TRIO R1000

£298 inc VAT  Carr £4.50

The R-1000 uses an advanced PLL system in an up-conversion scheme to a high (48MHz) first IF to remove any possibility of image responses. The receiver covers the entire frequency range from below 200kHz right up to 30MHz in 30 bands, each 1MHz wide. The bands are selected, not by ambiguous knob twiddling as in receivers using the Wadley loop but by a 30 position band switch which controls the PLL system.

The band switch also electronically selects the appropriate band pass filter network in the RF stages of the receiver so there are no "preselector" or "antenna trim" controls to twiddle — simply set the band switch to the range required — that's it!

A highly stable VFO tunes each 1MHz range and its linear, back lit scale makes readout easy. However, in addition to this dial, Trio have also provided 5 digit true frequency digital readout so as to guarantee spot on accuracy on any frequency. As a further feature, the digital display can also be switched to read time, this being derived from a quartz standard. Marvellous for accurate log keeping. The display uses high intensity readout units which can be dimmed for use in low light conditions.

As for what else is inside this superb instrument — selectivity is catered for by three custom made IF filters; a 12kHz wide AM filter; 6kHz narrow AM filter; and a new 2.7kHz SSB filter with a shape factor of better than 1:2 6:60dB. Selectable sidebands are available at the touch of a switch.

For the first time in mid-price receiver, a true noise blanker is provided to remove pulse type ignition noise.

To minimise front end overload, a step RF attenuator is included which gives 0-60dB attenuation in four steps.

All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting.

The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial long lump of wire will work really well with the R-1000.

This receiver is so advanced it makes everything in its price range completely obsolete.

LOWE ELECTRONICS LTD. CHESTERFIELD ROAD, MATLOCK, DERBYSHIRE.
Trio have always been acknowledged leaders in the field of portable VHF equipment and this leadership is amply demonstrated by the TR2300. Following the long established TR2200 line, the TR2300 combines all the virtues of small size, ease of use and rugged go-anywhere construction but introduced for the first time, full band coverage in 25kHz steps from the same advanced synthesiser used in the TR7500. This provides all 80 FM channels from 144-146MHz together with 600kHz repeater shift (and reverse repeater if requested). Automatic tone burst is provided for repeater operation thus catering for all operational needs.

### TRIO TS120V/S

**TS120V £347.30 inc. VAT**

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<tr>
<td>TL120linear</td>
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**THE SYSTEM APPROACH**

What do we mean by the "System Approach"?

Well, take the TS120V and you have the finest 20W p.e.p. mobile HF transceiver you could buy. Many operators are even buying it as a second station because it’s so good. Consider its features, the single conversion PLL derived top performance, the accurate digital readout; the passband tuning; the noise blanker; the superb engineering; THEN may we add the PS20 mains power supply and you have an equally great home station; OR maybe add the multi-function VFO120 second VFO unit; OR the SP120 external speaker; OR the 100W AT120 antenna tuner or maybe even a superb Microwave Modules 2 metre or 70 cm transverter to get you up on the VHF and UHF bands. It all adds up to a fine station tailored exactly to your own needs.

If you need more power, the TL120 200W p.e.p. linear is now available, but you will need a hefty 12V supply to run it. A suitable unit would be the PS30 which delivers up to 200amps fully regulated and protected. Lots of people are buying the PS30 as a general purpose heavy duty supply for shack use.

Finally, should you really want high power all the time, consider the TS120S which incorporates all the features of the TS120V but has a built-in high power, fully protected 200W p.e.p. linear and it’s still not too expensive to enjoy!

**TAKE A GOOD LOOK AT THE PRICES!!!**

Don’t forget, we stock almost everything that the keen DXer, short wave listener or radio amateur could possibly need, including the complete range of J Beam aerials, Microwave Modules equipment, feeder, clamps, insulators — in fact our catalogue makes good reading for 48p and includes honest advice on aerial matters. For all that’s good in Amateur radio, contact Lowe’s Electronics at Matlock.
LOWE ELECTRONICS Ltd.

TRIO
TR9000

2 metre MULTIMODE
£365.00 (approx)

If you sat down at some time and designed your ideal 2 metre multimode rig, you probably laid down the specification for the new Trio TR9000. I believe this transceiver will satisfy the needs of every radio amateur, combining as it does small size (same as the TR7600), light weight (same as the TR7600), and powerful performance. As you can see, the TR9000 has a complete array of facilities including all mode operation, noise blanker, RIT, 5 memories, twin digital VFOs and digital frequency readout to 100Hz. Now for the smart parts.

The TR9000 is based on a 100Hz synthesiser controlled either by a photo microsensor on the main dial or by the remote up/down microphone. On FM, the operator has instant selection of either 25kHz steps (for convenient mobile use), 12.5kHz steps (for future use), or 100Hz steps (for continuous tuning). On SSB and CW, the synthesiser steps are automatically switched to 100Hz and the digital display is extended to match.

A special feature is the search facility on SSB which tunes the whole band, and the scan facility on FM which scans in 25kHz or 12.5kHz steps, stopping momentarily on any received signal. The scan may then be held by touching the HOLD button or depressing the PTT switch on the microphone.

The TR9000 has so much to offer, it's bound to be yet another leader, from Trio. Contact us soon for further details.

AUTHORISED DEALERS IN THE UK
Yorkshire
Leeds Amateur Radio

Birmingham
Ward Electronics

South London
Catronics Ltd

North London
Radio Shack Ltd

Lancashire
Stephens-James Ltd

Wales
M.R.S. Communications Ltd

Essex
Waters & Stanton Electronics

Sussex
Bredhurst Electronics

REMEMBER. Only an authorised Trio dealer can give you the service, spares and advice that you may need, and only an authorised dealer can give you full advantage of the regular meetings between the distributors and Trio factory personnel at which there is a constant exchange of information and advice.

THE WAY TO HAVE TOMORROW'S EQUIPMENT TODAY

As sole official distributors for Trio, we recommend that you purchase your Trio equipment from an approved dealer (full list above). Any dealer NOT on this list has no connection with the Trio UK sales and service organisation and cannot, despite claims to the contrary, offer any meaningful guarantee of backup service on Trio equipment.
Hello

I'm John Wilson, and I'm the Lowe Electronics director whose main responsibility is the after sales service and customer advice business of the company. (I also write our sometimes controversial advertising.) As most of you may know, ever since Bill Lowe began business from his garage, our company emphasis has leaned heavily towards service to the customer, and by accepted standards we are top heavy in our service staff/sales ratio. We have always believed that when a man has trouble with his radio equipment, he is entitled to the best advice and help that it is possible to give, and our customers world wide know that we do offer this kind of service.

As we have had it said to us (and about us) many times, "You won't get a penny off at Lowe's, but they really look after you when you have trouble, and they certainly know what makes a rig tick.

The reason for the lack of discounting in our prices is the simple one that discounts have to be paid for by cutting elsewhere, and in this business, that cutting back usually takes place in the back-up service. We will not do this. The ultimate examples of discounting are often the cash and carry operators. You know the type; they take the cash, you take off a sealed box, and you carry also the responsibility for repairing your own rig if it goes wrong. That philosophy is not ours.

But to return to after sales service, it must be obvious from the photograph that we have exceptional service facilities here at Matlock, and in addition to the hardware we have the widest accumulated experience in amateur radio gear of possibly any dealer in Europe. That is why even dealers in this country send equipment to us for repair when they come up against the particular nasty faults. All this is at the disposal of our customers, as is the unique connection to the Trio company in Japan. As the sole distributor for Trio in the U.K., we keep in constant touch with the factory on all aspects of equipment design and use. Many of the refinements in design of the gear such as the reverse repeater switch on the TR2300, or the modified filter switching in the R1000 are originated here in Matlock as a direct result of comments from our customers. This is one aspect of our special relationship as the connection between you and the factory. For our staff here at Matlock, we have Barry who is a whiz at HF gear, Rob of the slender fingers who gets stuck into the subminiature stuff; David who has just joined us to look after the pre sales preparation and special orders, John T who is a digital wizard and who is going on to Cambridge this year with Lowe Electronics sponsorship (come back soon, J.T!); and of course, myself - I get landed with all the nasty faults. We can also call on Alan, who has a cold even older than mine, and who can remember details of faults we fixed years ago, but he is now more involved in finding new goodies for you.

So, to summarise what I have really been saying: If you need help or genuine advice on amateur radio matters, call Lowe Electronics. If you intend to own the very best equipment made, backed by real service, get Trio from Lowe Electronics, and if you have any doubt about what I've been saying, just ask our customers if it is true.

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THE SHORT WAVE MAGAZINE
May, 1980

LOWE ELECTRONICS Ltd.

HOKUSHIN AERIALS

From the makers of our popular HF5 vertical, we have a complete range of vehicle aerials for VHF and UHF use. All the whips terminate in a PL259 plug so that you have complete flexibility, and any aerial in the range will fit the RG4M base or the magnetic mount. The 2E, 2NE, and 430E have a quick foldover joint at the base so that you can drive in and out of your garage without dismantling the aerial.

2E
2M 5/8, 3.4dB gain foldover whip .......... £6.60 inc VAT
2NE
2M 7/8, 4.5dB gain foldover whip .......... £11.00 inc VAT
430E
70cm 5/8, 5.5dB gain .......... £10.00 inc VAT
HS-F1
2M rubber helical on PL259 plug .......... £3.95 inc VAT
320
2M stainless quarter wave on PL259 ...... £15.00 inc VAT
RG4M
Base for all above units including 4 metres of cable ready terminated in PL259 ........... £3.00 inc VAT
GSS
Heavy duty gutter/booth mount to take RG4M base .......... £3.15 inc VAT
MS5
Magnetic mount complete with 5m of cable and PL259 ... £7.95 inc VAT

Also two really great base station aerials:

GP5
High performance 2m base station collinear. Forget .... £22.00 inc VAT
THE S.JU.M AND R. OR R
GDX2
3dB gain over the range 50-480MHz. The classic wideband aerial. 500W p.e.p .... £36.80 inc VAT
HFS
Our original success. 5 band vertical 80-10m with great performance, great savings ...... only £41.40 inc VAT

SEND 48p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK
PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION

HEAD OFFICE AND SERVICE CENTRE
CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629-2817 or 2430. TELEX 377482. OPEN 9.30-5.30 TUES-SAT. PHONE IN 3am-9pm

For personal attention on the South Coast contact John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer 812071.

For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

FOR ALL THAT'S BEST IN HAM RADIO CONTACT US AT MATLOCK ANYTIME

Great News!

The AR240 is back in town but with higher battery capacity, provision for separate microphone and the hot performance (better than 0.7W for 12s), 2W output on TX1 that you will appreciate, PRICE? Even better value at £168 inc VAT (price includes Nicads, charger, etc.) It has a new name too -- the AR240A.

144-146MHz synthesized FM Hand Held
Today's crowded H.F. band conditions demand more control of a receiver's selectivity than most receivers provide. Conventional fixed bandwidth crystal filters are quite inadequate to cope with problems such as partially overlapping SSB stations, overmodulation splatter, very close-spaced CW stations, RTTY reception through interference, heterodyne whistles. Model FL2 offers a new high standard of performance under these critical conditions. It gives the user full control of upper and lower pass-band edges and even beats most crystal filters for the sharpness of its pass-band edges. It also contains a separate variable notch filter.

- Extremely steep skirt responses from a pair of 5-pole elliptic function active filters. Gives remarkable rejection of close-spaced interference in SSB, CW, RTTY.
- Superb "rectangular" pass-band out-performs crystal filters for close-in interference rejection.
- For SSB, AM and SSTV contains independent low-pass, high-pass and notch filters. Each continuously tuneable from 200 to 3500 Hz.
- For CW and RTTY the filters combine to give a pass-band variable from 40 Hz to 1750 Hz, with selectable peaked or flat response shape and independent control of centre frequency and bandwidth.
- Convenient push-button selection of operating mode, and colour coded panel labelling for ease of use.
- Connects between loudspeaker and receiver audio output. Two-watt power amplifier built-in.

A new data sheet is available free on request.

Price: £78 plus V.A.T. at 15% = £89.70

SEND FOR FREE CATALOGUE ON ALL DATONG PRODUCTS

Application to SSB and RTTY
Model FL2's ultra sharp skirts wipe out "monkey chatter" interference from adjacent off-tune SSB stations (HF or LF), with minimal effect on the desired signal. Interference rejection is superior to "IF shift" or "Pass-band tuning" techniques and of course Model FL2 works with any receiver. The notch filter can be switched in or out as required without affecting the low and high-pass filter settings.

Application to CW
The main CW mode uses 12-poles of filtering to give remarkable skirt selectivity together with peaked response for easy tuning. With minimum bandwidth selected, the response is typically 40 Hz at -3 dBs and only 280 Hz at -40 dBs. A second CW mode ("CW(2)") using 10-poles of filtering has a "flat" response instead of peaked. This is useful for net operations.

Model FL2 requires an external DC supply of between 10 and 20 volts. It contains 21 integrated circuits and is built to high standards using close tolerance parts for the filter sections and a double sided epoxy-glass printed circuit board.

Computer simulated frequency response curves for Model FL2.

Response in "SSB" mode showing the very steep pass-band edges and the ideal "rectangular" response shape.

Response in "CW" mode Note the remarkable skirt response.
WATERS & STANTON ELECTRONICS

The EL40X is an 80/40 Mini Dipole, 1KW 70 ft long, priced at £29.95 inc VAT.

LOWE SRX30

The SRX30 is designed as a budget priced receiver that outperforms many receivers costing three times as much. Featuring the Barlow Wadley loop, it will enable you to explore the exciting world of short wave radio - amateurs, broadcast, aircraft, shipping, etc. This is a completely self-contained package, having all the features necessary for complete and reliable coverage of the frequency range 0.5 MHz to 30 MHz.

£178 inc. VAT and delivery.

Dear Sirs,

Thank you for your most excellent service and unbiased advice when I called in to purchase a short wave receiver. I might say that I did intend to buy in London but when I was told by one dealer that their repairs were done elsewhere, I became suspicious. How confident I was when I saw your large service department - my message to any other customer would be: Go to Waters and Stanton -- they have the experience and facilities at their new premises that far exceed any other retailer I have visited!


YAESU FRG7000

£357 inc. VAT and Delivery.

The FRG7000 is based on the successful FRG7 design with a host of features that make it a deluxe receiver for the really serious short wave listener. Digital readout, electronic clock and timer, superb selectivity all go to make up the receiver that everyone aspires to own. Frequency coverage is 0.2 MHz to 30 MHz and the clear digital readout makes it one of the easiest receivers to use.

FANTASTIC OFFER

FDK 2m 1 watt Portable
Complete with: Flexible antenna, ni-cads, AC charger, S20 and S22, cigar lighter, DC lead and 6 channel capability.

Palm II

£89.50 inc. VAT*

Postage and packing 75p.

* Crystal tone-burst £10 extra.

70cms version

PALM IV

£149 inc. VAT.

Interested in RADIO or HI-FI?

HERE'S JUST A FEW OF OUR BARGAINS

TRIO HI-FI

PIONEER HI-FI

KA3700 2.5w, £77.00
KA305 4w, £97.00
KA405 5w, £140.00
KT5500 Tuner, £87.00
KR2010 20w Receiver, £106.00
KR3010 27w Receiver, £143.00
KR4010 35w Receiver, £177.00
KD3033B Tuntable, £53.00
KD1500 Tuntable, £56.00
KX530 Dolby Cassette, £116.00

SXS90 20w Receiver, £99.00
SX690 30w Receiver, £129.00
SX790 40w Receiver, £203.45
SA408 20w Amp, £59.90
TX408 FM Tuner, £59.90
PL512 Tuntable, £51.00
PL200x Tuntable, £92.00
PL300x Tuntable, £112.00
CTF500 Dolby Cassette, £88.00
CTF600 Dolby Cassette, £109.90

SXS50 20w Amp, £59.90
TX408 FM Tuner, £59.90
PL512 Tuntable, £51.00
PL200x Tuntable, £92.00
PL300x Tuntable, £112.00
CTF500 Dolby Cassette, £88.00
CTF600 Dolby Cassette, £109.90

Securicor £3.50 extra on above.

MONDAY - SATURDAY 9.5.30
18-20 MAIN ROAD, HOCKLEY, ESSEX
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The R-1000 uses an advanced PLL system in an up-conversion scheme to a high (48MHz) first IF to remove any possibility of image responses. The receiver covers the entire frequency range from below 200kHz right up to 30MHz in 30 bands, each 1MHz wide. The bands are selected, not by ambiguous knob twiddling as in receivers using the Wadley loop but by a 30 position band switch which controls the PLL system.

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To minimise front end overload, a step RF attenuator is included which gives 0-60dB attenuation in four steps.

All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting. The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial long lump of wire will work really well with the R-1000.

Up until now we have been taking orders on a waiting list system because of short supply of this item. Hopefully by the time you read this we will be able to supply from stock. And remember all our R1000 are given our full pre-delivery check and then dispatched promptly to reach you within 24 hours of us receiving your order. That's real service! Just one of the many things that make more and more people come to us for all their amateur radio needs.

£298 inc. VAT
WATERS & STANTON ELECTRONICS

TRIO

FULL RANGE IN STOCK DELIVERY ANYWHERE IN U.K.

STOP PRESS
TR9000 2m all mode £340 inc. VAT

NEW TRIO TS120V £408
TS120S £495

Up until now there has been a natural reluctance to accept solid state HF rigs as anything but a second rig or mobile unit with dubious reliability of the PA devices. Now at last the new TS120 series gives you 80-10 metre coverage at either 10 watts output or 100 watts output. Digital readout and variable selectivity are just two features that put them in a class above any other solid state rig we know of apart from the TS1800s - even those costing nearly £1,000. The TS120 will put to shame many of the older valve PA designs and can confidently be regarded as a good reliable base or mobile station - and no tune-up means instant OSY from band to band at the flick of a switch.

NEW TRIO TR9000 £345 inc. VAT

The new Trio TR9000 heralds the beginning of a new era in 2 metre mobile or base station operation. A host of new features that make it direct competitor look pretty expensive! Its two tuning ranges either 25kHz or 12kHz per step. On SSB the tuning rate is in 100Hz steps or with the search button depressed, it will step in 1kHz at the same time scanning for signals within each 1kHz segment. Dual VFO enables the operator to hold one frequency whilst searching for another. The inclusion of five memory channels provides for the storage of your five favourite frequencies. Built-in scan permits FM scanning 25 or 12kHz steps with momentary pauses on busy channels whilst providing continuous scanning of SSB/CW over 2kHz. Positive or negative repeater shifts are already programmed into the unit. For base station use, the PS-20 AC supply can be used plus the SP120 external beam and the 80-9 system base package. An exciting rig at a very reasonable price. Send today for details.

NEW TRIO R-1000 £298 inc VAT

At last the Trio R1000 has been announced - a real purpose-built receiver for the serious short wave listener. 20kHz to 30MHz in 30 bands. This receiver has many features that are not available on other models and of course, has the technical backing of the world's largest manufacturers of amateur communications equipment. Features include: 1kHz digital readout and separate analogue dial, large high quality speaker, digital 12 hour clock - AM and PM, separate filters for razor sharp selectivity, noise blanker (try finding this on any other receiver!), automatic preselector tuning via the 1MHz band switch, three-stage attenuators, dimmer control, tone control, timer circuit, and all this in a diminutive package measuring 12x x 13 x 8 in. Trio have now solved the problem of choosing a receiver - there is no choice - it's got to be Trio!

ALL PRICES INCLUDE 15% VAT

NEW TRIO TR2400 £210 inc VAT

The new TR2400 really does eclipse all other hand-held in its class technology. There's no other model that can approach its performance. The large LCD readout has low current drain and the 1.5 watts output is a good compromise between effective communication and reasonable battery drain. 10 memories, automatic scanning, instant reverse repeater operation, 16 key touch-tone encoder, 144-148MHz etc, etc. all adds up to the new leader in hand-helds - the Trio TR2400. Get your Barclaycard or Access card ready for this one - half its fascination is operating it - the other half is owning it.

KING OF THE PORTABLES

NEW TRIO TR2300 £166 inc VAT

NEW LOW PRICE!

The TR2300 is a remarkable package which combines all the advantages of a portable station with those of a mobile transceiver. In many ways it's the ideal "starter rig" in amateur radio. Full band coverage from 144-148MHz in BO - 25kHz channels plus 800kHz radio shift and 1750Hz automatic tone-burst complete its versatility. The dial is directly calibrated in frequency and has illumination for night use. The transmitter is exceptionally clean with an output power in excess of 1 watt. Receiver sensitivity is every bit as good as the best mobile rigs and either internal batteries of an external DC source may be used. Fits easily into a suitcase or on the corner of a desk and makes a really compact mobile rig. Price includes carrying case, shoulder strap, battery charger, external DC cord and, of course, the Waters & Stanton 12 month warranty. An absolute bargain - we even sell them to our staff!

May, 1980
The Multi 700EX is the replacement for the Multi 700E, having an updated specification — without making it too complex for safety under mobile conditions! Its powerful 25 watts output has been retained together with the front panel continuously variable power control. The frequency range has been expanded to cover the entire band 144-146mHz in 25kHz steps. Of course, essential to all current equipment is its ability to operate on 12½kHz channel spacing and this you can do at the press of a button. Four priority channels that are user programmable have been added and these can be electronically scanned. The channels are not lost when the equipment is switched off! The stable crystal controlled tone-burst is automatic and both normal and inverse repeater operation is possible at the press of a button. By simple alteration of the diode matrix the plus 600kHz facility can be changed to 1.6mHz for operation through the proposed FDK 70cms transverter (in matching cabinet). Altogether a simple but highly effective mobile transceiver that provides everything you could wish for in a 2 metre FM mobile.

**MULTI 750 15 WATTS FM/SSB/CW — EVERYTHING YOU NEED AT A VERY SENSIBLE PRICE!**

This rig will really set the pace for 1980 — wait until you hear the price!

Price **£299** inc. VAT

The Multi 750 is FDK's new, all mode 2 metre unit for both base or mobile use. Using the same cabinet dimensions as the M700EX, this really does provide the basis for an action-packed, go-anywhere station. To list all its features would be impossible in the space available on this page. However, we will list its main points so you can get some idea of just what this amazing package is capable of.

- 144-146mHz at 10 WATTS OUTPUT (Minimum!): ALL MODES — FM/USB/LSB/CW; REPEATER OPERATION — normal or reverse with automatic crystal controlled tone-burst; DUAL VFO's — these are selectable at the press of a button so that one vfo can be left at the SSB end of the band and the other at the FM end; NOISE BLANKER — a really efficient circuit to take out those ignition pulses on ssb; DUAL SPEED TUNING — enables 5kHz or 100Hz step tuning; RIT — essential for accurate tuning of the received SSB signal; High/low power — switchable between 1 and 10 watts; Remote frequency control — electronic tuning via microphone if desired; 12 months warranty — parts and labour — want to know more? THEN SEND US A S.A.E. FOR LATEST INFORMATION ON THIS MOST EXCITING PRODUCT.
TR2300 2m Synthesised Portable Transceiver. We have lost count of the number of this model we have sold over the last 12 months. Hikers, campers, climbers, you can hear them all over the country and reliability which is the essence of TRIO equipment.

**£166.75**

**JAYBEAM**

SY:2M 5 element yagi  £10.24
BY:2M 8 element yagi  £13.23
10Y/2M 10 Element  £28.41
PBM:14/2m. 14 element Paraboom  £40.38
5XY/2m. Bellent crossed yagi  £20.70
SXV/2m. Element crossed yagi  £25.88
10XY/2m. 10element crossed yagi  £34.27
Q4:2m. 4 element Quad  £21.51
Q6:2m. element Quad  £28.52
D5:2m. 5 over 5 slot fed yagi  £18.29
D8:2m. 8 over 8 slot fed yagi  £24.94
UGP:2m groundplane  £9.37
MBM48:70cms. Multiebeam  £28.18
MBM88:70cms Multiebeam  £37.49
MB  £2m. Whipmobile  £15.30
CTm. Collinear  £40.02
CB:70cm. Collinear  £45.43
D1/S128 23m. Antenna  £30.94
Carriage on Antennas £3.00

**TRIO R1000**

R1000 Receiver £298.00

The latest general coverage from Trio. Frequency coverage 200 KHz to 30 MHz in 30 bands. Using an advanced PLL system. Full digital readout. Three filters 12 KHz for AM, 6KHz narrow AM and 2.7 KHz SSB. Also incorporates a noise blanker.

**£28.00** inc. VAT and postage

**NEW ATENNA MODELS**

H S, HFS Vertical 10-90m  £41.40
HFR, Ground Plane Kit  £23.00
GDX 2 Discote Antenna 50 450MHz  £36.80

**TRIO TS120 TRANSCEIVER**


**£347.30**

**TS 180s**

TS 180s, HF Transceiver. An all solid State Transceiver with Digital Frequency Control. A rig that has the facilities that DXer, Contest operator or anyone would desire for the most flexible operation through 10 metre bands. Up to 200 watts PEP input. No tone final amplifier.

With digital readout.

**£679.65**

**RECEIVERS AND TRANSCEIVERS**

INC. VAT and Postage

SHR8 Tunable 144-148 MHz Receiver  £46.00
AMR217B Scanner Receiver AC or DC operation  £113.50
RS12 Aircraft Band Scanning Receiver  £135.00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver  £230.00
Philips FM321 70cms FM Transceiver  £264.00
Yasu TS520S Receiver  £214.00
Tornado 318 Scanning Receiver 30 Channel  £95.00 + Crystals
FDX TM553 2m Receiver  £105.00
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Bearcat 220 Scanning Receiver  £241.50

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**Price** .................................................. £289  
**DCK-1 (DC kit)** ........................................ £6.95

**OTHER TRIO EQUIPMENT**

(Phone or write for latest prices and details)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>TR-2300</td>
<td>2m FM PORTABLE</td>
</tr>
<tr>
<td>TR-2400</td>
<td>2m FM HAND HELD</td>
</tr>
<tr>
<td>TR-7625</td>
<td>2m FM MOBILE (25 watts)</td>
</tr>
<tr>
<td>TS-770</td>
<td>2m/70cm MULTIMODE</td>
</tr>
<tr>
<td>TS-120S</td>
<td>HF SOLID STATE MOBILE (High Power)</td>
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<tr>
<td>TS-180S</td>
<td>HF SOLID STATE TRANSCEIVER (with Memories)</td>
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<tr>
<td>TS-520SE</td>
<td>BUDGET PRICED HF TRANSCEIVER</td>
</tr>
<tr>
<td>TS-820S</td>
<td>DE-LUXE DIGITAL HF TRANSCEIVER</td>
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**FRG-7 £199**

**OTHER YAESU BARGAINS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>FT-227RB</td>
<td>2m FM mobile</td>
<td>Down to £229</td>
</tr>
<tr>
<td>FV-901DM</td>
<td>Scanning/memory VFO for FT-101Z/901</td>
<td>Down to £199</td>
</tr>
<tr>
<td>FRG-7000</td>
<td>General cover receiver (few only)</td>
<td>Down to £339</td>
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The ALUMAST is a 15" (375 mm) wide triangular cross section lattice sectional aluminium mast based on a 10ft (3.05 m) section length. It is supplied "knocked-down" in a tubular carton for ease of transport, but can easily be assembled needing no special tools or skills. The system includes top plate with bearing sleeve, rotor plate and a choice of a fixed base frame (FB-1) or one with hinge joints (HB-1) to enable the mast to be pivoted at ground level. Guy brackets are available for use at heights above 30ft.

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<tr>
<th>Code</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>375/PSS/3</td>
<td>30ft mast (3 sections)</td>
<td>£184.00</td>
</tr>
<tr>
<td>375/PSS/1</td>
<td>Additional 10ft section</td>
<td>£62.68</td>
</tr>
<tr>
<td>HB-1</td>
<td>Hinged base unit</td>
<td>£31.05</td>
</tr>
<tr>
<td>FB-1</td>
<td>Fixed base unit</td>
<td>£21.85</td>
</tr>
<tr>
<td>RMP-1</td>
<td>Rotor mounting plate</td>
<td>£12.05</td>
</tr>
<tr>
<td>TP-1</td>
<td>Top plate with sleeve</td>
<td>£13.23</td>
</tr>
<tr>
<td>GB-1</td>
<td>Guy brackets (set of 3)</td>
<td>£11.50</td>
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Computer compatible—the Best!
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ICOM's superior LSI technology takes the lead in Amateur HF. The extremely compact IC-701 delivers 100 watts output from a completely solid state, no tune (broad band design) final, on all modes and all bands, from 160-10 M.
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Full band coverage of all six HF bands, and continuously variable bandwidth on filter widths for SSB, RTTY, and even SSTV help to make the IC-701 the very best HF transceiver ever made. IC-701 includes two CW widths, all of this standard at no extra cost.
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OF COURSE
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We have had a poke around one of these little beauties and are certain that Icom, yet again, have come up with a winner. As you can see, it has the expected smart Icom appearance. Features include:

- Crystal controlled Tone Burst
- Full band coverage — extendable to 148 MHz if required
- Four digit LED display
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At £255 including VAT these are such value for money that demand may exceed supply for a while — but they are worth waiting for! (Delivery is free of course by Registered First Class Letter Post.)

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"NEW" IC251E £479 inc.

DON'T WORRY – WE GUARANTEE
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INCLUDING PAs

AFTER YEARS OF SUCCESS THE IC211E HAS NOW BEEN REPLACED BY THE IC251E. NOT JUST A FACELIFT, BUT A NUMBER OF IMPORTANT DEVELOPMENTS HAVE BEEN INCORPORATED.

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MULTI-PURPOSE SCANNING – Memory Scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning step size. Auto-stop stops scanning when a signal is received in all modes.

DUAL VFO’s – Two separate VFO’s can be used either independently or together for simplex operation, and any desired frequency split in duplex operation.

CONTINUOUS TUNING SYSTEM – Icom's new continuous tuning system features a luminescent display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 7 digits representing 100 MHz to 100 Hz digits.

Automatic re-cycling restarts the tuning at the bottom of the band when the top is reached – and vice versa. Quick tuning in 1 kHz steps is available, and fine tuning in 100 Hz steps in the SSB and CW modes, and 5 kHz steps in the FM mode, is provided for trouble free QSO.

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MODES – USB, LSB, CW and FM output.

SENSITIVITY – CW and SSB – Less than 0.25 microvolts for 10 dB S+N/N. FM – More than 30 dB S+N/D+N at 1 microvolt or less than 0.3 microvolts for 20 dB Noise quieting.

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**JUST LOOK AT OUR PRICE**

**STAR OFFER**

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(p&p £3) £289 inc. VAT

**JUST LOOK AT OUR PRICE**

Something different, the fabulous new synthesised VHF/UHF BEARCAT 220FB receiver from the USA. Covers three amateur bands plus aircraft, marine and public service bands on these frequencies: 65-88MHz, 118-136MHz, 144-148MHz, 148-174MHz and 420-512MHz. Scans between any two pre-set channels, and also offers a priority-channel signal-finder and a lock-out facility. Operates on mains or 12V, so use at home, in the car, or on the boat.

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£241.50 inc. VAT

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Free-standing external digital display giving accurate frequency readout while still retaining the analogue tuning facility.

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SHORT WAVE MAGAZINE

(GB3SWM)
ISSN: 0037-4261

Vol. XXXVIII MAY, 1980 No. 439

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Editor: PAUL ESSERY, G3KFE/G3SWM
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Also from May we are giving away Free All Risk Insurance Cover on any new equipment purchased from us over the value of £150!!

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The FRG7 needs no introducing, this low price Receiver must be one of the best buys around. The unit covers 500kHz to 30 MHz in four ranges using the famous Barlow Wadley Loop technique. The unit operates from 100-240V AC or 12V DC (batteries can be used with the optional battery holder)

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£39.95 inc. VAT and Postage

The Trio R1000 uses the latest techniques to produce a truly remarkable Receiver covering 200 kHz to 30 MHz in 30 bands. Excellent selectivity is obtained by 12, 6 and 2.7 kHz filters, the 2.7 kHz filter producing a shape factor better than 1:2, 6:60dB. Accurate frequency readout is achieved by a 5 digit Display, the unit operates from 100-240V AC and 12V DC.

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The Beacon Scene

The Angus 2m. beacon is back again after a long absence on 144.975 MHz. It is just over 600 km. from the G3FPK QTH and can usually be detected, with patience, under flat conditions. Its locator is YQ35c. Another welcome return is GB3SUT (ZM31b) on 432.89 MHz in the 70cm. band. On 6m. GB3SIX has now been licensed to operate outside TV hours on 50.02 MHz. Brian Bower, G3COJ, says it is hoped to have it operating by the summer and points out that multihop E’s propagation across the Atlantic late at night is just possible.

Satellite News

A note from AMSAT-UK secretary Ron Broadbent, G3AAJ, dated March 22 mentions the launch of A-O-9 is now scheduled for May 23, between 1500 and 1700 GMT. To keep the world informed, amsat has arranged Project ALINS, meaning AMSAT Launch Information Network and Service. Pre- and Post-launch, Europe will be served by transmissions from W2JT, Monday through Saturday on 28.555 MHz from 1800; 21.260 MHz from 1820 and on 14.260 MHz from 1830 GMT. On Launch Day, a net will start about 45 mins. before launch and continue till O-9 is in transfer orbit about 20 mins. after launch. The ARL station WIAW will beam to Europe on 21.390 and 28.590 MHz. Latest news can also be gleaned from the Sunday nets from WA3AN on 14.280 MHz at 1800 and on 21.280 MHz at 1900 GMT.

A-O-9 will be a single transponder satellite, like O-7, Mode “B.” The general communications band is 124 kHz wide. The 70cm. uplink band is centred on 435.215 MHz and the inverted 2m. downlink band on 445.900 MHz. The tentative band plan is for CW only to be transmitted in the top third which will result in its being in the bottom third on 2m. The bottom third is for USB transmission on 70cm. which will result in LSB in the top third on 2m. The middle third is mixed CW/SSB. It is vital that no attempt is made to use the transponder until AMSAT give the “go-ahead.” For this reason, it is suggested that O-7 should not be used when on Mode “B” from A-O-9 launch until it becomes operational. O-7A and all O-8 usage is unaffected.

On 29.451 MHz, telemetry is being transmitted daily from RS-O which appears to be a terrestrial station, probably in Moscow. Your scribe has copied reams of TLM. One stream, at 1352 on April 4, consisted of groups such as K36, K37, K42 . . . etc., while on April 6 at 1130, the format was; — RS0 EK30 ED74 EO84 EG01 EU34 ES26 EW23 RS5, etc. Perhaps this activity suggests that RS-3 and RS-4 are about to be launched. If so, it is unlikely there will be any prior warning or orbital information. AMSAT-UK runs a weekly net on Sunday mornings from 1015 local time on 3,780 kHz from which the latest satellite information can be gleaned.

Contests

Results; — From GB2RS come the results of the 432 MHz Fixed Contest on Feb. 3. The Multi-Op. part was won by G3NNW with 630 points, runner-up being G3J4CD/A with 423 pts., just 7 pts. clear of third placed G8GLI/A. G4BEL won the Single-Op. section with 416 pts. and G3XDY was runner-up with 352. G3UBX’s 316 pts. earned him 3rd. spot. Coming events; — The May 3/4 weekend sees the 144/432/1296 MHz event from 1600-1600GMT. There is a 144 MHz Low Power affair scheduled for May 25 but your scribe cannot advise the times or rules. The 70 MHz Contest, which is also an s.w.l. events, takes place on June 1 but again no times or rules have been advised.

Repeaters

VHF relay GB3TR, Newton Abbot in Devon on R2, is now in operation. Details from G3UIQ. UHF repeater GB3MK in Milton Keynes on RBO is also QRV. Details from G8CXT. The deliberate interference on the London VHF repeaters continues unabated, with the Crystal Palace one, GB3SL, worst affected. Listening any evening
reveals little meaningful traffic. Those genuinely wanting to use the thing to call up a friend are deliberately denied the chance by a few morons. Some seem to be pirates, some licensed amateurs, others are illegal CB-ers whose voices one recognises from 27 MHz. The playing of tapes containing call signs and remarks is prevalent. It remains a source of utter amazement to your scribe and many others that the Home Office is prepared to allow this sort of disgust abuse to be so widely broadcast. If an individual amateur used his station this way there is little doubt his licence would be withdrawn. Why should repeaters be treated differently?

The only times when GB3SL is free of protracted jamming is during the normal, working day. Therefore, would it not make sense to close it down at weekends and evenings?

Six Metres

The first of the season’s TEP signals to southern Africa were reported by G3COJ who heard the ZS6PW beacon on 50.028 MHz from 1130 on March 1. On Mar. 9, Brian copied it from 1139 to 1315 and ZS6BMS and ZS6LN were also heard. On Mar. 12, ZS3E on 50.07 MHz was heard in beacon mode at 1327 for 8 mins. and again at 1424 on the 16th followed by a 10m. cross-band QSO. G3COJ says that ZS3E monitors 28.885 and/or 28.330 MHz for cross-band calls. ZS6PW keys his 2m, 6m, and 10m. beams simultaneously, with call signs and pulses, so that distant stations can compare propagation times. When he is in the shack, he cuts the 10m. beacon for exactly 10 secs., in every 100 and, during these breaks, listens for calls on 28.305 MHz, the beacon QRG.

It is reported that VK6XO received a picture from BBC TV on Mar. 12 at 0915 for 4 mins. on 51.75 MHz at S3. He is QRV on 52.005 MHz with 350 watts to a 5-ele. beam from 0800 and listens on 28.885 MHz. On Mar. 25, SV1DH in Athens heard KH6EQI in Hawaii on 50.1 MHz at 1200 when he was beamng over the South Pole. 6m. enthusiasts have a net from 1800 GMT each Monday on 3650 kHz with G5KW in the chair.

Four Metres

In the March feature, mention was made of the desirability or not of possible Class “B” licensee operation on 4m. following certain WARC decisions. Written and on-air comment is divided. Jim Whittle, G3KX (Lancs.) feels more activity is needed and that the GBs could provide it. (He had just spent 45 mins. calling

“CQ” in all directions without a single reply!). Alan Scott, G4BYP (Cheshire) prefers to keep out of the debate until he hears some definite proposals.

Roger Thomas, GW4BCD, admits his first reaction to G8s on 4m. was, “...never!” However, he reasoned that it all depends on one’s location, pointing out that in South Wales, it is difficult to do any serious work on the band due to the lack of activity. Roger agrees that demands for “channelisation” should be resisted but writes, “...what about a linear repeater?”

Dave Thorpe, G4FKL (Essex) asks for skeds with stations in Oxon., Northants., Warks., and the Isle of Wight, any mode. Roy Webb, GW3CBY (Swansea) re-enters the Three Band Annual table and says he will be operating on 4m. shortly.

Two Metres

Mick Allmark (Leeds) was out with G8MJD/P during the Mar. 1/2 contest and lists some nice continental DX worked on a low power from YP79e including DK0Y/L/P (EH11h) at 1237 km. They hope to put up four 9-ele. Tonna aerials for the low power contest. Dave Sellars, G3PBV, reports the reception daily of FX0THF (AJ46h) on 144.895 MHz at Newton Abbot (Devon). He has replaced his 15 years old 10-ele. Jaybeam with the much lighter 9-ele. Tonna. G4BYP is finding many new friends on 2m. SSB in the north easterly direction from Cheshire. Alan’s previous QTH was poor that way. He is one of a growing number becoming thoroughly fed-up with the goings-on in the FM part of the band, so much so that he finds the HF bands are more rewarding.

Bryn Llewellyn, G4DEZ (Essex) had a chance QSO on 40m. with the 9A1NY operation which resulted in the unexpected opportunity to try an MS contact on Mar. 31, at 2310. 27 reports were exchanged each way and the QSO took 50 mins. G4FKI now has an Icom IC-201 transceiver. During the Barking club contest on Mar. 30 he worked 50 stations with just 2½ watts. Gary Allitt, G4HNS (Notts.) found conditions in the latter half of March very poor and Chris Baker, G8JGK (Essex) found things rather quiet after the Mar. 1/2 weekend. He now runs 60 watts to a 16-ele. beam at 60 ft.

During the Barking club contest,
John Lemay, G8KAX, was out portable and made 110 QSOs. Alan Nottage, G8KPZ, was also -/P for this affair and made what must be a winning number of 192 contacts. Tim Hague, G8GTP (Kent) made 76 of his 153 QSOs in the first hour. He worked E4CN (WN) and GM8VBYX (YP37g).

Dave Cox, G8OPR (Hants.) worked EI2AWB in this event for one of his best QSOs.

Pete Connors, G8LEF, has run into planning permission problems at the new QTH near Huddersfield from the local “... privet hedge mentality...” as he puts it. He has been listening on 2m. and mentions the FM-ers who QSY down below 145.00 MHz into the beacon band, when the “S” channels are full. Jon Stow, G8LFJ (Essex) has written to update his score in the Squares Table and notes some of the DX worked in the Mar. 1/2 contest, since when things have been rather dull. Likewise for George Gullis, G8MFJ (Wilts.) the contest produced a couple of new squares; F1EKU/P (BH) and H9MIN/P (DH).

Andy Markham, G8RZA (Essex) enjoyed the Mar. 1/2 weekend but found things very quiet till the 16th when, for a couple of hours from 1640, some reasonable G-DX was worked. He noted the considerable activity during the Barking contest on the 30th. but remarks about the number of bad signals. He is missing a Leics. contact by the way. From Harrogate, Steve Cottis, G8FTR, lists some of the nice DX he worked in the Mar. 1/2 affray. 11 countries were worked, including 3 new ones; HB, GD and GJ. The gear used was an Icom IC-255E to a 100 watts amplifier with a 12-ele. ZL Special aerial at 35 ft. Operation tends to be spasmodic due to studies at the Teeside Polytechnic in Middlesbrough.

Arthur Breese, G2HDZ, added 25 counties and 7 countries to his 1980 Table total in the Mar 1/2 event including HB9MIN/P and DL0EE/P, a fair haul from the Island. He remarks; “Congratulations to the RSGB for having at last arranged a contest date to coincide with a good opening!” Darrell Mawhinney, G18JP (Antrim) enjoyed the contest but reports that most of the mainland stations seemed very reluctant to beam to G1, since they make more points from continental QSOs. He suggests this discourages the GIs from contest operation as the chance of their being well placed in the results is remote. He found conditions good on the Saturday but poor the next day in the event.

G14GTY/P made 272 contacts including 42 continentals. The best DX was F1EDJ/P (BH68h) at 1302 kms.

From Jersey Island, Geoff Brown, GJ4ICD, mentions the Sporadic E openings on Mar. 14 and 15 when Hungarian stations worked into Russia. In a brief note dated Mar. 28, Geoff wrote; “Oxford University confirm new information and theory,” and maintains that this E’s event was predicted. He reports that Phil Johnson, G18KNV, has been accused of running illegally high power and that a report has been sent to the RSGB Contests Committee. However, this is rather daft as Phil does not enter contests. Geoff asks us to publish the fact that when he enters a contest, he signs the “427” form on which he states his maximum power is 400 watts PEP output, measured on a Bird “Thruline” meter. It is a sad fact that anyone who has a good site and...
taken the trouble to put together an efficient station often gets accused of running excessive power. Sour grapes?

Another E’s opening has been reported on Apr. 4 when French stations worked into Hungary and Yugoslavia. Looking back through the G3FPK logs, it transpires that the first E’s QSOs have been made an average of nine days earlier every year since 1976. If this pattern is maintained, we should get an opening around May 12!

Seventy Centimetres

G3PBV mentions the lift on Mar. 16 when activity was low. G8OPR was very strong and still readable on one watt. The Syledis QRM, which had been on since early Feb., ceased in mid-March. Dave gets a very strong signal from the Weymouth repeater GB3SD, even with horizontal polarisation and using slope detection. G4HNS added a couple more counties in mid-March; G8CVF in Merseyside and G8GPP in Kent. On Mar. 9, G8OPR worked country no. 10 in the shape of ON5UN and still retains a comfortable lead in the 1980 table.

G8LFJ should have added a new tower to the Billercay landscape by now and hopes to be on the band soon. During the Mar. 1/2 weekend, G8MJF worked FD1JY/P (CH); HB9BHC/P (EH) and DK0VLP/P (EH). The Swiss QSL came direct and stated the best DX was EL16AS (Dublin) at 1250 km. On 432 MHz, George just runs an Icom IC402, 3 watts to an 8-ele. Yagi at 6m. The same contest provided GD2HDZ with another four squares; 3 F’s in BH, BJ and CH, and EH (DK0VLP/P). G8JPG was out/-P in this contest and made 20 QSOs, including 5 continents, for a total of 386 pts. Best DX was DK0VLP/P, who else! GW3CBY promises to put West Glamorgan on the 70cm. map soon.

Twenty-three Centimetres

G3PBV has been doing some aerial work and has put up a double 15-ele. array on the mast. Dave is now accumulating the bits and pieces to get going on the band. G8LEF has everything ready and has an appeal in against the planning permission refusal. If it is not successful, a move to a new house in half an acre at 1150 ft. a.s.l. is possible. From Ulster, G8JPG writes that the Lagan Valley ARS members (G14GTV) are building for 23cm. and should be active in this year’s contests.

Operating Notes

Writing from Tonbridge School in Kent, Brian Morrison, G8SEZ, responded in detail to the G8s on 4m. debate. Summing up, he feels 4m. should be left as it is and like 2m. was before repeaters came on the scene. He confesses to a dislike of the 2m. band plan and reckons it discourages operators from tuning for distant stations. However, he does concede that CW and satellite operators need special segments.

Of course, nobody can ever devise a band plan that meets with universal approval. The present 2m. one, which has been agreed to internationally by Region 1 IARU VHF Managers, does indeed provide for an all-mode segment; i.e. 144.50-144.850 MHz. In practice, most all the stations in this part stick to the 25 kHz “channel” concept and use FM. Your scribe has reached the conclusion that neither the FM-ers nor the SSB folk are the slightest bit interested in cross-mode QSOs.

The occupancy of the 2m. band now is such that the 25 kHz channel idea is indefensible. At a time when the amateur fraternity on the HF bands is exploring ways of transmitting speech in narrower bandwidths, it seems ludicrous to maintain this wasteful system. What is happening is that in areas like London, where all channels are occupied, an increasing number of operators use the satellite, beacon and SSB sections for FM. Some of these, when politely asked to use the appropriate section of the band, become quite abusive. One wonders what their reaction would be if a net of powerful SSB stations began regular operation on their pet FM frequency.

When there is the slightest sign of a “lift,” the SSB section of 2m. i.e. 144.15-144.50 MHz, gets quite crowded. Even so, many operators, have established contact on the calling frequency, only QSY a few tens of kilohertz away from it. Invariably another QSO will descend upon them so why not make much more use of the 144.4-144.5 MHz part? As a matter of courtesy, it seems common-sense for strong stations in populous areas to conduct QSOs well away from the calling frequency, say on 144.45-144.50 MHz. Not everyone yet has an Rx with 120 dB. dynamic range.

Deadlines

Next time we could be reporting the first 2m. E’s from the U.K. All your reports and comments by May 7 for the June issue — don’t forget the Bank Holiday on the 5th. — and by June 4 for the July effort. Post it to; "VHF Bands," SHORT WAVE MAGAZINE. 34 High Street, WELWYN, Herts., AL6 9EJ. 73 de G3FPK.
The only slightly unusual point about the power supply is the circuitry around IC2 and thyristor TY1 across the input rails to the stabiliser board. This is present solely because the author feels a lot happier with 4CX250B's and a few kilovolts than with RF power transistors (dreading the prospect of soldering in replacements and re-aligning the thing) and it was deemed necessary to provide some over-voltage protection in case regulator or pass transistor failure applied about 20v. to transistors rated for 14v. maximum. IC2 and the thyristor form a "crowbar" which under normal circumstances play no part in the functioning of the stabiliser: should the output voltage exceed 13, IC2 provides an output to the gate of the thyristor, turning it on and hence shorting out the input rail to the stabiliser board. The fault current is limited to about 15A (!) by the 1-ohm resistor R2 in series with the thyristor, which rather convincingly blows the 7.5A fuse F4 on the board and removing the offending voltage, hopefully in time to save the PA transistors or whatever. The crowbar circuit operates between 2-3 microseconds to fire and even though the fuse will take several tens of milliseconds to blow, the transformer/rectifier department certainly cannot sustain its normal output voltage in the face of the sudden 1-ohm load presented by the resistor and thyristor.

Tests have shown that the effect of presenting the crowbar with an externally supplied 15v. is to cause the output voltage to fall to about 9v. in about 3-4 microseconds, followed (on average 50 milliseconds later) by the disappearance of the voltage as the fuse blows out! The LED D3 on the board lights if the fuse blows, giving a visual indication of what has happened; this LED could if required be on the front panel.

The 0.1 \( \mu F \) capacitor across the thyristor is there to remove any tendency to random triggering in the presence of odd surges, spikes, etc., which was occasionally observed in the course of development. The voltage at which the crowbar is to trip is set by helipot VR2, and a method of setting-up will be described later. The crowbar chip itself is a \( \mu A \) 3423 device — the author decided to use the IC-plus-thyristor approach after being rather horrified by some of the published circuits for over-voltage protection, which appeared to be either shatteringly complicated or unable to hold an accurate setting for along period of time. This system has no detectable drift and appears to work infallibly every time; the thyristor used is a 500v. 40A device which happened to be in the junk box.

Purists may object that the thyristor series resistor, a 25W component, is grossly over-run, but as it is only asked to carry the fault current for about 50 milliseconds once in a blue moon, it doesn't seem to matter that it is actually dissipating something in the region of 200W! It does not get warm when the crowbar has fired, so one can assume that all is well.

As mentioned before, stabiliser and overvoltage protection part of the power supply are built on a printed circuit board. Since relatively high currents are handled, as little copper as possible should be removed from the board, which is why the track layout may look slightly peculiar. After all components have been soldered to the board, the track side should be given several thin coats of clear cellulose lacquer to prevent oxidation.

At this point it may be noticed that the input and output rails of the board positively bristle with decoupling capacitors. This is not because this type of circuit is inherently unstable or particularly prone to malfunction when used in the vicinity of intense RF fields (although decoupling is obviously a wise precaution against any odd parasitic oscillation or RF feedback problems): there is another reason for this, which will be mentioned later in the section on the control circuitry.

As mentioned earlier, the relay and control voltages are derived from a separate secondary winding on the transformer, feeding another bridge rectifier and smoothing capacitor; this voltage is also used for the LED transmit/receive and "band selected" indicators. Perhaps the only slightly unusual feature of this part of the circuit is the inclusion of a 12v. 18W bulb LP1 in series with the feed from the smoothing capacitor. This is present as a simple means of current-limiting, since its cold resistance is very low and very little voltage is dropped across it in normal use. If the relay supply is short-circuited for some reason, the bulb simply lights to full brilliance. "But why on earth should a relay supply ever be short-circuited?", I hear. The answer is, of course, that it shouldn't, but in this design the switched and unswitched relay voltages are taken to a socket at the rear of the cabinet for use with interfacing the transverter system to big valve linears that the author likes to play with. From bitter experience, when you are prodding about wondering why the thing won't give more than about 14W output for 1 KW input, one of the easiest things to do is to short out the bit of wire that you put in as an after-thought to switch the beast to transmit: in other words, the relay supply. In this case, the current from it is limited to 1.5A, which saves both the premature demise of the smoothing capacitor and rectifier (large-value electrolytics do \textit{not} take kindly to being shorted out and neither do rectifiers) and, for that matter, saves time in changing fuses and one's nervous system from the sound of the transformer groaning in protest. The fuses F2, F3 are only present to save the transformer in the case of catastrophic failure of the rectifiers or smoothing capacitors, which hopefully is rare, and the presence of LP1 means that F3 is spared one's clumsiness. The output voltage and current meters are illuminated in the prototype by the relay supply line, so that the sudden disappearance of meter lights suggests that the screwdriver has slipped again!
PTT
STABILISED HT
RELAY SUPPLY
RELAY SUPPLY OUT TX
" " RX
28MHz INPUT BNC
IC701 CONTROL VOLTS IN
" " OUT
EXTERNAL RELAY CONTACTS

FIG. 4 CONTROL SWITCHING AND INDICATORS FOR TRANSVERTER SYSTEM

Ganged wafer switches all shown set to 2m. position. Note: S1a, S1b
is TX1, TX2 and so on in text; similarly S2a, S2b is RX1, RX2 etc.
Table of Values

<table>
<thead>
<tr>
<th>Fig. 4</th>
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<tbody>
<tr>
<td>RLA, B, C, E, F, G = Magnetic Devices 2-pole changeover, screened, 12v, coil.</td>
</tr>
<tr>
<td>RLD mounting socket = Radiospares stock no. 349-210, D1 to D7 = BY127; D8 to D23 = LED's (amber for standby, red for receive/transmit). R1 to R17 = 1K ohm. TR1 = BF85 or similar npn switching transistor. Function switches = 6-pole 4-way for transmit, 5-pole 4-way for receive. C1 = 0.01 µF ceramic. Sockets = two SO-239's, N-type and BNC-type (for 28 MHz input; 70cm., 144 and 432 MHz output). PTT and HT sockets to suit individual requirements.</td>
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</table>

Switching and Control

That "light" relief concludes the description of the power supply section of the circuitry, and we may now turn to the switching and control section, Fig. 4. As may be seen from the photograph, there are two function switches, one controlling the "transmit" band and one for the "receive" band, and in use one simply selects the transmission band on one switch and the reception band on the other. In the prototype the four bands are HF (under control of the IC-701), VHF1 (4m.), VHF2 (2m.) and UHF (70cm.).

It becomes possible, for instance, by selecting VHF2 on "transmit" and HF on "receive" to call someone on 144 MHz and receive the knowledge of whether or not they are hearing you on, say, 3.5 MHz. Oscar use is self-evident: the desired uplink and downlink bands are selected and the dual VFO's brought into play. Normal use is, of course, obtained by setting both switches to the same band. Two rows of LED indicators are associated with "transmit" and "receive", in other words four per band. The top and bottom rows, labelled "standby" in the photograph, show which band is selected to transmit and receive, and the middle rows light to confirm that one is in "transmit" or "receive" condition.

The RF switching is performed by six small changeover relays (i.e., two per transverter band) which in the prototype were Magnetic Devices screened 12v. changeover devices as used in Pye radio telephones. As can be seen from the circuit diagram, these relays are in series: one acts as a standard changeover relay to apply 28 MHz drive to the transverter on "transmit" and to select the 28 MHz transverter output on "receive". The other relay acts as a "master transverter select" driven by 12v. applied from either the transmit or receive band select switches, themselves fed by the master transmit/receive changeover relay R.L.D. This is a 6-pole changeover device with a 150-ohm coil (a so-called "magnetic style" relay) which is driven by the PTT line from the IC-701 via TR1 and associated components. The mode of operation can best be shown by an example.

Assume that the "master transverter select" relays are designated RLA, RLB and RLC and that the changeover relays associated with each transverter are designated RLE, RLF and RLG. The master transmit/receive changeover relay is RLD, with its contacts designated by RLD/1, RLD/2... RLD/6 in the usual way. The six wafers on the four-way "transmit select" switch are designated TX1-TX6, and similarly the five wafers on the "receive select" switch are designated RX1-RX5. The abbreviations CO, NO and NC have their normal meaning of changeover, normally open and normally closed respectively.

If we wish to transmit and receive on 2m., i.e., "VHF2", the switch positions are as shown in the circuit diagram. RLD/1 (NO) on receive does nothing: on transmit it will apply 12v. to TX1 and hence RLB to select the 28 MHz input/output line from the IC-701 to the 2m. transverter. RLD/2 (NO) also does nothing on receive: on transmit it will extend an earth via TX2 to the PTT line of the 2m. transverter, causing it to change state internally from "receive" to "transmit". RLD/3 (NC) on receive applies 12v. to RX1 and hence RLB to select the transverted 28 MHz output from the transverter to the input/output line of the IC-701. Note here that in the case of transmitting and receiving on the same band (the usual mode of operation) the "master transverter select" relay, i.e., on 2m. RLB, remains operated all the time even though its actual voltage is derived from different places which are switched. Since in practice RLD operates faster than the RF changeover relays, RLB here does not change over between "transmit" and "receive" and vice-versa.

RLD/4 (CO) is used to switch an 8v. control voltage (generated in the IC-701 when switched to 28 MHz) to RX5 on receive and TX6 on transmit. This voltage is required to be fed back to an input pin on the IC-701 to control internal RF switching when transverting. Hence when anything other than "HF" is selected on the transverter function switches, this voltage is selected to the IC-701 input pin by RX5 or TX6, depending upon whether one is receiving on one of the transverted bands or transmitting on it. This network (i.e. RLD/4, RX5, TX6) could be omitted with other HF equipments.

CORRECTION

In Fig. 1 (Part 1, April 1980 issue, p. 95), there must not be any connection between the top of C10 and the junction of the top of R7 and pin 1 of IC2: the un-numbered pin at the bottom of IC2 should be 8'; the resistor between the bottom of D4 and earth should be R10 and not R11, which latter is connected to D5.

Owing to pressure on space, this article will be concluded next month

June issue due to appear on Friday, May 30th
Hi, gang! Back again, and straight into the business of indoor aerials which is of some consequence, particularly to those who have a shack on an upper floor such that the run to “true” earth is an unknown factor. The mains earth is both noisy and dangerous as a signal earth, and the cold water pipes are most likely polythene which isn’t a very good conductor. Don’t believe the chap who tells you the earthing is through the water. It isn’t true to a significant degree, even though purifying water to the standard required for a QRO valve is extremely difficult. So — what to do? If you must have a signal earth, run it in braid from the earth terminal of the ATU to a ground spike, as many radials just below the ground surface as you can, of any length, and maybe a few resonant length radials if you have enough real-estate. At the top, where you meet the ATU, tune the earth: if longer than a half-wave or multiples of a half-wave, electrically shorten with a variable capacity; if shorter, lengthen by way of a loading coil.

The Mail

Newcomers first, as is only right. D. J. F. Gordon (Chepstow) mentions the VP2MM “Round-Table” operation on 14176 kHz in the evenings as a fruitful source of interest. The writer must admit to not having heard this group.

R. Baker (North Walsham) has a starting list, heard with his HA-600A receiver and a VHF box; he is a bit doubtful about the CQ calls as being legitimately on the HPX total. As far as the writer is concerned, so long as there is definite identification a CQ call from the station is OK. As a matter of interest, if he is calling CQ and not getting any takers, he might be interested in a QSL card reporting his signal strength, lest he takes the rig to bits to find out what is to be done!

J. Worthing (Harlescott Grange) has a nice tidy list, but queries the VP2 prefix. Only one VP2 goes in, I’m afraid, despite the first letter after the number being an indicator of location. As for the Y prefixes from East Germany, the story is a little different, since the old DM prefix carried a number and all were East Germany, while the present allocation for that country is Y2A-Y9Z. The point at issue is that all the variations on the East German theme are part of the prefix, and in any case are all the same country, while the VP2 prefix is allocated to a number of different islands in the Caribbean group, the suffix merely indicating which island is which. The decision on this was taken a long time ago, before your J. C. was ever involved in any way with Short Wave Magazine. However, one is beginning to get the feeling that all the changes and signs are that we will have to rethink the whole set of Rules for the coming years, ’ere long.

A taciturn chap is C. M. Nagle (Lisburn) who just put in a nice tidy list of 221, with no comment.

We are asked about a helical aerial by R. Newall (Bracknell) who has bought one and made another; he is hoping to get all-band coverage in a garden only 20 feet wide. Well now, this is a Difficult One! It is true to say that you can radiate a signal with anything conducting as the aerial, provided you have a ground of some sort and can cook up a network to match it to the transmitter. Fair enough, as far as it goes. However, aerial test gear above an SWR indicator is something most of us haven’t got, so start with a dipole as a resonant aerial and feed it with the right feeder (twin, or coaxial via a balun) and run a plot of SWR versus frequency on each band; the lowest SWR (hopefully!) will be where you hoped it would be; and will rise as you head for the band edges. Now, if you shorten the aerial by inductive loading — and that is what the helical is doing — then you must trade off the shortening against the loss of signal. It can be pretty potent, for all that, but it is vital to realise the trade-off is in bandwidth. Frankly, for a small garden, the writer much prefers the trapped vertical in conjunction with careful and adequate work on the ground connection.

B. A. Payne (Leeds) says that this first list brings him back into the fold for the first time since 1956. The first reaction is amazement at the disappearance of AM, and the complete sway which SSB now has. All we can say is “thank heaven for that!” as about all one could work on AM phone was the odd European, unless one took to CW seriously. A DX-pedition using phone to any extent was unheard-of.

Another to return to the fold as a new starter, after nine years away from it, is A. Rowland (Mansfield) who was in BFPO 53 in those far-away days. He runs a Trio R-820 nowadays. SWL Rowland wonders about a 4X6AF, and FYOEOO. So do we, but if they were heard in one of the contests they are probably OK — does anyone else have a story on these two?

There are some queries as to the validity of the /P situation. The suffix /P added to a call in UK only counts as the call. However, in some countries, it is normal when out /P to use the number of the call area as the suffix. Thus W1BB at home, but W1BB/1 when at the famous water-tower QTH operating Top Band. Many countries use a similar form when licensing foreign stations, for example G3KFE/W6, who would count as W6. On the other hand this can give rise to the arbitrary situation discussed in the rules where, for example, W1BB/4X4 would be countable as a 4X1 (which is an imaginary prefix). There were at the

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**ANNUAL HPX LADDER**

**Starting Date, January 1, 1980**

<table>
<thead>
<tr>
<th>SWL</th>
<th>PREFIXES</th>
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</thead>
<tbody>
<tr>
<td>R. Newall (Bucknell)</td>
<td>426</td>
</tr>
<tr>
<td>B. A. Payne (Leeds)</td>
<td>303</td>
</tr>
<tr>
<td>J. Worthing (Shrewsbury)</td>
<td>299</td>
</tr>
<tr>
<td>D. J. F. Gordon (Chepstow)</td>
<td>298</td>
</tr>
<tr>
<td>J. Weston (Borehamwood)</td>
<td>246</td>
</tr>
<tr>
<td>Miss J. Ribbon (Oxted)</td>
<td>243</td>
</tr>
</tbody>
</table>

200 Prefixes must have been heard for an entry to be made, all since January 1, 1980, and in accordance with HPX Rules.
time the rules were originally drafted such anomalies and the only way to deal with them was, and is, by some such arbitrary ruling, as any other ruling would have been equally arbitrary!

Questions

And, we hope, the correct answers! R. Howes of Weymouth takes us up on our comments last time about bits and pieces and full layout diagrams. Normally we don’t go into too much basic constructional detail, unless the contributor himself feels it necessary; and the comment about bits and the ideal world we made in good faith. The big worry is in junk-box components; none of them are exactly what they purport to be: resistors are inductive to a small degree, capacitors inductive above a certain frequency, a length of wire has a capacity to chassis — some inductance and some resistance. When you come to the active devices, it gets even more entertaining. In general, if you used valves, the specified type or equivalent would be near enough, but transistors and linear ICs, and to a lesser degree TTLs can have marked differences between one maker and another, and even between a particular device from a certain manufacturer bought at different times. The point is that the data sheet only carries the details on which the maker is sure — and there are always parameters besides the ones in the data sheet which may change. Among the listed ones, there is also room for quite a change — one transistor which immediately springs to mind is the obvious pass device in a stabilised PSU was originally registered by RCA, with a F, minimum of 800 KHz, and the average specimen was just above the mark. Along comes another manufacturer and makes the “same” transistor — but his process yields a transistor which meets the registered specs, with an F, which normally runs around 30 MHz. Use the RCA one, no problem, change it to the other maker, lots of troubles with TF generation!

A lot of readers commented on the nice crop of new prefixes landed on their logs by way of the celebratory, the Olympic, and the just-plain-change. However, E. W. Robinson (Bury St. Edmunds) reckons, nonetheless, that last winter was not as good as the one before, on Ten anyway, and deduces we may have gone over the sunspot peak in 1979. We must wait and see, as the trend will only show as the running daily figures are turned into monthly means and the monthly means plotted to show the way things are really going.

Reverting for a moment to A. Rowland, he brings up a point of what to do about scores should a move take place. One would feel that a move within a limit of around 200 miles should not cause one to start again, but above that things would be different. This is a generality, of course, and we do not lay hard-and-fast rules down because most HPX-ers operate within a self-generated mandate tighter than the Rules to enhance their own pleasure in the hobby — and why not.

Other Mail

K. Kyezor (Brandon) has been an SWL since 1936, with a Hallcatters “Sky Chief”, and now has just passed his 70th birthday. Sometimes between 0900 and 2300 he can get as much as 8 or 10 hours listening in, and so his score rises accordingly.

Over to J. F. Hobson (Ely) who comments that our remarks on his filing-system being foolproof caused it to go all haywire! However, it all comes out in the wash, and reader Hobson is handsomely into the All-Time list now.

In Cardiff, F. C. D. Barnes has had a change of receiver to the DX-300 from the DX-160, partly at least to placate the XYL who had banished receiver and owner to the shed.

R. C. Mackay (New Romney) returns to the piece after a year or so devoted to the matter of RAE, Morse and a ticket — the latter has now been applied for and is very eagerly awaited. On a different tack, one of the places never previously heard was KL7, then on March 11 one was heard on Ten, at 1948z. A switch to 21 MHz and — lo! — another one heard at 2109z, both in Anchorage and both at 59-plus.

On a philosophical point, P. Ford (Longlevon) remarks that while he has several “gadgets” in his station, they wouldn’t be of much interest were they not helping to wink the wanted signal out from under — and indeed that to him is the whole essence of our hobby. We agree.

Aerials for use with an AR88D is the question from M. C. P. Bennett (Datchet). We would put the question the other way round and ask what aerial is best for a given site and given times. A general-coverage receiver is more of a difficulty than an amateur-bands only one; it really seems to boil down to either a random wire, good earth, and an ATU, or if the receiver is going to be kept on the amateur bands, then use a normal amateur-type aerial.

A clow in an aeroplane appeared in J. Doughty’s receiver in Walsall, signing 6Z2AM or 6Z2AW, working stations but refusing to answer questions about his call or location. A prize phoney by the sound of him.

Another phoney was the ship signing NNNOWXT, first calling W2TTQ in the 4X4 net: being queried put on to the maritime mobile net on 14313 KHz, who just ignored him. Hard luck, B. A. Payne (Leeds)!

H. M. Graham (Moulton) heard 12YJD on the receiving end of a pile-up on Ten, while callers enquired among themselves as to the nature of the pile-up; and three days later the same 12YJD was on Twenty — and nothing much happening! On an entirely different tack, Maurice sent off

**HPX LADDER**

(All-Time Post War)

<table>
<thead>
<tr>
<th>SWL</th>
<th>PHONE ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. Kyezor (Brandon)</td>
<td>2300</td>
</tr>
<tr>
<td>B. Hughes (Worcester)</td>
<td>2117</td>
</tr>
<tr>
<td>S. Fowler (Lincoln)</td>
<td>1893</td>
</tr>
<tr>
<td>J. Fitzgerald (Gl. Missenden)</td>
<td>1655</td>
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<tr>
<td>E. W. Robinson (Bury St. Edmunds)</td>
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</tr>
<tr>
<td>M. C. P. Bennett (Slough)</td>
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</tr>
<tr>
<td>M. J. Quinlan (Wotton-under-Edge)</td>
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<td>H. A. Londenbosch (Swanland)</td>
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<td>H. M. Graham (Moulton)</td>
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<tr>
<td>M. Ribbon (Oxley)</td>
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</tr>
<tr>
<td>M. Law (Chesterfield)</td>
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<td>M. Shaw (Huddersfield)</td>
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<tr>
<td>K. Ling (Willington)</td>
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<tr>
<td>L. Stockwell (Grays)</td>
<td>794</td>
</tr>
<tr>
<td>P. Ford (Longlevon, Glos)</td>
<td>792</td>
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<tr>
<td>R. Middleton (Bury St Edmunds)</td>
<td>784</td>
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<table>
<thead>
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<tbody>
<tr>
<td>H. A. Londenbosch (Swanland)</td>
</tr>
<tr>
<td>D. C. Casson (Reading)</td>
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<tr>
<td>D. M. Mullins (Crowdon)</td>
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<tr>
<td>J. Doughty (Bohwich)</td>
</tr>
<tr>
<td>J. Hobson (Ely)</td>
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<td>D. G. Sim (Southampton)</td>
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<td>L. Joyce (Grimsby)</td>
</tr>
<tr>
<td>G. F. Green (Middlebrough)</td>
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<tr>
<td>F. C. D. Barnes (Cardiff)</td>
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<tr>
<td>B. Shepherd (Staines)</td>
</tr>
<tr>
<td>Mrs. R. Smith (Nuneaton)</td>
</tr>
<tr>
<td>T. Anderson (Stroud)</td>
</tr>
<tr>
<td>B. L. Henderson (Laverstock)</td>
</tr>
</tbody>
</table>

Minimum score for an entry: 500 for Phone, 200 for CW. Listings include only recent claims, and are in accordance with HPX Rules (see p. 615, January 1980 issue). A “Nil” return is allowable in order to hold a place.
WSLs to VE1BWP and YB0ADT, and both YLs returned the compliment in short order: as he says, it is true that the YLs and XYLs are more punctilious in the matter of QSLing than the OMs.

D. Casson (Earley) has changed to the FRG-7000, and is looking at the Top Band possibilities with some seven countries logged - to get the hundred up on Top Band you will need to be a dab at CW and split-frequency listening!

A large sigh of relief comes from B. Henderson, who has now moved from Chetnole to his new base at Laverstock where there is a wire round the bedroom and a tiny tuner. Nonetheless some new prefixes go on the record.

T. Morgan (Swansea) has returned to the bands after seven weeks of hospital. Trevor has two lists on offer, with a query as to which is the desired one, but he also crossed the dates over so we will have to try and sort it all out. One definitely "sad" one is the 3E007/MM, who was claiming to be the R/O aboard SS Polaris in 40°W 32°S. Sounds a bit as though his navigation is shakier than his callsign, if that were possible.

Others

Here we acknowledge lists and letters from: Miss J. Ribton (Oxted); P. W. Cutts (Acocks Green); R. Middleton (Bury St. Edmunds); S. Foster (Lincoln); T. Grimbleby (Hull); M. Law (Chesterfield); L. Joyce (Grimsby); Melvyn Hill (Bedworth); and B. Hughes (Worcester).

Wind-Up

Which is where we've come to the bottom of the list. Deadlines for the next two "SWL" features are May 15th and July 17th. Address your entries, scores, news and views to Justin Cooper, "SWL", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

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The smile of success! Phil Ashton, G3XAP, holding the prize of a cheque for £50 for the best article appearing in Volume 37 of Short Wave Magazine. As author of "Antennas - The Weak Link", a multi-part series, G3XAP was considered to have made an important contribution to clarifying a vital, but often largely ignored, aspect of Amateur Radio. Photo by G4HFF J

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FIRST COLOUR SSTV BETWEEN UK AND USA!

On March 8th at 11.45 GMT, Jeremy Royle G3NOX transmitted, on 28.6 MHz, the first full colour SSTV to the United States, which was received and tape recorded by K2RZ near New York. The colour signal was played back and received by G3NOX, a path distance of approximately 7000 miles. Then, on March 15th, G3NOX made the first transatlantic two-way SSTV contact with W9NTP, at 14.30 GMT on 29.150 MHz, using electronically generated RGB colour separation signals with sequential transmission of the colours. At G3NOX, a Pye 2014F Image Orthicon monochrome camera fitted with Red, Green and Blue filters on a motorised turret is used to produce colour separation signals, which are sequentially loaded into three digitally synchronised Robot scan converters; the scan converters are then switched to the Tx in turn.

Congratulations to G3NOX for a unique British 'first'!

"AURORA"

We have been asked by those named below to publish the following statement: "We, the undersigned, wish to state that we were not consulted verbally or in writing by Mr. C.T. Reed, G8MEP, for permission to use our names, materials or observations in his article "Aurora" which was published in the November 1979 issue of Short Wave Magazine. (Signed) B.C. Sowter G3NAP, R.J. Nash G4GEE and P.A. Edwards G8KG1."
THE TRIO R-1000 COMMUNICATIONS RECEIVER

MANY years ago, the communications receivers used by radio amateurs on the HF and LF bands featured continuous coverage of the short wave spectrum with bandwidth of the amateur allocations. Typical of such models were the Hallicrafters SC-100, covering 538 kHz to 34 MHz, and the Eddystone S-640 covering 1.7-32 MHz. These were later supplemented by amateur band only sets, like the Hammarlund HQ-170 and the National NC-300.

Then came the "Small is beautiful" phase when the trend was to amateur band transceivers to replace the bulky "separates." Typical of these was the KW Electronics KW-2000 series. By the end of the 1970's, the solid-state revolution was complete and all the latest transceivers and receivers are valveless. Furthermore, many products incorporate bespoke LSI circuitry for memory functions, frequency synthesis and remote control by microprocessors. Therefore, it was with great interest that the writer undertook this review of the Trio R-1000 Communications Receiver.

Packaging and Accessories

The receiver was supplied by Lowe Electronics Ltd. of Matlock and arrived safely by Securicor in a double box measuring 390 x 340 x 220mm. Accessories supplied included AC and DC power leads, 7-pin plug for remote control use, extension loudspeaker jack plug, a spare fuse, five metres of aerial wire, a plastic bath-cap style dust cover and the manual.

The Manual

The twenty page instruction manual is clearly written in good English and is well illustrated. It includes the specification, a block diagram and a complete circuit diagram, on which all component values are identified including many of the filter inductions. The only complaint is the usual one of interconnecting leads surrounding the diagram, rather like a picture frame, with nineteen parallel lines in a space of 30mm. in one instance making it very difficult to trace the connections correctly. The manual also contains useful information on aerial systems and notes on propagation for the uninitiated. There are many drawings and photographs showing how to install the receiver and aerials and to program the digital clock. It is not a service manual so no fault-finding or alignment procedures are included.

Description

The R-1000 measures 300mm. wide, 155mm. high and 218mm. deep and weighs 5.5 kg. It has a robust carrying handle which doubles as a tilt-up foot. The front panel layout can be seen from various advertisements in Short Wave Magazine. An 8 ohms impedance, 100mm. diameter speaker is mounted in the top panel. The top and bottom covers are separately fixed by six cross-head screws. Connexions at the rear are mounted on a novel sloping panel which simplifies the fixing of leads from the top. This ruse enables the receiver to be stood on its back without squashing these leads.

From left to right in Fig. 1 the connexion are: medium wave aerial, earth, high impedance short wave aerial, SO-239, 50 ohms short wave aerial socket, DC and AC power sockets. The slide switch at the left on the vertical panel selects either high or low impedance SW aerial and the round object at the right is the 100-240 AC voltage selector.

The workmanship quality is very good and all the components are clearly identified on the printed circuit boards. The wiring harnesses are neat and inter-board and other connexion are made with numerous miniature plugs and sockets.

Circuit Description

The R-1000 provides continuous coverage from 30 MHz through 200 kHz and down to 150 kHz at reducing sensitivity. The heart of the receiver is the VFO and phase-locked loop synthesizer. The VFO is housed in the larger screened box in Fig. 2. It covers 5.545-4.545 MHz and is a capacity tuned Colpitts oscillator. It is heterodyned with a 47.6 MHz signal from a crystal oscillator, the difference frequency being fed into the PLL chain.

The PLL circuit reference oscillator operates at 10 MHz and is divided by ten in a 74LS90P IC. This is fed into an MC4044P phase detector, then through the loop filter to the four voltage-controlled oscillator circuits which cover 48-78 MHz. The VCO and heterodyned VFO frequencies are mixed in a SN16913P IC and fed back to a programmable divider through a 6-35 MHz bandpass filter. The 30-way band selector switch is programmed to divide by 6 to 35 to feed back 1 MHz to the phase comparator.

The R-1000 is basically a dual conversion superhet with a first IF of 48.055 MHz and a second IF of 455 kHz, the second conversion using the afore-mentioned 47.6 MHz oscillator. The incoming RF signals pass through either high or low impedance attenuators comprising simple pi-networks and are then routed through one of six bandpass filters which are the group of 32 screened coils visible in Fig. 1.

The RF stage is a 3SK74 dual-gate MOSFET, AGC controlled, the buffered output being fed to a balanced mixer, using the same devices, in which the RF is mixed with the 48-78 MHz local oscillator to produce the first IF of 48.055 MHz. This is next fed through a crystal bandpass filter to another 3SK74 balanced mixer stage and heterodyned to 455 kHz. Before passing through one of three Murata ceramic filters, the signal can be processed by a noise blanker.

The IF filters provide bandwidths of 12, 6 and 2.7 kHz. For SSB reception, the last is switched in along with the appropriate USB or LSB BFO crystal. Lowe Electronics have incorporated their own modification to enable the user to choose the 2.7 kHz filter for very narrowband AM reception. This requires a 3-pin plug to be moved along one step in a 4-pin socket whereby "AM Wide" becomes 6 kHz and "AM Narrow" 2.7 kHz with SSB as before. The top cover has to be removed to make this alteration.

The R-1000 incorporates true digital readout of the
frequency being received using an LSI clock chip type MSM5524. This can be switched to display time in 12 hour a.m. and p.m. mode, and can be programmed to switch the receiver on and off for any one period in 24 hours. So long as the set is plugged into a live power socket, the clock circuits continue to function even though the R-1000 is switched off.

**Operation**

Operation is simplicity itself: just connect an aerial, switch on, select the mode, select the desired band and dial up the additional kHz. e.g. to receive BBC World Service on 5.975 MHz, switch either to wide or narrow AM, click the band switch to “5”, then spin the VFO dial until “5.975” is displayed on the digital read-out and “975” on the analog dial.

The VFO tuning was firm and smooth, completely free of backlash due to the use of precision, spragged gears in the reduction drive. The band switch had light, but positive indexing. The “Function” switch displays either frequency or time. In time mode, it reads either time, or programmed “On” and “Off” times. When an AM station was being received in USB mode at zero beat, the displayed frequency was 1.6 kHz higher than the actual carrier. Vice versa on LSB.

A.m. or p.m. is denoted by a bar of light next to the display and the decimal point between hours and minutes pulses on and off every second. The time is set by pushing the hour and minute “Time Set” buttons simultaneously which stops the clock at 1.00 a.m. Releasing these buttons on the last Greenwich “pip” sets the clock going after which one presses the “Hour” button until the actual time is displayed. The timer function is programmed in by continually pushing the “Hour” and “Minute” buttons until the respective “On” and “Off” times are displayed. The system is activated by pushing the “Timer” button with the “Power” button off.

**Performance**

The R-1000 was used for several weeks both as a straight receiver and as a tunable IF for the VHF station. The reviewer does not possess expensive laboratory-type test equipment so this report is limited to factual observations with a few measurements carried out with a Heath IG-42 signal generator.

The RF attenuator proved to be an essential feature. The sensitivity of the set, even with a short piece of wire as an indoor aerial, was such that very strong signals were received in the short wave spectrum from the multi-megawatt broadcasters. These caused cross modulation in...
places and this was most noticeable in the 26.75-27.60 MHz part of the spectrum. These images comprised pairs of stations without any beat note but it was not possible to establish just which short wave broadcast bands these signals were in. In all cases the 20 dB. attenuator cleared up the trouble but also eliminated desired weak signals. The 40 dB. attenuation was only used when employing the R-1000 as a tunable IF when a very strong local 2m. station was operating. Indeed, the 20 dB. position was often used to compensate for the 35-plus dB. gain from aerial and converter ahead of the R-1000.

Both the calculated and measured attenuations were within 1 dB of the marked values but the S-meter did not indicate this correctly. A signal at 14.5 MHz was fed in and adjusted to give a reading of S9-plus-40 dB. Switching in the 20 dB of attenuation resulted in the S-meter reading showing S9-plus-27 dB. With 40 dB it indicated S9-plus-13 dB. Set to the "AM Narrow" mode, an S9 reading was achieved with an average of only 3½ microvolts over the 2-30 MHz section. An S2 signal was about 17 dB below the S9 level.

The sensitivity was checked over the 2-30 MHz range and, for a constant S9 reading with the 20 dB attenuator in circuit, the variation was ±2 dB, a quite remarkable result. In the middle of the 1-2 MHz range, a 60 µV signal applied through a "dummy aerial" consisting of a series 220 pF capacitor gave an unattenuated S9 reading within ±0.7 dB.

On the 0-1 MHz range, sensitivity at 200 kHz was about 10 dB below that at 1 MHz.

The receiver was remarkably free of internal "birdies." Without aerials connected, the harmonics of the 1 MHz synthesizer were detectable as faint beats in SSB mode, as were the BFO crystal frequencies. However, all were far too weak to be of any consequence and they did not budge the very sensitive S-meter.

The noise blanker was quite effective particularly on car ignition interference and the notorious Russian "Woodpecker" on the HF bands. An S9-plus 30 dB signal from the latter was reduced by up to 30 dB when the noise blanker was switched in. It also reduced the racket from random clicks such as light switches, but had no effect on the "raspberries" from thermostats and oil-fired central heating ignition devices. One rather odd effect was noticed when the neighbouring d-i-y pest was using his electric drill. When not tuned to any signal, the NB virtually killed the hash, but when tuned to a signal, it seemed to make no difference to the background hash whether the NB was on or off.

One of the domestic "Hi-fi" loudspeakers was plugged into the R-1000 and the quality of wide AM reproduction was quite good, the available power output being more than adequate for the average room. Best reproduction was with the "Tone" control at the high end of its range. It is the

![Fig. 2. View of the bottom from the front. The large box contains the VFO, and the printed circuit boards behind and to the left contain the synthesiser circuitry.](image-url)
simplest of top cut circuits consisting of a 47 nF capacitor in series with a 10k control across the volume control.

On the short wavebands, especially when searching out a weak DX station on AM broadcast, there is no point in using wide bandwidths. The "Lowe" modification was tried and, as was to be expected, the selectivity was very sharp. By careful tuning, quite acceptable quality was obtained but selective fading distortion was much more noticeable. With the 12 kHz filter, converted VHF FM signals could be copied very well using slope detection.

Correlation between the analog and digital displays was satisfactory, all of the 100 kHz points on the former being within 3 kHz of the latter. It requires 20 turns of the VFO knob to tune the 1000 kHz. The analog dial can be set very simply to coincide with the digital reading.

A miniature jack socket is provided on the front panel providing 30 millivolts AF at 100k impedance for a tape recorder. This level is independent of the AF gain control setting. This facility was used to record the GB2RS news broadcasts for later playback. The "Timer" function was frequently programmed to switch the R-1000 on and off for specific items such as current affairs programmes, using the "Remote" socket to switch a battery tape recorder on and off to make unattended recordings.

Conclusions

The Trio-Kenwood Corporation has certainly produced a fine, general coverage receiver. The R-1000 is robust, stable, versatile and a pleasure to use. A radio amateur friend, part of whose job it is to check out many professional receivers, reckoned this receiver to rival several costing four and five times as much. The only real criticism is that the 20, 40, 60 dB attenuator seems too great. The reviewer would have preferred 15, 30 and 45 or even 10, 20 and 30 dB. Perhaps the dynamic range could be improved by using a different RF amplifier device. There is no doubt that this receiver represents good value for money. For anyone on the national average salary, its cost is about 3-4 week's earnings: can't be bad!

N.A.S.F.

MODIFYING THE HEATHKIT HW-101 FOR TOP BAND OPERATION

R. J. HARRIS, G3OTK, AND J. H. STOCK, G3PKS

MODIFICATIONS to commercial equipment are not usually undertaken lightly, even by the experienced amateur, and doubtless many are deterred because the resale value of the equipment can so easily be reduced by bad workmanship. Further, if the modification does not prove successful there is the possibility that the equipment cannot easily be restored to its previous performance or appearance. This particularly applies if the modifications involve some re-alignment and panel changes.

One of the writers (G3PKS) has used a Heathkit HW-101 for many years but found the lack of Top Band operation a definite drawback, so much so that much time and effort have been expended on the construction of separate 160m. equipment. Serious thought was given towards the construction of a transverter such as that described in the Short Wave Magazine a few years ago1.

A different approach was pursued when it was realised that by taking the difference frequency of the second mixer (instead of the sum) full 160m. band coverage was available from the transceiver IF. A modification was therefore undertaken to convert the HW-101 to Top Band operation without upsetting 80m. to 10m. operation in any way. It was decided that the modification had to meet three conditions:

\[ a) \text{Changes to be simple and reversible.} \\
\[ b) \text{Performance on existing transceiver bands to be unaffected.} \\
\[ c) \text{Appearance of the HW-101 (already neatly modified for optional CRT) not to be adversely affected.} \\
\]

The modification described fully meets these conditions and does so by ignoring the HW-101 PA and RF stages. Top Band frequencies are extracted from, and returned to, the IF with a single cable which connects the transceiver to an external linear amplifier and RF preselector.

In many ways, this is an ideal modification for the average HW-101 owner to carry out. Only one hole needs to be drilled (for a miniature toggle switch) and three PCB tracks cut; nothing is taken away, only a few components are added. There is no re-alignment of the original transceiver and, with the exception of the single hole, the modification can be "undone" at any time. The external

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**Fig.1** HW-101 SECOND MIXER INPUT/OUTPUT CCT.
Theory of Operation

The LSB carrier frequency of the HW-101 is 3.3936 MHz and is mixed with the 5.0 to 5.5 MHz VFO, the sum frequency giving the tuning range 8.3936 to 8.8936 MHz. This is then mixed with the output of a switched crystal oscillator to give coverage of the bands 80 to 10m. However, if the difference between the carrier and VFO frequencies is taken (rather than the sum) the tuning range becomes 1.6064 to 2.1064 MHz which includes the 160m band. It should be noted the 'direction of tuning' is reversed, i.e. 1.8 MHz corresponds to about 300 on the dial and 2.0 MHz corresponds to about 100; the sideband selection is correct, LSB being selected for normal 160m SSB operation.

The modifications to the HW-101 therefore consist of disabling the tuned circuit T202 in the anode of V5A and substituting another filter (T160) tuned to the difference frequency, centred on 1.9 MHz, and taking the output to the external linear and pre-selector. The operation is still true 'transceive', as both transmit and receive paths have the anode of V5A as a common point.

Because of the high level of RF in any transceiver, it is a great advantage to use DC control signals to perform switching functions since this will minimise the possibility of spurious RF feedback effects. To this end, diode switching has been used to select T202/T160 as required, all components being fixed to the underside of the Bandpass Circuit Board; the only alignment involves peaking T160 on 1.9 MHz.

Transmit/receive switching of the external circuits is controlled by a voltage fed through the coax cable which connects both units. This cable is the only interconnection.

The AGC in the 160m. mode operates on one stage only and so the S-meter appears to be much more sensitive. The RF gain control still operates as is it is coupled to the AGC line.

Circuit Modifications

In order to emphasise the simplicity of the modification, the original circuit is shown in Fig. 1 and the modified circuit in Fig. 2. Diodes D1 and D2 perform the switching function under control of the toggle switch, S1, which is mounted on the front panel. V5A is cut-off on receive and R1 ensures that current flows through the appropriate diode continuously; R2, R3 and R4, R5 serve solely to limit the reverse bias applied to the diodes to about 50 volts. If low capacitance diodes with breakdown voltages in excess of 300 volts are available, then R2 and R4 can be omitted.

Table of Values

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<thead>
<tr>
<th>Component</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>R1</td>
<td>220K, 1w.</td>
</tr>
<tr>
<td>R2, R4</td>
<td>47K, 1/2w.</td>
</tr>
<tr>
<td>R3, R5</td>
<td>270K, 1w.</td>
</tr>
<tr>
<td>R6</td>
<td>680 ohm, 1/2w.</td>
</tr>
<tr>
<td>R7</td>
<td>10K, 1/2w.</td>
</tr>
<tr>
<td>R8</td>
<td>47K, 2w.</td>
</tr>
<tr>
<td>R9</td>
<td>8.2K, 1/2w.</td>
</tr>
<tr>
<td>D1, D2</td>
<td>1N4148 or equiv.</td>
</tr>
<tr>
<td>T160</td>
<td>Primary 80i, 34 s.w.g., in two layers; secondary 7t</td>
</tr>
<tr>
<td>C1</td>
<td>100 pF 350v. silver mica.</td>
</tr>
<tr>
<td>C2, C3</td>
<td>0.01 µF 500v. disc ceramic.</td>
</tr>
<tr>
<td>C206, C208</td>
<td>0.01 µF ceramic.</td>
</tr>
<tr>
<td>C216</td>
<td>0.01 µF ceramic.</td>
</tr>
<tr>
<td>C224</td>
<td>0.01 µF ceramic.</td>
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</table>

Note: All the above items obtainable from RS Components

Fig. 2 MODIFIED CIRCUIT
The bandwidth of the 160m. tuned circuit is designed to about 200 kHz (by the addition of R7) and so the circuit does not require peaking when the transceiver frequency is changed from one end of the band to the other. The output is taken to the 'spare' phono socket on the rear apron of the transceiver and a voltage for controlling the selection of the linear and pre-selector, derived by R8 and R9, is also carried by this socket.

Fig. 3 shows the style of modification used. Three cuts are made to the tracks and the components added. The common point of R5, R6 and R4 is 'up in the air' as is the coil former which is supported by components. Mechanically, this is far from ideal but has proved satisfactory in practice. A twisted pair of wires takes the 160m. signal to the 'spare' phono socket and the transmit/receive control voltage components are mounted in the vicinity of this socket. A hole must be drilled in the front panel to accommodate the control switch and will be 0.25 inches diameter if a miniature toggle switch is used (if the transceiver does not have a CW filter fitted, then it may be possible to use the SSB/CW filter switch to select 160m. operation and the complete modification can be made without any holes being drilled).

Preselector and Linear Amplifier

The selectivity of the 160m. filter (T160) in the transceiver is insufficient to prevent breakthrough of strong signals on other frequencies, notably in the passband of the crystal filter. Therefore an external preselector must be used to

![Diagram of preselector and linear amplifier](image)

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>R3</td>
<td>6.8K</td>
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<tr>
<td>R4</td>
<td>22 ohm</td>
</tr>
<tr>
<td>R5</td>
<td>15K</td>
</tr>
<tr>
<td>R6</td>
<td>1.8K</td>
</tr>
<tr>
<td>R7</td>
<td>1K</td>
</tr>
<tr>
<td>R8, R13</td>
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<tr>
<td>R11, R12</td>
<td>100K</td>
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<tr>
<td>C16, C19</td>
<td>56 pF</td>
</tr>
<tr>
<td>Note: All resistors are 1/2-watt rating.</td>
<td></td>
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![Diagram of modification details to band-pass circuit board](image)
improve front end selectivity. Because the output of V5A on transmit is only a few milli-watts, a buffer amplifier is necessary to increase the power level to that suitable for driving a linear amplifier. There are many circuit configurations which could be used and the one shown in Fig. 4 is included as a typical example. The actual circuit used will probably depend upon the contents of the builder’s junk box.

TR1 forms a simple amplifier using a high voltage transistor and drives the PA which is operated in the passive grid mode[2]. A 5B/254M was chosen because several were available but a 6L46 should prove equally suitable. L2 is wound on R8 and forms an anti-parasitic choke. A conventional pi-tank output circuit is used.

TR4 and TR5 form the basis of a cascade pre-amplifier. The input and output tuned circuits are tuned by a dual-gang capacitor. The relay is controlled by TR2 and TR3 using the DC voltage fed through the coaxial cable which connects this unit to the HW-101.

The writers built a PSU specifically for the unit because a suitable transformer was available. As an alternative, the HW-101 PSU could be used as it contains all the voltage rails necessary, with the exception of the +12 to +15 volt supply for the preselector and relay; this voltage rail can be obtained by rectification of the heater supply. The screen/buffer amplifier supply should be derived from a low impedance source and a zener-diode/emitter-follower combination is recommended. The negative bias line should be variable so that the PA quiescent current can be set.

Alignment

This is simplicity itself. Select 160m. operation of the transceiver, set the main tuning to about 200 on the dial and connect an aerial to the ‘spare’ phono socket. Peak TR60 for maximum output of the HiFIX beacon on 1.9 MHz.

The external unit is aligned by connecting the HW-101 and plugging in an aerial. The preselector tuning capacitor is set at half-mesh and the cores of T1 and T2 adjusted for maximum output of the HW-101 at 1.9 MHz. A dummy load of 50 ohms should be used for checking the operation of the linear amplifier. The negative bias preset potentiometer should be set for maximum negative voltage and then adjusted until a standing current of about 30 mA is indicated. Drive can now be applied and the output checked.

Operating

On HF operation, the transceiver operates exactly as before. In the 160m. mode, the HW-101 preselector, PA loading and tuning controls are non-functional as is the band-selector switch. Although the HF aerial can be left connected to the transceiver when operating on 160m., there will be a small output due to the self-capacitance of D1 feeding a very small residue of the ‘sum frequency’ into the succeeding stages. This small output is detectable over the few hundred yards between the writers’ respective QTHs. Operating is virtually identical to normal transceiver operation.

The standing dissipation of the linear amplifier is about 18 watts and so to remain within the terms of the licence when operating CW, the DC input must be reduced to less than 10 watts. This may be done by increasing the bias voltage of the linear.

Conclusion

The actual modification to the HW-101 IF circuit board was carried out by the authors in about one hour — some of which time was spent in deciding where to place the components. The performance has been found to be entirely adequate and has given many SSB contacts over the British Isles.

Since devising the modification, the circuit diagram of the HW-100 has been examined and is almost identical: therefore this modification should work well with the HW-100 transceiver.

References


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**CLUBS ROUNDUP**

By "Club Secretary"

**Scotland and North**

Dumfries & Galloway have the first and third Mondays of each month at the Cargenholm Hotel, New Abbey Road; but May 5 is down for a Skittles Night, with all XYLs, YLS and friends, at the Needle & Pins Bar, St. Michael Street, Dumfries, 7.30 for 8 p.m. May 17 they take part in a local hobbies exhibition in Dumfries Drill Hall, and on 19th, back at the Cargenholm, there is a tape-talk.

At York, they have Fridays except the third one, at the United Services Club, 61 Micklegate, York; and they have an extra event on May 17, when they put GB3YCS on the air at a gathering of Cub Scouts at Snowball Plantation, Stockton-on-Forest. Showing the amateur radio flag is a great hobby for the group during the summer months in particular.

Now to Denby Dale who are in — where else? the Denby Dale Pie Hall every Wednesday evening, with the even ones being given over to talks and other formal activities.

Scotland again, this time Helensburgh which is based on East Clyde Street school, on the first and third Wednesdays of the month; they are affiliated to RNARS by virtue of the number of visitors they receive from the RN types who come to the area in the course of their work.

White Rose have a fine QTH at Moortown R.U.F.C.,
Moss Valley, King Lane, Leeds 17, where they now have a tally of 125 current members; not least of the attractions is the amount of space, the HF and VHF stations both with rotary beams, workshop facilities, and so forth, on the regular Wednesday evenings, not to mention a fairly full programme of lectures. If you are an award-hunter, the White Rose one appears to be interesting, and the gang have a net on Thursday evenings on 3750 kHz, as much for the award hunters as for the ragchew.

Midlands

And, most appropriately we start with Midland. The front cover of the Newsletter shows where the new place is — and to this old Brummie who hasn't been home since the 'fifties it shows an awful lot of change in the centre of the City! However, when the new place is ready it is very much a question of how soon they can finish with bricklaying and paint pots. So — May 20 will be held almost certainly at the University of Aston, G2RQ going back in time to the earlier years. Nostalgia for the OTs, and, maybe, some surprises for the youngsters!

The Derby scribe notes with pleasure that we are back on schedule — thanks, pal! To return to the club, they are to be found at 119 Green Lane, on Wednesday evenings. May 7 is the Bring-and-Buy, May 14 is a Video Show, and on March 21 G3AAJ of AMSAT-UK is going to give an illustrated talk on Oscar. No doubt about it, Ron does get around!

A change of venue and date comes up for mention now; the St. Helen's group are now at the YMCA in North Road, on Thursday evenings. More about what goes on at the Hon. Sec. — see Panel.

On we go now to Worcester where it would seem the Bank Holiday has landed on top of their May meeting and cancelled it. However, we have not much doubt that a small band, at least, will find some way of getting together during the month — try asking the Hon. Sec. at the address in the Panel. They are back in session in June — 2nd at the Old Pheasant in New Street, Worcester.

Cambridge must be somewhere near our southerly line. Anyway, the main thing to be noted is the change of Hq to the Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge, on Fridays. May 2 and 16 are both informal, May 9 is a computer evening with a selection of micros for you to try, and on May 23 a D/F Hunt is to be run — details from the Hon. Sec. That leaves May 30, on which date there is no meeting.

Bury are at Mosses Community Centre, Cecil Street, every Tuesday, with the second Tuesday always being the "main" date. Thus May 13 gives them a talk on D/F Techniques by — no speaker mentioned!

The Hon. Sec. at Liverpool is one of the well-organised chaps, who use a standard sheet, so when the time comes he can just put some carbons in, stick 'em in the machine and mail the copy as required. Labour-saving, but definitely. May 6 is down for a Junk Sale, and on May 13 there will be the ritual of the preparations for HF NFD (at least this way you can find out who forgot the generator or the beer, just by looking at the list!) On May 20 G3YBH will talk of his travels in USA, and on May 27 there will be a speaker on RTTY. Hq is the Conservative Rooms, Church Road, Wavertree.

Next in the pile is UK FM Group (Western), and we see that they can be found on the first Thursday of each month at the Grappenhall Community Centre, Bellhouse Lane, Grappenhall. If you come along the A50 from the M6 intersection "you really can't go wrong", it says.

Still in the same general area we have a couple from the Wirral Peninsula. The first one calls itself Wirral and District and is based on the West Kirby Sports Centre, on the second and fourth Wednesdays. In the Panel this one, as the younger club will be "Wirral (West Kirby)".

The older Wirral gang have their place at the Sports Centre, Grange Road West, Birkenhead, on the first and third Wednesdays. For May, we also note May 3/4 is down for an Expedition — details will be more complete by the times this comes to be read.

Malvern Hills is an evocative name to this old scribe, with many childhood memories. The locals get together at a pub called The Star, in Cowleigh Road, North Malvern; and they make a point of welcoming new members or visitors.

The venue for Nottingham is Sherwood Community Centre, Woodthorpe House, Mansfield Road, every Thursday.

Deadlines for "Clubs" for the next three months—

(June issue — April 25th)
July issue — May 30th
August issue — June 27th
September issue — July 25th

Please be sure to note these dates!

The St. John Ambulance Hall, Asfordby Hill, Melton Mowbray is the home of the local lads on the third Fridays. On May 16, G4ASE will be talking about some Aspects of Televison and Sound Broadcasting.

G41LQ has a tame spider which dips its feet in the ink and writes his letters; which left G41LQ with time to enclose a copy of their first newsletter. We think Jenny, G8UZV, has pitched it just about right — we hope it can keep up this sort of level. The formal sessions are on alternate Tuesdays at Aggborough Road Sports and Social Centre, Hoo Road, Kidderminster. Mondays are the "Booze-Up Nights" at Bellmans Cross Inn, Shatterford, which is a couple of miles out towards Bridgnorth, from 9.30 onwards, maybe followed by QSY to the local chinese restaurant.

Quite a while since we saw a newsletter from Stockport, and so the current effort comes as something of a surprise. It is a very fine job indeed, and indicates a very happy thriving club behind it all. G2ARX was the founder member back in 1920, and 60 years on he has been made President. He has seen it grow from that first meeting 60 years ago to become a powerful club with some 160 licensed members.

At Stourbridge May 5 is the Bank Holiday Constructionsal Evening, and May 19 the "main" meeting, the details of which have yet to be settled. All are at Longlands School, Brook Street, Stourbridge.

Cheltenham seems to be going from strength to strength, since the amalgamation. They can be found on the first Thursday and the third Friday in each month, at the Old Bakery, Chester Walk, Clarence Street; this gives May 1 for
Names and Addresses of Club Secretaries reporting in this issue:

DENBY DALE: J. Clegg, G3FOH, 8 Hillside, Leak Hall Lane, Denby Dale, Huddersfield HD8 8QZ (skimantorphe 2390)
DUMFRIES & GALLOWAY: C. Rodgers, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL
MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 2AN (021-422 9787)

ST. HELENS: P. Gaskell, G8PQD, 131 Greenfield Road, St. Helens, Lancs, WA10 4SH (St. Helens 25472)
STOCKPORT: G. R. Phillips, G3FYE, 6 Ross Avenue, Davenport, Stockport. (061-456 7239)
SALTASH: D. Bunce, 47 Hobbs Crescent, Saltash, Cornwall PL12 4JJ (Saltash 2839)

See April issue ‘Panel’ for names and addresses not appearing here.

a talk and demo by Vero Products, and May 16 which is, at the time of writing, still open, but will doubtless be all sorted out by the time you come to read this.

Back to the Liverpool area again, to Ormskirk, where they are to be found on Tuesdays at the Over-60’s Hut, Liverpool Road, Opposite Christ Church. More details from the Hon. Sec. — see Panel.

Nationals

Here our first one must be the Ex-G Club, members of which are in general born in UK and domiciled abroad. They are not only still around but, by the looks of it, bigger and stronger in all directions, largely we believe due to the efforts put in by Reg Cherrill. W3H4O has now by general acclaim been elected President Emeritus of the club as some reward for the enormous amount of work he has put in (and still does, indeed), and the resulting many thousands of hours of pleasure the members have had in their turn. The UK Hon. Sec. is still as always — see Panel for the details.

Now we come to RAIBC, catering for those in our hobby, whether SWL or licenced, male or female, who are either blind or invalid. Of course this implies the need for other, active, sighted, members to lend a hand. In essence, these are the Supporters and the Representatives, the difference in title indicating the degree of help they can find time to give. Details from the Hon. Sec. at the address in the Panel.

Next we come to AMSAT-UK. This is the group of G stations and SWLs with active interest in the Oscar series of amateur radio satellites. Details can be obtained from the Hon. Sec. — see Panel.

Last, but by no means least, on this pile is BATC; if you have an interest in Amateur Television, whether SS/TV, B/W or Colour fast-scan, even 30-line, this is the club for you. Details from the Hon. Sec. at the address in the Panel.

Away West

Plymouth don’t normally write in of late years, but a member detected and rectified the error — good club-member attitude, we think. Apart from the alternate Monday evenings at Whiteleigh Methodist School, we note the Rally is on May 25 at Tamar Secondary School. So we reckon preparations will be in full swing for this by the time you get your issue! Details from the Hon. Sec. — see Panel.

On to Cornish now, where they have a talk for the May session on a Synthesized Homebrew 2-metre Transceiver. This is the first Thursday of the month, as always, at the SWEB Club room, Pool, Camborne.

Hereford’s HQ is at the Civil Defence HQ, Gaol Street, in the County Control, where they foregather on the first and third Friday of each month.

On to North Devon, where they have the Bideford School & Community Centre on the fourth Wednesday in each month; the second Wednesday is taken at Pilton Community College at Barnstaple. Notice this is a change of venue for the Bideford meetings, forced upon them by the rising membership. To find the new place, Bideford School and Community College is in Abbotsham Road, Bideford.

Yeovil still have their room at Hut 101, Houndstone Camp, every Thursday evening, and there is also a club net on 3660 KHz at 1030 clock time. May 15 is down for a demonstration of the club members two-metre gear, and May 15 will be the time to look out for G3MMY — a favourite speaker to judge by the number of times he is asked to appear! — talking about the circuit often known as the Reactance Valve (or FET). Clearly they are getting all FM and with it!

It’s quite a long time since we received a copy of “Tamar Pegasus”, the newsletter of the Saltash group. They are available to be met at the Burraton To H Hall, on the first and third Fridays; the venue is at the junction of Warraton Road and Oaklands Drive. May 2 is down for a talk by the Chief Engineer of the local ILR station, Tim Morgan; and on May 16 weather permitting G8SAL will be out on safari to some local high spot for DX.

Over the water now to IRTS based on Dublin, but having tentacles all over E1. Just before the date this is due to reach you, they will be having their AGM, so the name in the Panel may well be wrong; but we are sure that someone getting in touch will get the information needed with a smile! Likewise, it would seem rather likely that he would have news of the other groups around the Emerald Isle.

In GI, we have news of Lagan Valley who are to be found on the second Monday of every month at the Scout Hall Dromore; a short talk or film or whatever is usually followed by a session with the club station and a natter. Details from the Hon. Sec. — see Panel.

Fridays in North Bristol are taken at a place called S.H.E.7 (Self Help Enterprise), in Braemar Crescent, Northville, Bristol.

Finally in this section we hear from Jersey in the Channel Isles; they are to be found on the second Wednesday of each month at Quennevais Communicare Centre, St. Brelades. More details from the Hon. Sec. — see Panel.

Southern and Eastern

Top of the pile is Ipswich, and reading their newsletter they are still having problems with the venue at Handford.
House, Ranelagh Road, not knowing till they arrive which room they will be allocated or even which building. So we reckon the thing to do is to get in touch with the Hon. Sec. for the current details and maybe a guide! As for dates, on May 14 is a discussion of outdoor events, and May 25 the East Suffolk Wireless Revival, which sound to be quite an interesting “do” at the IACCSSA Sportsground Straight Road, Buckleham. Again, we refer you to the Hon. Sec.

Surrey are to be located on the first and third Wednesdays, at T.S. Terra Nova, 34 The Waldrons, South Croydon. On May 7, G3EUE will be talking about and showing slides of VK6-land (bring all the family for this one), but we do not have details of the other May date. The Hon. Sec. will doubtless know — see Panel.

Mid-Sussex have one of the nicest Newsletter presentations and they have kept it up too, which is unusual: good editing and good printing facilities don’t often seem to go together! To turn to the programme, May 1 is a VHF/ UHF Forum, and on May 15 Reg Moore will be talking about metal Detectors, at the Marie Place F.E. Centre, Burgess Hill, Sussex.

Next Edgware, on the second and fourth Thursdays of each month at Watling Community Centre, 145 Orange Hill Road, Burnt Oak. Thus we have May 8 which is “TBA” at the time of writing, and May 22 when there will be the Construction Cup and an NFF briefing combined.

At Harrow they have a room at Harrow Arts Centre, High Road, Harrow Weald on every Friday. Since they have just had an AGM, we do not have details of the May doings.

Another group who will have just had their AGM when you read this is Stevenage, still in the Senior Staff canteen at British Aerospace Plant B on the first and third Thursday of each month, and no doubt by now the committee will be looking into the question of the programme build-up.

Microphones by G3JIR is the fare on May 17 at Crystal Palace, at Emmanuel Church Hall, Barry Road, SE23.

The Hq of the Reigate gang is at the Upstairs Meeting Room of the Constitutional and Conservative Centre, Warwick Road, Redhill on the third Tuesday. Again we have to pass you on to the Hon. Sec. as the programme detail stops at the end of April with the AGM. He is in the Panel.

Acton Brentford & Chiswick are settled into their new home in Chiswick Town Hall, where on May 20 they will be hearing G3CCD about his visit to 4X4-land.

Cray Valley newsletter is completely taken up this time with the AGM and a few odds and ends, but pp the back page there is the note in its usual place giving the venue, Christchurch Centre, High Street Eltham on the first Thursday. How we wish other newsletter editors would by way of repetition or a red pen, tell us where to find the gen!

Now to Guildford, where the Hon. Sec. always has room for an appropriate comment above the print and marks the date for us. May 9 it is, and the title “100 years of Radio — David Hughes FRS” is a talk to be given by Ralph Barrett, MIEE MIERE, G2FQS. This should be a very interesting talk indeed, on a very interesting subject, and one who has been largely forgotten by posterity.

It is the Adult Education Centre, Monson Road Tunbridge Wells for the West Kent gang for the formals, and the Emmanuel Church Hall Victoria Road for the informals. For and the Emmanuel Church Hall Victoria Road for the informals. For and the Emmanuel Church Hall Victoria Road for the informals. For and the Emmanuel Church Hall Victoria Road for the informals. For and the Emmanuel Church Hall Victoria Road for the informals.

Eton does not have a formal or informal until May 23rd. Looking at the list here, we have a wee feeling of doubt, so if you’ve never been before we suggest a quick contact with the Hon. Sec. for confirmation.

Eric Mollart is a name to conjure with in the D/F Hunt game over the past twenty years or more; so he has been asked to tell all his secrets to Verulam on May 22, at the Jubilee Centre, Catherine Street, St. Albans. A sure sign that summer’s along is that the informal on the second Thursday of the month is transferred to Salisbury Hall, London Colney. Visitors welcome, but for either meeting please first check with the Hon. Sec. — see Panel.

Now for one which should really make people think — G6NR on the vexed topic of “How to work DX from a Ground Floor Flat”, or simply “Backyard Aerials!” This one is for East London RSGB group.

At Farnborough the group meet at the Railway Enthusiasts Club, Access Road, off Hawley Lane, near the M3 bridge. The club keep details in the Aldershot and Farnborough public libraries, or you can get it from the Hon. Sec.

Down to the South Coast to Bournemouth — one of those areas which fall on the borderlines when we try to do the piece by areas. The venue is normally the Dolphin Hotel, Holdenhurst Road, but it would seem as though there is a possible VHF D/F Night or a Natter Night, probably a question of the weather-man. A check may be made with the Hon. Sec. anyway — see Panel.

The YLs have it at Burnham Beeches, at least as to the position of Hon. Sec.; this group foregather at the St. John Ambulance Service Hq, Slough, on the first Thursday of each month.

Sign-Off

We’re off to work the DX — may you have a better month at it than your scribe! Arrival deadlines are in the ‘box’ in the body of the piece, with all letters addressed to “Club Secretary”, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.
COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

WE have quite a nice pack of mail to go through this month. Firstly, and a great pleasure, was to hear from G3UZ (St. Mary's, Isles of Scilly) that although he has been transferred, and by the time this reaches you will be finding his way about his new empire of Round Island lighthouse, he will still spend his short-time periods on St. Mary's. Older readers will no doubt recall the days, years ago, when he was GW3UZ and well on the way to making WAS on Top Band, with the help of a lighthouse a quarter-wave high as a mast, some radials out, and the whole caboodle a half-wave above salt water in the general direction of USA. One wonders what problems may be encountered on Round Island for amateur radio activity as this one, on the most northerly tip of the Scillies group, not only flashes a rather powerful red light (!) but also has the QRO RDF beacon on 308 KHz; but it may be assumed that G3UZ will try his hardest for some operation, as well as some Top Band operation which has not been really practical since Nash Point. On a different tack, "Andy the Lamp" as he was universally known when he was a GW, has now another lighthouse keeper colleague, on Portland Bill light, and his call is ... G8UZU! They are, it is believed, the only two lighthouse keepers on the air, although there are some others in the Trinity House set up who appear from time to time.

Another one who has been silent for some time is G3RKC, now based on Felixstowe in retirement. Bill and N8RT are involved with the Kenwood (Triio) International Users Club; there will be an informal gathering on the air monthly, and a newsletter which will be monthly except August and September (i.e. 10 issues a year), and the object of the club will be to enhance the effectiveness of user's equipment. G3RKC will be pleased to send details of the club to UK enquirers enclosing an s.a.e. for the reply; or one can write direct to N8RT, or look in on 14230 plus-or-minus 5 KHz at 2000z on Sundays. G3RKC is at 20 Shilmire Court, Felixstowe, Suffolk IP11 9SN; but don't forget that Bill is retired and heavy postages could be a burden, so enclose that s.a.e.!

Ten Metres

G3NOF (Yeovil) had his usual regular outings on the band, and noted its first beginnings of change into Summer conditions, with days when no North Americans were heard. The band has opened around 0700 to 0800 on some paths around 100 to 1400, with SE Asia also heard at the time. North Americans have been heard from 1100 to as late as 2300, with some unusual openings, around 2245 to 0100, and at 1900 there have been openings to KL, ZL, KH6. There has been little from Africa and nothing from the Pacific. Thus the SSB QSOs noted were with AI4XGC, F67AV, H311R, H61XQL, HL9KE, HI4XK, JA4YFH, J66AUH, JF1EEK, JH3HBF, JH6QJ, K0CL (Colorado), K0RF in the same State, KB5SF in New Mexico, KB7CQ in Idaho, KB7CR in Washington, KB7DB, KL7Y, N7ACG all in Washington, N7AOS in Idaho, N7BGH in Arizona, P179YF, VE4CQ, VE4KX, VE6RA, VE6WQ, VE7BGW, VE7CC, VE7SK, VE6AKA, V05RIT, V5SWJ, W7AVD, WV7KT, and WB7CFL all in Montana; WB7FRO in Oregon; WB7MBW, WA7VK1 and WB7NCD all in Arizona, WB7TYF in Nevada, 3B7CF, and 3Z4YV.

G4HZW (Knutsford) continues to be a 28 MHz-only man, with about 20 watts out of a Yaesu FT-75 into a two-element Quad for 28 MHz. On March 5 at 1900 WB7PYA in Oregon was worked, while a few minutes later K7BFI/M was worked, crossing the state border between Utah and Idaho during the QSO. The following day started at around 1819 with VE1ACC, and at 0000 there was the disaster of the day when ZK1AC resisted Tony's blandishments; but WB8JQR was worked and almost on the dot of nine there was HH2JL. March 5 was a bit boring with just K6TLL and 6Y5YM, while March 8 gave VP2VEJ, OX3OZ, VE3EV/W4/P, W4JCK, K62XJ, KB5DK, and N4NX. March 9 was memorable for KH6IBA coming back to a CQ call; W5VJQ, WB7VVV, the latter in Oregon. Just before setting off to work on 10th, HM1QD was RS59+ and giving Tony 58; coming home for tea and sympathy the rig gave the latter in the way of N8BQE, W1VZV, K6DO, KL8Z/P2, KA1CCX, W7J1I in Arizona, and at bedtime it was W8GZL. On the evening of the 11th W9NFW/P7 (Montana) set the ball rolling, and WICUW, KA7FE, K12BUY, K18UFN led up to the VP8SB on Adelaide Island at 2107, and finally W8NQR running eight watts to a three-element Yagi at 2237. On 12th there were East Coast Ws, and on 13th a KL7Y in Alaska (rare to find a KL7 in Alaska thanks to the muddled callsign policy of the Americans), WB7VLM, VE5BHU who was using a '10IE to a dipole, and three East Coast Ws. The lack of ZL caused a morning off from work to attack the problem on 14th. The result was H44WH for starters, then ZL1AFM heard at 58, and dropping down to 53 over the next 45 minutes while telling someone about the cars he had owned; when Tony did get a chance to call he got a report of 4 and 2. In the evening, among the East Coast Ws there suddenly appeared a twenty-minute opening to South America which gave a QSO with LL8EKC. If we pass over the next few days we come to 18th, on the evening of which a brace of KH6s were worked, the first one, KH6CF commenting that the quad elements must be gold plated! On the Saturday of the CQ WW DX Phone contest, from 1830 onwards, in order, G4HZW worked VE7CC, VE7DET, H311R, VE4XK, W0SF, VE6WQ, K0RF, K6DYE; KN0KCW, AC6V, AKOA, A16V, LU7KAT, VK7K on the long path, VP2VGB, FM7AV, VK3VDP, and VK1FT. The next morning the contest was swinging along with VK6UL, WH7JG, through to 1T9GA1 at tea-time, after which the band wasn't playing E-W.
any more; and no Ws were noted on 29th either. However, even with the onset of summer band conditions, all is not completely lost! For April, Tony is going to GM and taking a rig, but primarily for bird-watching.

Another Ten-metre specialist is G2ADZ (Chessington); despite tiredness he still copes and works the odd one or two on CW, for example J7DBB, TU2GA, VU2LHO, VP1HE, 8P6MQ, J28CC, VP2KAH, VP2BFV, VP2AJ, 9Q5VT, 6Y5YM, FK8BT, a brace of 4S7s within an hour — never having worked one before! PJ9UQ and W2BBK/PJ7 who was nearly missed included VP1SWC, WD5DIZ/SNO, VP2VEG, HM1DC, and HL9TW. Having now encircled China with contacts, Bill is most definitely hoping that there will be a BY contact to be had before long.

G2HLU (Reading) has many interests other than radio, and so his main activity is in contests such as BERM and ARRRL; but conditions have been so good that Harold had made time of an evening for about 20 minutes and has been pleasantly surprised at the odd plumb to be picked off. If one disregards the run-of-the-mill stuff like VK67W and 4S7 — not that they aren’t appreciated, he hastens to add! — the plums that were tastiest were, on Ten, FR7BP and VP2VG on CW. Then came the CQ WW WPX Contest on SSB, during which the band added CX9CO, FG0DYM/F57, H16XQL, HP11XX, H3ILR, PJ3CC, VE1-7, VP2VGB and 4A2MX.

The usual amusing comment appears in the log from G3CED/3VFA; this session has involved operating with 100 watts, which for George is most unusual — he explains it as necessary, testing out some QRO ATU jobs, for the QRM generators!

The other one we liked was hidden up in a corner and refers to T1FM in Istanbul, who was left to the wolves because he “couldn’t see the end of the queue!” Apart from the Europeans, one notes UA9, lots of Ws in all the call areas save W5, worked with the 2-watts. A particularly pleasant QSO with WD9EJE elicited the fact that Al was 13 years of age, and running 200 watts into a 3-element beam — operating as George put it “like an old-timer.”

Now we have G4BUE (Upper Beeding) to bring us up to date not only with his own doing but also that of the G-QRP Club. To deal with the latter, the G2NJ Trophy has gone to GM30XX for an entry of QRP contacts on all bands 1.8-144 MHz, at levels varying between 2 watts and a few milliwatts and all home-brew gear to a dipole, the total country score being 94 in the year. GM30XX had the first QRP Masters award, G4BUE himself has the second; the third goes to G3DNF, the club chairman — 75 countries worked endorsement, sixty members endorsement, and two-way QRP with 20 countries. Chris himself is still struggling for the 200 countries on QRP, having now got to 194C with five watts or less. It is an interesting comparison to add the QRO countries band by band and the same for QRP; the ratio is 940 to 501 — but the interesting thing is that the QRO total has taken 7 years but the QRP total has been collected in half the time. G4BUE also has the Milliwatt DXCC Trophy Number 3, for 100 countries confirmed with less than one watt output power. Chris in fact used 1 watt input power as his criterion as being easier to measure (and giving a bit more handcap!). During the month five watts input SSB yielded on Ten: KL7Y, C6ACY, VP2ML, T2NWC, 9Gl1JX, VP8PP, PJ2CC, YV2IF, H31LR, HP11XRK, VP2VGB, YV5USB, HK4LRL, YS1GMY, Hl6XQL, XE2MX, 4U1UN, VK7GK on the long path at 2150z, FM7AV, VK3VDp also long-path at 2292z, VK6UL, H19KE, VU2DPK, A22DW, and KO6EA/AM high over Southern France. Turning to CW the same band yielded A22DW, 6Y5YM, VP2A, KL7PJ, and K9EF/8R1.

When your scribe looked at the next letter on the pile the immediate reaction was “Crikey!” — it is so long since G3ZPF reported in, although he was a ‘regular’ for Justin Cooper. David has been playing with an APPLE, and two other chaps in the club have them too; they would like to hear from anyone else who has an interest in making use of the microcomputer for Amateur Radio purposes. G3ZPF on the operating side is clearing up the last few for 5BDXXC, SSB on all bands except 80 where it is CW to avoid the antics at the other end of the band. To return to the APPLE, David has a programme with which, if one keys in the desired latitude and longitude one gets an indication as to whether or not there is a path on a particular band. It has already eaten some 16K bits of memory, so that to persuade it to accept three-hundred odd DX Prefixes and give a read-out of all the ones to which a path is available on a given day would need some more. David is interested in meeting up with anyone else who has embodied the micro into his rig, insofar as he has a yen to make the VDU operate as a silent RTTY rig. Changing tack a bit, G3ZPF reckons that 5BDXXC is no great sweat if you look at it intelligently: draw a circle of radius to make the Caribbean centred on London, and then do the same but centred on Chicago, and on realises that in G-land we have a considerable advantage geographically with the

We apologise for the late publication of this issue of “Short Wave Magazine” which is due to industrial action by the National Graphical Association, and we regret that the June issue is likely to be delayed also.
Top Band

When first your conductor took over this piece as a very raw substitute for G6QB, the vast majority of amateurs held their communication, at least in TV hours, on Top Band: and many and wondrous were the topics of conversation. Then along came ‘Pye surplus’ which converted to two metres, and the VHF swing was on the way — the modern, shiny, expensive black box being the next step along the line to the shack ceasing to be a retreat for thought and meditation as well as for operating, and fell to being a little case alongside the OM’s chair in front of the radiator. But, there have always been those among us who retained the ability to enjoy the odd quirks of the band, and there is some evidence of a swing back to it. G3YY (Brighton) just missed the deadline last time when he wrote to say that from our Russian contemporary he noted that a new call-sign series, E21-E20 with three-letter suffixes, would be allocated to Russian novices on Top Band. No start date given.

We have already mentioned Round Island, and G3UZ, and he may be a focal point of the revival if he can manage to co-exist with that RDF beacon, and get the Top Band CW rig fired up. It is a double problem of course, in that he has not only to cope with the QRO machine on his rig, but also the polar diagram of RI’s aerial — since the beast is quoted in Reed’s as having a day range of 200 miles!

G2HKU worked SSB with DK3FB, YU3EF, and PA0PN, plus keying out to OK1DWF and OZ1W — the latter a genuine call, whom Ted has met several times and who has returned to 160 after some 30 years away.

GM4DMK (Jedburgh) reckons to be the only radio station in The Borders; he has been QRT for quite a while, and since then has been getting his station into some sort of order. His aerial is about 100 feet long at 20 feet, pieced out by vertical end-sections and loading coils to persuade it to look a bit like a half-wave; Graham says openly that he is a bit baffled as to how the darn thing works! GM4DMK reckons that the chaps who say there isn’t much activity on the band don’t listen much, as he hears quite a few inter-G nets spaced up and down the band, and at the time of writing there was a ZB2/MM calling. SSB QSOs are noted with PA0H1P, YU3EF, DL9MN, DF1OW, RZ2ABT, and W3HNN/MM, plus CW with UA6AUZ, R5B5BH, UB5EAQ, UA3FZ, UC2AAK, RQ2GCR, EZ1NAA, RT5AB, HB9NL, OK1DWF, OL8CMY, OE1KX, PA2REC, DJ4MJ, W3HNN/MM, K2GNC, W1BB, W1PL, K2BQ, N41N, WAIKXE, VE1BVL, and 50NOK which was said to be an expedition to Reef Island near Cyprus.

We have always said there is room for simple gear on the bands, but timed to arrive in the mail on April 1 we had a letter from T. R. Purnell, Flat 10, 28/30 Elphinstone Road, Southsea, with the call G4W7Z attached, indicating that his idea of Top Band gear is a clamp-modulated 6V6 driven by a TTL crystal calibrator or a Top Band crystal, to choose, with the receiver as a modified version of the ‘Athenian’, April 1965 vintage, with the BFO removed and a more sensitive IF amplifier fitted. Well, well! About all we can say to that is that if he gets it on the air, just about every local for miles around will be looking for him, with a hammer for the rig and a cowl for the op! Seriously, one feels that if one wants to run AM, at least it should be done with a rig that would have a chance of sounding reasonable — just think of 100 kHz marker pipes clamped-modulated with nothing between the TTL and the PA grid. To adequately drive the PA, one would need a super TTL and a band-pass filter to get, and keep, the volts to the right shape and level, let alone using a ‘scope to set it up for every QSO. Thinking back, about the only chaps we ever knew who had a decent signal from a clamp system was G2FTK in Coventry, over 20 years ago.

Eighty

Now please, dear readers, don’t foam at the mouth — it is a band for amateurs after all. One has to admit that a quick spin up the dial rather bears out the truth of Mr. Phineas T. Barnum’s dictum that there’s a sucker born every minute; but, on the other hand, lots of these groups are composed of operators who have bought their first receiver after the arrival of the first licence — which, when compared with the Russian system of making operators first and then giving them licences, makes our system look a bit daft. But, if they have fun, and they don’t interfere with the 10 kHz at each end of the band, the DX fraternity can disregard the worst of what remains.

Let G2NJ (Peterborough) go in first this time; Nick is addicted to QRP on the one hand and oddities on the other, during the daytime when the band is relatively sane. He found a potent signal coming from LU2AAW/MM, who was operating from near Rotterdam in the early afternoons and late at night. Another one was with LA3JU at midnight giving name as Geir, QTH North Sea, and working on a drilling barge in calm sea. That one, in view of the events on the Norwegian Ekofisk field since, gives a feeling of wondering. On the QRP side another midnight QSO was with SM7YG, who said he started with QRP originally back in 1926. Among the portables, one always notes G2CAS, but G2NJ says that the weather has been too awful for even G2CAS to be interested in /P.

G3ROO (Dover) has been looking at things after a year’s operating. The FT-7 has been kept in the car, and the home rig has been an FRG-7 with a small PA running 400 milliwatts on Ten to 1 watt on Top Band. An interesting effort was the matter of VO1FG on Eighty one night around 2100; he was called with the FT-7 but wouldn’t bite, but G3CON came back for a chat. The cross-mod on the FT-7 was a bit much, so a change was made to the FRG-7 so as to have the use of the attenuator. A couple of minutes later VO1FG called in, gave a 53 report, and they ended up with a three-way contact solid for some twenty minutes! The measured power output during this was some 750 milliwatts. At this sort of power level Ian
has made 485 contacts in 37 countries, including 25 JAs, 19 VKs, 1ZL, 31 Ws, and a brace of PYs.

G3ZPF has enough for his SBDXCC on all the other bands and has some 55 up on Eighty, on which band CW is the only mode. As he says, he's never had a beam, or an aerial above the ridge of the house, which at least ought to give the mob who bleat about "good aerials" something to think around. On the other hand of course, David had a long apprenticeship as an SWL which normally is a certain warranty of a savvy operator.

QRP Eighty CW for G4BUE resulted in QSOs with G3YNA, G3HQQ, Z3LA, G3DNF, G3RV, G2HLL, G3ZWH, OK2BMA, HB9PR, G3LRW, G3NJ, G4GFK, G6AB, G3RYP, G4II, PA3AFJ, and G3VFA.

G4BUE stuck to the QRP on 7 MHz, and found time to work G4DQP, G3HQQ, G3KSU, GM3OXX/A, G3LVZ, G3VTT, DK5FD, OZ1GHOQ, G3RYP, all around the QRP frequency of 7030 kHz.

14 & 21 MHz

We have to lump these together if only because of the space commitment, although most people seem to have spent most time on Ten anyway. Which reminds of the G4ITL (Harlow) activities. The aerial has, as predicted, grown into a tri-band dipole, but meanwhile he had the odd QSO with a TV set and a hi-fi. It might be instructive for others so fixed (and who isn't?) to indicate some of the effects. The first one was to remove the shack signal earth altogether; this cleaned up a large proportion of the trouble instantly, largely we suspect because it just was not possible to get the earth connection for the shack near enough to the rising pipe. The second point concerned the fact that the shack is at the front of the house while the aerial is hidden away at the back, the feeder being routed through the loft. Simply by tying it up to the beams — and hence separating it from close proximity to other pipes and wiring — seems to have done more still. And between all this, the last continents has now been collected up and the cards are awaited.

G2HKU indicates three distinct and definite phases to its activity; the usual QRO rig skeds with ZL1VN, ZL3RS, ZL3SE, and ZL3FV on SSB, and VE2DFY, JA2EIV, N6EA, JA8CU, ZL1AXM, and VE5RQ. The QRP from the HW-8 reached out to WOUBT (Minn.), IT9WEY, UB2RHJ, UB5BBM and OH2KF on CW, of course, all the above being 14 MHz. 21 MHz gave the HW-8 CT4CH who was using 4 watts, OH3BB/1, WB0WZX (Kansas), and OH8VG.

Now we look to the log pages of G3CED/G3VFA, which, like almost all the others is in the main a 28 MHz offering. However George does mention the odd QSO on the bands: 21 MHz first and a collection of East Coast Ws and Europeans; and a revealing comment on the antics of someone near his QSO with OH9SW "Super-Lid on QRG." One Sunday morning George just sat in the shack with the QRO rig simmering on 14048 kHz, and snaffled everything that came up on the receiver frequency. Between the 0930 start and a late lunch seven stations were worked, one of them a 45-minute CW ragchew.

G2HLU looked at 21 MHz CW and found EA9AQ, EC5AA, who said QSL via EA5ACA, PP0MAG, and V9Q7R; 14 MHz gave TA2HJ and 5W1BZ.

SSB first for G4BUE, and HV3SJ, VP2MGQ, HDOE, TFI3RA, TG9GI who was also running QRP, LUSHDJ, VK9XT, 5TSCJ, VKs, EL2AV, and VP8PP, all 21 MHz SSB; CW on 21 MHz came up with KP4DJ who was running two watts to an 'Argonaut', A7XE and PP0MAG; but 14 MHz was used for just one solitary contact, namely the SSB one with KH6XX.

Next we have the monthly analysis from G3NOF (Yevoli); Don reckons 21 MHz has not been as good as Ten, by and large. From 0630-0930 the long path to VK has often been open, with the short path opening at around 1000 to VK and JA. North America from 1100 to midnight; KL5s were S9 at 0900, but little was heard from Africa and nothing from the Pacific. So... SSB QSOs with A4XIU, A7XD, AL7H, AP2MQ, G6ACY, HP1XRR, JA6OKB, OH3JR/OH0, OX3HA, VE7WJ, VK2TG, VK3VIL, VK3XP, VP2MGQ, VP2SAB, W7SA, W7ZT, WA0CFY, WL7AAN and 8Q7AR. Turning to 14 MHz, this band has been opening in the mornings from 0600 to VK, W6-7, and the Pacific; resulting in SSB QSOs with K7SE/PJ5, P29JUS, T2CF, VKOKC, and WA0QBN in N. Dakota. This does raise one rather interesting question, which is the absence of the Pacific stations from 21 and 28 MHz.

Finale

As usual, the deadlines are in the 'box' in the body of the piece; they give the dates to arrive, and the address is "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Now for those darned aerials!
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<td>7072</td>
<td>Hand microphone for TR-4CW</td>
<td>£18.40</td>
</tr>
<tr>
<td>7073</td>
<td>Hand microphone for TR-7</td>
<td>£18.40</td>
</tr>
<tr>
<td>7077</td>
<td>Desk microphone for TR-7</td>
<td>£25.30</td>
</tr>
<tr>
<td>DL-300</td>
<td>Dummy Load, 300 watts</td>
<td>£20.70</td>
</tr>
<tr>
<td>DL-1000</td>
<td>Dummy Load, 1000 watts</td>
<td>£20.70</td>
</tr>
<tr>
<td>RC-5</td>
<td>Remote Control antenna switch, 5 way</td>
<td>£62.90</td>
</tr>
<tr>
<td>B-1000</td>
<td>Balun 4:1 for MN-7 &amp; MN-2700</td>
<td>£20.70</td>
</tr>
<tr>
<td>1625-EM</td>
<td>Encoder microphone</td>
<td>£36.80</td>
</tr>
<tr>
<td>AA-10</td>
<td>2in. Amplifier 1.5W 0.5V output</td>
<td>£69.00</td>
</tr>
<tr>
<td>WV-4</td>
<td>RF Wattmeter 20-200 MHz</td>
<td>£460.00</td>
</tr>
<tr>
<td>SFR-4</td>
<td>Programmable general purpose receiver</td>
<td>£460.00</td>
</tr>
<tr>
<td>DC-PC</td>
<td>DC Power cord for SFR-4</td>
<td>£4.44</td>
</tr>
<tr>
<td>FL-Filter</td>
<td>Filter R-4C, 25 kHz, 50 kHz, 6 kHz, each.</td>
<td>£39.10</td>
</tr>
<tr>
<td>Manuals</td>
<td>Spare operator manuals</td>
<td>£6.00</td>
</tr>
<tr>
<td>Crystals</td>
<td>Accessory crystals for R-4C &amp; SFR-4</td>
<td>£6.44</td>
</tr>
</tbody>
</table>

**Carriage Extra All Items**

**Barclaycard**

**Radio Shack Ltd.**

Qiro Account No. 587 7151  Telephone: 01-624 7174  Cables: Radio Shack, NW6  Telex: 23718
ICOM IC-260E
The One With the Full 7 Digit Display and Guaranteed Finals

Enjoy VHF mobile at its best. Sideband FM or CW, the ICOM IC-260E does it all. The ICOM IC-260E contains all the features a mobile operator would want in a compact 2 metre mobile package with FM, SSB, CW operation. Features customers ask for most, including:

- 3 memories built in (quick access to your favourite frequencies)
- Memory scan — automatically stops on an active frequency programmed in the memories
- Programmable band scan — scan the whole band or any portion of it you desire (adjustable scanning speed)

- Squelch on SSB the 260E will automatically and silently scan the SSB portion of the band seeking out the SSB activity on 2
- 600 KHz repeater offset built in. Easy repeater operation on the FM portion of the band.
- Variable repeater split — with the 2 built in VFOs it's possible to work the odd splits plus accommodate future repeater band changes.
- Multimode operation — USB, LSB, CW and FM, great for getting into OSCAR plus enjoying SSB rag chewing as well as repeater operation.
- With optional 240/12V supply, the 260E makes a flexible functional base for SSB/OSCAR/FM operation.

The RF amplifier and first mixer circuits using FETs and other circuits provide excellent Cross Modulation and intermodulation characteristics. The IC260E has excellent sensitivity demanded especially for mobile operation, high stability, and with crystal filters having high shape factors, exceptional selectivity.

The transmitter uses a balanced mixer in a single conversion system a band-pass filter and a high performance low-pass filter. This system provides distortion free signals with a minimum spurious radiation level.

THANET
Phone — or put a message on the ansafone for further details
ALSO AVAILABLE FROM OUR SHOP IN HERNE BAY
MICROWAVE MODULES WESTERN ANTENNA SPECIALISTS J-BEAM
STANDARD BEARCAT GWI WIP YAESU MUSEN RSGB PUBLICATIONS
HP AND PART EXCHANGE WELCOMED
1296 MHz LINEAR TRANSVERTER: MMT 1296/144

**GENERAL**

- Frequency coverage: 1296-1298 MHz
- Input frequency range: 144-146 MHz
- DC power requirements: 13.8 V at 0.5 A
- RF connectors: 'N' type antenna socket, all others 50 ohm BNC
- Power connector: 5 pin DIN socket
- Size: 187 x 120 x 106 mm (7.4 x 4.7 x 4.1)
- Weight: 1.8 Kg (4 lb.)

**LOCAL OSCILLATOR**

- Local oscillator frequency: 96 MHz
- Maximum error at 1296 MHz: ±6 KHz

**SPECIFICATION**

**TRANSMIT SECTION**

- Input impedance: 50 Ohm
- Input modes: SSB, FM, AM or CW
- Input required for full output: 5-500 mW or 10 watts with supplied 15dB attenuator
- Power output: 1.3 watts continuous rating
- Output impedance: 50 ohm
- Level of spurious outputs: Better than -40 dB

**RECEIVE SECTION**

- Overall converter gain: 25dB typical
- Noise figure: 2.9dB maximum
- Input impedance: 50 ohm
- IF output impedance: 50 ohm

**DESCRIPTION**

This 1296 MHz solid-state linear transverter, MMT 1296/144 is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability at 1296 MHz. The inclusion of an RF vox network minimises the necessary connections to the drive source, and will automatically switch the transverter into the transmit mode when 144 MHz drive is applied. The transverter incorporates two main sections: (1) MMK 1296/144, low noise receive converter incorporating MMA 1296 low-noise preamplifier, and (2) a low distortion transmit converter and power amplifier module. This modular construction technique ensures excellent electrical and mechanical stability, and the unit is ideal for all types of communication, particularly where a high degree of stability, sensitivity and linearity are of prime importance. The transverter is enclosed in a dual compartment case, and all circuitry is constructed on high quality glass-fibre printed circuit board, with the exception of the preamplifier which is constructed on TEFiON PCB. The high power linear amplifier stage is housed in a separate internal compartment.

**Price** £159.85 inc. VAT

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.

ALL MICROWAVE MODULES PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS

MICROWAVE MODULES
BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND
Tel: 051-523 4011 Telex 628608 Micro G
S18 and S19 are now added to our stock range.

| OUTPUT FREQUENCY | 6MHz-TX-145.25/26 | 8MHz-TX-145.12/17 | 10MHz-TX-144.95/16 | 12MHz-TX-144.72/15 | 14MHz-TX-144.49/14 | 16MHz-TX-144.26/13 | 18MHz-TX-144.03/12 | 20MHz-TX-143.80/11 | 22MHz-TX-143.56/10 | 25MHz-TX-143.32/9 | 28MHz-TX-143.08/8 | 30MHz-TX-142.84/7 | 32MHz-TX-142.60/6 | 35MHz-TX-142.36/5 | 40MHz-TX-142.12/4 | 45MHz-TX-141.88/3 | 50MHz-TX-141.64/2 |
|------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| CRYSTAL FREQUENCY RANGE | USE (Tx or Rx) and HOLDER | 144.4 (433.2) | 144.800 | 144.850 | 145.000/ROT | 145.025/R1T | 145.050/R2T | 145.075/R3T | 145.100/R4T | 145.125/R5T | 145.150/R6T | 145.200/R7T | 145.250/R8T | 145.300/R9T | 145.350/R10T | 145.400/R11T | 145.450/R12T |

PRICES: (a) £1.95; (b) £2.32; (c) £2.80; (d) £3.94.

AVAILABILITY: (a), (b), (c) stock items normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could be able to supply from stock. N.B. Frequencies as listed above but in alternative holders and/or non stock loads are available at the above price. ORDERING: When ordering please quote (1) Channel; (2) Crystal frequency; (3) Holder; (4) Circuit conditions (load in pF). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

JAPANESE AND AMERICAN EQUIPMENT

We can supply crystals for Yaesu FT2/FT2 Auto, FT224, most of the ICOM range and the ICIKENTWOOD range. We can also supply from stock crystals for the HEALTHKII HW202 and HW17A.

CRYS TAL MANUFACTURED TO YOUR SPECIFIC REQUIREMENTS

Prices shown are for one-off to our amateur spec., closer tolerances are available, please send us details of your requirements.

A Low frequency fundamentals in HC13/U or HC6/U

<table>
<thead>
<tr>
<th>Adj. tol. ±50 ppm. Temp. tol. ±100 ppm 0 to +70°C</th>
<th>60 to 999.99 kHz</th>
<th>£28.12 (£31.63)</th>
<th>80 to 999.99 kHz</th>
<th>£37.30 (£43.21)</th>
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<td>£37.30 (£43.21)</td>
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<tr>
<td>20 to 999.99 kHz</td>
<td>£17.75 (£19.97)</td>
<td>100 to 999.99 kHz</td>
<td>£6.68 (£7.51)</td>
<td></td>
</tr>
<tr>
<td>50 to 999.99 kHz</td>
<td>£15.51 (£17.45)</td>
<td>150 to 999.99 kHz</td>
<td>£4.20 (£4.97)</td>
<td></td>
</tr>
<tr>
<td>100 to 999.99 kHz</td>
<td>£12.41 (£14.39)</td>
<td>500 to 999.99 kHz</td>
<td>£7.30 (£8.21)</td>
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<tr>
<td>£4.64</td>
<td>£5.61</td>
<td>£6.88</td>
<td>£7.56</td>
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</tr>
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</table>

B High frequency fundamentals/or overtones in HC6/U, HC18/U or HC25/U

<table>
<thead>
<tr>
<th>Adj. tol. ±50 ppm. Temp. tol. ±100 ppm 0 to +70°C</th>
<th>60 to 999.99 kHz</th>
<th>£28.12 (£31.63)</th>
<th>80 to 999.99 kHz</th>
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<td>£7.30 (£8.21)</td>
<td></td>
</tr>
<tr>
<td>£4.64</td>
<td>£5.61</td>
<td>£6.88</td>
<td>£7.56</td>
<td></td>
</tr>
</tbody>
</table>

Delivery * Normally 4/6 weeks (express available), all other frequencies 8/10 weeks. Holders: Low frequencies HC13/U or HC6/U dependent on frequency. High frequencies are available in HC6/U, HC18/U or HC25/U unless marked * only available in HC6/U or ** only available in HC18/U and HC25/U, HC17/U (replacement for FT243) and HC33/C (wire end HC6/U available as per HC6/U above in 25°/25° over £10.56). Unless otherwise specified, fundamentals will be supplied to 30p circuit conditions and overtones to series resonance.
H. F. RECEIVERS

R1000
It is some time since a brand new design has appeared in the amateur general coverage receiver field, and the new R1000 certainly makes the wait worthwhile.

We won't use space listing all the features and performance figures available from this fabulous little receiver - you can read these in several adverts in this magazine. Suffice to say that we try lots of different receivers, and the R1000 performs better all round than every other in its price range.

V. H. F. MONITOR RECEIVER

Have you ever wanted a VHF receiver that will cover all bands with facilities such as scanning, lockout of unwanted signals, programmable memories, priority channel checking etc etc etc?

Well, now there is a set on the market that will do all this and much more. The BEARCAT 320 covers 4 MHz, 2 MHz, aircraft band, marine band and 70cm amongst other frequency bands. It has to 20 memories which can be programmed from a front keyboard. These can be scanned or locked out from scan as required, and any of them can be set to any frequency in the set's coverage. Normal mode is FM, switching to AM for the aircraft band. It is also possible to search entire bands or frequency segments between selected upper and lower limits.

2 METRE HANDHELD TRANSCEIVERS

ALSO IN STOCK
FDK Palm 202 6 channel.......................... £99.00
FDK Palm 202 6 channel..................... £119.00
YAESU FT202R synthesized..................... £149.00
YAESU FT202R synthesized + keypad........ £199.00
TRIO TR2400 synthesised + keypad........... £210.00

TRIO TR2300
IDEAL FOR PORTABLE, MOBILE OR HOME USE
£166 Inc. VAT & Carriage

A fully synthesised 25kHz spaced rig offering full band coverage, digital readout of frequency and auto tone burst. The excellent 1 watt transmitter and very sensitive receiver make this rig excel at any environment. Well, now there is a set on the market that will do all this and much more. The BEARCAT 320 covers 4 MHz, 2 MHz, aircraft band, marine band and 70cm amongst other frequency bands. It has to 20 memories which can be programmed from a front keyboard. These can be scanned or locked out from scan as required, and any of them can be set to any frequency in the set's coverage. Normal mode is FM, switching to AM for the aircraft band. It is also possible to search entire bands or frequency segments between selected upper and lower limits.

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ALL PRICES INCLUDE VAT and CARRIDGE

YAESU 7455 Headphones.......................... £10.00 (75p p&p)
YAESU World Clock Qtr 24........................ £18.40 (75p p&p)
RINGO RANGE Vert. Antenna VHF.............. £25.00 (75p p&p)

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<table>
<thead>
<tr>
<th>Price and Delivery</th>
<th>Adjustment Tolerance</th>
<th>Frequency Ranges</th>
<th>Price Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td></td>
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</tbody>
</table>

**Fundamentals**
- 1 200 (total) 10 to 19.999 kHz £23.00
- 2 200 (total) 20 to 29.999 kHz £19.50
- 3 200 (total) 30 to 59.999 kHz £16.50
- 4 200 (total) 100 to 999.999 kHz £10.50
- 5 1.00 to 1.499 MHz £9.00 £6.00
- 6 1.50 to 1.999 MHz £4.75 £4.20
- 7 2.00 to 2.999 MHz £4.75 £4.00
- 8 3.00 to 9.999 MHz £4.75 £3.60
- 9 10 to 29.999 MHz £6.00 £5.40
- 10 30 to 99.999 MHz £6.00 £5.40
- 11 100 kHz to 170 kHz £6.00 £4.40
- 12 171 kHz to 225 kHz £6.00 £4.40
- 13 225 kHz £6.00 £4.40

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| Price £1.83 for one crystal £1.74/crystal when two or more purchased |
|------------------------|------------------------|
| 30pF TX | 30pF TX | 40pF TX | 20pF TX | 20pF TX |
| R0 | 4.0277 | 8.0555 | 12.0833 | 4.9888 | 8.1250 | 44.9666 |
| R1 | 4.0264 | 8.0569 | 12.0854 | 4.9916 | 8.1281 | 44.9750 |
| R2 | 4.0291 | 8.0738 | 12.0851 | 5.0134 | 8.1312 | 44.9833 |
| R3 | 4.0298 | 8.0967 | 12.0956 | 5.0364 | 8.1343 | 44.9916 |
| R4 | 4.0305 | 8.0611 | 12.0916 | 15.0000 | 8.1375 | 45.0000 |
| R5 | 4.0312 | 8.0259 | 12.0527 | 15.0000 | 8.1406 | 45.0095 |
| R6 | 4.0319 | 8.0339 | 12.0565 | 15.0000 | 8.1437 | 45.0186 |
| R7 | 4.0326 | 8.0652 | 12.0979 | 15.0000 | 8.1468 | 45.0250 |
| R8 | 4.0326 | 8.0652 | 12.1000 | 15.0000 | 8.1499 | 45.0333 |
| R9 | 4.0326 | 8.0652 | 12.1020 | 15.0000 | 8.1511 | 45.0416 |
| R10 | 4.0326 | 8.0652 | 12.1041 | 15.0000 | 8.1532 |

**CONVERTER CRYSTALS**

| Price £8, 100 kHz £5 (total) 100 kHz £5 |
|-----------------|-----------------|
| 170 kHz | 200 kHz |
| £8.00 | £5.00 |
| £6.00 | £4.00 |
| £4.55 | £3.60 |
| £4.75 | £4.20 |
| £5.00 | £4.00 |

**CONVERTER CRYSTALS**

| Price £8, 100 kHz £5 (total) 100 kHz £5 |
|-----------------|-----------------|
| 170 kHz | 200 kHz |
| £8.00 | £5.00 |
| £6.00 | £4.00 |
| £4.55 | £3.60 |
| £4.75 | £4.20 |
| £5.00 | £4.00 |

**MINIMUM ORDER CHARGE** £1.50.

**COMMERCIAL USERS.** Crystals can be supplied for MPU, industrial control, etc. in the range 4-21 MHz fundamental and 3rd OVT 18 to 60 MHz at £1.15 for 100 off. This is only an example of our capabilities. Please enquire about other quantities, frequency ranges, watch and sub-carrier crystals. We can supply crystals for marine and land mobile radio telephone use. Send for details.

**TERMS.** Cash with order, cheques and postal orders payable to QSL Ltd. All prices include postage to UK and Irish addresses. Please note that Southern Irish cheques and postal orders are no longer acceptable. Please send bank draft in pounds Sterling.

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Antenna Tuning System incorporates E-ZEE Match, SWR/RF power meter; Dummy Load; Antenna switch.
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PC301         £132.25
PR67          £210.00
FL110         £500.00
FT225R        £550.32
FT225RD       £557.75
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FT202         £119.00
FT207W        £199.00

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GTR24         £18.40
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Standard      £3.15
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All are linear, ALL MODES. Switch straight THROUGH on receive.
R.F. switching switches at 1 watt. Latest SWR protected power transistors. Receive J.FET selected for 1dB N.F. 18dB gain, same circuit as Sentinel V.H.F./pre-amp (see below) SO239 socket.

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SENTINEL 40 — Four times power gain, e.g. 10W in 40W out to 16 watts drive, £66.70.

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The 2 metre units use a neutralised J.FET circuit rather than the more common M.O.S.F.E.T on grounded gate J.FET. This gives lower noise figures and higher gain. We select the J.F.E.Ts for a 1dB noise figure and 18dB gain.

The noise figure of the 2 metre receivers is usually 7-10dB and to overcome this noise we find the 18dB is necessary. We have three models for your choice:

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For connection straight into the aerial lead and the r.f. switch changes over automatically between transmit and receive on any mode. See above for more detail. 12V nominal. Size: 1½ x 2½ x 4. Price: £20.00 ex. stock. 70 cm version £23.00 ex. stock.

2. PAS AUTOMATIC 2 METRE PRE-AMPLIFIER
Same as the Sentinel Auto but for 240V mains operations in a


3. SENTINEL STANDARD 2 METRE PRE-AMPLIFIER
Same performance as the Sentinel Auto but no r.f. switching. Price: £13.22* ex. stock. 70 cm version £16.00* ex. stock.

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This circuit is generally accepted as being the most VERSATILE transmatch system.

It will match aerials of 15-5000 Ohms, to your equipment. BALANCED or UNBALANCED at up to 1kW, SO239 and 4 mm terminals for co-ax or wire aerials, both end fed and open wire. Price: £45.00. Ex. stock.

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2-40MHz, 15dB gain. Ideal units for pepping up receivers on 15 and 10, for OSCAR reception and as an ACTIVE AERIAL. 9-12V supply. Size: 2½ x 1½ x 3. We make the following two versions:

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Performance as above. £10.00* ex. stock.

Prices include VAT and delivery. * Bellin Lea sockets standard, SO239 £1.73 extra. 12 months guarantee. To order: C.W.O. or credit card. Phone your credit card number for same day service. Bellin Lea Plugs 25p, PL 25 plug and reducer 75p.

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