

# The SHORT WAVE Magazine

VOL. XXXVIII

MAY 1980

NUMBER 3



## 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 blander 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.

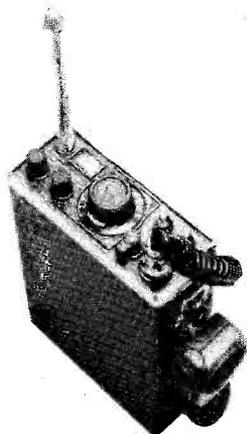
All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting. The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial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

# LOWE ELECTRONICS Ltd.

## TRIO TR2300



£166.75 inc. VAT

Nicad Pack £10.35 inc.

VB2300 £49.45 inc.

The high sensitivity receiver section uses a combination of effective RF filters providing optimum cross modulation rejection across the entire band. An extra low profile speaker uses a samarium cobalt magnet to reduce equipment size whilst improving speaker efficiency and clarity of reproduction.

The remarkable asset of the TR2300 has to be its unexcelled versatility. Using the carrying case and shoulder strap, you can take the 2300 anywhere, powered by the rechargeable ni-cad batteries, and this is certainly the way that most operators use the rig. Sit the 2300 on top of a 12V dc supply at home, however, using the power cord provided, and you have a terrific home station FM rig.

If you want mobile operation, slot the 2300 into an MB1 mounting bracket, possibly add the matching VB2300 amplifier and you have a really high performance mobile transceiver — and being so small, the TR2300 fits almost anywhere. The front panel layout was designed for ease of operation and the back illuminated dial is so easy to read that it's a delight to use.

TR2300 — truly the transceiver for all seasons.

Now — if you insist on a hand held, and don't need the versatility of the 2300, take a look at the new TR2400. Full details on request.

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

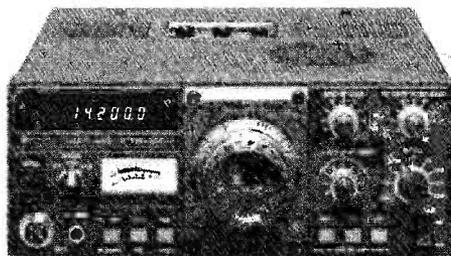
TS120V £347.30 inc. VAT

TS120V	£347.30	TS120S	£432.40
PS20 4 Amp	£44.85	PS30 20 Amp	£85.10
AT 120	£55.20	MC355 mic	£13.80
SP120	£25.30	TL 120 linear	£128.80
VFO120	£89.70		

### 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 be add the PS20 mains power supply and you have an equally great home station; OR maybe add the multi-fraction 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.



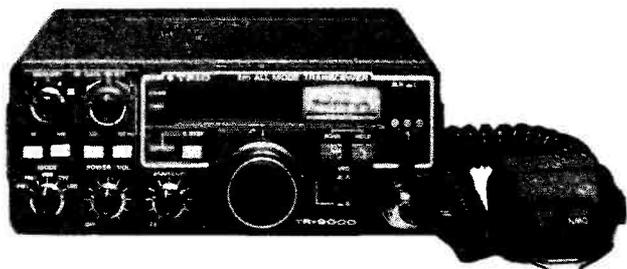
If you need more power, the TL120 200W p.e.p. linear is now available, but you will need a heftier 12V supply to run it. A suitable unit would be the PS30 which delivers up to 20 amps fully regulated and protected. Lots of people are buying the PS30 as a general purpose heavy duty supply for shack use.

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 that 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.

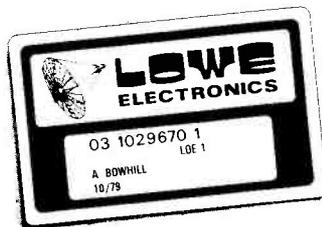
A special feature is the search facility on SSB which tunes the whole band, and the scan facility on FM which scans in 25kHz or 12.5kHz steps, stopping momentarily on any received signal. The scan may then be held by touching the HOLD button or depressing the PTT switch on the microphone.

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**

Everyone is talking about the new Lowe credit card scheme, following its introduction at Leicester. This is the new, easy way to have the rig you wanted right away and avoid any future price rises. How does it work? You simply agree to pay a fixed amount each month and you then get instant purchasing power of 24 times the payment. For example, a payment of £10 gives you £240 of credit, more than enough to buy that TR2400, aerial and accessories. No fuss and no hefty deposits needed. A further advantage is that as the payments continue your credit is automatically extended to allow further purchases. Why not send for full details right away and join the growing numbers who hold the Lowe blue card — the way to have tomorrow's equipment today. A major advance to your purchasing power.

**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.**

# 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	£6.50 inc VAT
2NE	2M 7/8, 4.5dB gain foldover whip	£11.00 inc VAT
430E	70cm 5/8 + 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	£1.50 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/boot mount to take RG4M base	£3.15 inc VAT
MB5	Magnetic mount complete with 5m of cable and PL259	£7.95 inc VAT

### Also two really great base station aerials

GPV5	High performance 2m base station colinear. Forget THE S...M.J...M and R...OR...R	£22.00 inc VAT
GDX2	3dB gain over the range 50-480MHz. The classic wideband aerial. 500W p.e.p.	£36.80 inc VAT
HF5	Our original success. 5 band vertical 80-10m with great performance, great savings	only £41.40 inc VAT

## Hello --

I'm John Wilson, and I'm the Lowe Electronics director whose main responsibility is the after sales service and customer advice areas 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 are in 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 operations. You know the thing; they take the cash, you carry 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 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 particularly 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 shift 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. That is one aspect of our special relationship as the connection between you and the factory.

As for my staff here at Matlock, we have Barrie 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 call sign 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 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.

73G3PCY

## Great News?

The AR240 is back in town but with higher battery capacity, provision for separate microphone and the hot performance (better than 0.2µV for 12dB SINAD, and 2W output on TX1 that you all appreciate. PRICE? Even better value at £168 inc. VAT (price includes Nicads, charger, etc). It has a new name too — the AR240A.

144-148MHz synthesized  
FM Hand-Held



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

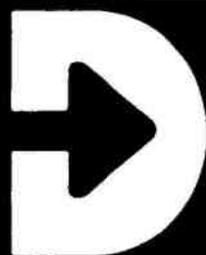
### HEAD OFFICE AND SERVICE CENTRE

CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629-2817 or 2430. TELEX 377482. OPEN 9-5.30 TUES-SAT. PHONE IN 9am-9pm

For personal attention on the South Coast contact John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer B12071.

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**

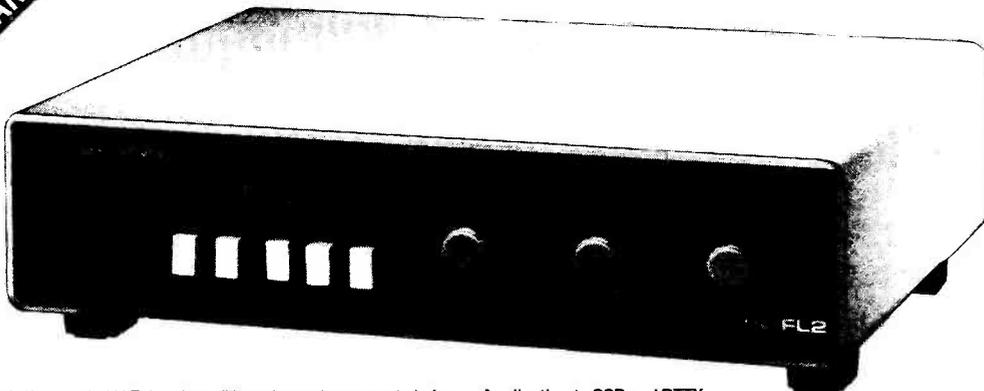


# DATONG ELECTRONICS LIMITED

**NEW PRODUCT  
ANNOUNCEMENT**

## MULTI-MODE AUDIO FILTER MODEL FL2

**Adds knife-edge variable selectivity to any receiver.  
Superb for all modes but especially for SSB.**



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, over-modulation 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.

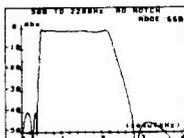
### Application to CW

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 db and only 280 Hz at -40 db.

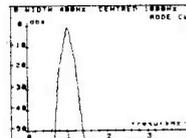
A second CW mode ("CW(2)") using 10-poles of filtering has a 'flat' response instead of peaked. This is useful for net operations.

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.

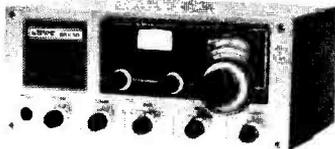
# DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England Telephone (0532) 552461

# WATERS & STANTON ELECTRONICS



**EL40X 80/40 Mini Dipole**  
1KW 70 ft long £29.95 inc VAT



**LOWE  
SRX30**

The SRX30 is designed as a budget priced receiver that outperforms many receivers costing 3 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 exceeds any other retailer in the South I have visited!*

R. THOMSON, London, E17.

## 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.

MONDAY - SATURDAY 9-5.30

18-20 MAIN ROAD, HOCKLEY, ESSEX

PHONE ORDERS

ACCESS

BARCLAYCARD

MAIL ORDER

AGENTS: — G3PWJ (03844) 77778 G3WRA (0432) 67864 G8NNU (0272) 669454 G3XTX (0708) 68956 GM3GRX (0324) 24428

## Interested in RADIO or HI-FI?

HERE'S  
JUST A FEW OF  
OUR BARGAINS

### TRIO HI-FI

KA3700 Amp 2.5w .....	£77.00
KA305 Amp 40w .....	£97.00
KA405 Amp 55w .....	£140.00
KT5500 Tuner .....	£87.00
KR2010 20w Receiver .....	£106.00
KR3010 27w Receiver .....	£143.00
KR4010 35w Receiver .....	£177.00
KD1033B Turntable .....	£53.00
KD1500 Turntable .....	£55.00
KX530Dolby Cassette .....	£116.00

### PIONEER HI-FI

SX590 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 Turntable .....	£51.00
PL200x Turntable .....	£92.00
PL300x Turntable .....	£112.00
CTF500 Dolby Cassette .....	£89.00
CTF600 Dolby Cassette .....	£109.90

Securicor £3.50 extra on above.

## FANTASTIC OFFER

### FDK 2 m 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

## WATERS & STANTON ELECTRONICS

Telephone (03704) 6835

EARLY CLOSING WED 1.00pm

Telex 995895

PHONE ORDERS

ACCESS

BARCLAYCARD

MAIL ORDER

RETAIL CALLERS

# WATERS & STANTON ELECTRONICS



All major items delivered by Securicor within  
24 hours

## A NEW EXPERIENCE — R1000



### TRIO

### R1000

### TRIO

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.

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 despatched 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



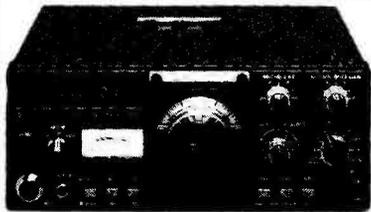
FULL RANGE  
IN STOCK

DELIVERY ANY-  
WHERE IN U.K.

**STOP PRESS**

TR9000 2m all mode £340 inc. VAT

**SOLID STATE RIG  
RELIABLE AT LAST**



⊕ **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 TS180S) — 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 QSY 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 makes it direct competitor look pretty expensive! FM has two tuning rates either 25kHz or 12½kHz per step. On SSB the tuning rate is in 100Hz steps or with the search button depressed, it will step in 10kHz at the same time searching for signals within each 10kHz 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 12½kHz steps with momentary pauses on busy channels whilst providing continuous scanning of SSB/CW over 2MHz. Positive or negative repeater shifts are already programmed into the unit. For base station use, the PS20 AC supply can be used plus the SP120 external speaker and the BO-9 system base pinth. 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. 200kHz 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, three 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 attenuator, dimmer control, tone control, timer circuit, and all this in a diminutive package measuring 12½ x 4½ x 8½ 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

**KING OF THE PORTABLES**

⊕ **TRIO TR2300 £166 inc VAT  
NEW LOW PRICE!**



**NEW**

⊕ **TRIO**

**TR2400 £210 inc VAT**

The new TR2400 really does eclipse all other hand-helds in its sheer 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 cards ready for this one — half its fascination is operating it — the other half is owning it.



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 80 x 25kHz channels plus 600kHz repeater 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 or 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!

# WATERS & STANTON ELECTRONICS

**FDK**  
UNITED KINGDOM

## NEW SPRING COLLECTION!

**MULTI 700EX 25 WATTS 2M FM 25 & 12½kHz CHANNELS  
PRIORITY  
SCANNING**

Price **£199**  
inc. VAT



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

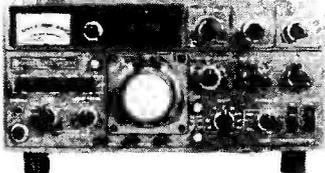


The **Multi 750** is FDK's new, all mode 2 metre unit for both base or mobile use. Using the same cabinet dimensions as the M700EX, this really does provide the basis for an action-packed, go-anywhere station. To list all its features would be impossible in the space available on this page. However, 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 VPO'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.

# STEPHENS-JAMES LTD. G3MCN

47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA  
Telephone (0942) 676790



**R820 RECEIVER**

... THE ULTIMATE IN RECEIVERS ...

Frequency coverage 160-10m plus SW Broadcast Bands. All modes CW-USB-LSB RTTY. Digital Readout. Noise Blanker. Fully variable I.F. Bandwidth. plus Bandpass tuning, plus rejection notch filter. **£690.00**

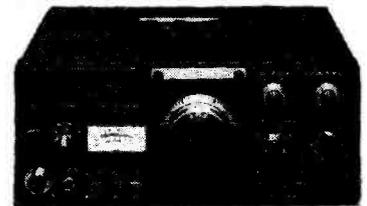
**TR9000**



**TRIO**

R820 Receiver	£690.00
TS820 Transceiver	£669.30
VFO820	£118.45
DSIA 12v. DC Inverter	£42.93
SP820 Speaker	£37.95
SM220 Monitor scope	£197.80
TL922 Linear Amplifier	£672.75
VFO520S	£98.80
SP520 Speaker	£17.25
DG5 Digital readout for TS520S	£103.50
TS120V 80-10m. Mobile Transceiver	£347.30
PS-20 AC power supply for TS120V	£44.85
MB100 Mobile mounting bracket	£17.25
SP70 Speaker	£18.40
R1000 Receiver	£298.00
TS770 2M + 70cm All Mode Transceiver	£690.00
TR2300 2m. Portable Transceiver	£166.75
PB15 Battery Pack	£20.25
TS520SE HF Transceiver	£437.00
TR2400 Hand held 2m Transceiver	£210.45
DM800 Grid Dip Meter/Wavemeter	£59.80
TS120S200 watt Transceiver	£432.40
TL120 Linear Amplifier	£128.80
HS5 Headphones	£21.85
HS4 Headphones	£10.35
MC50 Desk Microphones	£24.15
MC30S Hand Microphone 50K	£13.80

Crystals and accessories in stock



**TRIO TS120 TRANSCEIVER**

ALL SOLID STATE HF BAND

TRANSCEIVER

Freq. 3.5-30 MHz Amateur Bands and WWV. I.F. Shift System, Noise Blanker, Vox, Single conversion system using PLL circuit. Digital display dial.

TS 120V 10 watts PEP	£347.30
TS 120S 200 watts PEP	£432.40

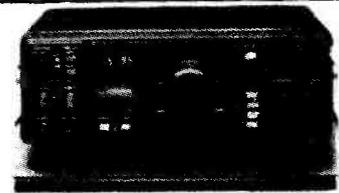


**TR2300**

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**

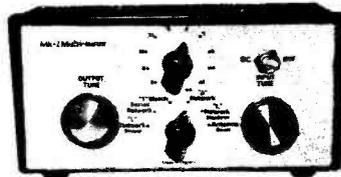
**JAYBEAM**

5Y/2M 5 element yagi	£10.24
8Y/2M 8 Element yagi	£13.23
10Y/2M 10 Element	£28.41
PBW/14/2m. 14 element Parabeam	£40.38
5XV/2m. 5 element crossed yagi	£20.70
8XV/2m. 8 element crossed yagi	£25.88
10XV/2m. 10 element 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	£24.84
UGP/2m. ground plane	£9.37
MBM48: 70cms. Multibeam	£28.18
MBM88: 70cms. Multibeam	£37.49
TAS 1/2m. Whip mobile	£15.30
C5/m. Colinear	£40.02
CB/70cm. Colinear	£45.43
D15/1296 23cm. 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. Operation is from 100-240 V AC or 12 V DC.



The Mk. 2 Multituner was designed by us to many requests who found our Mk. 1 the finest they had ever used but required a wider frequency range. This covers 550 kHz to 30 MHz. The circuitry gives 50 switchable, tunable positions to match any antenna over 5 metres in length to practically all communication receivers. Our "Multituners" are designed and manufactured by ourselves and have been exported to over 50 Countries. Many operators use them for QRP Transmitting also. See the February edition 1977 of the "Short Wave Magazine" or send SAE for details. **£28.00 inc. VAT and postage**

**NEW ANTENNA MODELS**

H.S. HFS Vertical 10-80m	£41.40
HFR. Ground Plane Kit	£23.00
GDX 2 Discone Antenna 50-460MHz	£36.80



**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 any Amateur would desire for maximum flexibility on the 160 through 10 metre bands. Up to 200 watts PEP input. No tune final amplifier. **£679.65**  
With digital readout.

**RECEIVERS AND TRANSCEIVERS**

(Inc. VAT and Postage)	
SR9 Tunable 144-146 MHz Receiver	£46.00
AMR217B Scanner Receiver. AC or DC operation	£113.50
R512 Aircraft Band Scanning Receiver	£135.00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver	£230.00
Philips FM321 70cms FM Transceiver	£264.00
Yaesu FRG7 Receiver	£214.00
Tomaco 318 Scanning Receiver 30 Channel	£95.00 + Crystals
FDK TM563 Scanning 2m Receiver	£109.00
'Sky Ace' Hand held Aircraft Band Receiver	£49.50
Bearcat 220 Scanning Receiver	£241.50

**SECONDHAND EQUIPMENT**

Due to delay in publishing secondhand lists please send SAE for our up to date lists. We have a very quick turn over in secondhand equipment, especially in receivers. If you require a specific model please let us know and we will inform you as soon as we have one available. Our secondhand equipment carries a three month guarantee. We would be pleased to sell your equipment on a commission basis, which saves you time and money advertising.

ACCESS and BARCLAYCARD facilities.  
Instant HP service

Part exchange always welcome. Spot cash paid for good clean equipment. If you have equipment surplus to your requirement we would be pleased to sell this on commission for you.

Shop Hours: 9.30 to 5.30 Monday to Friday.  
4.30 p.m. Saturday

No parking problems. Turn at the Greyhound Motel on the A590 (East Lanes.) Road, S.A.E. with all enquiries. 25p will bring you latest information and prices, credited to your first purchase over £5. Postage carriage extra.

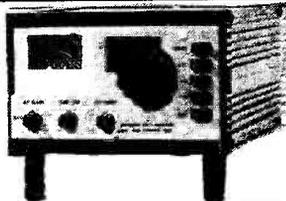
ALL OUR PRICES INCLUDE VAT

ROTATORS		CABLE	
AR30	£47.16	UR43	24p metre
AR40	£54.73	UR67	80p
CD44	£109.25		300 ohm Ribbon
AR22	£49.46		11p metre
KR400	£98.13		75 ohm low loss 20p
DR7500	£108.10		
ART300C	£95.00		
SRX-30			
Solid state Receiver 550kHz-30MHz			£178.00

Mobile Antenna Range	
5/8th Whip PL259 fitting	£6.00
Magnetic Mount PL259 fitting	£8.00
7/8th Whip	£11.00
Basemount and lead	£3.00
Gutter mounts	£3.15
Bantex Magnetic mounts	£12.59
Bantex S/S Whip 5/8th	£9.50
Bantex G. fibre 5/8th whip	£9.10

Accessories	
2 way Antenna Switch 50 ohm-200 watt	£6.60
3 way Antenna switch SWL push button type	£4.60
3 way Antenna Switch 2 kW PEP 0.500 MHz	£10.60
4 way Antenna Switch 50 ohm 200 watt PEP	£10.60
Single Meter SWR Wall type	£10.87
Single Meter SWR Desk type	£11.00
Twin Meter SWR Desk type	£13.55
T345N Thru Line Wattmeter 140-435 MHz	£34.45
DL20 20 watt 50ohm Dummy Load	£6.30
DL50 50 watt 50ohm Dummy Load	£7.50
DL-1000 1 kW Dummy Load 50ohm	£31.00
Morse Keys Light weight	£3.25
Nye King Morse Keys	£10.15
HyMound HK708	£10.50
Katsumi EK 150 Electronic Keyer	£79.00
Katsumi MK 1024 Electronic Keyer, with memory	£135.00
DX-008 Programmable Frequency Counter	£116.25
HP3A High Pass Filter	£3.25
Twin Keying Paddle Chrome plated with heavy base. Precision Unit	£26.50
OSCERBLOC SWR2000B	£40.00
Full Range of Microwave Modules Converters, Transverters, Linears, etc.	
Mini Products	
C4X 3band Vertical	£48.00
HQ1 Mini Beam	£96.00

Hy Gain	
12AVQ 3band Vertical	£43.12
14AVT/WB 4band Vertical	£60.37
18AVT/WB 5band Vertical	£87.40
ASP and Diawa 144 MHz and 70 cms Antennas in stock	



ARAC 102 Receiver. 28-30 MHz. 144-146 MHz AM-SSB-FM-CW Price £107.50

S.T.E. Prices include VAT and postage

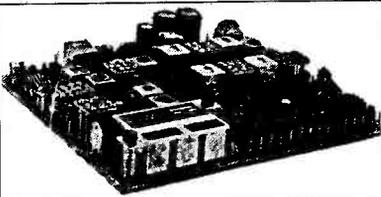
ARAC 170 10cm and 70cm Receiver	£129.00
AAI Audio Module for AR10	£4.10
AD4 FM Discriminator	£5.00
ALB Linear Amplifier	£27.60
AG10 Tone Generator	£4.50
ATAL 2m AM-FM Tx	£129.00

STANDARD

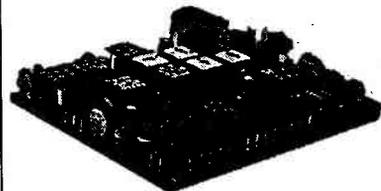
C8800 2M FM Mobile Transceiver	£252.00
C7800 70cm FM Transceiver	£275.00
G-WHIP	
Tribander Helical 10-15-20m	£24.72
LF Coils for Tribander	£6.55
LF Telescopic Whip Section	£3.35
Basemount standard type	£4.48
Basemount 78. 10-15-20m	£28.75
MM Coils	£6.55
MM Telescopic whip section	£3.33
Flexiwhip basic 10 metres section	£17.25
Basemount standard	£4.48
Ball type Basemount	£6.32
Coils for Flexiwhip	£6.55
Base thread adaptor USA/G Whip	£0.75
Extended 40"	£11.50

DRAKE

TR7 TRANSCIVER AND MOST DRAKE ACCESSORIES AVAILABLE FROM STOCK - P.O.A.



AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v DC operation Price £50.00



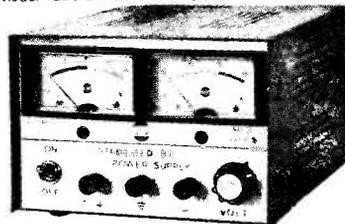
AT23. 12 Channel PM Transmitter 3 watts 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v DC operated AF input sensitivity 2mV adjustable to 50mV Price £50.00



455 kHz FM DISCRIMINATOR AMPLIFIER. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 20 300mV frequency deviation ± 3kHz Price £5.00

SOLID STATE STABILISED POWER SUPPLIES

Maximum ratings quoted. Prices include postage.	
Model 122 12.6V 2.5A	£15.55
Model 125 10-15V 5amp	£28.00
Model 153S 4-20V 3amp Dual Meter	£29.35
Model 156S 4-15V 5amp Twin Meter	£35.00
Model 1210S 4-20V 10 amp Twin Meter	£85.00
Model 1210SV 4-20V 10 amp Digital Readout	£110.00
Model 153SV 4-20V 3amp Digital Readout	£38.00
Model 1220 1 13.5V 20 amp	£90.00
Model 1220.2 13.5V 12 amp	£80.00



Mod. 1210 S

TECHNICAL ASSOCIATES

Rx Band Pass Filter. 9 I.C.'s. 1 watt output\* 8 switched positions of filters\* High pass 2.5 kHz-2.00 kHz-1.5 kHz-200 Hz-110 Hz-80 Hz\* Ideal for increased selectivity with FRG7, SXR30, etc. Price £30.45

MULTIFILTER

This unit is the complete answer to interference and bandwidth problems. The unit contains the well proven peak and notch filter and band pass filter. Ideal for users of the FRG7, SXR30, SSR1 type of receiver. No internal connections to your receiver Price £51.75

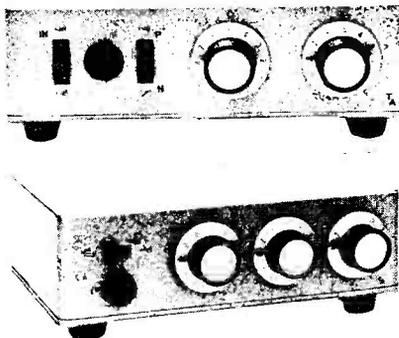
Pre-Selector. Coverage 1.6 MHz to 31 MHz\* Three switched bands\* Type 1 with antenna changeover relay for Transceiver op Price £30.45

Type 2 for SWL without relay Price £27.25

Crystal Calibrator. Seven ranges down to 1 kHz. Selected from front panel. Complete with antenna Price £22.80

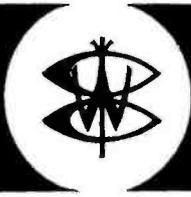
Some Models in New Type Cabinets

These prices include VAT and postage.



# STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA  
Telephone (0942) 676790



# Western

## TRIO *Have you seen the R-1000 yet?*

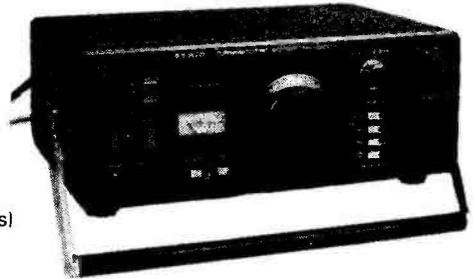
A high class general coverage (0.2 to 30 Mhz) receiver with digital and analogue display. Built-in quartz clock, selectable bandwidth, simple operation, well finished, lightweight and compact.

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

### OTHER TRIO EQUIPMENT

*(Phone or write for latest prices and details)*

- |          |  |
|----------|--|
| TR-2300  | 2m FM PORTABLE                             |
| TR-2400  | 2m FM HAND HELD                            |
| TR-7625  | 2m FM MOBILE (25 watts)                    |
| TS-770   | 2m/70cm MULTIMODE                          |
|          |  |
| TS-120S  | HF SOLID STATE MOBILE (High Power)         |
| TS-180S  | HF SOLID STATE TRANSCEIVER (with Memories) |
| TS-520SE | BUDGET PRICED HF TRANSCEIVER               |
| TS-820S  | DE-LUXE DIGITAL HF TRANSCEIVER             |



**Coming Soon:**

**TS-9000 Miniature 2m MULTIMODE — A WINNER!**



## FAST BECOMING AN ESTABLISHED FAVOURITE — THE YAESU FT-101ZD

- ★ Latest in a famous line of HF transceivers
- ★ Digital frequency readout
- ★ QRM-beating Variable IF Bandwidth
- ★ High performance RF processor
- ★ Rugged 6146B PAs with RF negative feedback
- ★ Full band coverage 160-10 metres
- ★ Compatible with all 901 accessories
- ★ Analogue FT-101Z available

**FT-101Z £550; FT-101ZD £639**



### FRG-7

ANOTHER WELL KNOWN  
YAESU PERFORMER

ONLY

**NOW DOWN IN PRICE!**

**£199**

The general coverage receiver for the SWL with a limited budget.  
Good all-round performance at a down-to-earth price.

- ★ Full and continuous coverage from 500KHz to 29.999MHz.
- ★ SSB/AM/CW operation.
- ★ Fine tune control for ease of SSB tuning.
- ★ Accurate readout of frequency to 10KHz or better, using MHz and kHz controls.
- ★ Wadley loop circuitry for minimum drift and maximum stability.
- ★ Operation from mains supply, internal batteries or external 12V DC.



### OTHER YAESU BARGAINS

- |          |                                     |       |                     |
|----------|-------------------------------------|-------|---------------------|
| FT-227RB | 2m FM mobile                        | ..... | Down to <b>£229</b> |
| FV-901DM | Scanning/memory VFO for FT-101Z/901 | ..... | Down to <b>£199</b> |
| FRG-7000 | General cover receiver (few only)   | ..... | Down to <b>£339</b> |

**(Phone or write for details and prices of other models)**

**ALL ADVERTISED PRICES INCLUDE VAT — ACCESS/VISA ACCEPTED**

# Electronics (UK) Ltd

## The UNIQUE **ALUMAST** "The Tower That Comes in a Tube"

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.

★ Made from high strength corrosion resistant alloy using WESTERN's exclusive "W" section leg extrusions.

★ Easy assembly using bolts and "Nyloc" locking nuts for security.

★ Free-standing to 30ft (9.15 m) with a typical tri-bander plus VHF/UHF antennas.

★ Heights to 250ft (75 m) with appropriate guy configurations (ask us for quotes).

★ Lightweight — only 25lbs (11 kg) per 10ft (3.05 m) section.

★ 30ft (9.15 m) mast is delivered in a tube only 10ft 6ins (3.2 m) long, 6ins (0.126 m) dia.

**A COMPLETE  
30FT (9.15 m) MAST for £240.35**

### FULL PRICE LIST

375/PSS/3	30ft mast (3 sections).....	£184.00
375/PSS/1	Additional 10ft section.....	£62.68
HB-1	Hinged base unit.....	£31.05
FB-1	Fixed base unit.....	£21.85
RMP-1	Rotor mounting plate.....	£12.08
TP-1	Top plate with sleeve.....	£13.23
GB-1	Guy brackets (set of 3).....	£11.50

All prices include carriage and VAT at 15%

**DEALER ENQUIRIES WELCOME**



DESIGNED and MANUFACTURED in GREAT BRITAIN by **Western!**  
BUY BRITISH AND HELP THOSE BALANCE OF PAYMENT FIGURES!

### \* \* \* SPECIAL SUMMER OPENING HOURS \* \* \*

For the benefit of personal callers we are OPENING ALL DAY ON THE SECOND SATURDAY EACH MONTH from MAY to OCTOBER. This is in addition to our normal hours of 9-12; 1-5 on weekdays.

TELEPHONE ENQUIRIES WILL BE TAKEN BY OUR ANSWERING MACHINE AS USUAL.

**MAKE A NOTE OF THE DATES NOW!**

10 May; 14 June; 12 July; 9 August; 13 September; 11 October. 9 a.m. to 5 p.m.  
COME AND BROWSE over the gear, or natter over a COFFEE!

## Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)

**FAIRFIELD ESTATE**

**LOUTH, LINGS LN11 0JH**

Tel: Louth (0507) 604955/6/7 Telex: 56121 WEST G

Our Agents

Southern: Alan Paxton, G4BIZ, Southampton, Hants  
(0703) 582182

Scotland: Alan Cameron, GM30GJ, Alloa (0259) 214653

N. Ireland: Les Lyske, G13CDF, Newtownards (0247)

812449

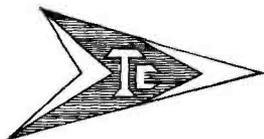
Opening hours:

LOUTH: 9-12: 1-5pm Mon-Fri. By appointment Sat 9-12.

LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662).

Mon-Sat 9-6pm; closed Thurs.





## Tried — Tested and Popular . . .



**IC-202S**  
**£169 inc.**

ICOM's range of sideband portables has been recently expanded. The well known and tested IC-202E has now been improved in the form of the IC-202S which has lower side band fitted also and provides sidetone on CW. The receiver has been hotted up making it even more suitable for use as a base station, either barefoot or as a prime mover. The new IC-402 is the 70cm version of the 202S giving the same facilities as its 2m cousin over the range 432-435.2 MHz. Both use a very stable VXO circuit, to give fully tuneable coverage of the band at 200 kHz segments and both have extremely clean signals so that using them to drive a linear to the full legal limit presents no problems. We are very impressed with both the 202S and the 402.

IC-202S	Less VAT = £146.96	With VAT = £169.00
IC-402	Less VAT = £210.43	With VAT = £242.00



**IC-402**  
**£242**  
**inc.**



**IC-240**  
**£169 inc.**



**IC-280E**  
**£250 inc.**

★ **WITH SCANNER £260**

The IC-240 is the ideal mobile rig for most people. Apart from the fact that it is quite a lot cheaper than most, it is, in fact, more suitable than many to use in the car while driving (and let's face it, it is under those conditions that most mobiles are used). It can be operated with ease without taking your eyes off the road and provides up to 22 channels (which is more than you are likely to need). Being synthesized, of course, there are no crystals to buy for extra channels. Full repeat, reverse repeat and automatic tone burst plus a low power facility are selectable from the front panel.

The IC-240 is a superbly built and very reliable piece of equipment as witnessed by the many thousands in use. All Icom equipment is built to a very high standard and the IC-240 is no exception. It has an excellently sensitive receiver and a very clean transmitter and will give you hours of headache-free pleasurable use — so why not get one now before the price goes up again!

**PRICE.**

Less VAT = £146.96      With VAT = £169.00

Less VAT = £217.50      With VAT = £260

As usual, ICOM have kept ahead with technology and have produced their revolutionary new IC-280E which uses a microprocessor to produce frequencies throughout the 2m band at the ideal 25kHz spacing required today. The IC-280 has the ideal advantage of being separable into two parts for easy mounting into today's cars which so often forget to leave space for a rig. The removable front panel, with all controls, is only 3" deep and will fit in any convenient spot — in the glove pocket, on the dash or even on the sun visor! The main part of the set can be mounted anywhere within 4 feet — or even further in many cases — under the passenger's seat is quite handy! Display is of frequency on an LED readout and there are three memories for your favourite channels. These are not cleared when the set is switched off as long as it is left connected to the car battery.

**AGENTS (PHONE FIRST — All evenings and weekends only, except Barnsley and Burnley)**

**Scotland** — Jack GMBGEC (031-665 2420)

**Wales** — Tony GW3FKO (0222 702982)    **Burnley** — (0282 38481)    **Midlands** — Tony G8AVH (021-329 2305)

**North West** — Gordon G3LEQ (Knutsford (0565) 4040)    **Yorkshire** — Barnsley (022678 2517) Evenings  
Barnsley (0226 5031) Days

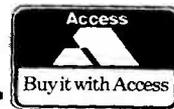


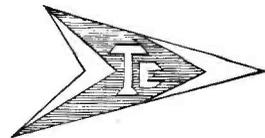
**H.P. TERMS AVAILABLE**

**FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS**  
**YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM**

**THANET ELECTRONICS LTD.**

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





**AT LAST!! A two-metre FM handy Talkie from the famous ICOM stable; probably the smallest sized one, too!**

**IC2E £159 inc.**

**CHECK THE FEATURES —**

**FULLY SYNTHESIZED** — covering 144-145.995 in 400 5KHz steps.

**POWER OUTPUT** — 1.5W with the 9V rechargeable battery pack as supplied — but lower or higher output available with the optional 6V or 16V packs.

**BNC ANTENNA OUTPUT SOCKET** — 50 ohms for connecting to another antenna or use the Rubber Duck supplied.

**WEIGHT** — 450 Grams with supplied power pack and antenna.

**DIMENSIONS** — Height 116.5mm (without battery pack), width 65mm, depth 35mm.

**SEND/BATTERY INDICATOR** — Lights during transmit — when battery power falls below 6V it doesn't! — indicating the need for a recharge.

**FREQUENCY SELECTION** — by thumbwheel switches, indicating the frequency.

**+5KHz SWITCH** — adds 5KHz to the indicated frequency.

**DUPLEX SIMPLEX SWITCH** — gives simplex or plus 600KHz or minus 600KHz Transmit or 700KHz for you travellers!

**HI-LOW SWITCH** — reduces power output from 1.5W to 150mw reducing rapid battery drain.

**EXTERNAL MICROPHONE JACK** — If you do not wish to use the built-in electret condenser mic an optional microphone/speaker with PTT control can be used. Useful for pocket operation.

**EXTERNAL SPEAKER JACK** — for speaker or earphone.

This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck AND the famous THANET WARRANTY.

By skilful design and the use of highly advanced technology ICOM have produced this gem for £159 including VAT!

**Computer compatible — the Best!**  
**IC-701 HF £899 inc.**



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. With single knob frequency selection and built-in dual VFO's, the LSI controlled IC-701 is the choice in computer compatible, multi-mode Amateur HF transceivers.

The IC-701's single frequency control knob puts fully synthesised instant tuning at a single finger tip. WIDE bandspread, with 100Hz per division and 5kHz per turn, is instantly co-ordinated between the smooth turning knob and the synthesiser's digital read-out with positively no time lag or backlash (no waiting for counter to update: less operator fatigue). And at the push of the electronic high speed tuning button, the synthesiser flies through megacycles at 10kHz per step (500Hz per turn).

The computer compatible IC-701 LSI chip provides input of incremental step

or digit-by-digit programming data from an external source, such as the microprocessor controlled accessory which will also provide remote band selection and other functions.

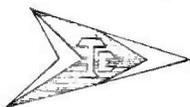
Full band coverage of all six HF bands, and continuously variable bandwidth on filter widths for SSB, RTTY, and even SSTV, help to make the IC-701 the very best HF transceiver ever made. IC-701 includes two CW widths, all of this standard at no extra cost.

Sold complete with the high quality electret condenser base mic (SM-2), the IC-701 is loaded with many ICOM quality standard features. Standard in every IC-701 are two independently selectable, digitally synthesised VFO's at no extra cost. Also standard are a double-balanced schottky diode 1st mixer for excellent receiver IMD, and RF speech processor, separate drop times for voice and CW VOX, optionally continuous RTT, fast/slow AGC, efficient IF noise blanker, fast break-in CW, and full metering capability.

FROM

**THANET**

OF COURSE



## THE MOBILE OF CHOICE FROM THE WORLD FAMOUS ICOM STABLE — THE IC-255E



**25 WATTS — 5 MEMORIES — SCANNING — 600 KHz AND USER SELECTABLE  
REPEATER SHIFT — FULL COVERAGE IN 5 KHz or 25 KHz STEPS**

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
- ★ 25 Watts output or 1W low power. A superb receiver using grounded gate FET front end
- ★ Scanning over a user programmable range
- ★ Memory scan
- ★ Stop on empty or busy channels
- ★ Tuning in 25KHz or 5KHz steps
- ★ 5 Memories — retained while the power is connected to the rig
- ★ Built-in 600 KHz Repeater shift
- ★ Alternative programmable shift
- ★ Reverse Repeater facilities
- ★ RIT ( $\pm 3$  KHz) for those off channel stations
- ★ Good loud audio
- ★ Optically coupled tuning between control knob and CPU
- ★ Multiway 24 pin socket on back for touchpad, computer, or external control (note the current RM3 cannot be used but a new version is to be introduced)
- ★ Rugged modular PA (guaranteed of course!)
- ★ Mobile mount which can be padlocked

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.)

FROM

**THANET**

OF COURSE



# "NEW" IC251E £479 inc.

**DON'T WORRY — WE GUARANTEE  
ALL SOLID STATE RIGS  
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.

**MICROPROCESSOR CONTROL** — CPU control with Icom's original programs provides various operating capabilities. No backlash dial controlled by Icom's unique photo-chopper circuit. Band edge detector and Endless System provides out-of-band protection. No variable capacitors or dial gear, giving problem-free use. The IC251E provides FM, USB, LSB, CW coverage in the 144-146 MHz frequency range. Thus the IC251E can be used for mobile, DX, local calls, and satellite work.

**MULTI-PURPOSE SCANNING** — Memory Scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning speed. 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 and 1 KHz steps in the FM mode, is provided for trouble free QSO.

**EASIER OPERATION AND LIGHTER WEIGHT** — The most compact, lightest weight all-mode 144 MHz transceiver. First



to use a pulse power supply in communication equipment, for lighter weight. 50 mm-diameter large tuning control knob for smooth and easy tuning. Trouble-free controlling knobs for both receiving and transmitting. LED indicator for transmit and receiving modes.

**MOST SUITABLE FOR BOTH FIXED AND PORTABLE STATIONS** — Built in 240V AC and DC power supplies. Convenient Dial Lock switch for mobile operation. Easy carry handle. Effective Noise Blanker. IC SM5 high quality stand microphone is suitable for fixed station operation. Powerful audio output 1.5 Watts at 8 ohm, for easy listening even in noisy surroundings.

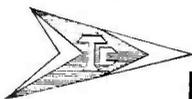
**OUTSTANDING PERFORMANCE** — The RF amplifier and first mixer circuits using MOS FETs and other circuits provide excellent Cross Modulation and Two-Signal selectivity characteristics. The IC251E has excellent sensitivity demanded especially for mobile operation, high stability, and with Crystal Filters 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. The system provides distortion-free signals with a minimum spurious radiation level.

**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+D at 1 microvolt or less than 0.3 microvolts for 20 dB Noise quieting.

**IC-251E Typical Technical Characteristics:** General. Numbers of semiconductors: Transistors 99, FETs 12 ICs 37. Diodes 132. Frequency coverage: 144-146 MHz (easily extended to 148 MHz at no extra charge). Frequency resolution: SSB 100 Hz steps FM 5 KHz steps. 1 KHz steps with TS button depressed. Frequency Control: Microcomputer based 100 Hz step Digital PLL synthesizer Independent Transmit-Receive Frequency Capability. Frequency Readout: 7 digit LED 100Hz readout. Frequency stability: Within  $\pm 1.5$  KHz Memory channels: 3 channels, any inband frequency programmable. Usable conditions: Temperature:  $-10^{\circ}\text{C}$ — $-60^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ - $140^{\circ}\text{F}$ ). Operational time: Continuous. Antenna impedance: 50 ohms unbalanced. Power supply requirement: 13.8V DC  $\pm 15\%$  (negative ground) 3A max. or 240V AC  $\pm 10\%$ . Current drain (at 13.8V DC): Transmitting, SSB (PEP 10W). Approx. 2.3A, CW, FM (10W). Approx. 2.3A FM (1W). Approx. 1.0A. Receiving. At max. audio output. Approx. 0.6A. Squelched. Approx. 0.4A. Dimensions: 141mm (h)  $\times$  241mm (W)  $\times$  264mm (D). Weight: Approx. 5.0 Kgs. Transmitter. Output power: SSB 10W (PEP). CW 10W. FM 1 — 10W (Adjustable). Emission mode: SSB (A3J),

USB/LSB), CW (A1). FM (F3). Modulation system: SSB Balanced modulation. FM Variable reactance frequency modulation. Max. frequency deviation:  $\pm 5$  KHz. Spurious emission: More than 60 dB below peak power output. Carrier Suspension: More than 40 dB below peak power output. Unwanted Sideband: More than 40 dB down at 1000 Hz AF input. Microphone: 1.3K ohm dynamic microphone with built-in preamplifier and push-to-talk switch. Operating mode: Simplex. Duplex. (Any inband frequency separation programmable). Receiver. Receiving system: SSB. CW Single conversion superheterodyne. FM Double conversion superheterodyne. Receiving Mode: SSB A3J, USB/LSB, CW (A1), FM (F3). Intermediate Frequency: SSB, CW 10.7 MHz, FM 10.7 MHz, 455 KHz. Sensitivity: SSB, CW Less than 0.25 microvolts for 10 dB S+N/N. FM more than 30 dB S+N+D at 1 microvolt. Less than 0.3 microvolts for 20 dB Noise quieting. Squelch sensitivity (FM only): Less than 0.4 microvolts. Spurious response rejection ratio: More than 60 dB. Selectivity: SSB, CW More than  $\pm 1.2$  KHz at  $-6$  dB point. Less than  $\pm 2.4$  KHz at  $-60$  dB point. FM More than  $\pm 7.5$  MHz at  $-6$  dB point. Less than  $\pm 15$  MHz at  $-60$  dB point. Audio output power: More than 1.5W. Audio output impedance: 8 ohms.



FROM

**THANET**

OF COURSE

# AMATEUR RADIO EXCHANGE



Brenda (G8 SXY) and Bernie (G4 AOG) invite you to the only shop in London where you can see and try all the leading makes of Amateur Radio Equipment under one roof . . . YAESU, ICOM, TRIO, STANDARD . . . compare them all . . . and have a cup of Brenda's coffee too!

## JUST LOOK AT OUR PRICE

STAR OFFER



TRIO  
R-1000

(p&p £3) **£289** inc. VAT

STAR OFFER

## Attention all FRG-7 owners!!!

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



PRICE **£57** inc. VAT

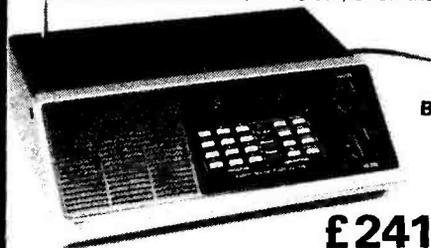
plus

**NEW, SIMPLIFIED  
NARROW-BAND, SSB FILTERS  
NOW AVAILABLE**

PRICE **£15** 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: 66-88MHz, 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.



BEARCAT  
220 FB

**£241.50** inc. VAT



At its price you won't find a better communications receiver than the YAESU FRG-7. We like to summarise its specification by saying that the FRG-7 hears things that other receivers don't even know exist . . . all the way from 500kc to 30MHz. So come and try it, and see for yourself why it still represents the finest value-for-money in the communications receiver market today.

YAESU **£199** inc. VAT and free  
(p&p £3) FRG-7 HELISCAN Aerial

## . . . and this is the HELISCAN Wall-to-Wall Aerial

Only from us, a specially developed high-tensile receiving antenna giving superb results. Use it indoors or out — from wall-to-wall, from point-to-point, or from pillar-to-post.



INTRODUCTORY  
PRICE — JUST **£15** inc. VAT

CLOSED WEDNESDAY, BUT USE OUR 24-HOUR ANSAFONE SERVICE

EASY TERMS UP TO  
2 YEARS



CREDIT SALES  
BY TELEPHONE



INSTANT HP FOR  
LICENSED AMATEURS

**2 NORTHFIELD ROAD, EALING, LONDON W13 9SY. Tel: 01-579 5311**

So easy for Overseas Visitors — Northfields Station is just seven stops from Heathrow on the Piccadilly Line — or phone your order and let us deliver it to you at the Airport.



# Lee Electronics Ltd

LEE

LEE

## WE HAVE SLASHED OUR RECEIVER PRICES FOR A LIMITED PERIOD!!!!

**Also from May we are giving away Free All Risk Insurance Cover on any new equipment purchased from us over the value of £150!!**

(SEE OUR STAND AT ALEXANDRA PALACE)



YAESU FRG7

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)

**£179.95** inc. VAT. Carriage **£3.00**

We have just made a new batch of our own Digital Readout. This can be fitted inside the set or mounted externally to give a very accurate read out

**£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.

**£259.95** inc. VAT. Carriage **£3.00**



TRIO R1000



**WE DON'T BELIEVE IN GIMMICKS JUST LOW PRICES**



Credit Facilities  
and Part  
Exchanges  
Welcome

Nearest Main Line  
Station:  
PADDINGTON.  
Nearest Underground:  
EDGWARE ROAD

**LEE ELECTRONICS LTD.**  
400 EDGWARE ROAD  
LONDON W2

Tel: 01-723 5521

Tlx: 298765

# VHF BANDS

NORMAN FITCH, G3FPK

## Award News

**G**LEN Ross, G8MWR, from Coventry is the recipient of 2m. VHF Century Club certificate no. 318. His interest in VHF started at the end of Hitler's War and he still has our VHF Listeners' Club certificate no. 28, dated September, 1948, issued by *The Short Wave Listener*. Glen's current operation is on 2m., 70cm., 23cm. and 3cm. On 2m., the "prime mover" is a *Trio TS-700G*. On FM mode, 100 watts feeds a *Cushcraft* Ringo Ranger aerial while on SSB, a 4CX350B amplifier is used with a *Wisi* 10-ele. long *Yagi*. On 70 and 23cm., a *Yaesu FT-221R* is the prime mover. On 70cm. this is switched to a *Micro-wave Modules* transverter followed by a 2C39BA amplifier. For FM, a vertically polarised 14-ele. *Yagi* is used and a *Jaybeam* 48-ele. *Multibeam* does it all horizontally on SSB. On 23cm. the *FT-221R* feeds a *SOTA* transverter, 2C39, 2C39BA set-up to a pair of *Jaybeam D-15 Yagis*, 90w. of SSB and 50w. of FM. On 3cm., Glen has 15mW. of FM to a dipole-fed dish.

2m. VHFCC award no. 319 goes to Derrick Simpson, G8NDF, from Byram cum Sutton in N. Yorks. He took the *R.A.E.* in December, 1976 and was licensed in March, 1977. His first rig was a *TS-700G* feeding a 6-ele. *Yagi* on a 20 ft. scaffold pole, then a *Trio TR-7200G* for FM mobile. The "DX bug" started to bite so a new *TS-700S* was acquired along with a 60 ft. *Versatower* and 10-ele. crossed *Yagi*. After that, a *Nag 144* amplifier was added, the aeriels now being a pair of 12-ele. *ZL Specials*. Still not satisfied, the latter were replaced with a 19-ele. long *yagi* and a new amplifier delivering maximum legal power is awaited. Another 19-ele. aerial will then be added.

## 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 multi-hop *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 *ARRL* station WIAW will beam to Europe on 21.390 and 28.590 MHz. Latest news can also be gleaned from the Sunday nets from WA3NAN 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 145.900 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 RS0, 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. Ron Isaacs, G8CSI, is now back in England and the Sunday evening 2m. SSB net has been resurrected in the London area on 144.280 MHz from 1930 *local* time. The latest *AMSAT-UK* satellite calendar has arrived covering *O-7*, *O-8*, *TIROS-N* and *NOAA-6* through July 2. With the *Phase 3* satellite programme imminent, readers who are interested but not members of *AMSAT-UK* would benefit from membership. All details from Ron Broadbent, G3AAJ, 94 Herongate Road, London, E12 5EQ.

## Contests

*Results*; — From *GB2RS* come the results of the 432 MHz Fixed Contest on Feb. 3. The Multi-Op. part was won by G3NNG with 630 points, runner-up being GJ4ICD/A with 423 pts., just 7 pts. clear of third placed G8LGL/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 RB0 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 disgusting 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 1136 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 1245 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. beacons simultaneously, with call sign 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 VK6OX 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 beaming 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

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3JXN	36	73	94	203
G3COJ	24	66	93	183
G3LEF	22	62	101	185
G8IFT	14	27	68	109
G8HVY	12	73	130	215
GD2HDZ	12	41	76	129
GRGML	11	74	122	207
G3SPJ	10	36	71	117
G8LHT	7	39	98	144
G4AEZ	5	29	61	95
G3OHC	4	33	104	141
G3BW	3	26	120	149
G8ATK	3	41	93	137
G2AXI	2	54	93	149
G4JW	1	30	108	139
G4ERX	1	41	72	114
G8OPR	1	28	85	114
G13RAX	1	24	67	92
G3POI	—	—	282	282
1EAT	—	25	238	263
DK3UZ	—	—	210	210
G3IMV	—	—	207	207
G4JCD	—	54	150	204
9H1CD	—	13	178	191
G3VYF	—	51	136	187
G3CHN	—	—	183	183
G3SEK	—	—	179	179
G4CMV	—	35	140	175
9H1BT	—	11	163	174
G4ERG	—	6	161	167
GM4COK	—	12	154	166
G18KNV	—	46	118	164
GM4CXP	—	25	136	161
G3FPK	—	—	158	158
EA3LL	—	15	137	152
G4BWG	—	29	118	147
G8HHI	—	36	102	138
G4AWU	—	22	110	132
G4IGO	—	—	126	126
G4IJE	—	—	126	126
G4HYD	—	40	83	123
G3KPU	—	25	91	116
G8KGF	—	20	94	114
G8IXG	—	—	104	104
G4FBK	—	5	98	103
G8KAX	—	39	63	102
G8LGL	—	15	87	102
G3PBV	—	35	62	97
GM8NCM	—	12	84	96
G4DEZ	—	—	96	96
G3FIJ	—	27	68	95
G8MFE	—	17	78	95
G8KPL	—	7	87	94
G18EWM	—	25	67	92
G8GXE	—	32	56	88
G4GEE	—	28	60	88
G6UW	—	—	88	88
G8JJR	—	9	78	87
G3JAG	—	7	79	86
G8LFI	—	—	83	83
G8KSP	—	2	76	78
G4GET	—	—	72	72
G4GHA	—	—	67	67
G4GXT	—	1	56	57
G8JGK	—	—	52	52
G8PRG	—	12	39	51
G4GSA	—	1	50	51

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 23cm.

on 4m. following certain *WARC* decisions. Written and on air comment is divided. Jim Whittle, G3EKP (Lancs.) feels more activity is needed and that the G8s 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, G4FKI (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 organising operation 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 DK0VL/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 (AI46h) 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 9A10NY 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, G8GGP (Kent) made 76 of his 153 QSOs in the first hour. He worked EI4CN (WN) and GM8VBX (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



The station of well-known VHF operator Geoff Brown, GJ4ICD, from St. Saviour, Jersey. Left to right: 2 x 4CX250B 2m. amplifier and power supply. Trio TS-700 (since replaced by a TS-770) with a Bird Type 43 power meter above, and a K2R1W 70cm. amplifier with PSU.

Photo courtesy of "Jersey Evening Post"

TWENTY-THREE CENTIMETRE  
ALL-TIME TABLE

Station	Counties	Countries	Total
G3JXN	35	9	44
G3DAH	36	8	44
G6NB	28	7	35
G3NHE	24	5	29
G3COJ	19	8	27
G4ALN	20	5	25
G3JVL	21	4	25
GD2HDZ	18	6	24
G3OBD	20	3	23
G8LEF	16	6	22
G8ARM	20	2	22
G8GML	17	4	21
G8IFT	13	5	18
G8EOP	11	5	16
G5DF	13	1	14
G8AOD	11	2	13
G8FMK	12	1	13
G8LHT	7	3	10
G8AII	7	2	9
G4DKX	7	2	9
G30HC	8	1	9
G3BW	3	5	8
G8ABH	7	1	8
G8FJG	7	1	8
G8GNZ	4	2	6
G2AXI	5	1	6
G8OPR	1	1	2

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 HB9MIN/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, G8TFR, 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-245E 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 Teesside Polytechnic in Middlesbrough.

Arthur Breese, GD2HDZ, 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,

G18JPG (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 G1s 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, GJ8KNV, 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

THREE BAND ANNUAL VHF TABLE  
January to December 1980

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G8OPR	—	—	60	17	39	7	123
GJ4ICD	—	—	53	13	35	8	109
G3BW	—	—	57	13	25	7	102
G8GXE	—	—	46	10	32	6	94
G4HNS	—	—	49	9	29	4	91
G8MFJ	—	—	49	12	23	6	90
G3PBV	—	—	42	9	30	8	89
G4ERX	15	2	30	10	18	8	83
GD2HDZ	10	3	33	10	23	4	83
G3FPK	—	—	63	15	—	—	78
G3KPU	—	—	33	5	28	6	72
G8KGF	—	—	42	13	10	4	69
G4DEZ	—	—	51	17	—	—	68
G4BYP	15	3	28	9	5	1	61
G8KAX	—	—	21	8	20	6	55
G8JJR	—	—	28	7	19	1	55
G8IFT	—	—	19	4	19	6	48
G3FJ	12	J	20	6	5	2	46
G4IGO	—	—	30	15	—	—	45
G8RZA	—	—	36	9	—	—	45
G8JGK	—	—	33	9	—	—	42
G8HHI	—	—	4	5	21	8	38
G3EKP	9	4	12	4	2	2	33
G4FKI	10	1	15	1	3	1	31
GM4CXP	—	—	16	7	—	—	23
GW3CBY	—	—	15	5	—	—	20
GM4COK	—	—	4	9	—	—	13

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 countries in mid-March; G8CVF in Merseyside and G8GGP 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 Billericay landscape by now and hopes to be on the band soon. During the Mar. 1/2 weekend, G8MFJ worked F1DJY/P (CH); HB9BMC/P (EH) and DK0VL/P (EH). The Swiss QSL came direct and stated the best DX was E16AS (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, plus EH (DK0VL/P). G18JPG was out -/P in this contest and made 20 QSOs, including 5 continentals, for a total of 386 pts. Best DX was DK0VL/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, G18JPG writes that the Lagan Valley ARS members (G14GTY) 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, when 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 9EQ. 73 de G3FPK.

## THE G4FRX TRANSVERTER/ CONTROL SYSTEM

### PART II

A METHOD OF INTERFACING TRANSVERTERS  
WITH AN HF TRANSCEIVER

JOHN H. NELSON, G4FRX

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 takes 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 bows 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 overvoltage 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 *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!

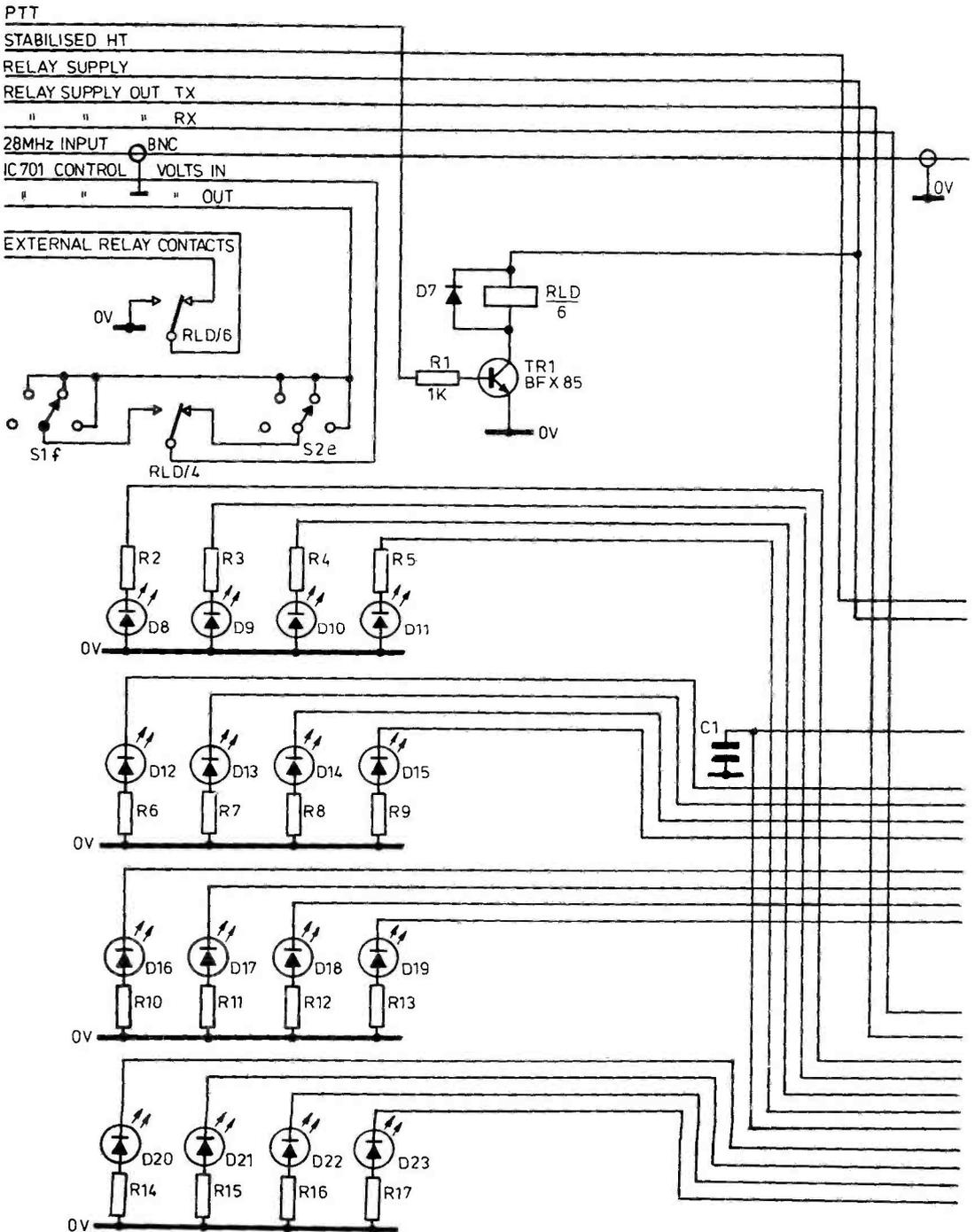
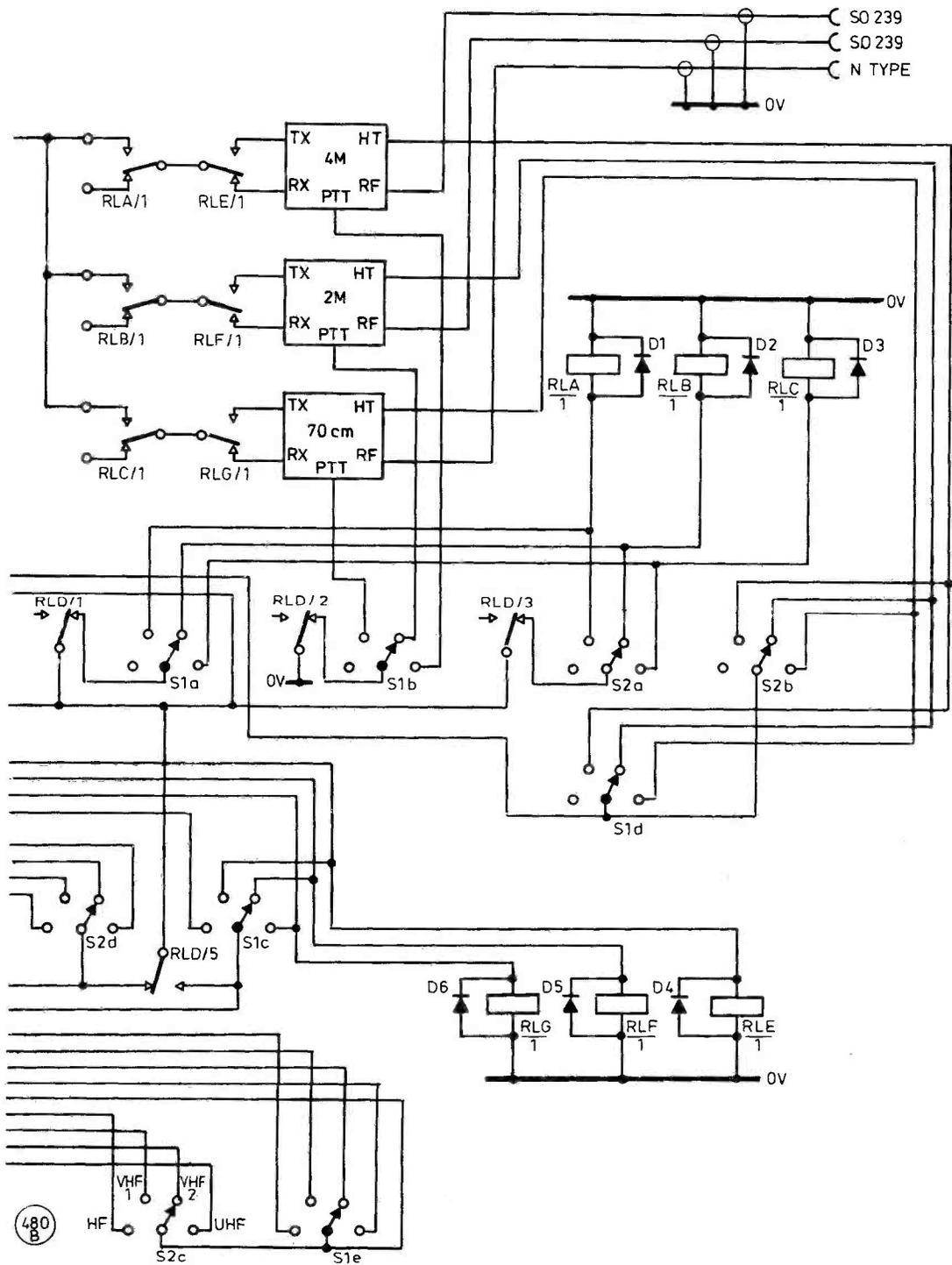


FIG. 4 CONTROL SWITCHING AND INDICATORS FOR TRANSVERTER SYSTEM

480  
A



is TX1, TX2 and so on in text; similarly S2a, S2b is RX1, RX2 etc.

Table of Values  
Fig. 4

RLA, B, C, E, F, G = *Magnetic Devices* 2-pole changeover, screened, 12v. coil.

RLD = 6-pole changeover, 12v. 150-ohm. *Radiospares* stock no. 349-153.

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 = BFX85 or similar *npn* switching transistor. Function switches = 6-pole 4-way for transmit, 5-pole 4-way for receive. C1 = 0.01  $\mu$ F 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.

## 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 transverted 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 RLD. This is a 6-pole changeover device with a 150-ohm coil (a so-called "continental 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 thence 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 actuating voltage is derived from two 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 I*, 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

# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By Justin Cooper

**H**I, 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 callers 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 FY0E00. 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

### ANNUAL HPX LADDER

Starting Date, January 1, 1980

SWL	PREFIXES		
R. Newall (Bracknell)	426	R. Baker (North Walsham)	241
B. A. Payne (Leeds 18)	303	D. J. S. Wilans (Wednesbury)	239
J. Worthing (Shrewsbury)	299	C. M. Nagle (Lisburn)	221
D. J. F. Gordon (Chepstow)	298	M. Hill (Bedworth)	207
J. Weston (Borehamwood)	246	T. Morgan (Swansea)	200
Miss J. Ribton (Oxted)	243		

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 as the obvious pass device in a stabilised PSU was originally registered by RCA, with an  $F_T$  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  $F_T$  which normally runs around 30 MHz. Use the RCA one, no problem, change it to the other maker, lots of troubles with RF 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 Hallcrafters "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** (**Longleven**) remarks that while he has several "gadgets" in his station, they wouldn't be of much interest were they not helping to wrinkle 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 clown in an aeroplane appeared in **J. Doughty's** receiver in **Walsall**, signing 6A2/AM or 6B2/AM, 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)

SWL	PHONE ONLY	PREFIXES	
K. Kyezor (Brandon)	2300	D. C. Casson (Reading)	745
B. Hughes (Worcester)	2117	M. Mullins (Crowdon)	732
S. Foster (Lincoln)	1817	J. Doughty (Bloxwich)	710
J. Fitzgerald (Gt. Missenden)	1655	J. Hobson (Ely)	709
E. W. Robinson (Bury St. Edmunds)	1651	D. G. Sim (Southampton)	677
M. C. P. Bennett (Slough)	1522	L. Joyce (Grimshby)	616
M. J. Quinrin (Wotton-u-Edge)	1454	G. F. Green (Middlesbrough)	563
H. A. Londesborough (Swanland)	1406	F. C. D. Barnes (Cardiff)	560
H. M. Graham (Moulton)	1238	B. Shepherd (Staines)	563
M. Ribton (Oxted)	1071	Mrs. R. Smith (Nuneaton)	552
M. Law (Chesterfield)	1059	T. Anderson (Stroud)	549
M. Shaw (Huddersfield)	1004	B. L. Henderson (Laverstock)	509
K. Linge (Willington)	867		
L. Stockwell (Grays)	794	CW ONLY	
P. Ford (Longlevens, Glos)	792	H. A. Londesborough (Swanland)	1180
R. Middleton		D. W. Waddell (Herne Bay)	1024
(Bury St. Edmunds)	784	T. Grimbleby (Hull)	722
		A. Rowland (Mansfield)	377

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.

QSLs 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 QSL-ing 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.

## FIRST COLOUR SSTV BETWEEN UK AND USA!

**O**N 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.J. Reed, G8MFP, 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. Sowler G3NAP, R.J. Nash G4GEE and P.A. Edwards G8KGJ".

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 G4HFJ



## EQUIPMENT REVIEW

## THE TRIO R-1000 COMMUNICATIONS RECEIVER

**M**ANY years ago, the communications receivers used by radio amateurs on the HF and LF bands featured continuous coverage of the short wave spectrum with band-spread 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 inductances. 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 connexions 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 connexions 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 connexions 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.

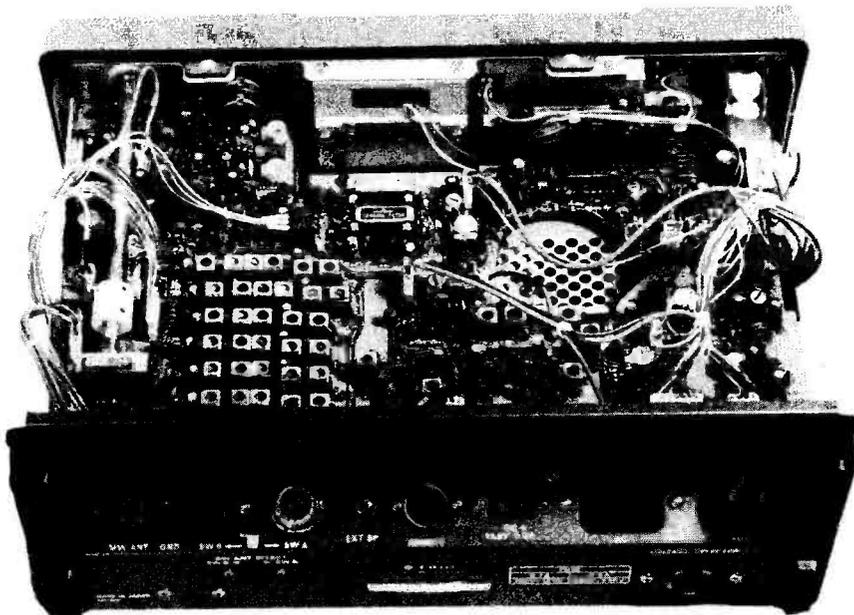
The VFO tuning was firm and smooth, completely free of backlash due to the use of precision, spragued gears in the reduction drive. The band switch had light, but positive indexing. The 'Function' switch displays either frequency or time. In time mode, it reads either time, or programmed 'On' and 'Off' 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



**Fig. 1.** View of the top from the rear. The six RF bandpass filters are the group of 32 canned coils. The three 455 kHz ceramic IF filters are grouped behind the main tuning mechanism, the plug just to the left being *Low Electronics'* alternative bandwidth selection (see text).

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  $3\frac{1}{2}$  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  $\pm 2$  dB, a quite remarkable result. In the middle of the 1-2 MHz range, a 60  $\mu$ V signal applied through a "dummy aerial" consisting of a series 220 pF capacitor gave an unattenuated S9 reading within  $\pm 0.7$  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

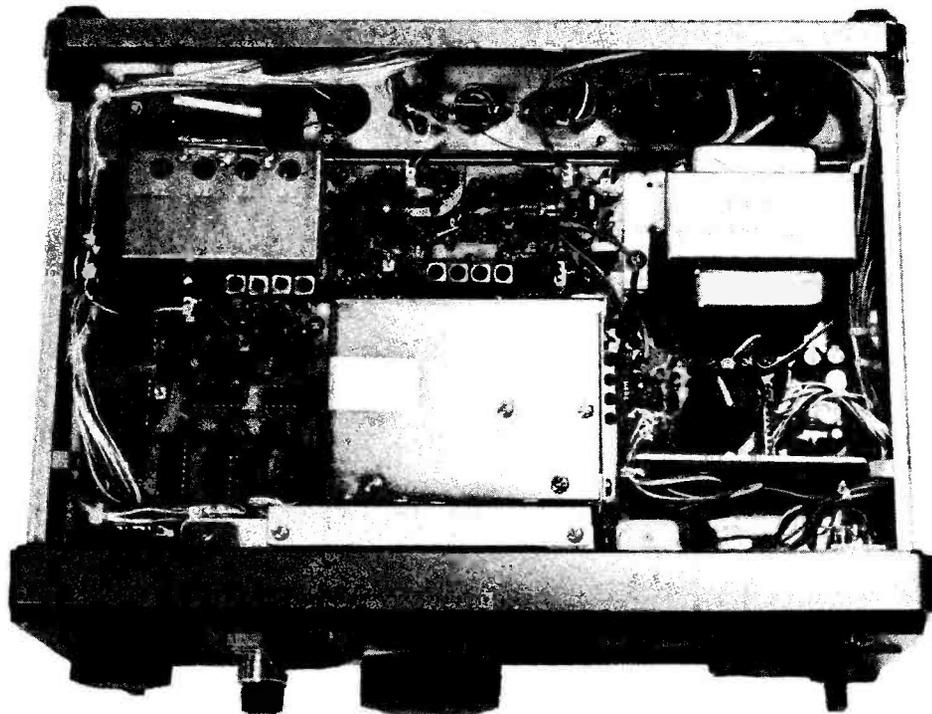


Fig. 2. View of the bottom from the front. The large box contains the VFO, and the printed circuit boards behind and to the left contain the synthesiser circuitry.

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, G30TK, AND J. H. STOCK, G3PKS

**M**ODIFICATIONS 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 involves 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 ago<sup>(1)</sup>.

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;

- Changes to be simple and reversible.
- Performance on existing transceiver bands to be unaffected.
- Appearance of the HW-101 (already neatly modified for optional IRT) 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

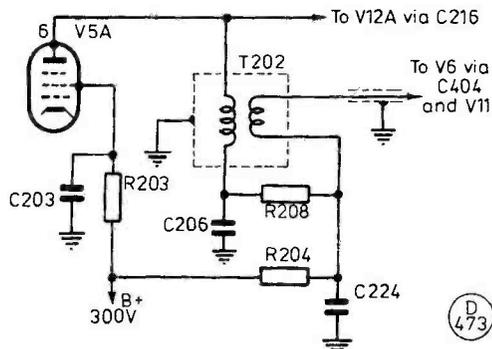


Fig.1 HW-101 SECOND MIXER INPUT/OUTPUT CCT.

linear amplifier and RF pre-selector circuitry can be to the individual owner's choice and component availability.

### 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 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

Fig. 2

R1 = 220K, 1w.  
R2, R4 = 47K, ½w.  
R3, R5 = 270K, 1w.  
R6 = 680 ohm, ½w.  
R7 = 10K, ½w.  
R8 = 47K, 2w.  
R9 = 8.2K, ½w.  
D1, D2 = 1N4148 or equiv.

C1 = 100 pF 350v. silver mica.  
C2, C3 = 0.01 µF 500v. disc ceramic.  
T160 = Primary 80t, 34 s.w.g., in two layers; secondary 7t 34 s.w.g. on top of primary.  
7.1mm dia. former RS Components no. 228-090. Core is RSC no. 228-107.  
S1 = s/pole changeover toggle.

Note: All the above items obtainable from RS Components

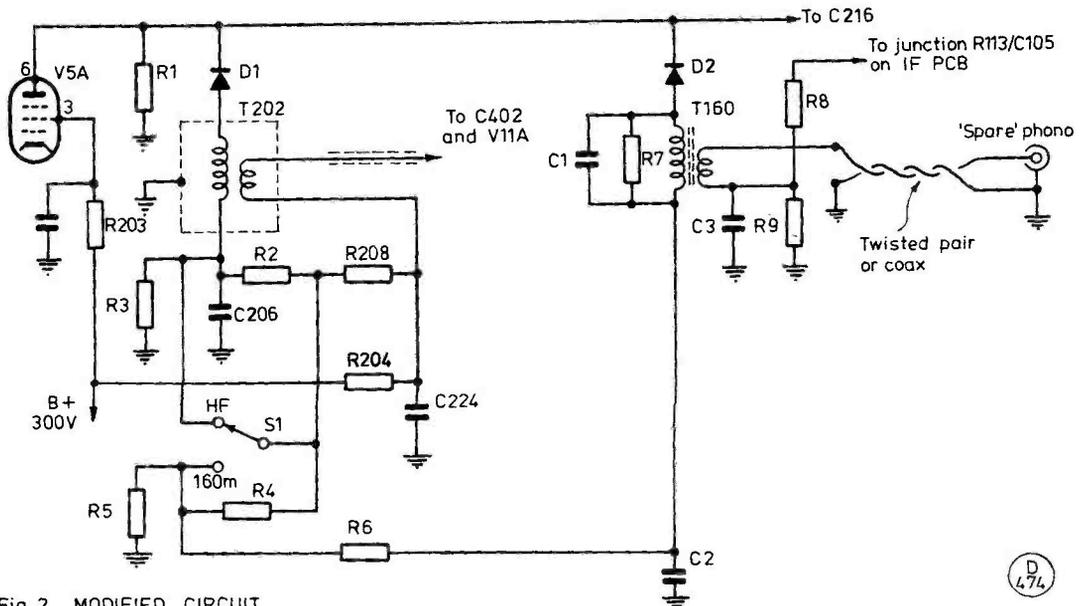


Fig. 2 MODIFIED CIRCUIT

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

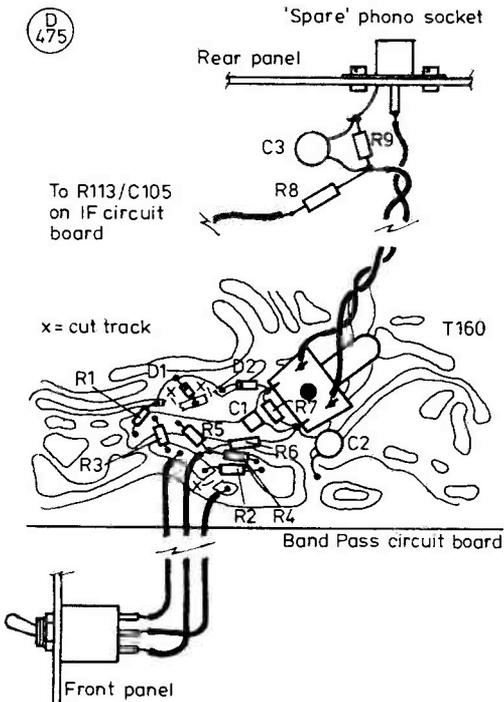


Fig. 3 MODIFICATION DETAILS TO BAND-PASS CIRCUIT BOARD

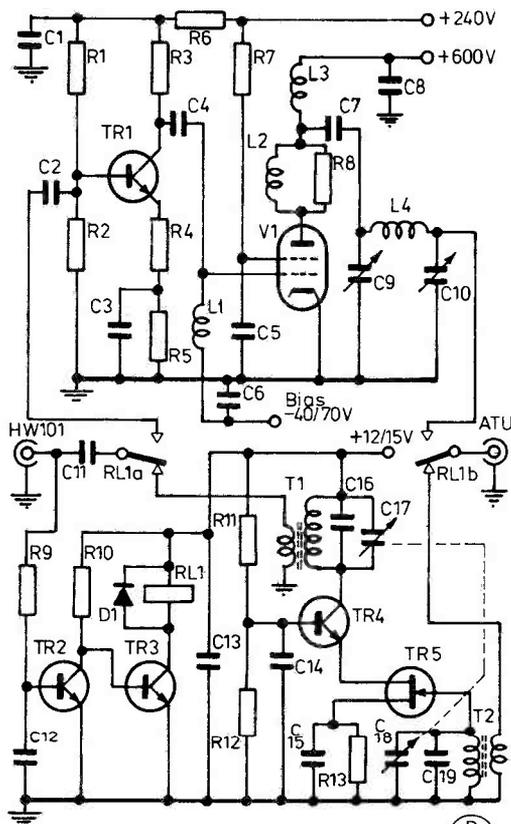


Fig. 4 LINEAR AND PRESELECTOR

### Table of Values

Fig. 4

- R1, R2, R9, R10 = 22K
- R3 = 6.8K
- R4 = 22 ohm
- R5 = 15K
- R6 = 1.8K
- R7 = 1K
- R8, R13 = 100 ohm
- R11, R12 = 100K
- C1, C2, C4, C5, C6, C11, C12, C13, C14 = 0.01  $\mu$ f 500v.
- C3, C15 = 0.1  $\mu$ F 250v.
- C7 = 1000 pF 4kV
- C8 = 0.01  $\mu$  750v.
- C9 = 250 pF var.
- C10 = 4-gang 500 pF var. (in parallel)
- C16, C19 = 56 pF 350v. s/m
- C17, C18 = 2-gang 100 pF var.
- L1 = 1 mH miniature choke
- L2 = 10t 34 s.w.g. wound on R8
- L3 = 2.5 mH RFC
- L4 = 40t 18s.w.g. close-wound on 2-in. dia. former.
- T1, T2 = as for T160
- TR1 = MJE340 (Motorola)
- TR2, TR4 = BC182
- TR3 = BFY 51
- TR5 = 2N3819
- D1 = 1N4001
- RL1 = 2-pole changeover relay, 12v. coil.
- V1 = 5B/254M

Note: All resistors are 1/2-watt rating.

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<sup>(2)</sup>. A 5B/254M was chosen because several were available but a 6146 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 cascode 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 T160 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. Operation 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

- (1) "Top Band Transverter for Transceiver Operation" by F. Powell, G3SEL, *Short Wave Magazine*, March 1972.
- (2) *Radio Communication Handbook*, Vol. 1.

## 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 XYs, YLs and friends, at the Needles and 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 is very much a question of how soon they can finish with bricklaying and paintpots. 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. Helens** group are now at the YMCA in North Road, on Thursday evenings. More about what goes on from 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 informals, 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 Sportscentre, 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 Television and Sound Broadcasting.

G4ILQ has a tame spider which dips its feet in the ink and writes his letters; which left G4ILQ 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 onward, maybe followed by QSY to the local chinese restaurant.

Quite a while since we saw a newsheet 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 Constructional 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 (*Skelmanthorpe 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 6SH (*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. W3HQO 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 invalids; but 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 Whitleigh 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 Synthesised 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 8 is down for a demonstration of the club members two-metre gear, and May 15 will be the time to look out for G3MYM — 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 Toc 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 IIR station, Tim Mason; and on May 16 weather permitting G8SAJ 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 EI. 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 IACSSA Sportsground Straight Road, Bucklesham. 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 Moores will be talking about metal Detectors, at the Marle 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 NFD 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 G3IIR 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 on 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 of 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, M1EE 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, Mill Hill Victoria Road for the informals. For the formal Construction Contest appears on 9th, and the informal on 23rd. Looking at the list here, we have

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.



"... just knocked up a gadget to save holding the mike..."

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

**W**E have quite a nice pack of mail to go through this month. Firstly, and a great pleasure, was to hear from G3UUZ (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 GW3UUZ 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 caboosh 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 G3UUZ 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 . . . G8UUZ! 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 (Trio) 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 Shirlmere 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 VK/ZL/JA on the long path, the same areas appearing on the short path around 1000 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 VK, 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 A4XGC, FM7AV, H31LR, H16XQL, HL9KE, HP1XRK, JA4YFH, JA6AUH, JF1EEK, JH3HBF, JH6QFJ, K0CL (Colorado), K0RF in the same State, KB5SF in New Mexico, KB7CQ in Idaho, KB7CR in Washington, KB7DB, KL7Y, N7AGC all in Washington, N7AOS in Idaho, N7BGH in Arizona, PJ7EF, VE4ADV, VE4XX, VE5RA, VE6WQ, VE7BGW, VE7CC, VE7SK, VK6NKA, VP5RIT, VP5WJR; W7AVD, W7KNT, and WB7CFL all in Montana; W7FRO in Oregon; W7MBW, WA7VKI and WB7NCD all in Arizona, WB7TYF in Nevada, 3B7CF, and 5Z4YW.

G4HZW (Knutsford) continues to be a 28 MHz-only man, with about 20 wats 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 K7BF1/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 2009 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 HH2JR. March 7 was a bit boring with just K6TLL and 6Y5YM,

while March 8 gave VP2VEJ, OX3OZ, VE3EV/W4/P, W4JCK, K6ZXE, KB5DK, and N4NX. March 9 was memorable for KH6IBA coming back to a CQ call; W5VJQ, WB7VVU, 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, W1GVZ, K6DQ, A18Z/P2, KA1CCK, W7JI in Arizona, and at bedtime it was W8GZL. On the evening of the 11th W9NFW/P7 (Montana) set the ball rolling, and W1CUY, AG4V, K7EFB, WA2BUY, K8UFN led up to the VP8SB on Adelaide Island at 2107, and finally W8NQR running eight wats 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), WB7VLE, VE5BBU who was using a '101E 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 LU8EKC. 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, H31LR, VE4XX, WOSF, VE6WQ, K0RF, K6DYE; KN0KCV, AC6V, AKO, AI6V, LU7KAT, VK7GK on the long path, VP2VGB, FM7AV, VK3VDP, and VK1FT. The next morning the contest was swinging along with VK6UL, JH7JGG, through to IT9GA1 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, VP2VJV, VP2AJ, 9Q5VT, 6Y5YM, FK8BT, a brace of 4S7s within an hour — never having worked one before! PJ8UQ and W2BBK/PJ7 who was nearly missed as a mere W2. Gotaways included VP1SWC, WD5DIZ/5NO, 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 BERU and ARRL; 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 plum to be picked off. If one disregards the run-of-the-mill stuff like VK W6-7 and so forth — 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/FS7, HI6XQL, HP1XRK, H31LR, PJ2CC, VE1-7, VP2VGB and 4A2MX.

The usual amusing comment appears in the log from G3CED/G3VFA; this session has involved operating with 100 watts, which for George is most unusual — he explains it as necessity, testing out some QRO ATU jobs, for the QRM generators!

The other one we liked was hidden up in a corner and refers to TA1FM 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 A1 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 GM3OXX 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 countries score being 94 in the year. GM3OXX 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 handicap!). During the month five watts input SSB yielded on Ten: KL7Y, C6ACY, VP2ML, T12NBC, 9G1JX, VP8PP, PJ2CC,

YV2JF, H31LR, HP1XRK, VP2VGB, YV5USB, HK4LRM, YS1GMV, HI6XQL, XE2MX, 4U1UN, VK7GK on the long path at 2150z, FM7AV, VK3VDP also long-path at 2229z, VK6UL, HL9KE, VU2DPK, A22DW, and KOGEA/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 micro-computer for Amateur Radio purposes. G3ZPF on the operating side is clearing up the last few for 5BDXCC, 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 out 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 5BDXCC 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.*

---

London-based circle holding 150 countries to start you off nice and easily! On a practical note, G3ZPF uses an 84-foot doublet aerial fed with open-wire line to an ATU; the spreaders are so much easier to make if you get some of the plastic U-section door track. It is cheap, easy to cut, and doesn't try to roll away when you want to drill it.

G2HKU (Sheppey) stuck to CW for his ten-metre activity and so collected up W6TER, K4XG, K4YF and YVINX who also holds the callsign EI4BD.

### 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, EZ1-EZ0 with three-letter suffixes, would be allocated to Russian novices on Top Band. No start date given.

We have already mentioned Round Island, and G3UUZ, 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 R1'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 PA0HIP, YU3EF, DL9MN, DF1OW, RZ2ABT, and W3HHN/MM, plus CW with UA6AUZ, RB5LBH, UB5EAQ, UA3FZ, UC2AAK, RQ2GCR, EZ1NAA, RT5AB, HB9NL, OK1DWF, OL8CMY, OE1TKW, PA2REC, DJ4MJ, W3HNN/MM, K2GNC, W1BB, W1PL, K2BQ, N4IN, WA1GXE, 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 G4WTZ 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 choice, 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 cosh 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 pips clamp-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 chap 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 5BDXCC 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 aeri-als" 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, G3ZLA, G3DNF, G3RJV, G2HLL, G3ZWH, OK2BMA, HB9PR, G31RW, G3NIJ, G4GFK, G6AB, G3RYP, G4III, PA3AFJ, and G3IVF.

---

#### 'CDXN' deadlines for the next three months—

June issue—May 1st  
 July issue—June 5th  
 August issue—July 3rd

*Please be sure to note these dates.*

---

### Forty

There is some good work being done there but not a lot being reported, and then only obliquely most times. G3ZPF enquires plaintively whether someone will tell the three inches of snow outside that it is nearly summer; he then goes on to indicate that it'll be nice to get back among the gentlemen on 7 MHz CW as soon as he gets the ton up on Eighty.

G2HKU is a bit more specific, mentioning a couple of QSOs, one with K0BKO and the other with ZL3IS.

Off we go now to Broadstairs and the G3CED/G3VFA set-up. Like most others he has more or less completely deserted the LF Bands — not a single one on Eighty — but there were a few inter-G and European QSOs with the QRP rig in the log for 7 MHz.

G2HLU had a session with the band during the BERU, working VE1-7, VP9BO, ZL, and 3V8AA.

G4BUE stuck to the QRP on 7 MHz, and found time to work G4DQP, G3HQQ, G3KSU, GM3OXX/A, G3LVZ, G3VTT, DK5FD, OZ1GHQ, 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 continent has now been collected up and the cards are awaited.

G2HKU indicates three distinct and definite phases to his activity; the usual QRO rig skeds with ZL1VN, ZL3RS, ZL3SE, and ZL3FV on SSB, and VE2DFY, JA2EIV, N6EA, JA8GU, ZL1AXM, and VE5RG. The QRP from the HW-8 reached out to W0UBT (Minn.), 1T9WEY, UR2RHJ, UB5RBM 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 VQ9TR; 14 MHz gave TA2HIA and 5W1BZ.

SSB first for G4BUE, and HV3SJ, VP2MGQ, HDOE, TF3IRA, TG9GI who was also running QRP, LU5HDJ, VK9XT, 5T5CJ, VKs, EL2AV, and VP8PP, all 21 MHz SSB; CW on 21 MHz came up with KP4DJ who was running two waits 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 (Yeovil); 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; KL7s were S9 at 0900, but little was heard from Africa and nothing from the Pacific. So . . . SSB QSOs with A4XIU, A7XD, AL7H, AP2MQ, C6ACY, HP1XRK, JA6OKB, OH3JR/OH0, OX3HA, VE7WJ, VK2TG, VK3VIL, VK3XP, VP2MGQ, VP2SAB, W7KSA, W7ZT, WA0CFV, 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, P29JS, T12CF, VK0KC, 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 aeri-als!

# AMATEUR ELECTRONICS UK

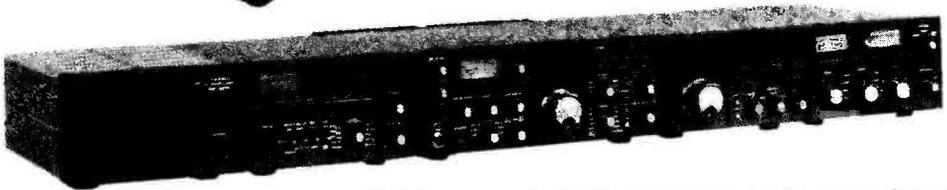
## AEUK — Your number one

AS FACTORY APPOINTED DISTRIBUTORS WE OFFER YOU—  
WIDEST CHOICE, LARGEST STOCKS, PROMPTEST DEAL AND  
FAST, SURE SERVICE RIGHT THROUGH



(Normally in grey livery)

### YAESU FT-107M



AMATEUR ELECTRONICS UK has been established for over twenty years and specialises for the amateur by employing licensed operators on our staff. At our H.Q. in Birmingham will be found the following Call signs:

G3FIK — Ken  
G3RGD — Ray

G4EWD — Peter  
G4GSJ — Ken  
G8GUS — Martyn

G8VXM — Gary  
G8VXN — Paul

#### HOW TO REACH US (EASY PRIVATE PARKING ON OUR 90ft FORECOURT)

**FROM SOUTH AND EAST.** We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork in to Alum Rock Road. We are located one mile from this point.

**FROM NORTH.** Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.

**FROM THE WEST AND SOUTH/WEST.** Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

**Hours: 9.30–5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.**



Access or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.



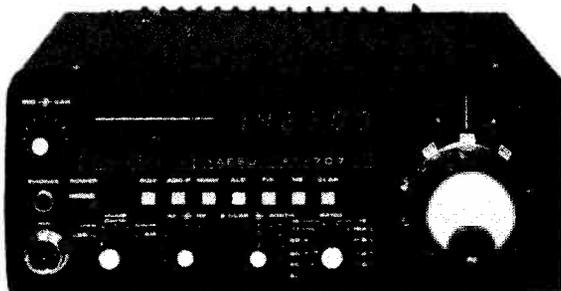
# AMATEUR ELECTRONICS UK

## source for YAESU MUSEN

The superb FT-107M all Solid State H.F. Transceiver is now appearing in increasing numbers on the bands and the impressive reputation that it has already built is largely due to the fact that it incorporates time proven design techniques borrowed from the outstanding FT-101Z and FT-901 transceivers. The receiver performance of the new FT-107M has brought high praise from experienced and critical operators and this, coupled with the undoubted convenience of all solid state construction, makes operating a joy and a delight indeed. The specification of the new FT-107M includes variable IF band width, audio peak/notch filter, RF speech processor, variable — threshold noise blanker, and full metering including SWR. An all new memory system is included providing twelve memory channels with fine tuning, scanning from the optional scanning microphone and YAESU's exclusive digital memory shift system. Modes include SSB, CW, AM and FSK with variable band width on CW.

Also pictured is the FT-107M together with its matching accessories which include separate VFO, transverter, tuning unit and speaker which interface to build a high technology base station designed for the 80's.

This month we also include a view of the new YAESU FT-707 compact H.F. all Solid State Transceiver which combines the technology engineered in the FT-107 and the FT-7B. The new FT-707 is, as would be expected, typically YAESU in design, construction and cosmetics and sets new standards for equipment in its class. Taking into account the time, money and effort which YAESU MUSEN put into their extensive research and design laboratories it is no wonder that YAESU MUSEN, the world's largest manufacturers of amateur radio equipment, always lead the field.



YAESU FT-707



THE ABOVE IS ONLY PART OF THE YAESU STORY — FOR FULL DETAILS OF ALL THE MODELS 36p IN STAMPS WILL BRING YOU THE LATEST GLOSSY CATALOGUE OF THE FULL PRODUCT RANGE TOGETHER WITH OUR CREDIT VOUCHER FOR £3.60 — A 10-1 WINNING OFFER!



### AGENCY APPOINTMENTS

We are pleased to announce that we have extended our service to out-of-town customers with the appointment of two new agents in areas which are, in our view, lacking in amateur sales facilities at the moment. AMATEUR ELECTRONICS UK is now fully represented by the following additional AGENTS and the personnel involved, named or otherwise, are fully licensed operators who have been selected for their interest in and knowledge of, the hobby not to mention their impeccable bona fides.

EAST ANGLIA — Dr. T. THIRST (Tim) G4CTT, NORWICH. 06925 403.

NORTH EAST — NORTH EAST AMATEUR RADIO, DARLINGTON. 0325 55969.

We hope customers in the above areas will avail themselves of the service now offered and we are sure they will derive great benefit from expert local help.

Our existing representatives remain, of course, as below.

- BRANCH: AMATEUR ELECTRONICS, UK — COASTAL, CLIFTONVILLE, KENT, KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m.-10.30 p.m.
- BRANCH: AMATEUR ELECTRONICS UK — SCOTLAND, 287 MAIN STREET, WISHAW, LANARKSHIRE, GORDON McCALLUM, GM3UCI. TELEPHONE WISHAW 71382. (EVENINGS CARLUKE 70914)
- AGENT: WALES & WEST — ROSS CLARE, GW3NWS, CAERLEON, NEWPORT. (CAERLEON 422232) — ONLY 20 MINUTES OVER THE SEVERN BRIDGE.



508-514 ALUM ROCK ROAD  
BIRMINGHAM 8

021-327 1497  
Telex 337045 6313

# RADIO SHACK for BEARCAT 220

## THE VERSATILE BEARCAT 220FB

### Bearcat® 220FB

#### Features:

- **20 Channels/2 banks** — Scan up to 20 frequencies at once or either of two banks of 10 channels.
- **7 Band Coverage** — Includes Low, High, UHF, UHF-Gov't and UHF-T public service bands, the 2-meter amateur (Ham) band, plus the aircraft band.
- **Automatic Search** — Seek and find new, exciting frequencies.
- **Aircraft Search** — Automatically search the entire Aircraft Band.
- **Marine Search** — Automatically search Marine frequencies by pressing one button.
- **Priority** — Samples designated priority frequency on channel 1 every 2 seconds.
- **Limit** — Sets upper and lower frequencies of search range.
- **Speed** — Choice of either 5 or 15 channels per second scan and search speed for closer monitoring of desired frequencies.
- **Automatic Lockout** — Locks out channels and "skips" frequencies not of current interest.
- **Selective Scan Delay** — Adds a two-second delay on desired channels to prevent missing transmissions when "calls" and "answers" are on the same frequency. Patented by Electra
- **Simple Programming** — Simply punch in the frequency you wish to monitor.
- **Decimal Display** — The large decimal display shows channels and frequency as well as features selected.
- **Patented Track Tuning** — Receive frequencies across the full band without adjustment. Circuitry is automatically aligned to each frequency monitored.
- **Crystalless** — Without ever buying a crystal you can select from all local frequencies
- **Automatic Squelch** — Factory-set squelch automatically blocks out unwanted noise.
- **Direct Channel Access** — Move directly to desired channel without stepping through all channels.
- **Deluxe Keyboard** — Makes frequency and feature selection easy for simple programming.
- **Space Age Circuitry** — Custom integrated circuits... a Bearcat tradition in scanning radios.
- **Rolling Zeros** — This Bearcat exclusive tells you which channels your scanner is monitoring.
- **AC/DC** — Operates at home or in authorised vehicle.
- **UL Listed/FCC Certified** — Tested for sale, quality design and manufacture.



### Bearcat® 220 FB Specifications

<b>Frequency Range:</b>	
Low Band Mobile	66-88MHz
Aircraft	118-136MHz
Amateur Band	144-148MHz
Public Services & Marine	148-174MHz
UHF Amateur	420-450MHz
UHF Band	450-470MHz
UHF Band	470-512MHz

**Size:**  
10 $\frac{1}{2}$ " W x 3" H x 7 $\frac{3}{8}$ " D

**Weight:**  
5 lbs.

**Power Requirements:**  
240V AC, 50 Hz,  
12-15V DC, 8 Watts

**Audio Output:**  
2.0 W rms.

**Antenna:**  
Telescoping (Supplied)

**Sensitivity:**  
0.6  $\mu$ v for 12dB Sinad on L and H bands  
 $\mu$  bands slightly less  
1.0  $\mu$ v for 10dB S/N on aircraft

**Scan Rate:**  
5 or 15 channels per second

**Connectors:**  
External antenna; external speaker;  
AC power, DC power

**Accessories (included):**  
Mounting bracket and hardware;  
DC cord

### Hear It All With One Antenna Total Frequency Coverage — 40 To 700 MHz

#### DISCONE

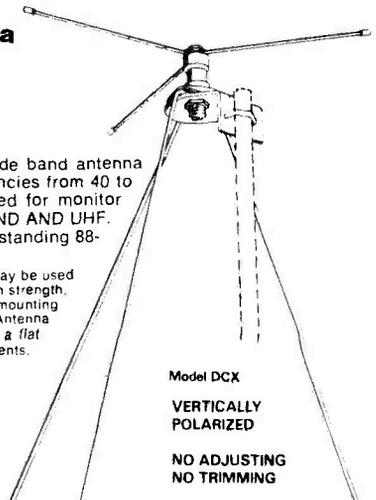
The Hustler Discone Model DCX is a wide band antenna and has complete coverage of all frequencies from 40 to 700 MHz. This design is especially suited for monitor radio reception of LOW-BAND, HIGH-BAND AND UHF. As a plus feature, use the Discone for outstanding 88-108 MHz. FM stereo reception.

The Discone is easy to assemble and install and may be used with any length coax cable. Manufactured from high strength, solid aluminum rod, zinc plated hardware and mounting assembly complete with SO-239 connector. Antenna mounts on vertical support up to 1 $\frac{1}{4}$ " O.D. or on a flat surface. Cone elements, 55" in length. Disc elements, 20" in length. Shipping Wt. 2.5 lbs. **£13.80**

#### Discone With Cable

Discone antenna supplied with 50' coax and factory installed connectors; PL-259 one end and monitor pin plug type on the other. Shipping Wt. 4.5 lbs.

**£20.70**

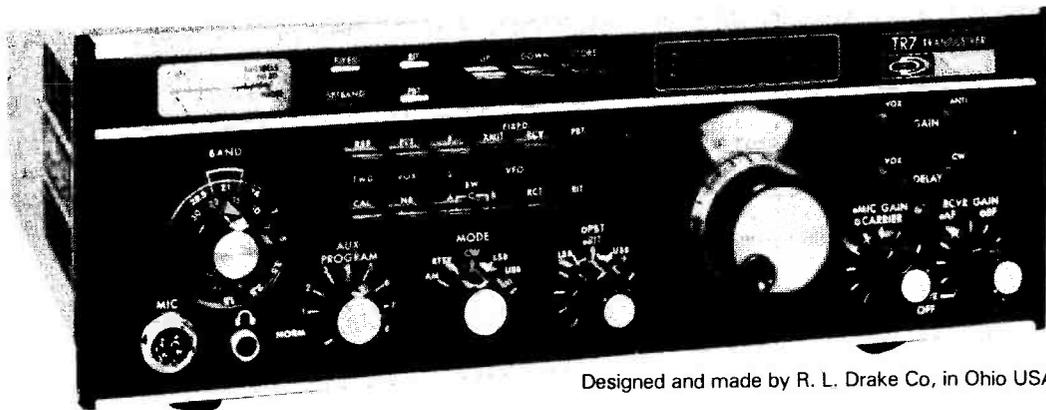


**RADIO SHACK LIMITED**  
TELEX 23718

188 BROADHURST GARDENS, LONDON, NW6 3AY  
TELEPHONE 01-624 7174

**Securicor Delivery**  
**£4.60**

# RADIO SHACK LTD for DRAKE



Designed and made by R. L. Drake Co, in Ohio USA

## DRAKE PRICES

4 international reply coupons

(Inclusive of 15% VAT)

TR-7/DR-7	Transceiver, gen. cov. receiver & Digital	1035.00
PS-7	Power Supply 120/240v for TR-7	207.00
RV-7	Remote VFO for TR-7	132.25
MS-7	Matching Speaker for TR-7 & R-7	25.90
R-7/DR-7	Receiver 0-30MHz	989.00
SL-300	CW Filter for TR-7 & R-7 (300 Hz)	39.10
SL-500	CW Filter for TR-7 & R-7 (500 Hz)	39.10
SL-1800	SSB/RTTY Filter for TR-7 & R-7 (1800 Hz)	39.10
SL-4000	AM Filter (4000 Hz) for R-7 Receiver	39.10
SL-6000	AM Filter for TR-7 & R-7 (6000 Hz)	39.10
AUX-7	Range Programme board & 1 Receive Module	32.20
RRM-7	Range receive modules (500 kHz) for AUX-7	5.75
RTM-7	Range transceiver modules (500 kHz) for AUX-7	5.75
NB-7	Noise Blanker for TR-7	66.24
FA-7	Fan for TR-7 & PS-7	20.70
MMK-7	Mobile mounting kit for TR-7	34.50
MN-7	ATU/RF Wattmeter 160-10m. 250 w	207.00
MN-2700	ATU/RF Wattmeter 160-10m. 2kw	197.80
WH-7	RF Wattmeter/VSWR bridge HF	59.80
385-0004	Service Manual for TR-7	18.50
7037	TR-7 Service Kit	37.95
L-7	Linear Amplifier 2 kw 10-160m.	759.00
TR-4CW(RIT)	Transceiver AM/SSB/CW with R.I.T.	496.80
AC-4	120/240v Power supply for TR-4CW	109.25
34-PNB	Plug in Noise Blanker for TR-4CW	73.60
DC-4	DC Power Supply for TR-4CW	138.00
RV-4C	Remote VFO for TR-4CW	109.25
FF-1	Crystal Control for TR-4CW	39.10
MS-4	Speaker for TR-4CW, R-4C & SPR-4	29.90
TV-42LP	Low Pass Filter 100w	10.35
TV-3300LP	Low Pass Filter 2kw	18.40
RP-500	Receiver Protector	73.60
7072	Hand microphone for TR-4CW	18.40
7073	Hand microphone for TR-7	13.80
7077	Desk microphone for TR-7	25.30
DL-300	Dummy Load, 300 watts	20.70
DL-1000	Dummy Load, 1000 watts	37.95
RC6-4	Remote control antenna switch, 5 way	82.90
B-1000	Bajun 4; 1 for MN-7 & Mn-2700	20.70
1525-EM	Encoder microphone	36.80
AA-10	2m. Amplifier 1w in-10w output	46.00
WV-4	RF Wattmeter 20-200 MHz	69.00
SPR-4	Programmable general purpose receiver	460.00
DC-PC	DC Power cord for SPR-4	4.60
FL-Filters	For R-4C, 25/ 5/1.5/4.0 & 6.0 kHz, each	39.10
Manuals	Spare operator manuals	6.00
Crystals	Accessory crystals for R-4C & SPR-4	6.44

BE READY FOR THE  
NEW BANDS  
WITH YOUR DRAKE TR-7!

CARRIAGE EXTRA ALL ITEMS

BARCLAYCARD

DRAKE ★ SALES ★ SERVICE

# RADIO SHACK LTD.



Giro Account No. 588 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 IC260E does it all. The ICOM IC260E 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  
STANDARD BEARCAT

WESTERN  
G WHIP

ANTENNA SPECIALISTS  
YAESU MUSEN

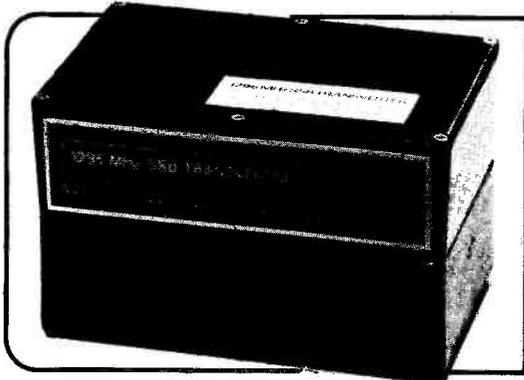
J-BEAM  
RSGB PUBLICATIONS

HP AND PART EXCHANGE WELCOMED



# MICROWAVE MODULES LTD

## 1296 MHz LINEAR TRANSVERTER: MMT 1296/144



- ★ Receive converter includes a two stage low-noise microstrip Preamplifier constructed on Teflon PCB and housed in a separate internal enclosure
- ★ Extensive filtering ensures excellent out of band signal rejection
- ★ 1.3 watts transmit output power
- ★ Built-in pin diode aerial changeover relay
- ★ RF Vox provides automatic operation
- ★ Highly stable zener diode controlled 96 MHz oscillator
- ★ 13.8 V DC operation

### SPECIFICATION

#### 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 × 120 × 106 mm (7 $\frac{3}{8}$ × 4 $\frac{3}{4}$ × 4 $\frac{1}{4}$ )
Weight	1.8 Kg (4 lb.)

#### TRANSMIT SECTION

Input impedance	50 Ohm
Input modes	SSB, FM, AM or CW
Input modes 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

#### LOCAL OSCILLATOR

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

#### 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 TEFLON 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: 051-5234011

Telex 628608 Micro G

# P.M. ELECTRONIC SERVICES

## PROFESSIONAL COMPLETE CRYSTAL SERVICE AMATEUR

Prices shown exclude VAT — UK Customers please add 15%.

### TWO METRE — CRYSTAL RANGE



CRYSTAL RANGE USE (Tx or Rx) and HOLDER	6 MHz-TX-HC25/U	8 MHz-TX-HC6/U	10 MHz-RX-HC6/U	11 MHz-RX-HC6/U	12 MHz-TX-HC25/U	14 MHz-RX-HC25/U	18 MHz-TX-HC25/U	36 MHz-TX-HC6 & 25U	44 MHz-RX-HC6/U	44 MHz-RX-HC25/U	48 MHz-TX-HC6 & 25/U	52 MHz-RX-HC25/U	72 MHz-TX-HC25/U
OUTPUT FREQUENCY													
144.4 (433.2)	b												
144.480	c												
144.800	e												
144.850	e												
145.000/ROT	e												
145.025/RTT	e												
145.050/R2T	a												
145.075/R3T	a												
145.100/R4T	a												
145.125/R5T	a												
145.150/R6T	a												
145.175/R7T	a												
145.200/R8T	a												
145.300/S12	e												
145.350/S14	e												
145.400/S16	e												
145.425/S17	e												
145.450/S18	a												
145.475/S19	a												
145.500/S20	a												
145.525/S21	a												
145.550/S22	a												
145.575/S23	a												
145.600/ROH	e												
145.650/R1R	e												
145.675/R2R	e												
145.700/R3R	e												
145.725/R4R	e												
145.750/R5R	e												
145.775/R6R	e												
145.800/R7R	e												
145.850/S38	a												
145.950/S38	a												

S18 and S19 are now added to our stock range

PRICES: (a) £1.95; (b) £2.32; (c) £2.80; (e) £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 as per code (e).

ORDERING. When ordering please quote (1) Channel; (2) Crystal frequency; (3) Holder; (4) Circuit conditions (load in p.f.) 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 (FT2F, FT2 Auto, FT224), most of the ICOM range and the TRIO-KENWOOD range. We can also supply from stock crystals for the HEATHKIT HW202 and HW17A.

### CRYSTALS FOR BRITISH 70CM CHANNELS

Due to the much higher multiplication involved (3 times that on 2m.) all our stock 70cm. crystals are now to much closer tolerances than our standard amateur range.

We are stocking the following channels RB0 (434.60/432.00), RB2 (434.66/433.05), RB4 (434.70/433.10), RB6 (434.75/433.15), SU8 (433.20), RB10 (434.85/433.25), RB14 (434.95/433.35), SU18 (433.45) and SU20 (433.50) — TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pockertone (PFI) and STORNO COL. COM 662 all at £2.32. For the U450L Base Station we have the Tx crystals for all the above channels. The RX crystals for the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SE12—433.30 RTTY, SU16—433.40 and SU22—433.55) for all the above equipments are available at £3.94 to Amateur Spec. or £4.64 to same spec. as stock items. Delivery approx. 4/6 weeks.

**4M. CRYSTALS FOR 70.26 MHz — HC6/U**  
TX 8.7825 MHz and RX 6.7466 MHz or 29.780 MHz £2.32.

**10.245 MHz 'ALTERNATIVE' IF CRYSTALS** £2.32. For use in Pye and other equipment with 10.7 MHz and 455 kHz IF's to get rid of the "birdy" just able 145.0 MHz in HC6/U, HC18/U and HC25/U.

**CRYSTAL SOCKETS — HC6/U, HC13/U and HC25/U (Low loss) 16p each**  
10p p&p per order (p&p free if ordered with crystals).

**CONVERTER/TRANSVERTER CRYSTALS — HC18/U**  
All at £3.00, 38.6666 MHz (144/28), 42 MHz (70/28), 58 MHz (144/28), 70 MHz (144/4), 71 MHz (144/2), 95 MHz (342/52), 96 MHz (1,296/432/144), 101 MHz (432/28), 101.50 MHz (434/28), 105.6666 MHz (1,296/28) and 116 MHz (144/28).

**TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS**  
100 kHz in HC13/U and 100 kHz in HC13/U and 200 kHz and 455 kHz in HC6/U, £2.95.  
1 MHz and 5 MHz in HC6/U and 10 MHz and 10.7 MHz in HC6/U and HC25/U, £2.80

**ANZAC MD-108 DOUBLE BALANCED MIXER**  
5-500 MHz supplied with full details for only £5.95.

**EXPRESS SERVICES**  
Many types made to order crystals are available on our EXPRESS SERVICE with a delivery of three days on our class "A" service. Telephone or Telex for details.

TERMS: CASH WITH ORDER — MAIL ORDER ONLY — S.A.E. WITH ALL ENQUIRIES — PRICES INCLUDE P.&P. (BRITISH ISLES) EXCEPT WHERE STATED — OVERSEAS CHARGED AT COST.

**CRYSTALS 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**  
Adj. tol. ±50ppm. Temp. tol. ±100ppm 0 to +70°C.  
6.0 to 19.999 kHz £28.12 (£31.63) 80 to 99.999 kHz ... £7.30 (£8.21)  
20 to 29.999 kHz £17.75 (£19.97) 100 to 149.99 kHz ... £6.68 (£7.51)  
30 to 59.999 kHz £15.51 (£17.45) 150 to 499.99 kHz ... £6.20 (£6.97)  
60 to 79.999 kHz £12.41 (£13.19) 500 to 799.99 kHz ... £7.30 (£8.21)

**B High frequency fundamentals/overtones in HC6/U, HC18/U or HC25/U**  
Adj. tol. ±20 ppm. Temp. tol. ±30 ppm — 10 to +60°C  
\*800 to 999.9 kHz (fund) ... £9.50 \*25 to 30MHz (fund) ... £7.56  
\*1.0 to 1.499 MHz (fund) ... £9.45 \*15 to 20.99 MHz (3 O/T) ... £4.72  
\*1.5 to 2.599 MHz (fund) ... £4.21 \*21 to 62.99 MHz (3 O/T) ... £3.94  
\*2.6 to 20.99 MHz (fund) ... £3.94 \*60 to 105 MHz (5 O/T) ... £4.53  
\*3.4 to 3.999 MHz (fund) ... £5.43 \*105 to 125 MHz (5 O/T) ... £7.09  
\*4.0 to 5.999 MHz (fund) ... £4.21 \*125 to 180 MHz (O/T) ... £6.48  
\*6.0 to 20.99 MHz (fund) ... £3.94 180 to 25 MHz (O/T) ... £10.64  
\*21 to 24.99 MHz (fund) ... £6.14

Delivery \* Normally 4/6 weeks (express available), all other frequencies 6/8 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/U (wire end HC6/U) available as per HC6/U above at 25p extra on HC6/U price. Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

**2 ALEXANDER DRIVE, HESWALL, WIRRAL, MERSEYSIDE L61 6XT**  
Tel: 051-342 4443. Cables: CRYSTAL BIRKENHEAD. Telex: 627371

**MAIL  
ORDER**

**BREDHURST  
ELECTRONICS**  
HIGH ST., HANDCROSS, SX.  
0444 400786

**RETAIL  
PREMISES**  
OPEN MON-SAT 9-5.30  
CALLERS WELCOME



TR10 120V . £347 : 120S . £432

**H.F. TRANSCEIVERS**

- TS 120S ..... £495
- TS 120V ..... £408

For the HF operator who wants either a base station rig that he can use for mobile operation or vice versa, the TS120 range is the optimum choice. Either the 120V with 10 watts output, or the 120S with 100 watts will give outstanding performance in any environment. The modular unit approach adopted for this series means that you can start with the basic rig and add units such as external VFO, speaker, matching PSU or 100 watt linear as your needs (and funds) grow. Come and try this marvellous little rig — you will be really impressed with its performance as hundreds of proud owners can testify.

ALSO IN STOCK

- |                            |      |                       |      |
|----------------------------|------|-----------------------|------|
| TR10TS 180S with DFC ..... | £679 | YAESU FT 101ZD .....  | £661 |
| YAESU FT 107M .....        | £859 | YAESU FT 101Z .....   | £574 |
| TR10TS 520SE .....         | £437 | DENTRON HF 200A ..... | £399 |

**H.F. RECEIVERS**

R1000 ..... £298

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.

ALSO IN STOCK

- LOWE SRX 30 ..... £178
- YAESU FRG 7 ..... £209
- YAESU FRG 7000 ..... £369

Convince yourself as we are convinced — come and try one and compare it side by side with its competitors.



R1000  
at £298 <sup>VAT</sup> inc CARRIAGE

**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 220 covers 4M, 2M, aircraft band, marine band, business band and 70cm amongst other frequency bands. It has up 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.

**PRICE**  
**£241.00**

Coverage 66-88 Mhz  
118-136 Mhz  
144-148 Mhz  
148-174 Mhz  
420-512 Mhz



**2 METRE HANDHELD  
TRANSCEIVERS**

ALSO IN STOCK

- FDK Palm II 6 channel ..... £99.00
- YAESU FT 202R 6 channel ..... £119.00
- FDK Palm Sizer synthesized ..... £149.00
- AOR AR240 synthesized ..... £165.00
- YAESU FT 207R synthesized + keypad ..... £199.00
- TRIO TR2400 synthesized + keypad ..... £210.00

**TRIO TR2300**

IDEAL FOR PORTABLE,  
MOBILE OR HOME USE

**£166** inc. VAT &  
Carriage



A fully synthesized 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 excellent value for money and comes complete with case, charger, power lead etc.

**TELEPHONE ENQUIRIES WELCOME**  
**ALL PRICES INCLUDE VAT and CARRIAGE**

- Yaesu World Clock Qtr 24 ..... £18.40 (75p p&p)
- Ringo Ranger Vert. Antenna VHF ..... £25.00 (75p p&p)
- Yaesu 7H55 Headphones ..... £10.00 (75p p&p)

- All Jaybeam Antenna ..... £P.O.A.
- All A.S.P. Mobile Antenna ..... £P.O.A.
- All Microwave Modules ..... £P.O.A.

**TO ORDER ANY OF THE ABOVE ITEMS SIMPLY WRITE OR PHONE YOUR CREDIT CARD NUMBER  
TO THE ABOVE ADDRESS TO ENSURE SAME DAY DESPATCH**

REMEMBER 0444 400786

ACCESS • BARCLAYCARD • INSTANT HP • PART EXCHANGE



**FOR QUALITY CRYSTALS - AT COMPETITIVE PRICES**  
**POPULAR FREQUENCIES IN STOCK**  
**MADE TO ORDER 10 kHz to 225 MHz**



QSL leads the field in supplying crystals world wide to major communications companies, broadcasting authorities and posts and telecommunications administrations. As a result we can supply the amateur with a high quality, competitively priced product over a frequency range from 10 kHz to 225 MHz. Get the power of the professionals in crystal supply behind you!

**2 METRE STOCK CRYSTALS.** Price £1.83 for one crystal. £1.74/crystal when two or more purchased.

	HC6/U	HC6/U	HC25/U	HC25/U	HC25/U	HC6 &
	30pF TX	30pF TX	30pF and	20pF and	25pF and	25/U
			40pF TX	30pF RX	20pF TX	SR RX
RO	4.0277	8.0555	12.0833	14.9888	18.1250	44.9666
R1	4.0284	8.0569	12.0854	14.9916	18.1281	44.9750
R2	4.0291	8.0583	12.0875	14.9944	18.1312	44.9833
R3	4.0298	8.0597	12.0895	14.9972	18.1343	44.9916
R4	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R5	4.0312	8.0625	12.0937	15.0027	18.1406	45.0083
R6	4.0319	8.0638	12.0958	15.0055	18.1437	45.0166
R7	4.0326	8.0652	12.0979	15.0083	18.1468	45.0250
S8	—	—	12.1000	14.9444	18.1500	44.8333*
S9	—	—	12.1020	14.9472	18.1531	44.8416*
S10	—	—	12.1041	14.9500	18.1562	44.8500*
S11	—	—	12.1062	14.9527	18.1593	44.8583*
S12	—	—	12.1083	14.9555	18.1625	44.8666*
S13	—	—	12.1104	14.9583	18.1656	44.8750*
S14	—	—	12.1125	14.9611	18.1687	44.8833*
S15	—	—	12.1145	14.9638	18.1718	44.8916*
S16	—	—	12.1167	14.9666	18.1750	44.9000*
S17	—	—	12.1187	14.9694	18.1781	44.9083*
S18	—	—	12.1208	14.9722	18.1812	44.9166*
S19	—	—	12.1229	14.9750	18.1843	44.9250*
S20	4.0416	8.0833	12.1250	14.9777	18.1875	44.9333
S21	4.0423	8.0847	12.1270	14.9805	18.1906	44.9416
S22	4.0430	8.0861	12.1291	14.9833	18.1937	44.9500
S23	4.0437	8.0875	12.1312	14.9861	18.1968	44.9583

SR = Series Resonance \*HC25 only

**Also in stock:** RO to R7 for FT221 RO to R7 and S8 to S23 for following: Belcom FS1007, FDK TM56, Multi 11 Quartz 16 and Multi 7, Icom IC2F, 21, 22A and 215, Trio Kenwood 2200, 7200, Uniden 2030 and Yaesu FT2FB, FT2 Auto, FT224, FT223 and FT202.

**Also in stock 4 and 8 MHz TX in HC6/U for 145.8 MHz.** Icom crystals TX for 145.6 MHz (RRO). 44 MHz RX crystals in HC6 for 145.8 and 145 (RRO) and HC6 only for 145.475 MHz (S19) HC25 for 145.00. All at above price.

**4 METRE CRYSTALS** for 70.26 MHz in HC6/U at £2.25. TX 8.78250 MHz. RX 6.7466 or 29.78 MHz in stock.

**70cm CRYSTALS** in stock 8.0222 and 12.0333 in HC6 £1.85. Pye Rocketfone PF1, PF2, PF70 and Wood and Douglas £4.50 a pair or TX £2.25, RX £2.50, SUB (433.2) RBO, RB2, RB4, RB6, RB10, RB11, RB13 and RB14.

**CONVERTER CRYSTALS** in HC18/U at £2.85. In stock 38,666, 42,000, 70,000, 96,000, 101,000, 101,500, 105,666 and 116,000 MHz.

**TONE BURST AND I.F. CRYSTALS** in HC18/U at £2.25 in stock. 7.168 MHz for 1750 kHz and 10.245 MHz for 10.7 MHz IF's.

**FREQUENCY STANDARDS** in stock £2.75. HC6 200 kHz, 455 kHz, 1000 kHz, 5,000 MHz and 10,000 MHz. HC13 100 kHz, HC18 1000 kHz, 7,000 MHz, 10,700 MHz, 48,000 MHz and 100,00 MHz.

PRICES ARE EX VAT. PLEASE ADD 15%.

**QuartSLab**

**MARKETING LTD**  
**P.O. Box 73**  
**Summit House**  
**London SE18 3LR**

Telephone: 01-690 4889 24 hr. Ansafone: Erith (03224) 30830  
 Telex: 912881 CWUKTX-G (Attention QUARTSLAB)  
 Cables: QUARTSLAB London SE18

**MADE TO ORDER CRYSTALS SINGLE UNIT PRICING**

	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery		
				A	B	
Fundamentals	1	200 (total)	10 to 19,999 kHz	—	£23.00	
	2	200 (total)	20 to 29,999 kHz	—	£16.50	
	3	200 (total)	30 to 99,999 kHz	—	£10.50	
	4	200 (total)	100 to 999,999 kHz	—	£6.00	
3rd OVT	5	50	1.00 to 1,499 MHz	£9.00	£6.00	
	6	10	1.50 to 1,999 MHz	£4.75	£4.20	
	7	10	2.00 to 2,599 MHz	£4.75	£4.00	
	8	10	2.60 to 3,999 MHz	£4.55	£3.70	
	9	10	4.00 to 20,999 MHz	£4.55	£3.60	
	10	10	21.00 to 24,000 MHz	£6.00	£5.40	
	5th OVT	11	10	21.00 to 59,999 MHz	£4.55	£3.60
		12	10	60.00 to 99,999 MHz	£5.00	£4.00
	5th, 7th & 9th OVT	13	10	100.00 to 124,999 MHz	£6.15	£5.20
		14	20	125.00 to 149,999 MHz	—	£6.00
15		20	150.00 to 225.00 MHz	—	£7.50	

Unless otherwise requested fundamentals will be supplied with 30pF load capacity and overtones for series resonance operation.

**HOLDERS** — Please specify when ordering — 10 to 200 kHz HC13/U, 170 kHz to 170 MHz HC6 or HC33/U, 4 to 225 MHz, HC18 and HC25.

**DELIVERY.** Column A 3 to 4 weeks (this service is subject to availability), Column B 6 to 8 weeks.

Please note that it is not always possible to provide the A delivery service but a telephone call will confirm its availability. Any orders received for A delivery when it is not available will automatically be placed on B delivery and a credit note issued for the difference in price.

**DISCOUNTS.** 5% mixed frequency discount for 5 or more crystals at B delivery. Price on application for 10 or more crystals to same frequency specification. Special rates for bulk purchase schemes including FREE supply of crystals used in UK repeaters.

**EMERGENCY SERVICE SURCHARGES** (to be added to A delivery prices). 4 working days £8, 6 working days £6, 8 working days £4, 13 working days £3 (maximum of 5 crystals on 4 day delivery).

**CRYSTAL SOCKETS** HC6/U and HC25/U 16p.

**MINIMUM ORDER CHARGE** £1.50.

**COMMERCIAL USES.** 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 a limited 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 Southern Irish cheques and postal orders are no longer acceptable. Please send bank draft in pounds Sterling.

**OVERSEAS DISTRIBUTORS**

West Germany, Austria and Benelux countries — SSB Electronic, Karl Arnold Str. 23, 5860 Iserlohn, West Germany.  
 Denmark — Asbjorn Jørgensen, Aabrinken 1, Tapdrup, DK800, Viborg.  
 Denmark, Portugal — Sorubal SARL, Rua General Pimenta de Castro, 15-81, Lisboa 5, Portugal.  
 (Enquiries invited from companies in other countries.)

EIØCL

EI8DC

G4CIV

# WESTERN COMMUNICATIONS (Galway) LTD.

## KILCOLGAN, GALWAY, IRELAND

Tel. Within the State: 091-86206 or 22567.

U.K. Callers: 0009-86206 or 22567

Telax: 8933 MHTC EI

### ***Importers — Exporters — Factors*** ***Distributors of Telecommunication Equipment***

*Your nearest AGENT West, Midlands & South for: YAESU MUSEN; STANDARD;*

DANCOM Landmobile — MPT + P&T Appd. — Agents reqd.

DRAKE TR7/DR7/L7  
note our Drake Tx/Rx, full cover

QUARTZ — Crystals — fastest delivery.

BEARCAT 210/22FB/250FB

Microwave Modules Products Stocked.

*Distributor for: H.M.P. Commercial, Marine, Amateur Antennas.*  
Agents required

LUNAR — Amps and Pre Amps.

SPECTRUM — Repeaters — Duplexers  
— Commercial. — to order

*Distributor for: G. WHIP of Wales — full line in stock.*

DANCOM — Marine, Type Approved.

SYT. Land line, interface equip.

SAXTON — RG8u + 58u — Agents reqd.

*Stockist of: J. Beam, Bantex, Cushcraft*

*We also have all the accessories and hard-to-get plugs, sockets, etc.*  
*Suppliers and Manufacturers — Note.*

***We will distribute quality communication products on a sole agency basis and are equipped to handle our own Warranty.***

# Optimum Performance with KW Ancillaries



**DECCA-KW E-ZEE MATCH**  
Antenna Tuner 10-80 metres, matches 50/75 ohm input to co-ax fed antenna's, also twin feeder and single wire systems.



**DECCA-KW107 SUPERMATCH**  
Antenna Tuning System Incorporates E-ZEE Match, SWR/RF power meter; Dummy Load; Antenna switch.

**DECCA-KW109 SUPERMATCH**  
A high power version of the KW107 is available.



**DECCA-KW BALUN Mk. II**  
The Decca-KW Balun is broadband-3 to 30 MHz, rated up to 2 KW p.e.p. 1:1 Ratio 50 ohms "unbalanced" feed to "balanced" output. Waterproof moulded case. Suitable for Dipole and Beam Antenna.



**DECCA-KW ANTENNA SWITCH**  
Selects up to 3 Antennas. Low-insertion loss up to 200 MHz. 1kW p.e.p. rating.



Amateur Radio Products,  
**DECCA COMMUNICATIONS LTD.**  
Crampton Rd., Otford, Sevenoaks, Kent TN14 5EA  
Tel.: Sevenoaks (0732) 50911

Other KW Favourites—Decca KW Dummy Load. KW Traps (original and the best); KW Trap Dipoles; Stockist for HY-Gain beams and Verticals; CDR Rotators; Shure Microphones, etc.  
Write or phone for catalogue.

## SERVING RADIO AMATEURS WORLD-WIDE

# C.B. ELECTRONICS

UNIT 3, 771 ORMSKIRK ROAD, PEMBERTON, WIGAN, WN5 8AT

Telephone: Wigan (0942) 216567

**THE BEST IN THE NORTH-WEST**

**HOW TO FIND US** — From M6 junction 26 follow signs for Wigan A577 at first traffic lights (T junction) turn right towards Wigan. At next traffic lights you are there. *BUT* turn left and 10 yards further turn right by telephone kiosk. Premises are slightly to your right. Plenty of parking space. Mileage from motorway ½ mile. From Wigan follow the A577 Skelmersdale to traffic lights at Fleet Street, Pemberton (Ye Olde White Swan on your left). Turn right then 10 yards right again. By Co-op. Mileage from Wigan 2½ miles.

<p>YAESU FT901DM ..... £920.00 FT101Z ..... £575.00 FT101ZD ..... £661.25 FL2100Z ..... £408.25 FT7B ..... £431.75 FC301 ..... £124.20 FC901 ..... £132.25 FRG7 ..... £210.00 FL101 ..... £500.00 FL110 ..... £149.50 FT225R ..... £560.32 FT225RD ..... £557.75 FT227RB ..... £263.35 FT202 ..... £119.00 FT207R ..... £199.00</p>	<p>Charger ..... £18.87 QTR24 ..... £18.40 YP150 ..... £67.27</p> <p><b>SWR Bridges</b> Single meter ..... £12.30 Twin meters ..... £15.51</p> <p><b>Morse keys</b> Standard ..... £3.15 Nye King ..... £12.00 Nye King heavy duty ..... £13.50</p> <p>F.D.K. Multi 700E ..... £229.00</p>	<p>Multi Ull ..... £249.00 Palmisizer ..... £159.00 Palm IV ..... £159.00 TM56B ..... £104.00</p> <p><b>CDR Rotators</b> AR30 ..... £47.15 AR40 ..... £54.62 CD44 ..... £109.25</p> <p><b>Ernotator</b> 103LBX ..... £98.00 502CXX ..... £145.12 1102 ..... £239.00</p>	<p>ASP Antennas 2009 5/8 wave ..... £11.38 201 1/4 wave ..... £4.31 397 Low Band ..... £7.13 E462 UHF ..... £6.75 677 5/8 wave ..... £14.95 462 5/8 wave ..... £7.56 Magnetic Base ..... £10.50 Boot mount ..... £3.50</p> <p><b>High Pass Filter</b> ..... £3.00 Headphones ..... £5.20 PTT mics ..... £4.50</p> <p><b>WESTERN</b> ANT SW. 5w ..... £10.50</p>
---	--	---	---

**TERMS: ACCESS, C.W.O. CARRIAGE AND POST EXTRA AT COST.**

**BUSINESS HOURS**  
Mon, Tues, Thurs, Fri 9.30-5.30  
Sat 9.30-4.30  
Closed Wednesday

INSTANT H.P. FOR LICENSED AMATEURS

S.A.E. ALL ENQUIRIES

H.P. AND CREDIT TERMS

# S.E.M.

P.O. BOX 6, CASTLETOWN, ISLE OF MAN Tel: MAROWN (0624) 851277  
**Pre-Amplifiers, Power Amplifiers, Converters, Transverters,  
 A.T.U.s — Something for Everyone**

## THREE SENTINEL 2 METRE POWER/PRE-AMPLIFIERS

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 sockets.

**SENTINEL 30** — Ten times power gain, e.g. 3W in 30W out up to 5 watts input. £50.00.

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

**SENTINEL 100** — Ten times power gain, e.g. 10W in 100W out up to 16W input. £126.50. All in stock.

## SENTINEL 2 METRE PRE-AMPLIFIERS

The 2 metre units use a neutralised J. FET circuit rather than the more common MOSFET on grounded gate J FET. This gives lower noise figures and higher gain. We select the J FETs for a 1dB noise figure and 18dB gain.

The noise figure of 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.

### 1. SENTINEL AUTO 2 METRE PRE-AMPLIFIER

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:  $1\frac{1}{2} \times 2\frac{1}{2} \times 4$ . Price: £20.00\* ex. stock. 70cm version £23.00\* ex. stock.

### 2. PA5 AUTOMATIC 2 METRE PRE-AMPLIFIER

Same as the Sentinel Auto but for 240V mains operations in a

pretty little case. Size:  $3\frac{1}{2} \times 6\frac{1}{4}$  front panel,  $2\frac{1}{2}$  deep. SO239 sockets. Price: £28.75\* ex. stock.

### 3. SENTINEL STANDARD 2 METRE PRE-AMPLIFIER

Same performance as the Sentinel Auto but no r.f. switching. Price: £13.22\* ex. stock. 70 cms version £16.00\* ex. stock.

### PA3 DUAL GATE MOSFET 2 METRE PRE-AMPLIFIER

Mini 2 metre pre-amp. Size 1 cubic inch to fit inside transceivers. N.F. 2dB gain 18dB. 9-15V. £8.00 ex. stock. 70 cm version £10.00 ex. stock.

### S.E.M. Z MATCH

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. SO 239 and 4 mm terminals for co-ax or wire aerials, both end fed and open wire. Price: £45.00. Ex. stock.

### SENTINEL H.F. WIDEBAND PRE-AMPLIFIERS

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:  $2\frac{1}{2} \times 1\frac{1}{2} \times 3$ . We make the following two versions:

### SENTINEL STANDARD H.F. PRE-AMPLIFIERS

Performance as above. £10.00\* ex. stock.

Prices include VAT and delivery. \*Belling Lee sockets standard, SO239s £1.73 extra. 12 months guarantee. To order: C.W.O. or credit card. Phone your credit card number for same day service. Belling Lee Plugs 25p. PL259 plug and reducer 75p. Need more info? Ring or write.

# J. BIRKETT

## Radio Component Suppliers

25 THE STRAIT · LINCOLN · LN2 1JF

Telephone: 20767

**UHF POWER AMPLIFIER MODULE** 50mW Input. Output 2.5 watt 420-480MHz, 13 Volt, 50 ohm Type BGY 22C with data at £12.50.

**BLY34 3 WATT 13 VOLT 175MHz** with data at 75p.

**HF-VHF POWER TRANSISTOR** 587BLY 28 to 70MHz SSB, FM, 40

Watts 28 Volt with data at £3.

**BLY55 175MHz 4 WATT 13 VOLT** with data at £2.50.

**BLY97 24 VOLT 175 MHz 4 WATT** with data at £4.

**BFR64 470MHz 13 VOLT 3 WATT** with data at £5.

**SPECIAL SUB-MINIATURE TUBULAR TRIMMER** 0.5 to 3pf at 15p.

**R.F. SIGNAL TRANSISTORS** 2N918 at 25p, AF239 at 50p, 2N 5179 at

50p, 2N 5180 at 50p.

**EDDYSTONE TRANSMITTING VARIABLES** 30 + 30pf (60pf) at £2.20.

**VHF-UHF STRIPLINE FET** 2N4417 with data at £2.20.

**FERRITE BEADS** FX 1115 at 15p doz.  $\frac{1}{2}$ " Long type at 6 for 20p.

**MINIATURE AIRSPACED TRIMMERS** 10pf at 20p each.

**SOLDER-IN FEED THRU's** 6.8pf, 300pf, 1000pf at 20p doz.

**MINIATURE VARIABLE CAPACITORS** 250 + 250pf (500pf) at 85p.

**VALVE HOLDERS** B7G, B96 Both 10p. Ceramic B9D at 15p.

**6 TO 12 VOLT SPCO 5 AMP CONTACTS** RELAY at 60p.

**MINIATURE DISC CERAMICS** 22, 33, 270, 330, .01uf 50v.w., All 20p

doz. .1uf 63v.w., at 5p. 22uf 6v.w., at 5p.

**VHF MINIATURE R.F. CHOKES** 10U.H., 30U.H., 300U.H., All 7p each.

**TTL I.C.'s** 7400, 7410, 74L00, 7453, 7430. All at 6 for 50p.

**BUTTERFLY PRE-SET VARIABLE CAPACITORS** 25 x 25pf at 50p.

38 x 38pf at 60p. 38 x 38pf Wide Spaced at 65p.

**ELECTRET MICROPHONE INSERTS** with FET Pre-Amp at £1.85.

**1 WATT WIRE ENDED ZENERS** 3.6, 5.6, 6.8, 8.2, 9.1, 11, 12, 13, 15,

16, 20, 22, 27, 30, 36, 56, 62, 91, 110, 120, 130, 150, 160, 180,

200 Volt all at 15p each.

**10 WATT STUD MOUNTING ZENER DIODES** 4.7, 6.8, 7.5, 8.2, 12, 15,

18, 20, 22, 27, 30, 36, 56, 62, 91, 110, 120, 130, 150, 180, 200

Volt All at 50p each.

**50 ASSORTED DISC CERAMICS** for 60p.

**100 C280 POLYESTER CAPACITORS** assorted for 60p.

**10.7MHz VERNITRON FM4 FILTERS** at 50p. 3 for £1.

**MURATA 10.7MHz FILTERS** Type SFC10.7 at 30p each.

**200 ASSORTED  $\frac{1}{4}$  WATT RESISTORS** for 75p.

**50. BC 107-8-9 TRANSISTORS** assorted untested for 60p.

**MINIATURE 12 WATT CERAMIC TAG STRIPS** at 15p.

**X BAND GUNN DIODES** with data at £1.65.

**ITRON 9 VOLT 9 DIGIT SEVEN SEGMENT DISPLAY** Type FG95A at

£2.20.

**3 GANG VARIABLE CAPACITORS** 25 x 25 x 25pf at 75p.

**HP HOT CARRIER DIODE** 5082-2800 at 40p each.

**NUT FIXING** SO 259 VHF SOCKETS at 50p each.

**SPECIAL 5 PIN DARLINGTON TRANSISTORS** in 14 PIN DIL PACKAGE

HF 5000, 10 Volt, 500mA with connections at 50p.

**SUB-MINIATURE 1000pf 50v.w. DISC CERAMICS** at 25p doz.

**SUB-MINIATURE SPCO TOGGLE SWITCHES** at 50p each.

**VHF-UHF FETS** BF256C at 4 for 75p. E304 at 30p. 4 for £1.

**VHF POWER TRANSISTORS** R5174 10 watt 13 volt 175MHz at £2.50.

**VHF STRIPLINE TRANSISTORS** Type 1. 2GHz 18 volt Emmitter

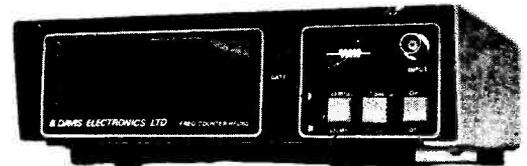
connected one leg only at £1. Type 2. 2 GHz 18 volt Emmitter Fully

connected at £2. Type 3. 5 GHz Low Noise with data sheets at £3.

Type 4. like BFR 96 at £1.95.

**HFC 600 8 DIGIT FREQUENCY COUNTER** 600MHz at £123. SAE for

leaflet.



**HFC 600 FREQUENCY COUNTER** 8 Digit 600 MHz at £123. SAE for

leaflet. Please add 20p for post and packing on U.K. under £2. Overseas

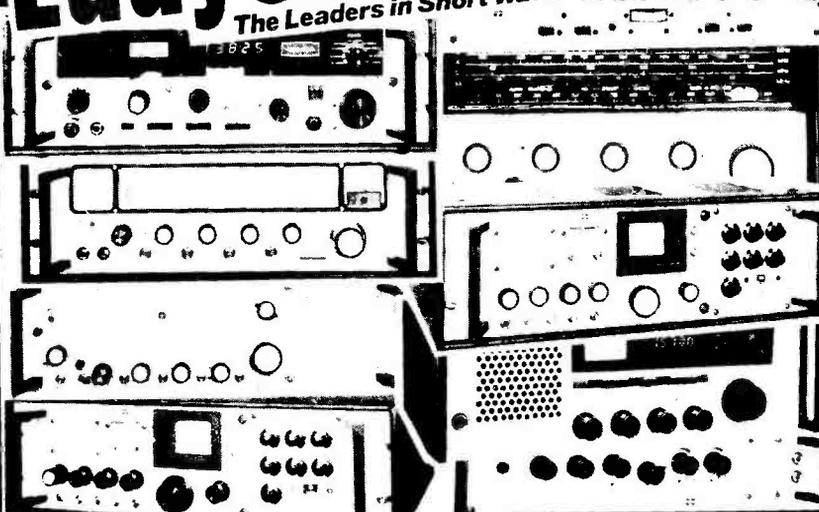
postage charged at cost.

# Eddystone

The Leaders in Short Wave

at SONIC SOUND AUDIO  
BRITAIN'S No. 1  
AUDIO STORE

SOLE UK DISTRIBUTORS FOR EDDYSTONE.



Sonic Sound, the premier home entertainment store have now added yet another big name in the field of sound equipment to further enhance their prestige in London's centre of the audio, visual and Hi-Fi field in Tottenham Court Road.

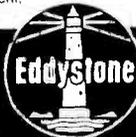
Eddystone, at the top of the tree since short wave began, have now appointed Sonic Sound Audio as sole retail distributors in the United Kingdom.

Anyone even contemplating purchasing short wave equipment, be they looking for the best possible available for their Embassy press department or home use, should visit or contact Sonic where they will be able to view and listen to the most comprehensive range of the latest short wave equipment on the market today.

Listen and choose in comfort at Britain's most up-to-date air conditioned sound demonstration studios. Full ranges of Hi-Fi, Video equipment, In-car and portables, etc., from all leading manufacturers; B & O, Sanyo, Sony, Hitachi, Pioneer, JVC...

THE COMMUNICATION CENTRE  
**SONIC SOUND AUDIO**  
248-256 TOTTENHAM COURT ROAD LONDON W1 TEL: 01-637 1908

**Eddystone**  
A Marconi Group Company.



## NORTHERN COMMUNICATIONS

AMATEUR ★ COMMERCIAL ★ MARINE

YAESU, FDK, ATLAS, DENTRON, STANDARD, JAYBEAM  
NAG, ASP, SWAN, G WHIP, MM, CDE, SEM




### QUSHCRAFT Power and Performance ANTENNAS

ATV3—Vertical 10/15/20 .....	(a)	£35.40
ATV5—Vertical 80/10m .....	(b)	£76.00
A144/11—11 element 13db Yagi 144Mhz. ....	(a)	£27.85
214B—14 element 15db long Yagi 144Mhz. ....	(c)	£45.00
A3219—19 element "Boomer" 16.5db long Yagi 144Mhz. ....	(c)	£64.00
ARX2—Ringo Ranger 6db Vertical 144Mhz. ....	(a)	£26.50
DX120—20 element stack array 13.2db 144Mhz. ....	(a)	£50.00
AR10—Ringo Ranger vertical 10metres. ....	(a)	£22.00
A10/3—3 element Yagi 7.6db 10metres. ....	(b)	£52.00
A15/3—3 element Yagi 7.6db 15metres. ....	(b)	£72.00
A20/3—3 element Yagi 7.6db 20metres. ....	(c)	£139.75
ATB34—3 Band HF Yagi 7.5db 10/15/20metres. ....	(*)	£235.75

Prices include VAT, \* carriage extra. (a) £1.00; (b) £2.00; (c) £3.00

**OR our very own 2 metre 12 element ZL SPECIAL**  
13db gain from a 10' 6" long, split boom ..... (a) £28.75

**OR our very own 2 metre 12 element ZL SPECIAL**  
ZL-12 13db gain from a 10' 6" long split boom ..... (a) £28.75

**NEW Portable, Compact 8 element ZL SPECIAL**  
ZL-8 9.5db gain only 6' 0" long split boom ..... (a) £17.25

### SWAN 100MX HF TRANSCEIVER — Now at a Price You Can Afford

80-10 metre Solid State, compact HF rig for mobile and fixed operation. 235 watts input. Send for details of this amazing rig! Limited period offer, including VAT ..... £450.00  
Mains PSU also available.

### STANDARD MOBILES ARE HERE!

C8800 2 metre FM Mobile, the best value around, in its price range. Superb list of operating features and an excellent performer too! (we're convinced — drop in for a demonstration) ..... £252.45

C7800 70 centimetres FM Mobile — a no compromise rig, at a sensible price. All the features of a good 2 metre unit in a purpose designed package for UHF ..... £275.45

### FDK — MULTI 700EX & 750EX ARE COMING SOON!

In the very best traditions of FDK the new M700EX (2m FM25 watts) and M750EX (2m Multimode Mobile SSB/FM) will be here soon to offer you the very best in 2 metre operating at economic prices.

If you liked the Multi 700E then you'll love the EX version! The new M750EX will make it possible to work the SSB DX, without breaking the bank! Contact us for details.

Bradford (0274) 814218 Mon-Sat  
Halifax (0422) 40792

VISIT OUR SHOWROOM — Thursday, Friday, Saturday  
303 CLAREMOUNT ROAD, HALIFAX HX3 6AW, West Yorkshire




A new Q & A from Newnes Technical Books

# Amateur Radio

FC Judd G2BCX

- \* What kinds of transmitters are used for amateur radio?
- \* Is an aerial difficult to make?
- \* What receiving equipment is available?



QUESTIONS & ANSWERS

These questions plus many others are answered in this book, which explains amateur radio in simple terms — what it is, how it started and how it has developed. The question and answer format also covers the basics of electrical theory, transmission and reception, aerials, the radio amateurs' examination and its requirements, and explains simply how *you* can become a radio amateur and join a world-wide fraternity.

1980

120 pages

£1.75/US\$4.00

**Newnes Technical Books**  
Borough Green, Sevenoaks, Kent TN15 8PH

Butterworths has companies in Australia, New Zealand, South Africa, Canada and the USA, where local prices apply.

## LAR THE SHORT WAVE WIZARDS



**TRIO R1000 PLL SWL Receiver 200 kHz to 30 MHz £297.85**

(Securicor delivery arranged if required)

TRIO EQUIPMENT	Price inc. VAT
SRX 30 SWL Receiver	178.00
RB20 The ultimate SWL receiver	690.00
SP820 Speaker	37.95
HS5 Communications headphones, tailored response	21.85
HS4 Communications headphones, tailored response	10.35
<b>VHF AMATEUR RECEIVERS</b>	
SR9 Tuneable/crystal 2m FM receiver 144-146 MHz	46.00
AMR217B Scanner with 8 crystals. Mains battery	120.75
<b>TUNERS &amp; SWITCHES</b>	
KX2SWL Antenna Tuner 500 kHz to 30 MHz	29.90
CX3 SWL 3 way Antenna Switch	7.20
KW SWL 3 way Antenna Switch	14.80
<b>AIR BAND RECEIVERS</b>	
SHARP FX-213 AU Air Bands Portable Receiver	18.75
SKY ACE RS17 Air Bands Portable	49.50
Copal 24 Hour Digital Clock. Mains Operated	12.95

Buy by post or phone your Barclaycard or Access number. Alternatively, call in for a chat. The shop is just 10 minutes from Leeds City Station, and there's easy parking if you travel by car. ★ Instant HP for licensed Amateurs ★ Extended Credit Terms Available ★ Send 50p for Catalogue and Price List.

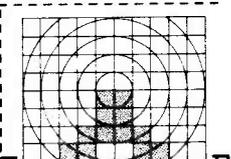
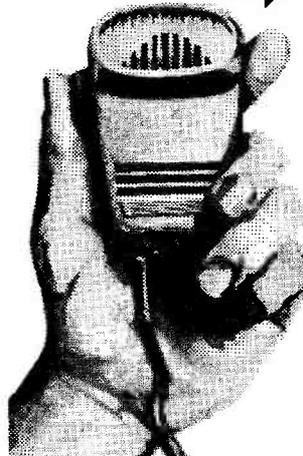
**LAR** Leeds Amateur Radio  
27 Cookridge Street, Leeds, W. Yorks.  
Tel: 452657

TRIO DISTRIBUTOR. LAR are area distributors for Jay Beams, Antenna Specialists, Hilomast, Icom, Microwave Modules and Ascot Products

# We give you the world.

Enrol in TUTORCOURSE and we'll take you step by step towards a full Amateur Radio Operator's Licence. Clip the coupon and discover the world.

FREE BROCHURES



**TUTORCOURSE**  
Amateur Radio Operator

Please rush me details of your AMATEUR RADIO COURSE

Name

Address

Block Caps Please  
Post now, without obligation to SWT/5

**British National Radio & Electronics School**  
P.O. Box 156, Jersey, Channel Isles

**YAESU MUSEN**

FT-101Z  
FT-901  
FRG-7000  
FT227RB  
FT-7B



**FT-101Z**

FT-101ZD  
FRG-7  
FT225RD  
CPU-2500R  
FT207R

All ex-stock and FREE SECURICOR DELIVERY.

APPOINTED JAYBEAM DISTRIBUTOR FOR NORTH WALES  
ASP MOBILE ANTENNAS. SEM PRODUCTS STOCKED  
FULL RANGE OF AMIDON TOROIDAL CORES IN STOCK

W2AU CUBICAL QUAD SPIDERS, Aluminium 2' Boom	£32.00
BOOMLESS CUBICAL QUAD SPIDERS, Aluminium	£32.00
W2AU BALUNS Built in lightning arrester 1:1 & 4:1	£14.37
BALUN KITS Toroidal Core. 1:1 or 4:1 LF Unit	£4.85
As above but for HF Use	£6.00
COPPER AERIAL WIRE 14swg Hard Drawn 140'	£8.84
Same as above, 70'	£5.34
12V at 3AMP POWER SUPPLIES	£20.00
SEM Z MATCH. Will handle 1KW	£45.00
LOW PASS FILTER, Nye-Viking 2-3MHz	£19.50
MULTIMETERS ME 221	£17.00
FERRITE RINGS Mullard FX1588 for TVI/AFI	£0.67

All prices include VAT & carriage

PL259, SO239, REDUCERS, COAX, ROTATORS, ETC. ETC. ETC.

Please send a Stamped Addressed Envelope with all enquiries

**TMP ELECTRONIC SUPPLIES**

Britannia Stores, Leeswood, Mold,  
Clwyd. CH7 4SD

Tel: Pontybodkin 846 (035287)

Business hours: 9.30-5pm Mon. Wed, Thurs, Fri; 9.30-1pm Tues & Sat.

# S.E.M.

P.O. BOX 6 CASTLETOWN, ISLE OF MAN  
Tel: Marown (0624) 851277

## S.E.M. EZITUNE

A new concept from S.E.M. to make operating easier for you and more pleasant for others

*Do you want to tune up without radiating a signal?  
Do you worry about your P.A. valves when tuning?  
Do you want to tune the quickest way?  
or do you want to take as long as you want?  
Do you want to do it without looking at meters?  
Does your solid state P.A. shut down when tuning your antenna?*

The Ezitune solves all these problems and more. It consists of a noise generator producing wideband noise from 1 to 170MHz, a 50 Ohm S.W.R. bridge, and an r.f. switch to switch it out of circuit if you forget to switch OFF.

You just connect it in the line between your transceiver or receiver and the A.T.U. or aerial. Adjust for minimum noise on the receiver, and you have presented your equipment with a precise 50 Ohm resistive load, without pressing the transmit button. It is also the only way you can accurately tune your antenna to a receiver.

Price: £28.75 with Belling Lee Sockets,  
£1.73 extra for SO239 sockets.

If this doesn't convince you, come and see it work at Ally Pally and that will.

Price includes VAT and delivery. 12 months guarantee. To order: C.W.O. or credit card. Phone your credit card number for same day service. Need more info? Ring or write.

## REG. WARD & CO. LTD. (G2BSW)

**YAESU**

FT901DM	£800.00	FC301	£108.00
FT901D	£710.00	FT225R	£455.00
FT301D	£585.00	CPU2500RK	£308.00
FP301D	£142.19	FT227RB	£229.00
FT101ZD	£575.00	FT227R	£213.00
FT101E	£515.00	FT207R	£173.05
FT101Z	£500.00	FT202R	£103.48
FT200B/FP200	£380.00	FP12	£67.00
FT7B	£375.00	FP4	£35.00
FT7	£265.78	YC601	£113.00
FL110	£130.00	SP101B	£19.00
FR101DD	£615.00	YD148	£18.50
FR101S	£395.00	YD844	£18.50
FRG7000	£327.00	YD846	£7.50
FRG7D	£235.00		
FRG7	£185.00		
Y0101	£169.50		
Y0100	£145.00		
YC500J	£168.50		
YP150	£55.00		

**SHURE**

444 ..... £28.20  
201 ..... £12.60

Add 15% VAT to all prices.

VALVES. Most types kept. All valves for Yaesu in stock, valves for K.W. also.

S.E.M. Equipment. Most items held.  
K.W. Ancillary equipment.  
Agents for G2DYM antennas.  
J Beam. 2m. antennas. Ascot antennas.  
Aerial wire insulators, co-ax cable, twin feeder  
CO-AX SWITCHES

H.P. available                      Carriage extra

Please check prices and availability before ordering.  
ACCESS / BARCLAYCARD / TRUSTCARD

**GEORGE STREET, AXMINSTER, DEVON**  
Telephone Axminster 33163 (STD 0297)

## SAMSON ETM-3C C-MOS KEYS

1 µA battery drain—Why switch off?

- Self-completing dots/dashes/spaces. ● Can be used either as normal electronic keyer or as an iambic mode squeeze keyer.
- 8-50 wpm. ● Constant 3:1 dash-dot ratio. ● 6 C-MOS ICs and 4 transistors. ● Plug-in PCB. ● Long battery life—typically 1 µA drain when idling—Built-in battery holder for 4 x 1.5v. batteries (but will work over 3-10v. range). ● PCB has both a reed relay (250v., 0.5 amp., 25w. max.) and a switching transistor (300v., 30 mA max.)—either keying method can be used. ● Has the well-known fully-adjustable Samson precision twin keying lever assembly. ● Operate/Tune button. ● Sidetone oscillator. ● Grey case 4" x 2" x 6". ETM-3C, £65.30.

**ETM-4C MEMORY KEYS:** Has ETM-3C features plus 4 memories of 22 characters each (or 2 of 44). Erase/Rewrite memories as needed—Send CQ's etc. by pressing a button.

**BUILT FOR DEPENDABLE MARINE AND COMMERCIAL SERVICE  
JUNKER PRECISION HAND KEY**

A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing—no screwing down. Front and back contacts—fully-adjustable gaps/tension. Key-click filter. Hinged grey cover, £37.89.

**BAUER KEYING PADDLE**

Single-paddle unit on 1½" x 2" base for home-built E1-bugs. Adjustable gaps/tensions, £11.92.

**88 mH TOROIDS**

For CW, RTTY, SSTV and other filters. £1.08 each.

All prices post paid UK and include 15% VAT.  
Please send stamp with enquiries.

**SPACEMARK LTD.**  
THORNFIELD HOUSE, DELAMER ROAD  
ALTRINCHAM, CHESHIRE  
(Tel: 061-928 8458)

**G4DSG D. P. HOBBS LTD. G3HEO**

**The Component Specialists**

YAESU FRG7 P.L.L. Receiver 0.5-30MHz. 1MHz segments... £212.75  
 LOWE SRX30 P.L.L. Receiver 0.5-30MHz. 1MHz segments... £178.94  
 KDK FM2016E 2mtr digital synthesized TCVR... £240.00  
 R517 Aircraft Monitor Receiver VFO + 3 fixed channels... £49.50  
 BELLSONIC 13.8v 3 amp stabilised power supply... £18.40 + £1.00 p&p  
 DL20 dummy load 15 watt cont. 30w peak... £6.04 + 20p p&p  
 DM350 50kΩ P.T.T. Mics... £4.83 + 20p p&p  
 Microwave Modules Converters for 2 mtrs, 70 cm, 4 mtrs, and 23 cm  
 Microwave Modules Transverters. MML 144/28 £90.85. MMT  
 432/28S £136.85. MMT 432/144R £173.65. MML 144/25 Linear Amp  
 £48.30. MMD 050/500 Frequency counter £69.00. MMD 500P  
 Prescalers, special price, £21.00.

Stolle 2010 Rotators £50.00. 2050 £45.00.

Ascot and Bantex Mobile Aerials now in stock.

Jaybeam Aerials full range stocked

Test Meters from £5.80

Denco Coils, valve and transistor types

Full Range of Antex and Oryx Irons, Stands and Bits in stock

Secondhand MMT 144/28 Transverter... £66.00

Daiwa SR9 2 metr VFU Monitor receiver... £46.00

Veroblock and C.S.C. Breadboard now in stock

Transformers as last month plus new types 6-0-6v 2 amp. £3.11 + 70p p&p  
 110/240v 20 watts Auto... £2.59 + 70p p&p

Our Standard Stock of Components includes Veroboard, Veroboxes,  
 Transistors, Integrated circuits, Resistors, Capacitors, Cable, Speaker  
 Units, Tools, etc. etc.

Prices include VAT

Access Barclaycard

**11 King Street, Luton, Beds. Tel. 20907**

Open 9 am - 5.30 pm Mon - Sat. Closed all day Wednesday

All Mail orders to Luton

Also visit **D. P. HOBBS NORWICH LTD.**

**13 St. Benedicts St., Norwich. Tel. 615786**

**(“SITUATIONS” AND “TRADE”)**

20p per word, minimum charge £2.40. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50 per cent for Bold Face (Heavy Type). Box Numbers 40p extra. No responsibility accepted for transcription errors. Replies to Box numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**SITUATION**

Due to continued expansion, **London Car Telephones** are looking for bright engineers to maintain VHF and UHF mobile radio systems. Well-equipped modern workshops in Croydon, with work in the field. Preference given to job ability rather than formal qualifications. Good basic salary, plus bonuses linked to profitability. **We need the best, so capable persons only need apply to 01-680 4444.**

**TRADE**

**Quartz crystals:** 120 kHz to 111 MHz, from £1 each; all new HC6U, HC25U etc. Nine oscilloscopes, from £20 each. RBW-2 panadaptor, £65. — Birkett, “The Moorings”, Halvarras Road, Playing Place, Truro. (Tel: 0872-862575).

**Used equipment required** for cash. Second-hand lists, metal box list, U.S. publications lists, send s.a.e. please. — **Derwent Radio**, Columbus Ravine, Scarborough, Yorks.

**VHF converter**, 45-220 MHz varicap, IF 28-30 MHz tunable, excellent sensitivity, £7 inc. postage. Send s.a.e. for data and lists. — H. Cocks, Cripps Corner, Robertsbridge, East Sussex. (Tel: 058083-317).

**FREE 1980 AMTRON CATALOGUE** with new range of kits and equipment cabinets. Send s.a.e. — Amtron UK Ltd., 7 Hughenden Road, Hastings, Sussex TN34 3TG. (Tel: Hastings 436004).

**Recorder owners** . . . speak to the World, through Worldwide Tapetalk, 35 The Gardens, Harrow. Members far and near, all age groups, every interest. Send stamp for particulars.

**June issue: Due to appear May 30th.** Single copies at 60p post paid will be sent by first class mail for orders received by Wednesday, May 28th, as available. — Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**Good second-hand equipment always wanted.** Come to **AMATEUR RADIO EXCHANGE** for the best deal. — 2 Northfield Road, Ealing, London W13 9SY. (Tel: 01-579 5311.)

**Bristol's Amateur Radio Supplier.** For Trio: R-1000, TR-2300, TR-2400, TS-120V etc. **FDK:** Multi 700EX, Multi 750, Palm II etc. **Yaesu:** FT-202R, FT-225RD, FT-101Z etc. **Bearcat:** 220FB etc. — Ring 0272-669454, or 0272-633647 evenings and weekends.

**French Language Booklet** written especially for the Amateur Radio QSO etc., £1.75 (overseas £2.00). — Mary Craven, XYL/G4EQI, “Grass Moor”, Radford Road, Alvechurch, Birmingham B48 7DT.

**QSL cards.** Sample pack and price list forwarded on receipt of 20p stamp. — **Derwent Press**, 69 Langstone Drive, Exmouth, Devon EX8 4HZ.

**Coax cables at trade prices.** UR43, UR67, UR76, UR57 and UR70. Also mains and multicores, s.a.e. for lists. — W. H. Westlake, Clawton, Holsworthy, Devon.



**MICROWAVE MODULES LTD**



**NEW PRODUCT!**

**MMA 144 V, 144 MHz ULTRA LOW-NOISE RF SWITCHED PREAMPLIFIER**

**SPECIFICATION**

Frequency bandwidth	144-148 MHz at ±1dB
Power gain	15dB
Overall noise figure	Better than 1.3dB
Through power capability	100 watts
Power requirements	12.5 volts at 7.5 mA
Power connectors	PTFE Scider pins
RF Connectors	50 Ohm BNC or Type 'N'
Weight	250 g
Size	110 × 60 × 31 mm

Price **£24.90** inc. VAT

Delivery from Stock

**MICROWAVE MODULES**

BROOKFIELD DRIVE, AINTREE,  
 LIVERPOOL L9 7AN, England

Tel: 051-523 4011

Telex 628608 Micro G

# Catronics **NEW**

## VIDEO DISPLAY UNIT MODEL CD300 especially designed for the RTTY ENTHUSIAST!

The video display unit is designed to be an all-electronic replacement for a Teleprinter, and therefore does *NOT* suffer the disadvantages of bulk, unreliability and noise.

The basic function is to take Murray Code — either from a Terminal Unit (on receive) or from a Keyboard — and produce a complete TV signal. This signal may be fed into a monitor or modulated and fed into the aerial of an ordinary domestic TV set. The resulting display is a page of 16 lines of up to 64 characters.

It may also be used (with a keyboard) to send fully encoded Murray Code signals for transmit purposes.

16 lines per page.

64 characters per line.

Standard TTL compatible input.

Standard IV video output.

Flashing cursor. Auto-scroll at end of page.

Front panel controls for:

Letter shift. Figure shift. Page reset.

Carriage return. Line feed.

Built-in mains P.S.U.

Styled to match the Catronics CT100 Terminal Unit.

Cabinet size 9" x 2½" x 7" approx.

Catronics price **£160** incl. VAT

ALSO NOW AVAILABLE — MODEL CD310

with Built-in UHF Modulator

for only **£170** incl. VAT

— add £5.50 for Securicor delivery

## RTTY TERMINAL UNIT CT100 Mk2

Now incorporating a number of modifications YOU have asked for: including Completely automatic receive/transmit modes. Protected and buffered input provided for TTY keyboard. Automatic re-generation of incoming tones. Special r.f. interference suppression circuit, etc., etc.

INPUTS FOR:

Audio FSK signal in; Data in from VDU (e.g. G3PLX); TTY Keyboard or Tape Reader.

Featuring a unique digitally controlled 'Autoprint' circuit which is a superior replacement for the 'Antispace' and 'Autostart' facilities found on some other terminal units. The terminal will ignore most CW and phone signals but will respond to a correct RTTY signal.

All prices include VAT: CT101 Receive/Transmit VDU only **£99.60**. CT103 with Teleprinter interface **£104.90**. All models plus £5.50 Securicor delivery.

OUTPUTS FOR:

VDU or other TTL compatible equipment; TTY Magnet — single or double current; AFSK to drive Transmitter.

Remember: All Catronics equipment is fully guaranteed. Pay by cheque, PO, Access or Barclaycard. HP available.

 Catronics LTD

**COMMUNICATIONS HOUSE (Dept. 15)**  
20 WALLINGTON SQUARE,  
WALLINGTON, SURREY, SM6 8RG.  
Tel: 01-669 6700.

Shop/showroom open Monday-Friday: 9-5.30  
closed for lunch: 12.45-1.45; Saturdays: 9.00-1.00

**Quartz crystals:** 32, 768 Hz, 5° x high temp. stab., miniature can, 150-off. Offers? Maximum unit price £1 for clearance, also quantity. Please state requirement. — Caze, 16 Conegra Road, High Wycombe, Bucks.

**Radio Amateur Examination City & Guilds.** Pass this important Examination and obtain your G8 Licence with an RRC Home-Study Course. For details of this and other courses (GCE, professional examinations, etc.) write or phone: **The Rapid Results College, Dept. JV/1, Tuition House, London SW19 4DS.** Careers Advisory Service, 01-947 7272 or ring 01-946 1102 for Prospectus. (24-hr. Recordacall.)

**Aluminium quad spiders, boomless, £18.50 pair.** Fibreglass quad spreaders, 1-in. dia. tube, 13-ft. 7-in. long, set of eight, £84. All including carriage, s.a.e. for details. — Willmot, G3ZHC. (Tel: 0922-26659, Walsall).

### READERS' ADVERTISEMENTS

**10p per word, minimum charge £1.50, payable with order. Add 25 per cent for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 40p extra. Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.**

### READERS

**Selling:** Storno 2-metre transceiver, £120. Racal RA-218, £75. VHF receiver, 80-170 MHz, £30. UHF receiver, 200-400 MHz, £50. FM tuner with PSU, £15. Carriage extra, s.a.e. with enquiries. — Hayward, Sunnyfields, Lighthouse Road, St. Margaret's Bay, Dover, Kent.

**Sale:** Yaesu Musen FT-202R with four channels, S20, S21, S22 and R7, almost new (cost £104), only £70. — Ring Mulholland, 01-672 7833 after 7.30 p.m.

**For sale:** Bearcat 250 and Discone DCL aerial (new December 1979), £175 or near offer. — Ring Murphy, Epsom 26539.

**Selling:** FRG-7 Digital, excellent condition, complete with Partridge Joystick antenna/tuner, £240 or near offer. — Ring Watson, 0642-479696.

**For sale:** Solartron 'scope, a fine example of the CD711S/2, recently personally overhauled, with home-made trolley and manual, £90 or near offer. Buyer collects. **Wanted:** Manual (buy, or borrow to copy) for Tektronix 190B signal generator. — Ring Burrows, Rochdale 58229.

**Wanted:** May or December 1979 multiple-choice RAE paper, both parts (for potential radio amateur). Will refund postage. — Spencer, Post Office, Swayfield, Grantham, Lincs.

**Wanted:** BC-221, or similar, with original charts. (Lancs). Box No. 5711, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**For sale:** Trio 9R-59DS Rx, coverage 0.5-30 MHz, with matching speaker, good condition, £55 or near offer. R.107 Rx, £15. Heath HA-201 2m. PA, £12. — Ring Mash, G8JAO, Malvern 63270 evenings.

**Wanted:** Army wireless set No. 18, any condition considered. Details and price please. — Brock, 70 Oakenshaw Road, Redditch, Worcs.

**Sale:** FT-200 with PSU and fan, fitted G3RLL RF clipper, with mic., perfect, surplus to requirements. First genuine offer accepted. — Ring Thomas, G3RXA, 0626-5109.

**For sale:** 9R-59DS Rx; No. 10 calibrator; No. 19 Tx/Rx; Air Ministry key, Type D; ARRL Handbooks 1939, '65, '75; Ampex VTR manuals, operation/maintenance. — Rolls, 23 Brandreth Avenue, Dunstable, Beds.

**Wanted:** Collins TCS transmitter and receiver, will buy separately, no modifications or parts removed, prefer good condition. I will pay for packing and transit by B.R.S. Full details and price, please (stamp refunded). — Barker, 42 Swinhoe Gardens, Wideopen, Newcastle-upon-Tyne NE13 6AF.

**Wanted:** Atlas 215, 206 VFO. **Selling:** RT-1000 'Seavoice' marine VHF RT, full set of channels, with antenna, mount, and 50-ft. co-ax., £270. New **Danameter 2000A** high quality digital multimeter, AC shunts, leather case, £85. — Jolly, G3TJY, QTHR. (Tel: 0202-622142).

**Selling:** FDK Quartz 16, fitted S16, S20-S23, RO, R3-R7, RRO, RR7, with xtal toneburst, mobile mount, original packing, very good condition, £130. Also matching FDK VFO, 600 kHz repeater shift, excellent condition, £50. Both 'or near offer'. — Markham, G8RZA, QTHR. (Tel: 01-500 1495).

**For sale:** STC 30LRE receiver, 118-132 MHz, 280 channels, with PSU and circuit diagrams, £100. Buyer collects. (London). — Box No. 5712, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**For sale:** Jaybeam 10-ele Parabeam, £24. Microwave Modules 144/28 MHz converter, £15. Both carriage paid. — Ring Williams, Braintree (0376) 23604.

**Sale:** Sommerkamp FR-DX500 HF receiver, £100. Yaesu FRG-7, mint, £165. — Ring Piper, Norwich (0603) 54854.

**Clearout** of new and little used equipment: IC-211E, new and unpacked, £495. SB-104 and SB-640 kits, £395. TS-120V, £330. FT-DX400 with spare PA's etc., mint, £255. Memo 512 memory keyer, £47. 4CX250B's, £4 each. — Ring Barry, G3RJS/MM, 01-878 5442.

**Selling:** Drake 2-C, 2-CQ, 2-NT, Ten-Tec VFO, Johnson 'Matchbox', a super CW station in excellent condition, £175. — Ring Benetato, 01-486 4137 or 01-637 8655.

**Sale:** Icom IC-240 2m. Tx, 12 months old, little used, £140. — Ring Spashett, G3RK, Wangford 619 (Suffolk).

**June issue: Due to appear May 30th. Single copies at 60p post paid will be sent by first class mail for orders received by Wednesday, May 28th, as available. — Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.**

**For sale:** National Panasonic DR-48, with ATU, manual and service information, packing, £280 or near offer. Hartley Type 13A 'scope, £12. — Ellis, Yew Tree Inn, Ednaston, Derbyshire.

**Selling:** Standard C-828 12-channel FM Tx/Rx, £135. G-Whip multi-mobile, £20. Eddystone 770R VHF Rx, £75. Pye AM base receiver, R6, low-band, £50. Bearcat 4-6 MHz scanner, low-band, high-band, UHF, xtal for R5 and S20, £50. R.1155 Rx, £6. Yaesu FP-103 (FT-103) PSU, 12v. 25 amp., £75. Burns FM-D1 FM detector, 455 kHz IF, £6.50. — Ring Perrin, G4AFY, Kidderminster 63358.

# Get them. Write now.



**VF 7401-2 2-Meter Digital Scanning Transceiver.**  
Fully synthesized. 15 watt solid-state rig. Scanning Capability. Mobile or fixed station use.



**HM 2141 VHF Dual Watt meter.**  
Measures forward and reflected P.E.P. and SWR to 175 MHz. Output up to 30/300 watts and 10/100 watts reflected.



**VF 2031 Hand-Held 2-M FM Transceiver.**  
Nickel-cadmium battery pack. 120/240V AC recharger. Optional carry case, external microphone and tone burst encoder available.

Heathkit make it easy for you to make these, and a wide range of top quality radio equipment kits.

And easy on your pocket too.

Full details are available in the Heathkit catalogue. Send for your copy now.

Heathkit Electronics Centres — 233 Tottenham Court Road, London (01-636 7349). Bristol Road, Gloucester (0452-29451). Registered in England, No. 606177.

To: Heath Electronics (U.K.) Limited, Dept (sws), Bristol Road, Gloucester, GL2 6EE. Please send a copy of the Heathkit catalogue. I enclose 25p in stamps.

Name \_\_\_\_\_

Address \_\_\_\_\_



Send for your FREE

N.B. If you are already on the Heathkit mailing list you will automatically receive a copy of the latest Heathkit catalogue without having to use this coupon. When you receive your catalogue you will get details of this free offer.



## G3LL TELLS THE TRUTH ABOUT VALVES FOR THE FT101

**PA VALVES.** Originally Yaesu used the Toshiba 6JS6A followed by the more robust Toshiba 6JS6C fitted with extra anode heat dissipating plates. The 6JS6C is a TV line output valve and with falling demand Toshiba ceased production. Late models FT101E were fitted with NEC valves and whilst they do not contain the extra dissipating plates in practice they work well and are reliable. (Other makes often give poorer output, parasitics, or refuse to neutralise).

**DRIVER VALVES.** NEC and Toshiba 12BY7A are almost identical except that with very early rigs on occasion the Toshiba give a fraction more drive on 10 and 15 metres.

**AVAILABILITY.** Fresh supplies of Toshiba valves are unobtainable and whilst we doubt if there is any need to worry about the 12BY7A we are very concerned about the 6JS6C. We know of no suitable alternative apart from the NEC and Toshiba valves, and while we can have bought a load direct from Japan. To get the right price we have bought too many, hence we are selling half of our stock then we will put up the price to conserve supplies.

Toshiba 6JS6C (unmarked, definitely Toshiba, few only) £15.00 pair  
NEC 6JS6C, in original coloured boxes ..... £9.00 pair\*  
Toshiba 12BY7A, original boxes ..... £4.00 each  
NEC 12BY7A ..... £1.50 each  
Toshiba 6KD6 (for FT401) ..... £15.00 pair

Above special lines — we don't retail other valves.

\* 2 pairs £16.00, 3 pairs £23.00, 4 pairs £30.00, 5+ pairs £7.00 pr, 10+ pairs, £6.00 pr. All inc. VAT.

These prices only while we have plenty — you have been warned!  
Orders over £20 Access/Barclaycard

## HOLDINGS PHOTO AUDIO CENTRE

39/41 Mincing Lane, BLACKBURN BB2 2AF. Tel (0254) 59595/6

## HAM BAND AERIALS GALORE

with

### EEZEBUILD Telescoping Aluminium Tubing

UHF 6 element YAGI 432 Mhz ..... £5.75 pp £1.15

VHF 5 element 2 metre YAGI ..... £6.33 pp £1.15

8 element 2 metre YAGI ..... £9.20 pp £1.15

Available now — the NEW J pole vertical 2 metre Radiator,

excellent matching, enclosed connectors — £6.33 pp £1.55

### HF Mono Bands ¼ Wave Verticals

28 Mhz £8.05 21 Mhz £9.20 14 Mhz £11.15 pp £1.15

Verticals now have Insulator and Ground Post sections

All prices include current VAT. For further information please send 20p for descriptive leaflets and prices.

## Uppington Tele-Radio (Bristol) Ltd.

12-14 Pennywell Road, Bristol BS5 0TJ

Telephone: 0272 557732

## ALL VALVES & TRANSISTORS

Call or phone for a most courteous quotation

01-749 3934

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

COLOMOR ELECTRONICS LTD. 170 GOLDHAWK ROAD LONDON W12

## MORSE MADE EASY BY THE RHYTHM METHOD!

FACT NOT FICTION

NO. TAPE WONT WORK AS WELL

If you start RIGHT you will be reading amateur and commercial Morse within a month. (Most students take about three weeks). That's why after 25 YEARS we still use three scientifically prepared 3-speed records with which you cannot fail to learn the MORSE RHYTHM automatically, it's as easy as learning a tune. 18 w.p.m. in 4 weeks guaranteed. Complete course comprising 2x12" + 1x7" 3 speed records + books. £5.50 plus (U.K. p.p. + 75p. Overseas, sufficient for 750 grms). For details only: ring S. Bennett 01-660 2896. SNOOPER radar detectors. 4 yr gree. £74. S.A.E. to S. BENNETT (Box 14), 45 GREEN LAKE, PURLEY, SURREY CR2 3PD

**Sale:** Codar PR-30X preselector, £6. Technical Associates BP-2 audio bandpass filter (two months old), £22. — Ring Wixon, Bristol 601576.

**For sale:** FRG-7 communications receiver, 500 kHz to 30 MHz, mint condition, unwanted gift, £150. — Ring Vincent, 01-958 9986.

**Selling:** QM70 144/28 MHz converter, £12 or near offer. 'Slim Jim' (TT), 144 MHz, as new, £12. SEM Sentinel auto/HF pre-amp., as new, £10. Codar No. 6 multiband Rx, as new (suit young SWL), £10. Two old Codar T.28 Rx's, 80/40m., £8 each. Murphy b/w valve TV, 3 channels in good order, £15. Buyers collect. — Ring Mathews, 01-876 7868 (S.W. London).

**Sale:** KW-2000E with PSU and p-t-t mic., good condition but low drive on 10m., hence low price of £200. Buyer collects or pays carriage. — Taylor, G3YJM, QTHR. (Tel: Blackburn 60455 day, 55939 evenings).

**For sale:** K. W. Viceroy Tx, 80-10m., 150-watt; Trio JR-500 Rx. Both in good condition, £110. Will split. — Bell, G3RTB, QTHR. (Tel: 01-348 9813).

**Sale:** KW-2000B transceiver complete with AC/PSU, mic. etc., good condition, £170. — Ring Morgan, G3MEM, 073525-3701 (Berks).

**Selling:** Eddystone EC-10 Mk. II communications Rx, good condition, with manuals and carton, £95 or near offer. 90 copies of "Short Wave Magazine": offers? FRG-7D digital readout communications Rx, complete with Partridge Joystick antenna/tuner, both as new (today's price £330), bargain £260. — House, 10 Leagh Close, Kenilworth, Warks. (Tel: 0926-54556, 6 to 9 pm).

**Wanted:** Manual for HRO-5, buy or borrow. — Ring Dooley, 02556-71054.

**Wanted:** Receivers BC-314, BC-344, BC-969A, RA-X1 and R.389. Handbook for R.206 LF adaptor. — Passfield, 144 Gilmore Road, Lewisham, London S.E.13. (Tel: 01-318 5290).

**Selling:** FRG-7, mint condition, with instruction book, boxed, £130. — Green, 23 Pervin Road, Cosham, Hants. PO6 3DE.

**QTH for sale:** Three-bedroom detached, built-on shack, very good VHF QTH, £23,950. — Ring Beardsley, G3XKT, Nottingham 392554 evenings.

**For sale:** B.40D communications Rx with S-meter, £90. Eddystone 680X communications Rx, £130 or near offer. Trio TR-7010 2m. SSB transceiver, £140. All mint condition. — Ring G8UFG, Orpington 28240.

**Sale:** QM70 VHF converter, 144/28 MHz, £12.50. Digital readout for Yaesu FRG-7 by Lee Electronics Ltd., with all instructions, £30. — Both items post paid. — Michaelson, G3RDG, QTHR. (Tel: 01-455 8831).

## PICTURE THE QSL — YES!

Any photograph or line drawing of your choice can be put onto your own individual QSL cards. Simply send a black and white photograph of your rig, shack, antenna (even the XYL) together with £25.00.

In return we will supply 1,000 QSL cards with your own photograph together with your call/BRS/ISWL No in top left hand corner of card. The back of card will show usual QSL format, date, time, freq., etc. Send today photo or line drawing to:

D. L. Cole, 65 Cecil Avenue, Hornchurch, Essex

SWM

**POPULAR QUALITY LINES IN PLUGS and SOCKETS, ETC.**

All below inc. VAT @ 15% Post 20p per parcel — any quantity.  
**PL259 PLUGS.** Excellent quality. 55p each (8 or more 50p each).  
**REDUCERS** for above for UR43/76. 15p each (8 or more 14p each).  
**4 PIN MIKE PLUGS.** As used on most rigs. 60p each.  
**4 PIN MIKE SOCKETS** to fit above. Chassis mt. 60p each.  
**2 x SO239 COUPLER.** 2 Sockets back to back in line 70p each.  
**2 x PL259 COUPLER.** 2 Plugs back to back 70p each.  
**SO239 SOCKET.** Square Chassis Mount. 55p each.  
**SO239 SOCKET.** Single Hole Mount. 50p each.  
**SO239 to PL259 ELBOW COUPLER** £1.00 each.  
**'T' CONNECTOR.** 3 x SO239 outlets. £1.20 each.  
**'T' CONNECTOR.** 2 x SO239, 1 x PL259 £1.30 each.  
**SOLDERLESS SPLICERS** for UR67. 80p each.  
**SO239 to BNC PLUG Adaptor.** £1.60 each.  
**BNC SKT to PL259 PLUG Adaptor.** £1.60 each.  
**BNC COUPLER.** 2 x Female. £1.40 each.  
**BNC COUPLER.** 2 x Male. £1.95 each.

SAE for full Cable/Xtal Lists

**W. H. WESTLAKE, CLAWTON, HOLSWORTHY, DEVON.**

**CRAYFORD ELECTRONICS**  
**MOBILE**  **AERIALS**

Band	Type	Code	Price
4m	1/2 wave	LM14	£3.60
2m	1/2 wave	LM14	£3.00
2m	1/2 wave	LM58	£10.00
70cm	Colinear	AC78	£7.00
			4dB gain
			5dB gain

**BASES**

Boot Mount (inc. 4m cable)	BMA	£7.00
Magnetic Mount (inc. 4m cable)	MAG	£13.00
Fixed Mount	ML	£4.00
Window Mount (not 4m) BNC	CP	£7.00
Gutter Mount (inc 4m cable)	GM	£8.90

Prices include VAT and inland carriage. Many others available, commercial, marine, air band, fixed — SAE for details. Phone in your Visa/Access card. 24hr Answerphone.

**047485 2577**

6 Lovelace Close, West Kingsdown, Sevenoaks, Kent TN15 6DJ.

**RADIO AMATEUR PREFIX-COUNTRY-ZONE LIST**

published by GEOFF WATTS

Editor of "DX News Sheet" since 1962

The List you have always needed, the list that gives you everything, and all on one line! For each country:—

- |                                       |                      |
|---------------------------------------|----------------------|
| a. its DXCC "status"                  | e. the continent     |
| b. the normal prefix                  | f. the "CQ" Zone No. |
| c. the special prefixes               | g. the ITU Zone No.  |
| d. the ITU call sign block allocation |                      |

Full information on Antarctic stations, USSR Klub-stations, obsolete prefixes used during the past 5 years, and much more, and the List can be kept always up-to-date because ample space has been provided for adding every new prefix, each new ITU allocation, etc. Everything arranged alphabetically and numerically in order of prefix. Ideal for Contest operators and SWL's.

Tell your Club-members about it. Order an extra copy for that overseas friend. 15 pages. Price 50p (UK), overseas (air mail) \$2.00 or 6 IRCs.

GEOFF WATTS

**62 BELMORE ROAD, NORWICH NR7 0PU, ENGLAND**

**LOSING DX?**

**POOR REPORTS?** Antenna faulty? Check it FAST with an Antenna Noise Bridge, MEASURE resonance 1-150MHz and radiation resistance 2-1000 ohms, accurate ANSWERS directly, no confusion with harmonics, STRONGER SIGNAL, £9.80.

**RARE DX UNDER QRM?** DIG it OUT with a Tunable Audio Notch Filter, between your receiver and speaker, BOOST your DX/QRM ratio, 40dB notch, by-passed when off, £8.90.

V.L.F.? EXPLORE 10-150 KHz, Receiver £10.70.

Each fun-to-build kit includes all parts, printed circuit, case, postage etc, instructions, money back assurance so SEND off NOW.

**CAMBRIDGE KITS**

45 (SE) Old School Lane, Milton, Cambridge.

**MORSE CODE RECEIVING AND SENDING**

Receiving: C-90 Cassettes

**CASSETTE A** For Amateur Radio examination preparation. Speed slowly increasing from 1-12 wpm.

**CASSETTE B** For Professional examination preparation.

Computer produced morse from 12-24 w.p.m. Including international procedure signs and symbols and their incorporation into messages.

Sending:

Morse Key and Buzzer Unit for sending practice and own tape preparation. Phone output.

Prices: each cassette, including booklets, £4.75

Morse key and buzzer unit, £4.75.

Prices include postage, etc. Overseas Airmail £1.50 extra

**MH ELECTRONICS (DEPT. 3)**  
**12 LONGSHORE WAY, MILTON,**  
**PORTSMOUTH PO4 8LS.**

**G2DYM ANTI-TVI AERIALS**

1980 Range: Shortwave Listener  
 Indoor models £14.50 & £27.50.  
 Outdoor models £30.00 & £36.00.

Tx-ing models £42.50, £52.50 & £59.75.

Lists 10 x 8in 17p SAE. Aerial Guide 50p.

New Publication "Indoor and Invisible Aerials for S.W.L.s" — £3.50.

**G2DYM, UPLOWMAN, TIVERTON, DEVON**

**MORSE CODE TUITION COURSE**

Here is a unique opportunity of getting that elusive G4. Have the Morse Code cracked in a week or so. We are pleased to announce that at long last we are able to supply a complete Morse Code tuition course on cassette. It really works! Each lesson is complete with a commentary. The complete course will take you up to 30 wpm with a very comprehensive selection of practice exercises at each speed. You choose your own learning pace.

**CASSETTE ONE** 'Beginners Guide' including booklet . . . . . PRICE £2.99

**CASSETTE TWO** Practice Tape at 6, 8, 10 wpm . . . . . PRICE £2.75

**CASSETTE THREE** Practice Tape at 12 & 15 wpm . . . . . PRICE £2.50

**CASSETTE FOUR.** Punctuation and Abbreviations . . . . . PRICE £2.50

**CASSETTE FIVE** Practice Tape at 18, 20, 25, 30 wpm . . . . . PRICE £2.75

For full details write, or phone Fred L. Curtis, 32 Elgin Avenue, Harold Park, Romford, Essex RM3 0YT. Tel. Ingrebourne 40308.

Cash with order only. Add 65p for post and packing. Crossed cheques and Postal Orders made payable to F. L. Curtis.

**SPECIAL INTRODUCTORY OFFER. COMPLETE COURSE**  
 Only £10 (Limited)

**PORTABLE MASTS EX-GOVERNMENT**

32 ft. heavy duty aluminium.

COMPRISING

8-4 ft. sections complete with 4 wire rope guys, base plate, 4-27 ins. securing stakes and marine ply carrying case.

£25.00 + carriage and VAT.

**WILLIAMSONS**  
**BROOK STREET, MUMPS BRIDGE,**  
**OLDHAM, LANCs.**  
 Telephone 061-624 5441.

# R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

COLLINS 51J4 Receiver	...	...	P.O.A.
DRAKE SPR4 Receiver	...	£350.00	(£5.00)
EDDYSTONE EB35 Receiver	...	£100.00	(£3.00)
EDDYSTONE 990S Receiver 230-870 MHz, AM/FM	...	P.O.A.	
EDDYSTONE EC10Mk. 2 Receiver	...	£140.00	(£3.00)
G.E.C. RC410R Receiver 2-31 MHz	...	P.O.A.	
G.E.C. RC411R Receiver 0.15-30MHz	...	P.O.A.	
HAMMARLUND SP600 Receiver	...	£180.00	(£6.00)
YAESU MUSEN FR50B Amateur Bands Receiver	...	£75.00	(£5.00)
TRIO TR7200G 2 Metre Transceiver	...	£105.00	(£3.00)

We are MAIN DISTRIBUTORS for AVO, MEGGER, TAYLOR and SULLIVAN INSTRUMENTS

## THE LATEST AVO AND TAYLOR METERS IN STOCK

AVO Digital Multimeter Model DA211	...	£45.00
AVO Digital Multimeter Model DA212	...	£65.00
Taylor Analogue Multimeter Model 131	...	£12.50
Taylor Analogue Multimeter Model 132	...	£18.00
AVO Digital Multimeter Model DA 116	...	£106.90
AVO Digital Multimeter Model DA 117 (Autoranging)	...	£135.00

Cases for AVO, TAYLOR & MEGGER instruments in stock.  
Send for Details

We also repair all types of instruments  
Trade and Educational enquiries invited

S. G. BROWN'S HEADPHONES. Type "F" 120 ohm, 2000 ohm, 4000 ohm, £14.50 (£1.00); Rubber Earpads for same, £1.50 per pr. (£1.00); Standard Jack plugs, 24p (12p).

### SINCLAIR EQUIPMENT

DM235 Digital Multimeter	...	£49.80	(£1.50)
Carrying Case for DM235	...	£8.50	(£1.00)

NOTE. 15% VAT must be added to TOTAL PRICE (including carriage and packing).  
This applies to NEW or USED equipment.

Carriage for England, Scotland and Wales shown in brackets. Terms: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export.

# R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986

NEAREST STATION: LEYTONSTONE (Central Line)

HOURS - 9.30 am - 5.30 pm MON.-FRI. CLOSED SATURDAYS

Mains Adaptor for DM235	...	£3.50	(£1.00)
PDM35 Pocket Digital Multimeter	...	£29.95	(£1.00)
PFM200 Digital Frequency Meter	...	£49.80	(£1.00)
YAESU MUSEN FRG-7 Receiver in stock	...	£187.00	(£3.00)
YAESU MUSEN FRG-7 Digital in stock	...	£228.00	(£3.00)
YAESU MUSEN FRG-7000 Receiver	...	£324.00	(£4.00)

### At R. T. & I.

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

PARTRIDGE "JOYSTICK". New improved VFA. £29.00. JOYMATCH IIIIB. £22.55. LO-Z500. £28.62. JOYMATCH A.T.U. Kit. £10.50. A.T.U. Kit assembled. £12.75. Artificial earth and bandswitch, £10.50.

Note - Partridge prices include postage, packing and VAT.

### TRIO EQUIPMENT.

New Trio R-300 Receiver, in stock, £164.00 (£3.00).

All Bands with xtal calibrator.

SHURE MICROPHONES, 526. T £30.80 (£1.00); 444, £25.40 (£1.00); 401A, £13.00 (£1.00); 202, £12.00 (£1.00); 201, £11.40 (£1.00); 414A, £19.50 (£1.00); 4148, £19.50 (£1.00). Full details on request.

### SCOPEX OSCILLOSCOPES IN STOCK.

VALVES. Please state your requirements.

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

TMK METERS: Model TP10S, £15.70. Model 500TU-B, £28.90. Model TW20CB, £34.40. Model TP5SN, £18.50. Model 700, £59.50. Post on any Meter, £1.50. Also in stock Leather cases for above.

Model 700B, £62.75. Model 3020E (Digital) £100.00. Full details on request.  
In present conditions we regret that all prices are subject to alteration without notice.

## SIMPLE, LOW-COST WIRE ANTENNAS

by William Orr, W6SA1

This excellent and thoroughly recommended handbook is the publication on the practical approach to building aeriels. After starting with aerial fundamentals there are discussions and descriptions of ground-plane, end-fed, DX dipole, vertical and wire beam antennas, plus coverage on a universal HF antenna system and working DX with an "invisible aerial"; the SWR meter and coaxial cable also have chapters to themselves.

The whole book is presented in an authoritative immensely clear, readable and enjoyable manner with the emphasis on the practical throughout - to the extent that even the chap who can hardly strip a piece of co-ax need not feel at all left out! Just as practical for the SWL, too!

192 pages

£3.50 inc. post

Order from

Publications Dept.

Short Wave Magazine Ltd.  
34 High Street, Welwyn, Herts. AL6 9EQ

## BETTER SHORT WAVE RECEPTION

by William I. Orr W6SA1 and Stuart D. Cowan W2LX  
New 4th Edition

In the latest edition of this excellent work for all those who own (or intend to own) a radio receiver, these two well-known and respected writers have produced chapters covering: the radio spectrum and what you can actually hear world-wide; the tuning of a shortwave receiver; the business of buying a receiver, both new and secondhand; a description of the SW Rx in non-technical terms, together with receiver adjustment and alignment; DX-ing above 30 MHz; a description of the VHF receiver; building and adjusting efficient aeriels; reception techniques.

Thoroughly readable and "digestible", this book is without doubt a very valuable addition to the bookshelf of any SWL.

160 pages

£3.00 inc. post

Order from

Publications Dept.

Short Wave Magazine Ltd.  
34 High Street, Welwyn, Herts. AL6 9EQ

# Technical Books and Manuals

## (ENGLISH AND AMERICAN)

### AERIAL INFORMATION

Antenna Handbook (Orr and Cowan).....	£4.10
Practical Aerial Handbook, 2nd Edition (King).....	£7.00
Beam Antenna Handbook.....	£3.15
Cubical Quad Antennae, 2nd Edition.....	£3.15
Simple Low Cost Wire Antennas, by Orr.....	£3.50
73 Vertical Beam and Triangle Antennas (E. M. Noll).....	£4.00
73 Dipole and Long-Wire Antennas (E. M. Noll).....	£4.00
Antenna Book (ARRL), 13th Edition.....	O/S
The ARRL Antenna Anthology.....	£2.75
Two-metre Antenna Handbook, F. C. Judd G2BCX.....	£4.35

### BOOKS FOR THE BEGINNER

Elements of Electronics, <i>Book 1</i> .....	£2.50
Elements of Electronics, <i>Book 2</i> .....	£2.50
Elements of Electronics, <i>Book 3</i> .....	£2.50
Solid State Short Wave Receivers for Beginners (R. A. Penfold).....	£1.15
Beginners Guide to Radio (8th Edition).....	£3.10
Beginners Guide to Electronics.....	£3.35
Beginners Guide to Microprocessors and Computing.....	£2.05
Course in Radio Fundamentals, ARRL.....	£2.80
Guide to Amateur Radio (17th Edition) (RSGB).....	£1.85
Ham Radio (A Beginners Guide) by R. H. Warring.....	O/S
Morse Code for the Radio Amateur (RSGB).....	O/S
Understanding Amateur Radio (ARRL).....	£3.65
Radio Amateur's Examination Manual, 8th Edition (new syllabus) RSGB.....	£2.70

### GENERAL

How to Build your own Solid State Oscilloscope (Rayer).....	£1.75
Radio Circuits Using IC's.....	£1.55
Projects in Radio and Electronics (Newnes).....	£2.60
How to Make Walkie Talkies (Rayer).....	£1.50
How to Build Advanced Short Wave Receivers (Penfold).....	£1.40
Better Short Wave Reception, New 4th Edition.....	£3.00
FM & Repeaters for the Radio Amateur (ARRL).....	£3.20
Easibinder (to hold 12 copies of "Short Wave Magazine" together).....	£2.60
Oscar — Amateur Radio Satellites.....	£4.25
World Radio & T.V. Handbook 1980 Edition.....	£9.40
World DX Guide.....	£5.40
Guide to Broadcasting Stations (new 18th Edition).....	£3.40
Radio Stations Guide.....	£1.75
Long Distance Television Reception (TV-DX) for the Enthusiast.....	£1.75
Solid State Basics for the Radio Amateur (ARRL).....	£3.35
Counter Driver and Numeral Display Projects, Rayer.....	£2.05
Weekend Projects for the Radio Amateur, ARRL.....	£2.15

### HANDBOOKS AND MANUALS

Radio communication Handbook, Vol. I (5th Edition) (RSGB).....	£9.75
Radio Communication Handbook Vol. II (5th Edition) (RSGB).....	£8.40
TVI Manual (2nd Edn.) (RSGB).....	£1.60
Radio and Electronic Laboratory Handbook by Scroggie-Johnstone, 1980 (9th) Edition.....	£19.05
RTTY Handbook (73 Magazine).....	£3.55
Slow Scan Television Handbook (73 Magazine).....	O/S
Specialized Communications Techniques for the Radio Amateur (ARRL).....	£2.85
Working with the Oscilloscope.....	O/S
The Radio Amateur's Handbook 1980 (ARRL) soft cover.....	£7.65
The Radio Amateur's Handbook 1980 (ARRL) hard cover.....	£10.65
Shortwave Listener's Handbook.....	£3.30
Learning to Work with Integrated Circuits (ARRL).....	£1.70
Weather Satellite Handbook.....	£2.85
Single Sideband for the Radio Amateur (ARRL).....	£2.95
Test Equipment for the Radio Amateur (RSGB).....	£4.50
Amateur Radio Operating Manual (RSGB), new title.....	£4.80
Satellite Communications (ARRL).....	£3.25

### USEFUL REFERENCE BOOKS

Solid State Design for the Radio Amateur (ARRL).....	£5.00
Foundations of Wireless and Electronics, 9th Edition (Scroggie).....	£5.40
Amateur Radio Techniques, 6th Edition (RSGB).....	£4.00
U.K. Call Book 1980 (RSGB).....	£3.80
Hints and Kinks (ARRL).....	£2.85
Radio Data Reference Book (RSGB).....	£3.65
Electronics Data Book (ARRL).....	£3.25
ARRL Ham Radio Operating Guide.....	O/P
Radio Frequency Interference (ARRL).....	£2.20
Amateur Radio Awards, RSGB.....	£3.40

### VALVE AND TRANSISTOR MANUALS

Towers' International Transistor Selector, 1980 Edition (Up-Date No. 2).....	£10.40
Service Valve and Semiconductors Equivalents.....	O/P
Radio Valve and Semiconductor Data (10th Edition).....	£3.45

### VHF PUBLICATIONS

VHF Handbook, Wm. 1 Orr.....	£4.00
VHF Manual (ARRL).....	£3.30
VHF/UHF Manual (RSGB) 3rd Edition.....	£7.20

O/P (Out of print)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

O/S (Out of stock)

*Many of these titles are American in origin*

(Terms C.W.O.)

*Prices are subject to alteration without notice.*

Available from

SHORT WAVE MAGAZINE

Publications Dept.

34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7

(Counter Service. 9.30-5.00 Mon. to Fri.)

(GIRO A/C No. 5476151)

# G3CED TWO G3VFA REALLY GREAT ANTENNAS

## THE JOYSTICK VFA (Variable Frequency Antenna)

claims un-beaten scoring over commercial and/or conventional antennae ● Simple, rapid erection ● Not only 6-band but CONTINUOUS 0.5-30Mhz, incl Broadcast ● Omni-directional ● Substantially Harmonic FREE ● 1,000,000 miles per watt, world record! ● Poor QTH's enhanced! CLIFF DWELLERS DREAM ANTENNA! ● QUOTE from RADIO ZS (South Africa) "A remarkable antenna with great possibilities. Its physical size makes confined space operation a practical proposition."

System "A"	For the SWL and 160m Band Tx.	£48.55
System "J"	500 w.p.e.p. Improved "Q" receive	£54.00

## NEW JOYMASTER ANTENNA SYSTEMS Amateur Bands 3.5-30Mhz

ANY amateur receiving or transmitting can benefit from PARTRIDGE JOYSTICK expertise. The JOYMASTER development adds to the efficiency of the JOYSTICK by providing tunable artificial earth elements to make your shack independent of its location problems. High-rise flat and cliff dwellers please note!

System JM1	150 w.p.e.p.	£61.50
System JM2	500 w.p.e.p.	£69.00

JOYSTICK OWNERS — PLEASE NOTE. YOU CAN CONVERT YOUR EXISTING SYSTEM "A" OR "J" TO A JOYMASTER OF THE SAME RATING WITH AN ADD-ON PURCHASE (£35.50 to update "A", £43 to update "J"). UP TO £10.00 TRADE-IN ALLOWANCE ON YOUR SYSTEM "J" LoZ 500, SUBJECT TO CONDITION. ALL INSTRUCTIONS, USUAL CARRIAGE, etc.



4 Partridge House, Prospect Road, Broadstairs, Kent CT10 1LD

(Callers by appointment)

## PARTRIDGE SUPER PACKAGES COMPLETE RECEIVING STATIONS FOR ANY LOCATION

All cables, matching communications headphones, Joystick VFA Aerial with purpose built ATU. ON THE AIR IN SECONDS!

**FRG7Rx** (and all accessories) **£235.40**  
(Rx. only £199.00, (Ask for Pkg. R.1)  
with FREE JOYMATCH ATU)

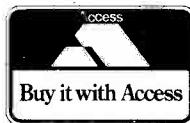
**FRG7000Rx** (and all accessories) **£395.40**  
(Rx. only £359.00, (Ask for Pkg. R.2)  
with FREE JOYMATCH ATU)

## SUPER BARGAINS IN YAESU/SWAN/PARTRIDGE PACKAGES

Quotes/Brochures on request

## BUSINESSMEN! VHF RADIO

Save time — petrol. Kill phone bills. Radio communicator: with your staff costs surprisingly little. What is your problem?



## JUST TELEPHONE YOUR CARD NUMBER

0843 62535 (Ext. 4) (62839 after office hours) or send 12p for FREE literature. Prices correct as at press. NOTE our prices are always INCLUSIVE OF VAT, carriage. Prompt service too, goods usually despatched WITHIN 48 HOURS!