pocket calculator, with a 0.1 µF capacitor at one end for isolation, easily makes up for that! 

For anything radio you may want to buy, sell or exchange use the Readers' Small Advertisement section in "Short Wave Magazine"—see pp.505-510
THE MONTH WITH THE CLUBS
By "Club Secretary"
(Deadline for November issue: October 8)

By the time this comes to print, most of the organised R.A.E. classes will have made their start. However, many areas which are quite capable of supporting a local Club certainly cannot do the same in terms of numbers for the local technical college class-size requirement. Where this is so, or seems to be, it is still worth negotiating with the College to put a course in next year’s prospectus, because often the majority of the folk who sign on are not in any way connected with the local Club or known to the local amateurs at all!

On a different tack, quite a few groups have their own places; if this is the case, they would be well advised to take a good look at their properties for any signs of subsidence due to the abnormally dry summer and consequent drying-out of the water-table under the club room—or your own home for that matter, come to think about it!

Veering yet again, your scribe annually takes the odd few days of complete solitude over and above the family fortnight; and in this period usually makes an effort to look in at the local group. The 1976 visit fell on the Cornish crowd on return from the Isles of Scilly. Thus it was that he arrived half-way or more through the meeting, and from the back was able to marvel at the numbers such groups can attract when they are as well organised as this one—the place was bulging with people! Of course, they are far from the centres from which the “guest speaker” can be attracted, but they make the maximum use of the talent they have within the group, and they work to create a best-possible programme on a once-monthly basis; it certainly would be an eye-opener to some of the faint-hearted Club secretaries who bewail the lack of membership in populous areas and can’t or won’t be bothered to ask speakers to come along or members to give a talk, and to try and get the membership back up. Success is the progenitor of success, in club life as elsewhere.

The Reports

Our first stop here must be with WAMRAC; their SWL representative writes in to point out that although the group started as, and has retained, the word “Methodist,” it is now open to all denominations of the Christian faith. For the details, drop a line to G3AGX, as Panel.

The Secretary of BARTG has lots of things to say this time, so we will have to condense a bit. Initially, let us say that the Group is the focal point for those who have an interest in operating in the teletypewriter mode on the air. Initially, they are after more news on the reception of their GB2ATG news bulletin transmissions. report forms for which have been distributed to members, Other reports are also welcomed, of course. Secondly, their very much travelled exhibition will be on show at Leicester.

Out West

Covers not only what is conventionally called the “West Country” but also GW and Ireland, not to mention the Marches; and it is in the Marches that we find our first stop, namely Hereford. It looks as though for October 1 they have a Quiz, and on the 15th, G3HVX is going to answer, and provide some enlightenment on, the question “What is Frequency.” Both will be at the Hq. Room at the Civil Defence Hq., Gaol Street.

At Torbay, we have a brief note to say the Friday evening natter sessions have been very good this summer, with various visitors popping in. As for the main meeting for October this is in the nature of a retrospect of past doings, seen on slides. In addition, they will have G3GDW/A at Newton Abbot during J-O-T-A. Hq. is at Bath Lane, rear of 94 Belgrave Road, Torquay, and October 30 the relevant date.

A report on their recent Bucket-and-Spade Party comes in from Pembroke; 47 visitors signed the book at the Regency Hall, Saundersfoot, where they had talk-in, and—an enterprising touch this—a group of members up on the hilltop with a station, to cover for the fact that Saundersfoot is claimed to be the worst VHF site in the country! Turning to the regular Club affairs, the October session is on the 29th, at the Defensible Barracks, Pembroke Dock—details from GW3XJQ at the address in the Panel.

Now the AGM is out of the way, the Bangor chaps, over there in GI, are setting out on the winter season in earnest; October 1 is down for a talk on Practical Aerials for the Radio Amateur, at the Redcliff Hotel, Bangor. Looking on to November, there will be a Surplus Sale, but for this one you must get details as to date and venue from GI4EMS.

For Yeovil, the first thing we note is that the p.r.o. has added G4EVI to his signature—congratulations. At the time of writing, a change of Hq. is in the wind, so before making any visit, check with the secretary for the latest state. However, subject to this reservation, they have October 7 for a visit to Hinkley Point group and on the 14th a talk by G3MYM on “Some Aspects of Resonance.” The same speaker looks at Signal Ducting in the Ionosphere on 21st; while on November 4 G3XFW will talk about a Frequency Counter.

We had already mentioned Cornish; but now we are to say that they have a place at the SWEB Clubroom, Pool, Camborne, where they will be on October 7, to hear G3CZZ talking about “SWR and all That!”

North

Here again our heading covers more than one would expect, including as it does those shy Scots who so rarely tell us of their doings. Lothians is the sole GM representative this time; it is to be noted that during October and November they have a temporary change of venue from Riddles Court, Lawnmarket, Edinburgh on the second and fourth Thursdays of every month, to

31st ANNUAL MCC

The 1976 Magazine Club Contest (MCC) will take place over the week-end December 4-5, evenings 1700-2100z. Rules will appear in the next issue. Start planning now!
be the same dates but at Cannonball House, which is about 100 yards further up towards the Castle. Further details from GM4BYF, as Panel below.

Now to White Rose with Hq. at 83 Town Street, Armley, Leeds 12, where they are to be found every Wednesday from 7.30 onwards; they have just about everything here in the way of facilities, and the Secretary indicates that he has quite a lot of interesting talks lined up, though he won’t commit himself to giving away firm dates.

Scarborough, after their summer recess at the Salad Bowl Cafe thanks to G3JBR, return to the Technical College in Scalby Road, every Friday evening at 7.30. Incidentally, four members passed their R.A.E., and again we gather G3JBR had a hand in the game; the sort of chap, obviously, who is needed in the Club to which your scribe belongs!

A change of venue for Hull, they having been rather troubled at the old place by vandals. Now it is to be in the lecture room at the Dorchester House Hotel, Beverley Road, Hull, every Friday evening, with a talk on alternate weeks; and there are hints of a new place of their own in the future, too!

The Northern Heights data are not quite clear, but we understand that they have a weekly session at the Peat Pitts Inn, Ogden; for October we see a talk on Amateur TV on October 13, and on October 27 there is a film show.

A pointed hint from York—they still have a few pages left in their visitors’ book! They can be found on each Friday except the third one in each month, at the British Legion Club, 61 Micklegate, York. In October, highlights include the Annual Dinner and the Leicester show.

Though at their AGM the Harrogate & Knaresborough secretary had to report a diminished membership, finances are in good order and there are plans to make G3HRS more active on the air, also to establish a quarterly Newsletter. Meetings are every Monday, 7.0 p.m. at the Adult Education Centre, 2 Victoria Avenue, Harrogate.

The Midlands

It is quite a while since last we heard from the Swindon crowd, who now have their Hq. at the “Cold-harbour” pub in Blunsdon, which is about five miles north of Swindon on the Cirencester road. On October 6, the details are crossed out, presumably due to some doubt as to the date on which they pay a visit to Harwell. But for October 20 there is no doubt—it’s the club Junk Sale.

Warrington have their place at Grappenhall Youth and Community Association, Bellhouse Farm, Bellhouse Lane, Grappenhall, and meetings appear to be on a weekly basis, with something laid on for every Tuesday between now and Christmas; October 5 is for G8FBX to talk about SWR, while on the 12th

---

Names and Addresses of Club Secretaries reporting in this Issue:

ACTON, BREATFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3 8LB.

BANGOR: D. Steele, G4EMS, 59 Donaghadee Road, Millisle (418), Newtownards, Northern Ireland.

B.A.R.T.G.: J. P. G. Jones, GW3JGG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed, SA62 4LR.

CHILTERN: I. Eamus, G3KLT, Windrift, Shortacre Lane, Princes Risborough, Aylesbury, Bucks.

CORNISH: S. Halfyard, G4EIS, Studio 12, Rosewell Terrace, St. Ives (3576), Cornwall.

COULSDON: N. Moyes, G8KMI, 23 Ellenbridge Way, Sandcross, S. Croydon, Surrey (01-657 2549).

CRAWLEY: M. Trupp, G3YWO, 57 Cathcart Drive, Orpington, Kent.

CRYSTAL PALACE: G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London SE19 2LD (01-653 4340).

DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3 7GE.

ECHLEFORD: R. S. Hewes, G3YDR, 24 Brightside Avenue, Laleham, Staines, Middx.

GUILDFORD: B. Light, G4BHQ, 4 Dagley Farm, Shalford, Guildford (76375), Surrey.


HARROW: L. Light, G3KDL, 22 Chippenham Avenue, Wembley, Middx., HA9 6NQ (01-902 2570).

HEREFORD: S. Jesson, G4CNY, 18 Kings Acre Road, Hereford (21931), HR1 17G.

HULL: F. Moss, G8GDG, 334 Ings Road, Hull (7603), North Humberside.

LOTHIAMS: F. Bates, GM4BYF, 2 Swan Spring Avenue, Edinburgh, EH10 6NJ.

MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leci., LE13 1TZ.


NORTHAMPTON: S. J. Purser, G8GHZ, 2 Dobson Close, G.N. Houghton, Northampton (61794).

NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (44329), West Yorkshire.

NORTH KENT: R. Wells, G4ARQ, 12 Bulbank Road, Belvedere, Kent.

NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham, NG5 1JR.

PROMPTO: M. A. Shelfer, G2SOO, Woodview, St. Florence, Tenby. Dyfed. Sat 70.079 GLS (Manzarmier 344).

PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

REIGATE: F. H. Mundy, G3KSZ, 2 Conifer Close, Reigate (43130), Surrey.

SCARBOROUGH: C. H. Whittaker, 1 Ryefield Close, Eastfield, Scarborough, North Yorkshire, YO11 3DN.

SOUTH BIRMINGHAM: J. S. Hughes, G8VSK, 103 Cottage Lane, Erdington, B29 5UJ (021-427 3088).

SOUTH EAST KENT (YMCA): A. D. Hewlett, G8KSD, 170 Princes Risborough, Aylesbury, Bucks.


SOUTH KENT: W. G. Dyer, G3GEH, 31 College Road, Deal, Kent.

SOUTH MANCHESTER: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

SOUTH MIDLANDS: A. D. Hewlett, G8KSD, 170 Princes Risborough, Aylesbury, Bucks.


SOUTH YORKSHIRE: M. Livingstone, G4CWH, 378 Skelmanthorpe Road, Barnsley, Yorkshire.

TENBY: R. Hughes, G4PAB, 119 Tenby Road, Tenby, Dyfed.

TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Teignmouth (5576), Devon.

VERULAM: B. H. Pickford, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

WARRINGTON: R. E. J. Staples, G3MMD, 2 Willow Close, Warrington, Cheshire.

WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Wirral.

WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Wirral.

WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Wirral.

WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Wirral.
For their meeting on Sept. 2, G2BAR gave the Cheltenham Group a demonstration of Slow-Scan TV, very successfully, and for which they had a packed house. This picture was taken by their Secretary, G2FWA, using a hand-held Leica IIIc in a subdued room lighting.

G3WFB details some Receiver tests. For October 19 G3SBI is in the spot, but no subject specified, while on the 26th it is “Club Matters” which we presume means a business meeting.

Things seem to be on the change at Midland; following the move to the University of Aston, they are also having additional dates at Brasshouse Centre, off Broad Street, this latter being on October 5, while Room 110 at the University is the venue, on October 19, for the AGM, starting at 8 p.m. sharp.

Not far away is South Birmingham, and here they congregate at Hampstead House, Fairfax Road, West Heath; a Surplus Sale appears on October 6, and the AGM is down for November 3.

We had to dig a bit in the Worcester newsletter to find their Hq.—the old Pheasant Inn, New Street. October 4 is set aside for G4FAT and G4ETH to show slides of their GM trip, while on the 16th they have some visitors to whom they are going to show what Amateur Radio is all about. This is a great idea—one which every other club could do well to copy.

At Peterborough the group have Hq. at the Scout Hut, Occupation Road, where on October 15 there will be a brief business meeting, followed by a Film Show.

On to Wirral, where there is never any doubt as to the dates or the Hq. address—it’s part of the heading. First and third Wednesdays it is, at the Sports Centre, Grange Road West, Birkenhead. This gives October 6 for G8IVW to deal with Part 3 of the Semiconductor Saga, and on the 20th there is the vitally important AGM to be dealt with.

Pressing on with the clip we next arrive at Northampton, where the Hq. address is Spencer Dallington Community Centre, Tintern Avenue, off Gladstone Road; they foregather there every Thursday evening from about 8 p.m. The main event for October is on October 28, the all-important AGM.

Once in a while we get the excellent Spalding Club Newsletter; from it we see they have split into a southern and a northern group. Southern first, and October 8 for demonstration and a discussion about commercial equipment, at the Teachers Centre, Knight Street, Pinchbeck. The Northern area chaps have their venue at William Lovell Secondary School, Stickney, on the A16 road, and their date is October 21.

We seem of late years to hear from the Melton Mowbray chaps just once in a twelvemonth—a time to give notice of the AGM; the only snag this time is that the AGM was down for September! However, they normally have a Friday once each month at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, and no doubt the remaining information can be obtained from secretary G3NVK—see Panel, opposite.

Now we come to a Club with a Problem—South Manchester. It seems they are soon to lose the use of their shack, as the land on which it is situated and on which they are equipped with aerials, has now been sold and they will have to find a new place for this facet of their activity. Can anyone offer useful suggestions?—if so, please get in touch with G8GDM. He can be reached at the address in the Panel, or by going to one of the normal meetings, which are on October 1, for a talk on Contest Operating by G4AUR; the 8th, for a Club Quiz; 15th, when the Stability of Oscillations will be discussed; October 22, which is down for a showing of the RAC’s Lombard Rally film; and October 29, when G3SVW talks about Modulation and Multiplex. All these are at Sale Moor Community Centre, Norris
Road, Sale; and for the moment the shack at “Greeba,” Shady Lane, Baguley is still in use on Monday evenings.

On to Derby, at their Hq. at 119 Green Lane. Here on October 6 they have a Surplus Sale, and on the 13th G2CVV will discuss the History of the Licence—a topic which might have a few surprises in store for the younger chaps! October 20 is down for a Video Show, and on the 27th there is to be a practical demonstration of Constructional Techniques.

Sherwood Community Centre, Mansfield Road is “home” to the Nottingham group, each Thursday evening. October 7 sees one of their favourite “Forum” sessions, but it is not yet known what is to happen on the 14th. No doubt at all about October 21—an Activity Night—while on the 28th, G8FWH will be talking about Semiconductors.

**Southerly**

First, North Kent, who have their gatherings on the second and fourth Thursdays at the St. Mary’s Institute, 2 North Cray Road, Bexley; however, we do not have any detail on the up-coming dates, the reason being no doubt that, as the duplicator for the Newsletter has been out of action for some time, there was much to be caught up with in the current issue!

At Reigate, the next natter-session is on October 5, at the Marquis of Granby, Hooley Lane, Redhill, in the Saloon Bar. As for the main meeting, this one is at the Constitutional Centre, Warwick Road, Redhill, at 8 p.m. Visitors who may have been before should notice this is a new venue.

The Chiltern Newsletter indicates that the Hq. address is now at 42 Castle Street, High Wycombe; the date is October 27, but at the time of writing nothing had been arranged firmly—doubtless it will have been sorted out by the time the gang arrive!

For Southgate the chaps are very coy indeed as to when they foregather—but our spies with their calculators indicate that it is the second Thursday in each month, at the Scout Hut in Winchmore Hill. No details though, on what is going to happen. Doubtless the Hon. Sec. will be able to give you the latest “gen” nearer the date.

A novel title is used for the Coulsdon group’s Newsletter—they call it “Car’s Whispers!” From it we glean the news that they now have two dates each month, each at a different address. October 7 is to be at the 10th Purley Scout Hall, behind the row of shops in Chipstead Valley Road opposite Rickman Hill, for a series of mini-lectures; and on Monday October 19, they are at the 1st Purley Scout Hall, in Purley Park Road, for an Activity Night.

Verulam have their “proper” meetings at the Market Hall, St. Albans; this month G6JJ will be talking on October 28 about the “New Luxembourg Effect.” There is also an informal, held at the RAFA Hq., in Victoria Street, St. Albans, this being on October 14.

A joint talk is to be given to Acton, Brentford & Chiswick on October 19, by G4GD and G3CCD, the title being “Hardware and Software.” This one is at the normal Hq. at the Chiswick Trades and Social Club, 66 High Road.

It’s back to the spirit duplicator temporarily for the Crystal Palace Newsletter, but quite readable none the less; they foregather at Emmanuel Church Hall on the third Saturday evening in each month, with October down for G3JIR to talk about Bedrooms he has been In—we guess this to have some reference to radio gear! A small point here is that as the Church have started to enforce a “No Smoking” rule, the meeting will now be in the small room just inside the main entrance, as a permanent thing.

Another Mammoth Junk Sale is forecast for October 4 by Southdown, their last one having seen £225 change hands! This one will be at Hq., the Victoria Hotel, Latimer Road, Eastbourne.

A terse note from the Harrow secretary gives us the information that they will be in action on each Friday in October; on the 1st a Film Show, “Practicals” on 8th and 22nd; a Junk Sale on October 15, and a lecture on the 29th. The only snag is the venue isn’t mentioned—but doubtless he will be only too pleased to tell you, if you ring G3KDL at the address in the Panel.

Over to Surrey who have their Hq. at T.S. Terra Nova on the first and third Wednesdays in each month. No details as to what is arranged, for which contact the Secretary, as Panel p. 492.

SE Kent (YMCA) is the title of a group who get together each week at Dover YMCA. On October 6 they have a talk on Satellites by G3XVY, and on the 13th it is Project Night dealing with the DFM under the surveillance of G8KEN; an Open Evening is down for October 20, with some Morse thrown in, and on October 27, more Morse, a Junk Sale and some HF activity.

The Echelford Newsletter this month comes up with the block diagram of a Frequency-Meter/Timer—most interesting but it’ll be better still next month when the rest appears! To get “the rest” you’ll have to go to St. Martins Court, Kingston Crescent, Ashford, Middx., on October 11 for a Film Show to which YL’s and XYL’s are invited, or on October 28 when you are advised to bring your wallet to the Surplus Sale.

October 7 and 21 are the dates for Cray Valley, who this month will be celebrating their 30th anniversary. The first date will be a slide show called “Meet the Members,” while the second will be given over to a celebratory birthday gathering. The place to aim for on these dates is Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9.

The secretary of Guildford writes to say they “are fit and well and wish for a mention” in this piece. Meetings are at the Model Engineers Hq., Stoke Park, from 7.30 p.m. On October 8, they will have the “G3OLM Aerial Show” and the 22nd is the Construction contest. With a membership of nearly fifty, average attendances are around 25, in a friendly and informal atmosphere; new membership is always welcomed. On the practical side, they ran an amateur-band station, very successfully, for the recent Guildford Town Show.

**Finis**

It’s just that for another month; deadline for next time is October 8, arrival, addressed as always to “Club Secretary,” SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. And don’t forget that it should contain your notes and news for November, the venue address, the dates, and, most important the address of the Hon. Sec. and, if possible, a telephone number. Thanks!
This space is for the publication of the addresses of holders of new callsigns, or changes of address, in EL, G, GC, GD, GI, GM, and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American “CALL BOOK” in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: “New QTH Page,” SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

NOTE FOR AUTHORS

When being offered articles for possible paid publication in SHORT WAVE MAGAZINE, we are often asked the sort of questions already answered under the heading “Authors’ Mss.”, to be found on the Contents page of any issue of the Magazine, where it has been appearing literally for years. If material is prepared strictly along the lines laid down there—which, in the case of technical articles, involves a study in detail of how such articles are presented in the Magazine—you will not go far wrong. Yet we are still offered contributions demanding extensive Editorial marking and adjustment simply because they do not conform to our setting convention (which means how you see them in print). And this as well as the work that may be required on the purely technical side.

While no article can be expected to go through exactly as the author composed it, those that require minimum Editorial attention always command the highest fee. Authors should also note that we expect their material to be “right the first time”—this means not only careful drafting in the first place but also checking and re-checking before sending it in. A full copy should be kept of the article complete, in case the Editorial Dept. have any queries.

In the Amateur Radio field, we pay fair rates and Ingatestone, Essex, CM4 9EF. (re-issue.)

G4ATC, Staffs. Wing Air Training Corps, c/o Flt./Lt. V. J. Reynolds, RAFVR (T), Waddington, Lincolnshire.

G3JFF, M. J. Matthews, 127 Drift Road, Glanfield, Portsmouth, Hants., PO8 0LN.

G3AT, R. Arnold, 33 Russell Road, Kinson, Bournemouth, Dorset, BH10 7HR.

G3JWY, B. Reddington, Abingdon (20707), Oxon., OX14 5QW.

G3ESX, G. L. Adams, o/b/o Cavalier Club, 2 Ash Grove, Knutsford (0460), Cheshire, WA16 8BB.

G3LNM, R. E. Chastell, 4 Fairley Way, Cheshunt, Herts., EN7 6LG.

G3LTG, D. Fillingham, 16 Hardy Street, Leeds (704260), West Yorkshire, LS11 7AP.

G3LTF, T. Routledge, Stoneleigh, Allonby, Maryport (984 3892), DG2 7NA.


G3LTW, S. J. Carter, 88 Lancaster Road, Marton, Blackpool, Lancs., FY3 9ST.

G3LWZ, K. Griffin, 97 Woodlands Road, Allestree, Derby, DE3 2HL.

G3LXB, T. M. White, 79 Elmbridge, Old Harlow, Essex, CM17 0JY.

G3LXN, W. S. Askey, 32 Hurst Rise, Matlock, Derbyshire, DE4 3EP.

G3LXQ, J. Head, 84 Sherwill Hill, Chelston, Torquay, Devon.

G3LVE, M. Hope, 34 Rowan Road, Exwick, Exeter, Devon.

G3LYF, D. Hope, 34 Rowan Road, Exwick, Exeter, Devon.

G3LYZ, R. C. Woolley, 29 Belle Vue Road, Ashtree, Tiverton, Devon, EX16 1AT.

G3LZQ, S. A. James, RPI House, 16 Mount View Road, Orpington, Kent, BR6 0HN.

G3MRAW, J. Lawton, 4 Glanstewi, Penrhyncoch, Nr. Aberystwyth (097 087 6460), Dyfed, SY23 3EG.

G3MBT, D. Tomkinson, The Old Hunters Tavern, Acres Lane, Stalybridge (061-303 9477), Cheshire.

NEW QTH’s

G3FHH, P. J. Roberts, Flat 2, 18 Western Avenue, Parkgate, Wirral, Merseyside, L64 6QW.

G3JWY, B. Reddington, 17 Victoria Avenue, Yeadon, Leeds (0532 502967), West Yorkshire, LS19 7AS.

G3QCV, D. K. Stevens, 3 Boyleston Road, Hall Green, Birmingham, B28 9JN.

G3MJ, A. J. Smith, 169 Belper Road, Stanley Common, Derby, DE7 6FT. (re-issue.)

G3FH, D. Roberts, 23 Pine Drive, Ingatestone, Essex, CM4 9EF. (re-issue.)

G3JWY, B. Reddington, 1 Grange Close, Oulton, Huddersfield, Yorkshire, HD3 3FU. (re-issue.)

G4ATC, Staffs. Wing Air Training Corps, c/o Flt./Lt. V. J. Reynolds, RAFVR (T), W5g Radio Officer, G3CJO, 28 New Abbey Avenue, Hartshill, Stoke-on-Trent (0782 44675), Staffs., ST4 7JL.

G3EOB, P. R. Stevens, 2 Vincent Close, Hainault, Ilford, Essex.

G4ABB, D. J. Ellis (ex-G8KRP), 17 Victoria Avenue, Yeadon, Leeds (0532 502967), West Yorkshire, LS19 7AS.

G4DG, J. S. Hitchins (ex-G8GBN), 48 Granville Road, London, N12 0HJ.

G4GP, F. C. Freece (ex-G8LBA), 44 Broadmeadow, Aldridge, Walsall, West Midlands, WS9 8JA.

G84HT, H. L. Millard, 32 Rosehill Road, Burnley (28530), Lancs., BB11 2JS.

G88LX, (Mrs.), C. A. Fogg, 6 Linden Leas, West Wickham, Kent, BR4 0SE.

G88LXZ, G. Griffin, 97 Woodlands Road, Allestree, Derby, DE3 2HH.

G88LB, T. M. White, 79 Elmbridge, Old Harlow, Essex, CM17 0JY.

G88LXN, W. S. Askey, 32 Hurst Rise, Matlock, Derbyshire, DE4 3EP.

G88LXQ, J. Head, 84 Sherwill Hill, Chelston, Torquay, Devon.

G88LVE, M. Hope, 34 Rowan Road, Exwick, Exeter, Devon.

G88LYF, D. Hope, 34 Rowan Road, Exwick, Exeter, Devon.

G88LZY, R. C. Woolley, 29 Belle Vue Road, Ashtree, Tiverton, Devon, EX16 1AT.

G88LZQ, S. A. James, RPI House, 16 Mount View Road, Orpington, Kent, BR6 0HN.

G88MRAW, J. Lawton, 4 Glanstewi, Penrhyncoch, Nr. Aberystwyth (097 087 6460), Dyfed, SY23 3EG.

G88MBT, D. Tomkinson, The Old Hunters Tavern, Acres Lane, Stalybridge (061-303 9477), Cheshire.
NEW! TWIN EUROPAS, NOW AVAILABLE IN U.K.

These two all solid state transverters for 2 metres and 70 cms. developed for the export market are now available to the U.K. amateur. The Europa S.S. is the solid state 2 metre model. The Europa 70 for use on 70 cms.

Both give 10 watts output using the latest type of SOE transistors, rated to withstand infinite load mismatches.

Noise figure on 2 metres is 2dB, on 70 cms. 6-7dB. Input and output impedance 50 ohms. Supply 1.5v. A.C. at 2 amps peak. D.C. may also be fed in, of course.

Prices : Europa 5.5 2 metres £80-00 + VAT = £95-00
Europa 70 70 cms. £85-00 + VAT = £95-00
Complete boxed Power Supply Type CPS £7-00 + VAT = £7-87

NEW FOR H.F. a wideband pre-amplifier circuit 1-30 MHz. Gain is 15dB. Noise figure 1dB. Input and output impedance 50 ohms. Supply 12v. (9-15v.) 25mA, +ve earth. The answer to all of you who have asked for an H.F. pre-amplifier. They use the latest wideband techniques and a UHF power transmitting transistor to give a high immunity to overload.

Two models : the PA10 is a printed circuit board version, size one cubic inch. Price : £5-00 + VAT = £5-60.

The Sentinel H.F. pre-amplifier contains a change over relay included in the box, size 2½" x 3½" x 1½" for placing in a transceiver aerial lead. The relay changes over for transmitting, and to switch the pre-amplifier out of circuit. Price : £9-00 + VAT = £10-12.

NEW FOR EVERYONE!

THE SSM "JAMBIC" AUTOMATIC MORSE KEYER

Uses the latest C MOS technology. It can be used with a twin paddle key for squeeze operation or with a single paddle key for normal automatic operation. Its self completing dots, dot memory, dashes and spaces are all digitally derived from a single I.C. timebase to ensure correct ratios.

The keyer has sidetone which can be switched OFF. 9v. battery operation and reed relay keyed output.

SSM Lambic Automatic Keyer. Price : £30-00 + VAT = £33-75.
A beautifully engineered twin paddle key to compliment our keyer also available. Price : £10-00 + VAT = £11-25.

EUROPA B

Our high power transverter (2 metre or 4 metre) is more in demand than ever, and remains in full production. Price £97-00 + VAT = £109-15. See previous adverts for data.

SSM Z MATCH 80-10 METRES. 2 kW. at 50 ohms—now a very popular unit. Price : £24-89 + VAT = £28-00.

CONVERTERS FOR 70 cms., 2 metres, 4 metres

SENTINEL 2 metre converters, IFs 2-4 MHz, 4-6 MHz, 28-30 MHz. Price : £18-00 incl. VAT.
SENTINEL X 2 metre converters with power supply, IFs 2-4 MHz, 4-6 MHz, 28-30 MHz. Price : £21-00 incl. VAT.
SENTINEL 2 metre converter kit 28-30 MHz. Price : £11-50 incl. VAT.
SENTINEL M.F. Price: £30-00 incl. VAT.
SM70 70 cms. converter IF 144-146 MHz. Price : £18-00 incl. VAT.

NEW 70 cm.—28-30 MHz converter, Noise figure—3dB, Gain—30dB, Price : £18-00 incl. VAT.

VHF AND UHF PRE-AMPLIFIERS

We have sold thousands of our pre-amplifiers. Hundreds of you have commented on the improved reception and no one has said that he hasn't found an improvement. Where else can you get such value in these pages?

SENTINEL LOW NOISE FET PRE-AMPLIFIER

* This pre-amplifier uses a selected low noise FET to provide the ultimate in sensitivity and selectivity.
* Isolated supply lines, compatible with any equipment.
* Low noise figure—1dB, High gain—18dB.
* Size : 1¾" x 2½" x 3¾". Price : £8-72 incl. VAT. Ex-stock.

PA3 DUAL GATE MOSFET PRE-AMP

* Small about 1 cubic inch, printed circuit board pre-amp. Now incorporated in thousands of transceivers.

SMTI 70 cm. PRE-AMPLIFIER

Selected FETs give a noise figure of—3dB and a gain of 18dB. Price : £10-00 incl. VAT. Ex-stock.

12 months guarantee on all units. We offer same day COD (£50 limit)

ACCESS BARCLAYCARD H.P. or C.W.O.

JUST PHONE YOUR CREDIT CARD NUMBER FOR SAME DAY SERVICE

Come and see all the new equipment gear in Leicester. we'll be right in the middle of the hall.

If you require more detailed information or help, we are a telephone call or a letter away, so do not hesitate to ask. You can call in anytime to inspect or collect equipment. Paul, G3MXG.
THE FINEST EXHIBITION OF AMATEUR RADIO EQUIPMENT IN EUROPE. STANDS BY ALL THE MAIN IMPORTERS AND MANUFACTURERS

Hourly rail service from London to Leicester. Easy access from the M1 Motorway

Talk-in on 2 metres
GB3ARE
By Leicester Radio Club

Ample car parking very near to Granby Halls (no parking allowed at Granby Halls)

ADMISSION
30 PENCE
this includes the opportunity to win a voucher prize for the purchase of radio equipment

REFRESHMENTS, BAR, R.A.I.B.C., R.S.G.B., FREE FILM SHOWS, LEAVE YOUR QSL CARD AT "EYE-BALL CORNER"

Sponsored by
THE AMATEUR RADIO RETAILERS ASSOCIATION
Gen./Sec. G3FGY
ADVANCED TECHNOLOGY FOR THE DISCERNING AMATEUR

UNIVERSAL R.F. SPEECH CLIPPER

Still unmatched after two highly successful years, the "Datong r.f. Clipper" has become the standard by which other speech processors are judged. It is used the world over by serious DXers and professionals. As reviewed in Rad. Com. (Aug. 1974) and Short Wave Magazine (July 1975).

6 Comparable to a linear for improving your SSB DX potential, the Datong r.f. clipper introduces negligible distortion, while raising your average radiated power. A Datong and a linear put your signs in the multi-kilowatt class.

6 Gives true r.f. clipping yet with no installation headaches. Simply connects in series with the microphone.

6 Works with virtually any make of transmitter.

6 Equally effective for FM and AM as well as SSB.

Mode RFC price £39.88 plus 12 1/2% VAT (£43.74 total). Also available with Jap 4 pin connector and complete with matching output lead, inclusive price, £41.90 plus 12 1/2% VAT (£47.14 total). Please state pin connections required.

Fully aligned and tested P.C. Module, Model RFC/M : price £19.50 plus 12 1/2% VAT (total £21.94).

FREQUENCY AGILE AUDIO FILTER MODEL FLI

Fast becoming a classic, Model FLI delights and amazes all who hear it in action. This unique product improves any receiver and is installed simply by connecting in series with the receiver's loudspeaker. It offers the following advanced features:

6 A notch filter which tunes itself for fully automatic removal of unwanted whistles in phone reception. With Model FLI in circuit you can ignore tune-up whistles.

6 Fully variable bandwidth tailoring for enhancing phone reception in the presence of interference and sideband splatter.

6 Band pass filtering with fully variable centre frequency and bandwidth (1,000Hz to 25Hz) plus a.f.c., for the kind of CW reception which you would not have believed possible.

Supplied with connectors and full instructions. Ready-made connecting leads also available. Price £47.50 plus VAT 12 1/2%.


DATONG ELECTRONICS J LTD.
11 MOOR PARK AVENUE, LEEDS LS6 4BT. TEL. 0532-755579

NEW PRODUCT PREVIEW

THE UP-CONVERTER - MODEL UC/I

A NEW CONCEPT IN GENERAL COVERAGE RECEIVING SYSTEMS

This major new product, "possibly the ultimate in add-on units" (Rad. Com. p.689 Sept.), unlocks the full potential of your amateur bands-only receiving equipment (HF or VHF) by allowing all of its expensive high performance features to be used on all frequencies from VLF to HF.

Model UC/I converts any receiver tuning 28–29 or 144–145 MHz into a receiver covering 90 kHz to 30 MHz in thirty switched-selected, crystal-controlled bands. It also gives full 2-metre coverage to receivers tuning 28–30 MHz.

No receiver modifications are required since the Up-Converter simply connects in series with the aerial. Overall receiver performance is primarily limited by that of the main receiver.

Although neither product nor data sheet are available right now, we hope to have our first batch ready for the Leicester Exhibition.

PRICE : £97.50 plus 12 1/2% VAT.

Why not join our mailing list for this product? As soon as the data sheets are printed a copy will then be sent to you automatically.

LEICESTER 1976

AMATEUR RADIO
EXHIBITOR

A NEW NAME : PLANET

SEE THE FIRST OF OUR NEW MODELS AT THE NATIONAL AMATEUR RADIO EXHIBITION, GRANBY HALLS, LEICESTER BETWEEN OCTOBER 28–30 ON STANDS 20 and 28

TRADE NOTICE :
WE SHALL BE PLEASED TO DEAL WITH HOME AND EXPORT TRADE ENQUIRIES AT THE EXHIBITION

A NEW RANGE :
R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

HEATHKIT Comanche M.R.I. and HEATHKIT
Cheyenne MTL complete with 12 volt P.E.P. and
Speaker ........................................... £50.00 (44.50)
TRIO JR310 B.S. RECEIVER .................... £90.00 (11.00)
EDDYSTONE 778U ................................... £80.00 (44.50)
HAMMERHEAD 5000, G.C. Receiver .......... £100.00 (44.50)
NATIONAL HRO 50T. RECEIVER ............ £140.00 (44.50)
NEW EDDYSTONE 9905 250-850 MHz ...... £800.00 (44.50)
EDDYSTONE ECIO Mk. 2 Receiver .......... £140.00 (44.50)
EDDYSTONE EB37 ................................ £100.00 (44.50)
K.W. Vamps. Mk. 2 Transmitter .......... £105.00 (44.50)
K.W. Vanguard Transmitter ................. £150.00 (44.50)
PAN ADAPTOR BC9131A 455/465 KHz .... £60.00 (44.50)

WE CAN ALSO SUPPLY ANY MAKE OF NEW EQUIPMENT—and have pleasure in giving a few examples which are normally in stock:

AVOMETERS. Model 7, Mk. 2, £25.00; Model 8, £15.00; Model 9, £12.50; Model 10, £10.00; Model 11, £8.50; Ever Ready, £5.00; Multimeter, £20.00; 30 K.V. D.C. Multiplier for model 8 or 9, £15.00; Pair of Long Reach Safety Clips, £1.00; Model EA113 Electronic Avo £13.00; Model 272 Electronic Avo £17.00; Model TT169 Transistor Tester, £15.00; All above post free in U.K. Trade and Educational enquiries invited. All other AVO and TAYLOR products available, ask for price.

S. G. BROWN'S HEADPHONES. Type "S" 120 ohm, 2000 ohms, 4000 ohms, £15.00 (60p); Rubber Earpads for same, 85p per pr. (30p); Standard Jack plugs, 20p (4p).

EDDYSTONE EQUIPMENT. Please enquire.

CODAR EQUIPMENT, PR40, £11.00 (40p). Leaflets on request.

In present conditions we regret that all prices are subject to alteration without notice.

NOTE: 12½% VAT must be added to all prices, new and secondhand, except Test Equipment which is 6%. Inc. carriage and packing.

Carriage for England, Scotland and Wales shown in brackets,

FREE SHURE MIC. WITH EVERY KW TRANSMITTER OR TRANSCEIVER PURCHASED

At R. T. & I.

★ We have full H.P. facilities.
★ Part exchanges are a pleasure.
★ We purchase for cash.
★ We offer a first-class overhaul service for your electronic equipment, whether you are an amateur or professional user.
★ We have EASY Parking facilities.
★ We welcome your enquiries for specific items which although not advertised, may very well be in stock.


TRIO EQUIPMENT.
New Trio R-300 Receiver, in stock £150.00 (3.00) All Bands with xtal calibrator.
SHURE MICROPHONES, 444T, £21.18 (75p); 444, £15.18 (75p); 401A, £9.18 (60p); 401, £12.18 (60p); 202, £18.10 (60p). Full details on request.

KEYNECTORS, piano key mains connector units, £4.25 (40p). Trade enquiries welcome.

VALVES. Please state your requirements.

ADVANCE TEST EQUIPMENT—we are agents—your enquiries please.

PHILPS FM200 ELECTRONIC MULTIMETERS, £35.00 (60p), etc. etc.
WE also supply PHILPS & LABGEAR COLOUR TV TEST EQUIPMENT, including Colour Bar Generators, Cross Hatch Generators, Degaussing Coils, Oscilloscopes, CRT Testers, Transistor Testers, etc. etc.

KW EQUIPMENT : (Don't forget your FREE mic with every Tx. and Rx.) KW2000E & P.S.U., £240.00; KW202, £130.00; KW300, £250.00 (25.00); KW100, £114.50 (60p); KW102, £129.00 (60p); KW103, £160.00 (60p); KW104, £190.00 (60p); KW208 Monitor Scope, £250.00 (60p); Speaker for KW2001, £180.00 (30p); KW108 Monitor Scope, £200.00 (25p), etc.

R. T. & I. ELECTRONICS LTD.
Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986
NEAREST STATION: LEYTONSTONE (Central Line)
J. BIRKETT

Radio Component Suppliers

25 THE STRAIT . LINCOLN . LN2 1JF

Telephone: 20767

5 MHz 1QX CRYSTALS at 50p
2000 PIY 100 mA SILICON DIODES at 7 for £1
TEXAS 800 VOLT 2 AMP NPN PLASTIC TO3 TRANSISTOR TYPE R2600A at 50p ea. 3 for £1-10
600 kHz 1000XJ CRYSTALS at 50p ea.
20 ASSORTED VHF TUNING VARACTOR DIODES. Untested for 45p
BAND EDGE MARKER CRYSTALS. 7 MHz, 8 MHz at 75p ea.
STC 12 Volt DPDT RELAYS at 50p ea.
5200 kHz 1000XJ CRYSTALS at 60p ea.
AUDIO AMPLIFIER I.C.'s. SN 74601 at 55p, TBA611B at 65p, TBA614A at 86p, SN76613ND at £1, TBA800 at 85p
TEXAS PNP DARLINGTON TIL17 at 35p ea.
1000uf 40v w. ELECTROLYTICS. 1½ x 4½ at 3 for 35p
PLASTIC TRIACS. 500V 6 AMP at 15p, 400V 6 AMP at 60p
PLASTIC S.C.R's. 500V 6 AMP at 15p, 400V 6 AMP at 40p
TAG ENDED ELECTROLYTICS. Size: 2½ x 1½, 3300uf 64v w. at 50p, 4700uf 40v w. at 45p
FT243 CRYSTALS. 8040 kHz, 8100 kHz at 75p ea., 7620, 7720, 7966-7, 8233-3, 8300, 8366-7, 9603-3, 8583-3, 8650 kHz. All at 40p ea.
ZN414 RADIO I.C. with data at £1
200 ASSORTED TUBULAR CERAMICS for 57p
DIVIDE BY 1 300 MHZ COUNTERS with data at 80p
SN 74400 LOGIC I.C.'s at 6 for 50p
GLASS WIRE ENDED 28 kHz CRYSTALS at 50p ea.
20 ASSORTED BRANDED ITT 250 mW ZENERS for 75p
STC BLOCK CRYSTAL FILTERS. 107 MHz B.W. ± 6 kHz at £4 ea.
FT 271 200 kHz CRYSTALS at 50p ea.
1250 PIY 1 AMP SILICON DIODES. BY 294 at 12 for £1
1 POLE 21 WAY ROTARY SWITCHES at 65p ea.
BF 177 100 VOLT NPN 600mW TRANSISTORS, 10p ea., 6 for £1
DIVIDE BY 4 150 MHz COUNTERS with data at 80p ea.
300 + 300 + 300.uf 100 uf TUNING CAPACITOR with SM Drive at 66p
25 BC 107-8-9 TRANSISTORS. Untested for 57p
TTL LOGIC I.C.'s. 7400, 7402, 7403. All at 6 for 55p
LOUDSPEAKERS. 2½ x 8, 45, 75 ohm. All at 75p ea.
COMMUNICATION SERIES OF I.C.'s. Untested consisting of 1 x R.F., 3 x I.F., 2 x VOAGAD, 2 x AGC, 1 x Mix Amp, 2 x Double Balanced Modulator, 1 x Mixer. The 12 I.C.'s with data for £3
TRIPLE DEMODULATOR AM, SSB, FM I.C. Untested with data at 30p
AF AMPLIFIER and VOAGAD I.C. with Side Tone. Untested with data at 30p
PHASE LOCK LOOP I.C. Untested with data at 30p
SSB DETECTOR, AM DETECTOR, AGC GENERATOR. Untested with data at 30p
X BAND GUNN DIODES with data for £1-65
X BAND TUNING VARACTOR DIODES with data 1 TO 2pf or 3 To 4pf at £1-65 ea.
BG CRYSTAL. 250 kHz at 75p each, HC6U Type 99-944 kHz at 50p
BRANDED 10 WATT ZENERS. 15, 18, 22, 33, 56, 100 volt- All at 30p ea.
I2-24 VOLT CATHODEON CRYSTAL OVENS at £1 ea.
10 AMP ON-OFF TOGGLE SWITCHES at 35p ea.
741 OP-AMPS & LEAD at 5 for £1
TTL I.C.'s. SN 74H00 at 6 for 50p
COMPRESSION TRIMMERS. 10pf, 30pf, 50pf, 150pf, 750pf, 1000pf. All at 6p ea.
TUNING VARACTOR DIODES. BA 102 at 20p, BB 110 at 15p, BB 121 at 15p, MV 1636 at 25p
UA 723 at 50p, LM 309K at £1-10
SN 7511 VIDEO AMPLIFIER I.C. with data at 25p
36 ASSOCIATED CRYSTALS. Between 5100 kHz To 7900 kHz at £1-20
200 CARBON FILM RESISTORS. Assorted Odd Values for 75p
100 ASSORTED SUB-MINIATURE DISC CERAMICS. 50v w. From 3-3p To -0-1uf at 57p
3 TRIACS TO1 1 AMP 400 VIV for 57p
10 AMP S.C.R's. 100 PIY at 25p, 400 PIY at 50p, 800 PIY at 60p
BOOKS. "Building Transistor Short Wave Receivers" at 60p
"Simple Transistor Test Gear" at 75p
12 FOR 50p
PLASTIC POWER NPN TRANSISTORS. BD 187 at 40p ea. for £1-35
GLASS WIRE ENDED CRYSTALS. 28 kHz at 50p, 84-274 kHz, 84-359 kHz, 84-520, 84-639, 85-174, 90-742, 91-545, 91-1815, 126-690, 127-110 kHz. All at 30p ea.
TIL 209 RED LEDS. 5 for 57p
10 kHz CRYSTALS at £10 ea.
MULLARD 455 kHz VERSION OF LP 1175 FILTER at 55p
US NAVY DC 30 CRYSTALS or similar 5210, 60211, 6021.11, 6026-67, 6029-44, 6042, 6043-39, 6046-10, 6047-76, 6048-89, 6054-44, 6071-1, 6075-5, 6076-8, 6085, 6086, 6037-500, 6075, 6720, 6770, 6890, 7045 kHz. All at 60p ea.
TEXAS TRANSISTORS R.F. type BF 224. 600 MHz NPN, 6 for 57p
2 GHz STRIPLINE TRANSISTORS similar to BFR90/91 with data at £3 ea.
VHF DUAL GATE MOS FET'S LIKE 40673 at 33p, 4 for £1-10
X BAND SWITCHES and MULTIPLIERS. Assorted good unmarked, 6 for £1-08
BF 180 or BF 181 at 3 for 50p
VHF FET's like 2N 3819 at 20p each or 6 for £1
GENERAL PURPOSE N-UNJUNCTION TRANSISTORS at 20p ea.
WIDE BAND RADAR AMPLIFIER I.C. 10 to 100 MHz. Untested with data at 5 for 57p
50 ASSORTED TRANSISTOR ELECTROLYTICS for 57p
P CHANNEL MOS FET's with circuits at 20 for 75p
20 SILICON PHOTO TRANSISTORS and PHOTO DARLINGTONS. Assorted, untested at £1
10 MINIATURE 10 AMP SILICON BRIDGES. Untested at £1-25
60 WIRE WOUND RESISTORS. Assorted 1 to 10 Watt at 57p
TUNING CAPACITORS. 150 + 150 + 25 + 25pf at 38p, 200 + 200 + 25 + 25pf at 38p, 300 + 300 + 17 + 17pf at 38p, 300 + 300 + 300p at 66p, 365 + 365 + 365p at 66p, 125 + 125p at 45p, 10pf at 75p, 250 + 250p at 38p, wide spaced 80p at £1-95
741 8 LEAD DIL OP-AMPS. 5 for £1
1000pF SOLDER IN FEED THRO's at 15p doz.

See you at Stand 19 at The Amateur Radio Retailers Association Exhibition at, Leicester on 28, 29, 30th October. Please add 20p post and packing on U.K. orders under £2. Overseas orders at cost.
Become a radio amateur.

Learn how to become a radio amateur in contact with the whole world. We give skilled preparation for the G.P.O. licence.

Free!

Brochure, without obligation to:

BRITISH NATIONAL RADIO & ELECTRONICS SCHOOL,
P.O.Box 156, Jersey, Channel Islands.
NAME
ADDRESS
(Block caps please)

LEE ELECTRONICS LTD.
01-723 5521  CLOSED THURSDAYS  G8JVL
400 EDGWARE RD., PADDINGTON, W.2

LONDON'S LEADING STOCKISTS OF YAESU
ANTENNA SPECIALISTS  STANDARD  ICOM
BANTEX  JAYBEAM  REVCO  QM70  ETC.

SPECIAL EXCLUSIVE OFFER
Perspex Dust Covers designed and manufactured by us to keep your Yaesu equipment in mint condition. Suitable for Models FT101, FT201, FT301, FRG7.

STANDARD CW.830. 1-watt Marine-Band Hand-Held Transceiver (fitted 6 channels) £139.00

STANDARD C.432 2-watt 5 channel Hand-Held Transceiver (fitted 432, 432.12 and 433.2 MHz) £125.00

STANDARD C.439 70cm. Mobile Transceiver £160.00

STANDARD C.428 Mobile Transceiver (10 Channels fitted) £149.00

STANDARD C.146A Hand-held 2-watt 5-Channel Transceiver fitted 5.20/5.22 £99.00

STANDARD C.828 Mobile Transceiver (10 Channels fitted) £149.00

STANDARD 12-Channel 2-Metre Mobile Transceiver (fitted with SO plus 2 Private Channels). Special Introductory Price £99.00

Set of 5 Additional Channels if desired £20.00

Crystal-Controlled Tone-Burst fitted if required £10.00

STANDARD Mains Charger Unit for C.146A (+ P. & P. at 25p) £3.20

MULTI U11 70cm. 10-watt Mobile Transceiver (fitted 8 channels) £99.00

2-Metre Helical Antennas Red Fitted BNC Plug (+ P. & P. at 20p) £3.85

2-Metre Helical Antennas Red Fitted PL259 Plug (+ P. & P. at 20p) £3.85

JVL 2-metre 30dB Base-Station Groundplane Antenna (+ Carr. £1) £18.00

STANDARD C.146A Mains Charger £99.00

STANDARD CSA Basemaster Chargers (+ P. & P. at 50p) £12.00

STANDARD Helical Antennas for C.146A (+ P. & P. at 15p) £6.00

STANDARD Mains Charger Unit for C.146A (+ P. & P. at 25p) £3.20

MICROWAVE MODULES:

MMT.432/28 70cm. Transverter (+ P. & P. at 50p) £84.00

MMT.144/28 2-metre Transverter (+ P. & P. at 50p) £76.00

Available soon:

MMT.432/144 Transverter (70cm. to 2 metres) £139.00

VAT at 12% MUST BE ADDED TO ALL THE ABOVE PRICES, WITH THE EXCEPTION OF THE YAESU CLOCK TO WHICH PRICE VAT MUST BE ADDED AT 8%.

FREE PARKING AT REAR OF SHOP
synchronous with excellence
antenna specialists

ANTENNAS FOR EVERY REQUIREMENT FROM 27 - 512 MHZ

Listed below are examples from their wide range of products:

<table>
<thead>
<tr>
<th>Antenna Model</th>
<th>Band</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASP201</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP629</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP657</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP667</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP19</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>ASP201</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP629</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP657</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP667</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP19</td>
<td>130-174 MHz</td>
<td>3 dB gain</td>
</tr>
<tr>
<td>ASP201</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP629</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP657</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP667</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP19</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP201</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP629</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP657</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP667</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP19</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP201</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP629</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP657</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP667</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP19</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP201</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP629</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP657</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP667</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP49UK</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
<tr>
<td>ASP19</td>
<td>425-440 MHz</td>
<td>5 dB gain</td>
</tr>
</tbody>
</table>

Please add 12.5% VAT to above prices.

We regret to announce that due to the falling pound, we are compelled to increase the prices of certain Antenna Specialists products by 10% as from August 1, 1976. The 10% increase does not affect the following products: ASP677, ASP667, ASP655, ASP680UK, ASP701UK.

AVAILABILITY FROM:

<table>
<thead>
<tr>
<th>Region</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>LONDON</td>
<td>LEE ELECTRONICS LTD.</td>
</tr>
<tr>
<td></td>
<td>01-721 5521</td>
</tr>
<tr>
<td></td>
<td>TERRY BARNETT, GBBM</td>
</tr>
<tr>
<td></td>
<td>01-956 9366</td>
</tr>
<tr>
<td>KENT</td>
<td>THANTE ELECTRONICS</td>
</tr>
<tr>
<td></td>
<td>0223 63859</td>
</tr>
<tr>
<td>AVON</td>
<td>D. G. SMITH, GIJUR</td>
</tr>
<tr>
<td></td>
<td>0293 833433</td>
</tr>
<tr>
<td>REVON</td>
<td>ELECTRICAL SERVICES</td>
</tr>
<tr>
<td></td>
<td>0272 64943</td>
</tr>
<tr>
<td>BEDFORD</td>
<td>ALAN R. MORRIS, GIENS</td>
</tr>
<tr>
<td></td>
<td>0282 414179</td>
</tr>
<tr>
<td>CHEM</td>
<td>BREDEHURST ELECTRONICS</td>
</tr>
<tr>
<td></td>
<td>0229 260706</td>
</tr>
<tr>
<td>YORKSHIRE</td>
<td>THE AMATEUR RADIO SHOP</td>
</tr>
<tr>
<td></td>
<td>0484 20774</td>
</tr>
<tr>
<td>SCOTLAND</td>
<td>ELMER ELECTRONICS, GBRKLY</td>
</tr>
<tr>
<td></td>
<td>0532 535134</td>
</tr>
<tr>
<td>WALES</td>
<td>J. J. DOYLE, GW8BEV</td>
</tr>
<tr>
<td></td>
<td>0639 294</td>
</tr>
</tbody>
</table>

J. YU
21, LANGLEY AVENUE, SURBITON, SURREY, KT6 4QN
2M TX & RX CRYSTAL AVAILABILITY AND PRICE CHART

CRystal FREQUENCY RANGE USE (Tx or Rx) and HOLDER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>144.0 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>144.1 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>144.2 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>144.3 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>144.4 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>144.5 MHz</td>
<td>b b b b b b b b b b b b b b b b b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PRICES: (a) £3-36 and (c) £2-90 + VAT (12%) for each Crystal.

AVAILABILITY: (a) and (c) Stock items, normally available by return (we have over 4,000 items in stock). (b) Four weeks normally but it is quite possible we could be able to supply from stock.

ORDERING: All we require to know is (1) Output frequency, (2) Crystal frequency range, (3) The holder and, (4) Either the Load Capacitance (pf) or equipment. It is not essential to quote the exact frequency, but it would be of assistance to quote it if known.

JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of stock crystals. We can now supply for almost all the JCDM range and the TRIO-KEN range. We can also supply from stock crystals for the HEATHKIT HW202 and HW17A 4m. CRYSTALS for the HW17A 4m. TX 9.7825 MHz and RX 29.7800 MHz ... at £3-36 each + VAT (12%) RX 6.7866 MHz ... ... ... at £3-90 each + VAT (12%)

CRystals For the NEW 70 cm. CHANNELS

GET SWITCHED ON to the NEW British 70 cm. Band Plan, with repeaters R15 (433-66/1200), R14 (433-66/1200), R13 (433-15/1200), R12 (433-15/1200), R11 (433-15/1200), and real calling channels UC20 (143-30), SU12 (143-30), SU11 (143-30), SU10 (143-30), and the new calling channel SU20 (143-30). SU12 (143-30) is designated for RTTY use. N.B. R8 = Repeater British System, SU = Simplex UHF.

We have over 4,000 items in stock (a) and (c). Stock items, normally available by return (we have over 4,000 items in stock). PRICES: (a) £3-36 and (c) £2-90 + VAT (12%) for each Crystal.


BAGINTON ELECTRONICS

7A ARROWE PARK ROAD, UPTON, WIRRAL, MERSEYSEIDE, L49 0UB

Tel.: 051-677 8918, 4.30-7 p.m. Cables: CRYSTAL, BIRKENHEAD
TECHNICAL ASSOCIATES
COMMUNICATION AIDS

AUDIO COMPRESSOR ★ Suitable for SSB/AM/FM ★ pure compression, no clipping ★ 2:4 to 26dBs of compression, with less than 1% distortion ★ variable decay time, on front panel ★ variable noise gate on front panel prevents ambient noise level tripping vox or being tx in pauses in speech ★ all functions routed to output in "off" position ★ goes between mc and tx no mods involved ★ these compressors have been tested alongside commercial rf stages in the only difference at the receiving end was superior audio quality, E2100 + VAT (12%) + 50p P. & P.

PRINTED CIRCUIT MODULE. Supply your own case and knobs. Assembled and tested. Type A.C.I, El 1.50+ In% VAT + 25p P. & P.

RX PEAK AND NOTCH FILTER ★ no gimmicks ★ all integrated circuits ★ will clear QRM in seconds ★ 1 watt o/p stage ★ headphone socket ★ goes between RX and loudspeaker ★ by-pass switch ★ notch-width control for optimum width of notch ★ tune control allows you to pu the notch or peak where you want it ★ runs from internalPP9 battery or any supply from 9v. to 15v. ★ will also peak up CW notch -width control for optimum width of notch ★ tune control allows...

AMATEUR RADIO
BULK BUYING GROUP

CRystal Controlled TONE BURST GENERATOR
The Ultimate in Stability
at a size to fit most rigs at a price to suit your pocket —only
2in. x 1in. x 0.5in.
Incl. VAT £8.75
Operates on 9-15v. DC output adjustable 0-100mV.

JAYBEAM VHF AERIALS
We generally have the full range of "Jaybeam" aerials in stock as follows:

OR 4m. BAND: 4 ele. Yagi... £19.56
FOR 12m. BAND: 12 ele. Quad... £28.12
5Y/2: 5 ele. Yagi... £6.07
8Y/2: 8 ele. Yagi... £7.87
10Y/2: 10 ele. Yagi... £11.59
15Y/2: 15 ele. Yagi... £14.51

RX BAND PASS FILTER ★ 9 integrated circuits ★ 1 watt o/p stage ★ headphone socket ★ 8 switched positions of filter ★ high pass—2.5kHz-2.00kHz-1.5kHz-1kHz-500Hz-10Hz-5kHz-1kHz ★ Bandwidths selected for optimum readability on AM, SSB, FM, CW ★ giving the operator total control over bandwidth and QRM conditions ★ makes the poor RX superb and the superb RX better ★ runs from internal PP9 battery or any supply from 9v. to 15v. ★ will also peak up CW...
**SMALL ADVERTISEMENTS**

("SITUATIONS" AND "TRADE")

9p per word, minimum charge £1.50. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 25p extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, Ltd., 29 High Street, Welwyn, Herts., AL6 9EE.

**SITUATION**

Service Engineer wanted for South Lancs. retail organisation. Must be versatile with HF and VHF/ UHF equipment. State age, experience and salary in mind. — Box No. 5528, Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

**TRADE**

Take Cover! Having a tough time fending off insurance salesmen? But could you spare the time for a land-line contact with G4DTA, a fellow amateur who can be trusted to give you a good deal, to understand your hobby, professional or family needs, and not to oversell? For instance, have you "taken cover" on that mobile or /MM rig? Are the valuable black boxes in the shack safe? And do you need to re-assess your cover in home and life and school fee plans, etc. Advice without obligation; the best deals secured with the best companies. — Endersby, G4DTA, QTHR, or ring 0843 21511 (Margate).

Re-Alignment and repairs, especially on valued equipment, Hame shack items and others for disposal. Send s.a.e. for list. — Drybrough Communications Services, Ltd., Mounts Lane, Newnham, Davenport (3964), Northants., NN11 6ES.


Radio Amateurs Examination City & Guilds. Pass this important Examination and obtain your G8 Licence with an R&C Home-Study Course. For details of this and other Courses (GCE, professional examinations, etc.) write or phone: The Rapid Results College, Dept. JV/1, Tuition House, London, SW19 4DS. Careers Advisory Service, 01-947 7272 or ring College, Dept. JV/1, Tuition House, London, SW19 4DS. Comprising: The NEW R.300 RX (with Xtal Mast), £38i0 (Variable Frequency Antenna). The VFA covers 5-30 MHz without gaps. Acting as an all band ground plane it gives power saving low angle radiation, avoiding scatter losses (who wants to cook the stratosphere ??). Vastly improves reception too.

Thousands of testimonials on our files describe the happy transition to the VFA... for many this means space saving also... its minimum configuration the JOYSTICK can simply stand in a corner of the shack!

A PATENTED INVENTION USED BY TRANSMITTING AMATEURS AND SWL’S WORLD WIDE—AND IN GOVERNMENT COMMUNICATION

**SYSTEM ‘A’**

250w. p.e.p. OR for the SWL £32.40

**SYSTEM ‘J’**

500w. p.e.p. (improved ‘Q’ on receive) £38.60

**PARTRIDGE SUPER PACKAGE**

COMPLETE RADIO STATION FOR ANY LOCATION £189.00

Comprising: The NEW R.300 RX (with Xtal Marker). Headphones, VFA, System "A", all connecting cables. Delivery: Securicor (our risk). ASSEMBLED IN SECONDS! BIG CASH SAVINGS! —OR R.300 ONLY £165.75 INCL. DELIV.

Prices include VAT, insurance and delivery by post or carrier

**The Antenna that makes all the difference**

The sun and its spots are under a cloud, so to speak! Our primary, it is suggested, may be getting irregular in its habits. Shall we in future not be able to rely on periods of good propagation on the HF bands? Will HF activity and interest have to wane? NOT AT ALL!

Good DX, and at lower powers—avoiding generation of spurious products, TVI, etc.—is possible if you install a JOYSTICK VFA (Variable Frequency Antenna). The VFA covers 5-30 MHz without gaps. Acting as an all band ground plane it gives power saving low angle radiation, avoiding scatter losses (who wants to cook the stratosphere ??). Vastly improves reception too.

Thousands of testimonials on our files describe the happy transition to the VFA... for many this means space saving also... its minimum configuration the JOYSTICK can simply stand in a corner of the shack!

A PATENTED INVENTION USED BY TRANSMITTING AMATEURS AND SWL’S WORLD WIDE—AND IN GOVERNMENT COMMUNICATION

**SYSTEM ‘A’**

250w. p.e.p. OR for the SWL £32.40

**SYSTEM ‘J’**

500w. p.e.p. (improved ‘Q’ on receive) £38.60

**PARTRIDGE SUPER PACKAGE**

COMPLETE RADIO STATION FOR ANY LOCATION £189.00

Comprising: The NEW R.300 RX (with Xtal Marker). Headphones, VFA, System "A", all connecting cables. Delivery: Securicor (our risk). ASSEMBLED IN SECONDS! BIG CASH SAVINGS! —OR R.300 ONLY £165.75 INCL. DELIV.

Prices include VAT, insurance and delivery by post or carrier

**Just Telephone Your Card Number**

Barclaycard

Buy it with Access

Contact No. 0843 62535 (or 62839 after office hours)

MARINE RADIO. Owners of small vessels with rigs on crawler bands or amateurs working /MM will benefit with a VFA on the mast. Let us advise you.

All advice is FREE, both before and after sales. Personal attention from the Inventor of the VFA as part of our FOLLOW-UP ADVICE SERVICE. All enquirers please ring or send S.A.E.

**BOX 4**

G3CED

G3VFA
Morse Made Easy

Fact Not Fiction!

If you start RIGHT you will be reading amateur and commercial Morse within a month. (Normal progress to be expected.)

Using scientifically prepared 3-speed records you automatically learn to recognize the code RHYTHM without translating. You can't help it. It's so easy as learning a tune, 15-W.P.M. in 4 weeks guaranteed. For Complete Course 3 Records & Books send £5.00 including P.P.T. etc., overseas surface mail £1 extra.

For further details of course Ring 01-660 2896 or send 7p stamp for explanatory booklet to: S. BENNETT, G3HSC (Box 14) 45 GREEN LANE, PURLEY, SURREY.


READERS' ADVERTISEMENTS

5p per word, minimum charge 70p, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognized abbreviations. No responsibility accepted for transcription errors. Box Numbers 25p extra.

 Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

READERS

Selling: Robot SSTV Sale

AERO & GENERAL SUPPLIES, NANAIMO HOUSE, 32 RUFFORD AVE., BRAMCOTE, NOTTINGHAM, TEL. 397588

For sale: Codar CR-70A communications receiver, brand new, £40. — Ring Mackertoom, Greenhithe Way, Erith, Kent.

For sale: Yaesu YC-355D transceiver complete with 4 crystals, spares and accessories £45. De-luxe model, mint condition, delivery by post only.

For sale: Hustler bumper mount, mast, resonators £45. De-luxe model, mint condition, delivery by post only.

For sale: Codar PR-40 receiver, FB condition, £65. Robb, 28 Stronsay Street, Glasgow G21 (Tel: 041-770 7573).

Wanted: Good AR88D communications receiver; or what-have-you? Also a two and four metre converter. — Harris, 4 Branksome Park Road, Poole (Dorset).

Wanted: Movement for Avo Model 8. — Ring Eddy, Devoran 862148 (Cornwall).

For sale: FT-75 transceiver complete with 4 crystals, spare driver and PA valves, FP-75 matching PSU with speaker, TV-50C external VFO, handbook etc., high-impedance dynamic mic, £95. Also N.R. 56V-F1 FM receiver, 144-146 MHz, mobile or static, £20. All equipment faultless. — Jackson, 109 Culver Grove, Stanmore, Middx.

For sale: Hustler bumper mount, mast, resonators for 10/15/20/80m., £45. De-luxe car mount and antenna transformer for Atlas 210, £35. Hy-Gain BN86 balun, £10. All mint condition; postage extra.

Hy-Gain C40000V2 power supply, £125. — Barry, G3UFU, 13 Mill Rise, Bourton, Dorset.

Exchange: 200 MHz digital frequency meter for Grandfather clock, or similar. — Ring Bowler, Market Drayton 2206 (Shropshire).

Wanted: Barlow-Wadley Receiver. Please state model, age, condition and price. — Harris, 4 Branksome Hill Road, Bournemouth, BH4 9L.D.
PROFESSIONAL MORSE CASSETTE

Computer produced C90 Cassette recorded with morse from 12-24 W.P.M. including International Procedure Signs and Symbols and their incorporation into messages

Complete with contents booklet.
£4 including VAT and postage etc.

M. H. ELECTRONICS
12 LONGSHORE WAY, MILTON, PORTSMOUTH PO4 8LS

Denco Coils ; Tuning Gangs ; TTL ; C'Mos, Quartz Crystals ; Vero ; DVM Chips ; Clock Chips ; Audio I.C.'s ; LCD's ; Displays ; Transformers ; Boxes ; Cases ; Knobs ; Transistors ; Diodes and Millions of R's and C's.

It's all in the brand new illustrated catalogue. With every copy are 36p worth of vouchers absolutely FREE!

Send 35p, incl Free p. 9 p., to :
Dept. 10—CHROMASONIC ELECTRONICS, 56 Fortis Green Road, London, N10 3HN
Telephone : 01-883 3705

G5RV-62DYM ANTI T.V.I. AERIALS

Custom built by G2DYM (Ex B.B.C. Engineer)

G5RV aerials under license of Louis Varney, A.M.I.E.E., A.I.L.

G5RV 10-160 metres 500W. ... £21 15 kW. £31 c/w 25m.
G2DYM Any Single Band + 160m. 500W. £10 15 kW. £15 B - twin
G2DYM Trapped 10-160m. 500W. ... £15 15 kW. £25 £ 75 ohm
G2DYM SWL Dipoles 10, 11, 13, 15, 16, 19, 20, 25, 31, 40, 49 80m. ... £10 ea. £15 ea.
Shipping or 160m. ... £10 ea. £15 ea.
All c/w 25m. Bait - twin feeder OR with Anti-T.V. Time Base £15 ea. £25 extra ea.
P. & P. £1 per aerial. VAT 12½% (except Export)
Any type of Tx or Rx aerial built to order.
Design, Advisory and Fitting Service details S.A.E. + 3 6ip stamps.
Satisfaction guaranteed or money back assurance.

OLD SAWMILLS, WHITEBALL, WELLINGTON, SOMERSET, TA11 8L4

WHAT'S ON VLF?

EXPLORE 10-150 kHz with a VLF TUNER. Listen to time signals, CW weather forecasts, DX beacons, standard frequencies, etc. RF input—audio out. EASY to make, all parts, PCB, case, instructions, money back assurance.

ONLY £9-70 inc. post, £11-30 airmail

CAMBRIDGE KITS
45 (5K) Old School Lane, Milton, Cambridge

Call or phone our
ALL
VALVES & TRANSISTORS

We are one of the largest stockists of valves etc. in the U.K.

COLOMOR ELECTRONICS LTD., 170 GOLDSHAW ROAD, LONDON W12
November Issue: To appear Friday, October 29, single copies at 45p post free will be dispatched first-class mail on receipt from printers. Orders by Wednesday, October 27, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts, AL6 9EQ.

Wanted: Redifon R.145 receiver (as S.W.M., June 1960), with VLF adapter unit; also ex-R.A.F. HF-type radiogoniometer, with manual. Please state condition and price. Can collect suitable instruments. — Box No. 5534, Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

Sale: Shure 401 ceramic hand microphone with p-t-t and bracket, £5.50 post paid. RTTY: Creed 7B teletypewriter, good, £12. Carriage or delivery extra by arrangement. — Michaelson, G3RDG, QTHR. (Tel: 01-455 8831).

For sale: Teleprinting equipment: Creed 54, £20; Creed 655, £5; Teletype 15, £15; ST-5 and generator, £12; ST-6 with generator, £25; 40 rolls of paper, £10; 20 rolls of perforating paper, £6; tools, £4. Carriage extra, but prefer buyers collect. — Young, G4DTL, QTHR. (Tel: Lincoln 26874).

For sale: Codar CR-70A Mk.II, with manual and matching speaker, all as new, £36. Wanted: Manual or circuit diagram for Lafayette HA-350; buy or borrow, desperate. — Ring Saunders, Newbury 49395.

Selling: Eddystone 840C, mint condition, £45. Eddystone EC-10, mint condition, £45. — Ring Handy, Coventry 22201.

Wanted: TN-18/APR-4 tuning unit from second world-war aircraft service wide-tuning-range receiver AN/APR-4. Also General Radio 1140-A wavemeter or any unit containing butterfly oscillator tuning range 300 to 1000 MHz. — Professor Smith, Chemistry Department, Queen Elizabeth College, Campden Hill Road, London W.8.

Wanted: Army Wireless Sets Types 58, 48, 46 and 52; also R.208, R.209, BC-611 handle-talkie and suitcase transmitter. Any other interesting wartime equipment considered. — Morris, Pippingford Park, Nutley, Sussex.

For sale: Ex-marine SSB transmitter covering 1.8 MHz in 5 ranges, transmission systems SSB/ISB/DSB/CW/FSK, including mains operated power supplies, technical drawings and handbook, bargain at £70 the lot. — Thomas, G3BVW, 4 Hemdean Gardens, West End, Southampton. (Tel: 04218-2584).

Selling: Eddystone EA-12, good condition, £110. Brennell 610 tape deck with heads and some electronics, £120. — Halls, G4CRY, 99 Ings Road, Redcar, Cleveland, TS10 2DE. (Tel: 0642-243241 day-time).

Sale: Canadian Marconi No. 52 Set, 1.75-16 MHz in 3 bands, broad and narrow selectivity, 5-meter crystal calibrator, original matching power pack, output to speaker (internal) or phones, manual with circuits, £20. Worldmaster mains/battery receiver, LW, MW, SW1, SW2, FM, 88-108 MHz, 108-175 MHz, world map and zone dial, new in maker's box, £22. ITT/KB 'Golf' mains/battery receiver, LW/MW/SW/FM 88-104 MHz, circuit, case slightly marked, £14. Buyers to collect please. — Ring Lindars, 01-647 6157.
Sale: Hammarlund SP-600JX receiver, with handbook, £50. Buyer collects.—Allcoat, G3PJM, 10 Heather Close, Croftmende, Nuneaton, Warms.

Wanted: Minimitter Top 2-7, first class condition and unmodified. High price paid. — Carter, G3SFZ, QTHR.

Wanted: K.W. E-Zee Match ATU, or Solid State Modules Z-Match.—Allen, 6 Monks Way, Reading RG3 3DP.

For sale: Barlow Wadley XCR-30 Mk.II, purchased 1974 and sparingly used, £75 or near offer.—Ring Morley, 01-737 4008 evenings.

Wanted: Two-metre FM gear (small), RX, transmitter (hand-portable).—Roberts, 71 Gibbins Road, Birmingham B29 6PQ.

Sale: KW-2000B with AC/PSU, Shure mic., dummy load, £200. Also TA-33Jr 3-tele, £50; AR-33 rotator, £30; once 50-ft. now 40-ft. Telomast with wire rigging, £35.—Overend, G4BVS, QTHR. (Tel: Amer 1363 office hours, or write to Box No. 5532, Short Heather Close, Croftmede Estate, Nuneaton, Warks.

Sale: Ex-G3BA mint Liner-2 with pre-amp., mic. and base, £14. Hunt, GW4CBR, QTHR.

Sale: FT-200/FP-200, crystallised for complete 10 metres coverage, £210 or near offer.—Ring Gilmour, Farrant House, Winstanley Road, London SW11.

For sale: Trio QR-666, general coverage RX, £162.

Sale: G.E.C. BRT-400E receiver, not working but ginning, £35.—Overend, G4BVS, QTHR. (Tel: Amer 1363 office hours, or write to Box No. 5532, Short Heather Close, Croftmede Estate, Nuneaton, Warks.

Wanted: Two-metre FM gear(small), RX, transmitter (hand-portable).—Roberts, 71 Gibbins Road, Birmingham B29 6PQ.

Sale: KW-2000B with AC/PSU, Shure mic., dummy load, £200. Also TA-33Jr 3-tele, £50; AR-33 rotator, £30; once 50-ft. now 40-ft. Telomast with wire rigging, £35.—Overend, G4BVS, QTHR. (Tel: Amer 1363 office hours, or write to Box No. 5532, Short Heather Close, Croftmede Estate, Nuneaton, Warks.

Sale: Ex-G3BA mint Liner-2 with pre-amp., mic. and base, £14. Hunt, GW4CBR, QTHR.

For sale: FT-200/FP-200, crystallised for complete 10 metres coverage, £210 or near offer.—Ring Gilmour, Farrant House, Winstanley Road, London SW11.

For sale: Trio QR-666, general coverage RX, £162.

Sale: G.E.C. BRT-400E receiver, not working but ginning, £35.—Overend, G4BVS, QTHR. (Tel: Amer 1363 office hours, or write to Box No. 5532, Short Heather Close, Croftmede Estate, Nuneaton, Warks.

Wanted: Two-metre FM gear(small), RX, transmitter (hand-portable).—Roberts, 71 Gibbins Road, Birmingham B29 6PQ.
G4DSG | G3HEO

D. P. HOBBS LTD.

THE COMPONENT SPECIALISTS

Trio QRO66 communications Receiver, £145.00.

Inoue. Mains Power Unit for IC22A, £35.00.

Inoue IC201 FM/SSB/CW Transceiver, £318.00.

Linier 2 SSB 2 metre Transceiver, £145.00. Power supply £28.00.

Yaesu FT200 HF Band Transceiver £355.00 with power supply.

QM70 Products. 28/144 MHz Solid State Transverter, 2 watts output. Linear and clean output, £41.00.

28/432 MHz 10 watt output Transverter, £76.00.

28/144 MHz High Power Transverter up to 200 watts P.E.P. Input. 2-IF outputs, £88.00.

144 PA 50. All Solid State 50 watts RMS, Output 2 metre. Linear Amplifier will accept F.M. SSB, AM, CW, £44.00.

432 VLA Linear Amplifier providing up to 50 watts RMS output, £33.60.

2FM70. 70 Cms or 2 metre at the flick of a switch, £66.60.

MICROWAVE MODULES

144 Converters 2-4, 4-6, 4-16, 28-30 MHz output, £16.00.

70 MHz Converters, £16.00. 70 Cms Converters, £17.60.

1296 MHz Converters, £21.60.

2 metre Pre-Amp, £10.40. 1296 Varactor Tripler, £24.00.

432 Varactor Tripler, £17.60.

432 Transverter, £84.00.

All above plus 121/2% VAT

50 MHz Counter, £61.15. 500 MHz Prescaler, £25.00.

Above plus 6% VAT

Also in stock: Jbaybeam Aerials, Denco Coils, Bantex Aerials, Die-Cast and Alum. Boxes and thousands of components.

PART EXCHANGE WELCOME ACCESS OR BARCLAY CARD

11 KINGS STREET, LUTON, BEDS.

Telephone 20907

Reg. Ward & Co. Ltd. (G2BSW)

KW 108 Mon. scope .................. £85.00

KW 103 VSWR and Combined Power Meter ........................................ £18.00

KW 107 Combined E-Z Match, VSWR and RF Power Indicator, Dummy Load and Antenna Switch for 3 Outlets £68.00

KW Trip Dipole coaxial Feeder ........................................ £26.00

KW Trip Dipole Balun ........................................ £29.00

KW 2-way Antenna Switches (for coax) ........................................ £5.00

YAESU

YAESU Y101E .. FT200B Transceiver and FP200 AIC PSU £429.00

YAESU FT 201 Transceiver ........................................ £299.00

YAESU FR101X R £219.00

YAESU TVR101 ........................................ £310.00

YAESU YO101 Mon. scope ........................................ £118.00

FT212-2M TVR 2Ghz, FM/MM £144.00

YAESU FRG7 New General Coverage Receiver, £144.00

Sentinel 2m. Preamps and 2m. Converters/Europa Transverters.

SMH MICROPHONES

Model 444, £19.20 · Model 201, £8.40.

USED EQUIPMENT:

YAESU FR101X TX. Mint · few hours use only, inc. speech processor (to be fitted) ........................................ £310.50

KW 202 X. ........................................ £130.00

YAESU FR 50B (CAI) ........................................ £70.00

YAESU FV 101B FVO ........................................ £115.00

Grundig 2000 Universal with 5.5 watts output, £88.80.

BC221 Frequency Meter with charts (reqs. PSU/Batteries) £220.00

WANTED:

YAESU FR50B’s in good condition.

VALVES for YAESU, etc. £GB8, £GB 26, GUB, C67, £6A6, £6K6, £62AA7, £6B77A, £6AU7, £6A/£, VALVES for KW and Heathkit equipment, £146, £6466, £6565, £6G6E, £6BE, £6GW, £6A6, £6ME, £6CL, £686, £68B, £68F, £656E, £68W6, £68A6, £68B6, £6826, £656C, etc., and many other valves.

Tubes and Stelsie Rotators: 1460t, 14g copper ant. wire; Ribbed and tube-in-units: £115, 75Q and 75Q caps, and U.H.F. plugs and sockets.

Master Couplers for 2m. Masts. Wigtape, G-Whips mob antennas, £29.00.

TRADE INS WITH PLEASURE. OUR STOCK OF GOOD SECOND HAND EQUIPMENT CHANGES DAILY. LET US KNOW YOUR REQUIREMENTS.

Due to currency fluctuations prices of imported equipment are liable to alteration. Add 121/2% VAT to all prices except used equipment.

Telephone: 33163
Volume XXXIV
THE SHORT WAVE MAGAZINE

DERWENT RADIO
COLUMBUS RAVINE, SCARBOROUGH
Tel. SCA 69994
Showroom open Tuesday/Thursday/Friday/Saturday

ALUMINIUM BOXES WITH LIDS
18SWG all sizes in inches. P/F less than 4" long, larger 22p
1 x 1 x 1 ... 35p
3 x 1 x 1 ... 35p
7 x 1 x 1 ... 52p
13 x 1 x 1 ... 60p
5 x 1 x 1 ... 35p
9 x 1 x 1 ... 35p
15 x 1 x 1 ... 60p
10 x 1 x 1 ... 35p
13 x 1 x 1 ... 35p
18 x 1 x 1 ... 35p
21 x 1 x 1 ... 52p
25 x 1 x 1 ... 60p
10 x 1 x 1 ... 35p
15 x 1 x 1 ... 35p
20 x 1 x 1 ... 35p
25 x 1 x 1 ... 52p
30 x 1 x 1 ... 60p
5 x 2 x 2 ... 45p
9 x 2 x 2 ... 45p
13 x 2 x 2 ... 60p
15 x 2 x 2 ... 60p
18 x 2 x 2 ... 60p
21 x 2 x 2 ... 60p
25 x 2 x 2 ... 60p
30 x 2 x 2 ... 60p

CRYSTALS. A couple of hundred in various bases to be cleared at 10/100 per unit. Our selection.
Amphenol PL329 ... 52p
5200 ohm headphones ... £1-62
Universal PL290 ... 52p
SLD-310 ... 52p
Morse practice oscillator ... £1-40
SD-2 PLUG to plug connector ... 40p
Video display strips ... 75p
Amerex 3N410 and 3N414 ... 50p
Dance calls, most stock
Newer model call book ... £1-00
Remove catalogue guide

QSL CARDS
10p stamp for quality samples and price list.

SHORT WAVE W/ART
WANTED GOOD SHORT WAVE COMMUNICATIONS RECEIVERS AND TRANSMITTERS FOR CASH

HAMMERLUND
HGF103 ... £115-00
Heath 102 scale receiver ... £68-00

TRIO SP3D spkr.
£13-50

SUZUKI
£9-00

HRO 6 bolt ... £115-00

10mA AM... £9-00

1AMP ... £4-00

Hampshire FM III ... £9-00

Second hand items available

Price £65-00

WE WELCOME BACK THE RM-8 800, WHICH GIVES YOU A GOOD FM STATION WITH THE FEATURES OF THE PREVIOUS RM8 SERIES.
THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.
THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE EMUSMPROR
This unit is proving a huge success so it is now available for £10. 9 or £12MHz to give others a chance to sample the RM8.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.

THE RM8 SERIES HAS BEEN IN DEMAND WITH MANY AMATEURS WHO WANTED A GOOD FM STATION AT A REASONABLE PRICE.
512 THE SHORT WAVE MAGAZINE

October 1976

“XG8” MORSEMASTER Cassettes

ONE TAPE — ONE HOUR — ONE SPEED

Speeds: 4, 5, 6, 7, 8, 9, 10, 11, 12 w.p.m.

Types: CODE, P.L., FIGURE EXERCISES

State SPEED(S) and TYPE(S) required

Single cassette — £3, or any three for £7.95

Also available: BEGINNER PACK (2 tapes), £5.60

TapeTalk

P.O Box 99, Milton Keynes MK3 5BR
Tel. Milton Keynes (0908) 77710

G3ACQ Offers:

All WESTERN ELECTRONICS goods—Yaesu, standard etc.

J. Beams Stolle Rotors. SOLID STATE MODULES

Converters and transverters. Large stock of surplus crystals.

Please write with S.A.E.

S. MAY (Leicester) LTD.

12 - 14 & 27 CHURCHGATE,
CITY CENTRE, LEICESTER
Telephone: Leicester 58662

S. MAY (Leicester) LTD.

P.O. Box 99, Milton Keynes MK3 5BR


3-5a 13-5v, output. Fully regulated.

Basic Kit (less case, meter) ................ £11.00

Full Kit as illustrated .................. £17.70

Ready made ........................... £22.00

Tax at 8%. P.P. £1.00

TELERADIO ELECTRONICS
325 Fore Street, Edmondton, London, N9

HAMEAGRE

Twelve years solely in H.F. preselector design and production. Our latest units having Three stages of amplification, a built-in A.T.U. and switchable regeneration to squeeze the last bit of signal from your antenna.

Send for full details of these units and antenna experiments using them. Please send three 6d stamps.

2 CROMWELL ROAD, SPREWSTON,
NORWICH

MORSE CODE TUITION

C90 CASSETTE For AMATEUR RADIO EXAMINATION

PREPARATION SPEED SLOWLY INCREASING FROM 1 to 12 w.p.m.

COMPLETE WITH INSTRUCTION BOOKS AND PRACTICE PAD, £3.

MORSE KEY AND BUZZER UNIT for sending practice, £3.

Prices include postage, etc.

M. H. ELECTRONICS

12 LONGSHORE WAY, MILTON, PORTSMOUTH,
PO4 8LS
Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION
Aerial Handbook (Briggs) ........................................ £1.05
Beam Antenna Handbook ......................................... £3.20
Cubical Quad Antennae, 2nd Edition ....................... £3.05
Simple Low Cost Wire Antennas, by Orr ............. £2.90
73 Vertical Beam and Triangle Antennas (E. M. Noll) £3.20
73 Dipole and Long-Wire Antennas (E. M. Noll) £3.35
S.W.L. Antenna Construction Projects (E. M. Noll) £2.25
Antenna Handbook (ARRL) 13th Edition ........... £3.20

HANDBOOK AND MANUALS
Amateur Radio DX Handbook ................................ £3.30
Electronic Circuit Handbook Vol. 1 .................... £1.73
Electronic Circuit Handbook Vol. 2 .................... £1.73
New RTTY Handbook ........................................... £5.30
Radio Amateur Handbook 1976 (ARRL) ............ £2.75
Radio Amateur Handbook 1976 (ARRL) Hard Cover .. £7.65
Radio Amateur Operators Handbook ................. 85p
RTTY A-Z (CQ Tech, Series) .......................... OS/5
Surplus Conversion Handbook .......................... £2.50
Slow Scan Television Handbook ........................ £3.10
Television Interference Manual (G3JGO) ........ £1.00
Specialized Communications Techniques for the Amateur (ARRL) .................................... £2.25
Practical Wireless Service Manual .................... £2.45
Advanced Communications Systems ................. £9.97
Working with the Oscilloscope ......................... £1.65
Know your Oscilloscope ................................ £3.30
Know your Signal Generators ......................... £2.30

USEFUL REFERENCE BOOKS
Amateur Radio Techniques, 5th Edition (RSGB) £2.47
Engineers Pocket Book, 6th Edition ................ £1.98
U.K. Call Book 1976 ........................................... £1.47
Hints and Kinks (ARRL) ................................... £1.60
Radio Data Reference Book (3rd Edition) (RSGB) £1.35
Single Sideband for the Radio Amateur (ARRL) £2.25
Sun, Earth and Radio (Hard Cover) ............... £2.70
NBFM Manual (RSGB) .......................................... £1.13
Q and A on Short Wave Listening ...................... 0/P
Electronics Data Book (ARRL) ......................... £2.90

VALVE AND TRANSISTOR MANUALS
ABC of FET's ...................................................... £1.50
Field-effect Transistors (Mullard) ................. £2.15
MOS Integrated Circuits & their Applications (Mullard) ........................................... £1.05
Transistor Audio & Radio Circuits—2nd Ed. (Mullard) ........................................... £3.00
Transistor Radio & Receiver—2nd Ed. (Mullard) .... £3.45
Principles of Transistor Circuits (5th Ed.) ........ £3.43
Service Valve and Semiconductor Equivalents ...... 50p
Radio Valve and Semiconductor Data (10th Ed.) .... £2.35
Transistor Pocket Book ................................ £1.70
Popular Valve/Transistor Substitution Guide ........ £2.10

VHF PUBLICATIONS
VHF Handbook Wm. 1 Orr (New Ed.) ................. £3.90
VHF Manual (ARRL) ........................................... £3.15
VHF/UHF Manual (RSGB) (New 3rd Ed.) .......... £5.70

Available from

SHORT WAVE MAGAZINE
Publication Dept.
34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7
(Counter Service. 9.30-5.15. Mon. to Frl.)

The above prices include postage and packing
Many of these titles are American in origin
SLOW-MOTION MOTORS (suitable for pro-

All other TCPI spares available.

Pack of PA COILS, mostly silver plated, 50p (the bug revealed approx. 700 items) £3.00 per pack, while stocks last.

PERPEX FILTER PANELS (for FM Band 2 tuners) marked 88-108 MHz and Channels 0-20, clear numbers, rest blacked out, modern appearance, size approx. 8½ x 12, 2 for 35p.

MAINS TRANSFORMERS

All 240v. inputs, voltages quoted approx. RMS (see the Type No. on the ordering).

TYPE 7/12 (10-12v. at 2A) £1.25.

TYPE 115/80 approx. 125v., at 30mA, £6.50.

TYPE 7270/8 approx. 170v., at 100mA, 200v. at 5mA, £6.40, at 400mA, £1-25.

TYPE 14/4. 14v., £2-50.

VHF RF chokes (wound on 2-2/2KJw, resistors, 5 for 35p. Relays, single pole change over, 20v. DC, approx. 2½ x 4½ x 12½, 35p each.

PROGRAMMERS (Magnetic Devices) Contain 9-12 mechanical switches (for operation) with 9 rotating casts, all individually adjustable, ideal for switching disco lights, displays, etc., or industrial meter programming.

(Need slow motion motor to drive casts. Not supplied) 9 switch version, £1-90.

TRANSISTORS

TO 3 TRANSISTOR INSULATOR SETS, 10 sets for 30p.

BSX20 transistors (VHF OSC/MULT) for 3 for 50p.

BC108 (metal case), 4 for 50p.

BC108 (plastic BC108), 5 for 50p.

PNP AUDIO TYPE TO TRANSISTORS, 12 for 25p.

BPSY TRANSISTORS, 4 for 60p.

BE152 (UHF AMP/MIXER), 3 for 50p.

2N3819 Fet, 3 for 60p.

BYX 39/300 Stud Rectifiers, 300v. at 2-5A for 45p.

BA12 Varicap Diodes, 4 for 50p.

IN194 DIODES, 10 for 25p.

2N3055 type Transistors, OK, but unmarked, 5 for £1.

VALVES

QVQ03/20A (ex equipment), £3.00.

QVQ03/100 (ex equipment), 75p or 2 for £1.20.

2C39A (ex equipment), £1.00 each.

DET-22 (ex equipment), 2 for £1.00.

Diode packs for 68p/4 (ex equipment), 2 for 50p.

PLUGS & SOCKETS

PL259 PLUGS (PTFE). Brand new, packed with reducers, 65p each or 5 for £3.00.

SO239 SOCKETS (PTFE), Brand new, packed with reducers, 65p each or 5 for £3.00.

N-TYPE PLUGS, 50 ohms, 60p each.

N-TYPE SKTS, 4 hole chassia mounting, 50 ohms, small coax lead type, 60p each.

GREENPARK TERMINALS (see GPN015/0). Chassia Lead Termina-

(These are the units which bolt on to the chassis, leads secured by screw cap, and the inner of the coax passes through the chassis). 25-60 WAY ISEP PLUGS and SOCKETS, 60p each.

25-60 WAY ISEP PLUGS and SOCKETS, 40p each.

MINIATURE 50 ohm COAX, high quality, PTFE insulated and vulcanised to connector, £0.65 each.

Screws and washers, 10 for 60p.

ALL BELOW — ADD 8% VAT

SPECIAL OFFER

FREE WELLER 25W (SP25) SOL-

DERING IRON (worth £3-24 Inc. VAT) with all orders over £20.00. Limited period only, send now.

AND SPIRALUX Tools for the Electronics enthusiast. S.A.E., for list.

AUSTRALIAN ALUMINIUM SOLDER (made by Multicore) Solder Aluminium to itself or Copper. 90% silver plated inner, and silver plated braid, and the inner of the coax passes through the chassis), 30p each, 4 for £1.00.

WE NOW STOCK WELLER SOLDERING EQUIPMENT (including the Famous TCPI).

HIGH QUALITY SPEAKERS. 8½ x 6" eliptical, 2½ deep, 4 ohm, inverse magnet transmission to Canada by Magazine Post.

MINIATURE 2 PIN PLUGS & SOCKETS (fit into ½ hole, pins enclosed, with recessed chassis mounting, or can be used for inline connectors). Brand pack of 3 plugs + 3 sockets + covers, £1.50.

TUNED COLUMNS, 2 section coils, around 1 MHz, with a black smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound, 3 for 50p.

LEAD SUPPRESSORS (10k ohm) for mobile plug leads, 4 for 50p.

PC BOARD WITHDRAWAL HANDLES, mixed coils, 8 for 50p.

SOLDER, 205SWG, 60/40 alloy six packs, approx. 1 stack, 25p.

3½ Polyethylene chassis mounting fuseholders, 5 for 50p.

4½, 10mm, circular, ceramic trimmers (for VHF/UHF work), 3 pin mounting, 5 for 50p.

SOLDER CORE, multicore, savbit size 12 reel £1.80.

HEAVY DUTY HETSINK BLOCKS, undrilled, chassis, base area 2¼ x 2¼, with 6 fins, total height 2½, 50p each.

SPECIAL OFFER

XTAL PACKS, 51 MHz range (our selection), HG6U, 10 for £1. SAE for our latest xtol list.

Small Chassis hand wound coils: dia. 1½" between holds, 1½ clearance, tapped 48A (with screws and washers, 2 pair for 45p.

ALL BELOW — ADD 12½% VAT

TERMS OF BUSINESS: CASH WITH ORDER, MINIMUM ORDER OF £10. PRICES NOW INCLUDE POST & PACKING (UK ONLY).

PLEASE ADD VAT AS SHOWN

PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES.

B. BAMBER ELECTRONICS

DEPT 5, 5 STATION ROAD, LITTLEPORT, CAMBS., CB6 1QE

Tel.: Ely (0353) 860185 (Tuesday - Saturday)

CALLERS WELCOME SATURDAY ONLY 9.30-12.00, 1.30-5.00

TERMS OF BUSINESS: CASH WITH ORDER, MINIMUM ORDER OF £10. PRICES NOW INCLUDE POST & PACKING (UK ONLY).

PLEASE ADD VAT AS SHOWN

PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES.