

The SHORT WAVE

Magazine

VOL. XXXVIII

JULY 1980

NUMBER 5

Contact Lowe Electronics for all that's Good in Receivers



**TRIO
R1000**
THE FINEST
RECEIVER ON
THE MARKET
£298 inc. VAT

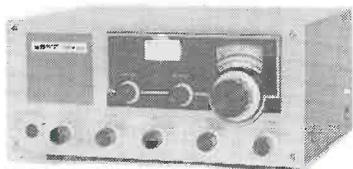
2 metre FM = SR9



**SR9 Value
£46** inc. VAT

2m FM TUNABLE 144-146 MHz
0.3µV Sensitivity. 12V Operation
plus 11 Channel Crystal Control

THIS PRICE INCLUDES DC KIT FITTED AND THE PEACE OF MIND THAT COMES FROM BUYING YOUR TRIO FROM AN APPROVED DEALER!



NEW LOW PRICE

**LOWE
SRX-30**
£158 inc. VAT

The SRX30 is the most impressive mid price Receiver available to the keen DX-er.
500 kHz — 30 MHz Continuous.
Drift Cancelling System.

AM/USB/LSB/CW with 6 kHz and 3 kHz filters.
Completely self contained. For AC mains and optional
12V DC operation.

AND FOR THE AIR BAND ENTHUSIAST WE HAVE THE LOT



THE
DIGITAL FLIGHT SCAN
DOES EVERYTHING
£215 inc. VAT



**R517 HAND HELD
TUNABLE 118-144 MHz**
plus Crystal Control on
three Fixed Frequencies
UNDER £50 inc. VAT

**AND SO MUCH MORE IS
HERE AT MATLOCK. SEND 48p** in stamps for Full catalogue

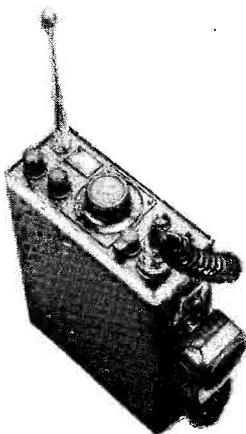
LOWE ELECTRONICS Ltd.

TEL. 0629 2430

CHESTERFIELD RD., MATLOCK. DERBYS. DE4 5LE

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

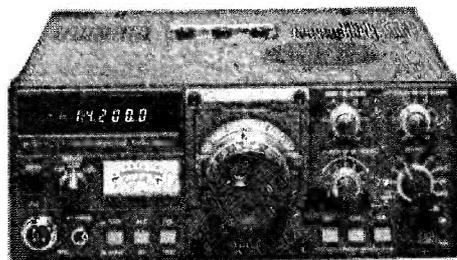
TS120V £347.30 inc. VAT

TS120V	£347.30	TS120S	£432.40
PS20 4 Amp	£44.85	PS30 20 Amp	£85.10
AT120	£55.20	MC35S mic	£13.80
SP120	£25.30	TL120 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-function VFO120 second VFO unit; OR the SP120 external speaker; OR the 100W AT120 antenna tuner or maybe even a superb Microwave Modules 2 metre or 70 cm transverter to get you up on the VHF and UHF bands. It all adds up to a fine station tailored exactly to your own needs.



If you need more power, the TL120 200W p.e.p. linear is now available, but you will need a hefty 12V supply to run it. A suitable unit would be the PS30 which delivers up to 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 Electronics at Matlock.

LOWE ELECTRONICS Ltd.




TRIO

TR9000

2 metre MULTIMODE
£365.00 inc. (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.

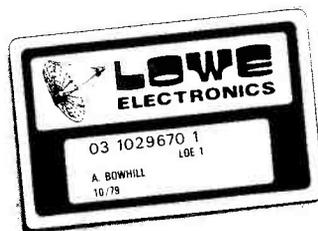
The TR9000 has so much to offer, it's bound to be yet another leader, from Trio. Contact us soon for further details.

NOW ASK US ABOUT THE TR7800!! 2m FM AT ITS VERY PEAK OF PERFORMANCE

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.

TS520SE

VOTED "MY FAVOURITE
TRANSCIVER" BY RADIO
AMATEURS WORLDWIDE



In the face of ever increasing complexity in amateur radio equipment, its comforting to know that the TS520SE is still in volume production. Radio amateurs all over the world (and dealers too) have voted the TS520SE "my favourite transceiver" because of its astounding reputation for reliability, high sensitivity receiver, and of course the unequalled Trio audio quality coming from the transmitter. The TS520SE incorporates all of the features demanded by today's amateur, and at an outstandingly low price. No wonder it's top of the list in popularity, and comparison with other transceivers will convince you that the TS520SE is the best value for money on the market today.

Of course, the bare figures cannot tell you just how nice the TS520SE feels in use, nor can they tell you the pleasure of hearing other operators saying "never heard better audio OM, what rig are you using?"

The TS520SE standard specification includes CW wide/narrow switching (using the optional 500Hz filter), semi break-in keying with sidetone, PTT or VOX operation, really effective noise blanker, switched AGC time constants, 5 function metering, switched RF attenuator, RIT, speech processing for punchy transmit audio, fixed channel facilities, 25kHz calibrator, fan cooled PA, internal loudspeaker, and of course the TS520SE will take all the wide range of current matching accessories including the DG5 true frequency digital readout, the VFO520S remote VFO unit, the SM220 station monitor scope and panoramic display and so on.

When talking to prospective purchasers of the TS520SE, the question we are most often asked is "how does it compare in price to its rivals?" and the transceiver it is most compared with is the Yaesu FT101Z series. The price for the FT101Z taken from March 1980 RadCom is £575 including VAT and you also should add PA fan at £13.80 (the fan is standard on the TS520SE) making a grand total of £588.80.

THE TS520SE costs £437 including VAT.

Now tell me if that's not value for money.

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

SPECIFICATIONS

General	
Frequency range	160 meter band: 1.8 to 2.0MHz 80 meter band: 3.5 to 4.0MHz 40 meter band: 7.0 to 7.5MHz 20 meter band: 14.0 to 14.35MHz 15 meter band: 21.0 to 21.5MHz 10 meter band: 28.0 to 28.5MHz 28.5 to 29.1 MHz 29.1 to 29.7MHz
Mode:	WWV: 15 MHz (receive only) SSB (USB, LSB), CW
Antenna Impedance:	50 to 75 Ohms
Frequency Stability:	Within ±1KHz during one hour after one minute of warm-up, and within 100Hz during any 30 minutes period thereafter
Tubes and Semiconductors:	Tubes: 3(2 × 6146B, 1 × 12BY7A) Transistors: 52 FETs: 19 Diodes: 101
Power Requirements:	120/220 V AC 50/60Hz
Power consumption:	Transmit: 280 Watts Receive: 26 Watts (with heater off)
Dimension:	333 (13 $\frac{1}{2}$) wide × 153 (6.0) high × 335 (13 $\frac{1}{4}$) deep mm (inch)
Weight:	16.0kg (35.2lbs)
Transmitter	
RF Input Power:	SSB: 200 Watts PEP CW: 160 Watts DC
Carrier Suppression:	Better than 40dB
Sideband Suppression:	Better than 50dB
Microphone:	High impedance microphone (50k Ohms)
AF Response:	400 to 2.600HZ
Receiver	
Sensitivity:	0.2 µV for 10dB (S + N)N
Selectivity:	SSB: 2.4kHz/-6dB, 4.4kHz/-6dB CW: 0.5kHz/-6dB, 1.5kHz/-6dB (with optional CW filter) Better than 50dB
Image Ratio:	Better than 50dB
IF Rejection:	Better than 50dB
AF Output Power:	2 Watts (8 Ohms load, with less than 10% distortion)

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 TX) 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



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...MJ...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

**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 812071.

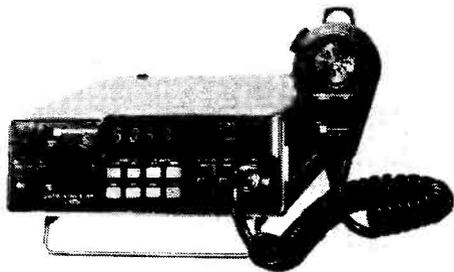
For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

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

Lee Electronics Ltd



We shall continue to give away, Free All Risk Insurance Cover on any new equipment purchased from us over the value of £150!!



C8800 2m FM MOBILE

The C8800 is a matching unit to the C7800 with the same features covering the 2m band in 5 or 25kHz steps (this is switchable from the rear panel). S20 and S22 are pre-programmed and available at a touch of a button, the unit has a 3 position RF gain to attenuate strong signals such as repeaters. Provision is made for two repeater offsets (600kHz is fitted as standard) at

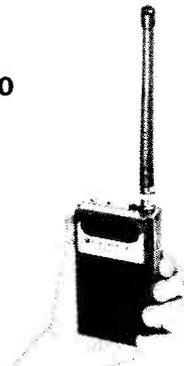
£219.50 + VAT Carriage free.

C7800 70cm FM MOBILE £239 + VAT

THE AMAZING NEW C800

This 10-channel scanner outperforms many of its rivals due to its highly sensitive front end and excellent filtering. A one channel 50Mw transmitter is incorporated that's ideal for local use. Controls include squelch, volume, autoscan and manual channel stepping. The unit comes complete with channels S20, R1, R2, R7, ni-cads, charger, helical antenna and wire antenna.

Price **£69.95** + VAT carriage free



YAESU FRG7

The **FRG7** needs no introducing, this low price receiver must be one of the best buys around. The unit covers 500kHz to 30MHz 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)

£199 inc. VAT. carr. £3

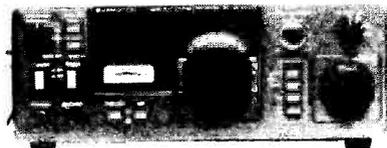
We have just made a new batch of our own Digital Readout. This can be fitted inside the set or mounted externally to give a very accurate read out.

£39.95 inc. VAT and Postage

FREE HEADPHONES WITH EVERY FRG7

The **Trio R1000** uses the latest techniques to produce a truly remarkable Receiver covering 200kHz to 30MHz in 30 bands. Excellent selectivity is obtained by 12, 6 and 2.7kHz filters, the 2.7kHz 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.

£289 inc. VAT. Carriage £3



TRIO R1000



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

PAUL
G3VJF



It's the fastest mover yet, so try to catch one! 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 (± 3 kHz) for those off channel stations
- ★ Scan control from the microphone (an optional mic available shortly)
- ★ 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



ICOM 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 100Hz step Digital PLL synthesizer Independent Transmit-Receive Frequency Capability. Frequency Readout: 7 digit LED 100Hz readout. Frequency stability: Within ± 1.5 KHz Memory channels: 3 channels, any inband frequency programmable. Usable conditions: Temperature: -10°C — 60°C (14°F — 140°F). Operational time: Continuous. Antenna impedance: 50ohms 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: ± 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 10dB S+N/N. FM more than 30dB S+D/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 ± 1.2 KHz at -6 dB point. Less than ± 2.4 KHz at -60 dB point. FM More than ± 7.5 MHz at -6 dB point. Less than ± 15 MHz at -60 dB point. Audio output power: More than 1.5W. Audio output impedance: 8 ohms.

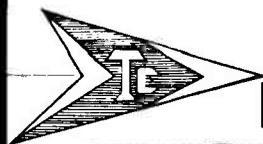


FROM

THANET

OF COURSE





ICOM DOES IT ALL!



**We are proud to announce the imminent arrival of
ICOM's new 8-band HF Transceiver—
the IC-720**

Some features:

- ★ 8 Bands Top to Ten including the new ones!
- ★ General Coverage Receiver
- ★ Tuning down to 10Hz steps — YES! 10Hz
- ★ A very effective Noise Blanker — the best yet — it even reduces the "Woodpecker"
- ★ Built-in Speech Compressor
- ★ The famous ICOM Band Pass Tuning
- ★ Two Independent VFOs that can track together
- ★ 100W Output
- ★ Modes AM, SSB, CW and RTTY
- ★ Lots more — But wait for it —

PRICE LESS THAN £700 incl VAT (psu extra)

Write or call for more details

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

Scotland—Jack GM8GEC (031-665 2420)

Wales—Tony GW3FKO (0874 2772) Burnley—(0282 38481) Midlands—Tony G8AVH (021-329 2305)

**North West—Gordon G3LEQ (Knuttsford (0565) 4040) Yorkshire—Barnsley (022678 2517) Evenings
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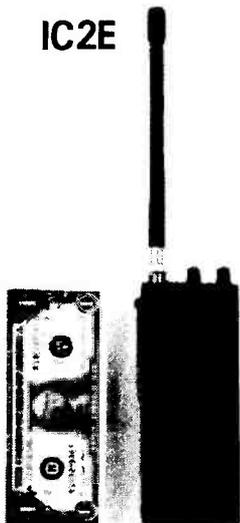
THANET ELECTRONICS LTD.

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





IC2E



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

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 12V 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 but when battery power falls below 6V it doesn't light 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 incl VAT!

THIS IS THE CHOICE FOR THE MAN WHO WANTS THE MOST FROM HIS MOBILE — THE IC260E

THE NEW ALL-MODE MOBILE

£339
inc.

The IC-260E is obviously going to be one of the best selling multimode 2M Transceivers of all time. Never before has so much been offered in such a small package.

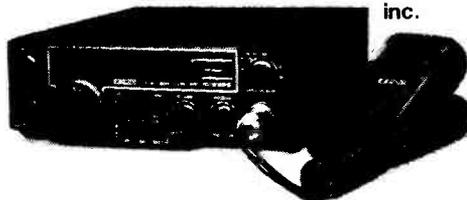
Replacing the IC-245E, the IC-260E offers such extras as full frequency read out, upper and lower sideband, and scanning. Thus, it makes an ideal base station, when used with a DC power supply, as well as a mobile. The use of a microprocessor instead of an LSI chip has enabled Icom to offer this at a lower price than the IC-245E.

144 MHz ALL-MODE TRANSCEIVER INCORPORATING A MICRO-COMPUTER — 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 IC-260E provides FM, USB, LSB, CW coverage in the 144-146 MHz frequency range. Thus the IC-260E can be used for mobile, DX, local calls and satellite work. Easily extendable to 144-148.

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 an LED display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 7 LED digits representing 100 MHz to 100 Hz digits. When in Duplex and using the tuning-knob the two VFO's track together. Automatic recycling restarts tuning at the top of the band, i.e. 145.999 9 MHz



when the dial goes below 144.000.0 MHz. Recycling changes 145.999 MHz to 144.000.0 MHz as well. 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.

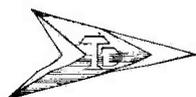
OUTSTANDING PERFORMANCE — The RF amplifier and first mixer circuits using MOS FET's and other circuits provide excellent Cross Modulation and Two Signal Selectivity characteristics. The IC-260E has excellent sensitivity demanded especially for mobile operation, high stability and with Crystal Filters 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 for an output of 10W or more.

ADDITIONAL CIRCUITS — The IC-260E has a built-in Noise Blanker, CW Break-in CW Monitor, APC and many other circuits for your convenience. The IC-260E has everything you need to really enjoy VHF operation, in an extremely compact rugged transceiver.

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Now, with SMC's prices much the same or a little lower than 18 months ago and inflation forecasts of 23%, this must be a good time to buy — and owning one of the best communications equipment in the world has never been easier than with SMC's new credit scheme . . . Free Finance. How does it work?

Simple: 6 months — pay 20% down, split the balance into 6 parts
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Give us a ring for full details (subject to clearance and a minimum of £100 invoice) we will help you to enjoy new regular priced Yaesu, KDK, Gem Quad, Ascot, SMCHS, CDE, Hy Gain, Stolle, SMC, Leader, Hansen, MFJ, KLM, Mirage, and Hi-Mound — Tomorrow!

REMEMBER: When you deal with SMC you get:

- The SMC two-year guarantee. The speedy free Securicor service.
- The security of dealing direct with the largest authorised importer.
- The spacious, very well equipped, ably staffed test and service facility.
- The knowledge that we carry tens of thousands of pounds of spare parts.
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- Our in-person, or over the phone, time saving credit card acceptance.
- Our honest advice and evaluation of part exchange equipments' worth.
- Our deep interest and knowledge in most facets of our common hobby.

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Telex: 477351 SMCOMM G
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AGENTS STOCK AND SALES

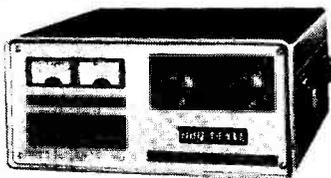
G3ZUL	Brian	Stourbridge	(03843)	5917
GI3KDR	John	Bangor	(0247)	55162
GM8GEC	Jack	Edinburgh	(031665)	2420
GI3WVY	Mervyn	Tandragee	(0762)	840656
GW3TMP	Howarth	Pontybodkin	(035287)	846/324
GW4GSW	Alan	Swansea	(0792)	24140

Communications Ltd



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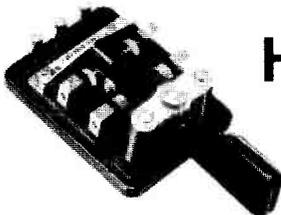
NAG
£359 +



The NAG 144XL-2200 is the finest 2m Linear Amplifier of its type we have yet seen. Identical in size to the FT225, it produces about 250W RMS of clean stable out from a grounded grid 4CX 350F for a nominal 10W drive. The inbuilt PSU provides a 12V 3 amp fully protected and stabilised for 12V only exciters. A switchable, 10db gain, low noise amplifier, coax change over relay, RF sensing and manual control, inbuilt SWR bridge, thermal delay on switch on, thermal cutout ALC output socket, are a few of the star features.

SPECIAL OFFER LIMITED PERIOD ONLY

HK703	Straight hand key	6" 3" 2"	£16.75
HK704	Straight hand key	6" 3" 2 1/2"	£11.35
HK706	Straight hand key	6 1/2" 4" 3 1/2"	£8.75
HK707	Straight hand key	6" 3" 2"	£8.00
HK710	Straight hand key	6 1/2" 4" 4"	£25.70
HK808	Straight hand key marble plinth	6 1/2" 4" 2 1/2"	£32.35
BK100	Semi Automatic mechanical bug	9" 3 1/2" 2 1/2"	£15.00
MK701	Single lever	6" 3 1/2" 2 1/2"	£16.00
MK702	Single lever	6 1/2" 3 1/2" 4"	£17.95
MK703	Squeeze paddle	5 1/2" 3 1/2" 2 1/2"	£17.10
MK705	Squeeze paddle	4" 3 1/2" 2 1/2"	£14.75
MK706	Squeeze paddle steel base	4" 3 1/2" 2"	£13.40



HI MOUND KEYS

The Mirage range of 12v solid state, no tune broadband 2 metre linears are justifiably famous in the U.S.A. for their reliability. All models feature an in-built pre-amp using a low noise, grounded gate, FET (10dB gain). External T/R relay keying and RF Sensing changeover with switchable and adjustable hang time is provided. An optional remote control unit is available permitting switching of power, mode and pre amp from the operating position thereby allowing the linear to be sited close to the battery or antenna.

MIRAGE LINEAR



B108	80w out. 10w nom. Drive. 10-12A	£105.00
B3016	160w out. 30w nom. Drive. 17-22A	£142.50
B1016	160w out. 10w nom. Drive. 20-25A	£165.00
RC1	Remote control c/w 18 ft cable	£15.00

The FM 2025 is a 25 watt, 12v DC 2 metre FM Transceiver that uses a custom designed microprocessor to provide "single knob" tuning in 25 kHz and 12.5 kHz synthesizer steps. Ten easy "write-in" memory channels with scanning plus band scanning between any two programmable limits (two of the memory channels) makes operation as simple as a crystal controlled transceiver.



KDK 2025E

MONITOR
£75 +



The SMC Monitorscope is a convenient test instrument for monitoring transmitters up to 2Kw PEP "on the air" across the HF spectrum. The incorporated two tone generator allows adjustment of SSB transmitter for optimum linearity and when used in conjunction with a RMS wattmeter provides accurate PEP measurements to be taken.

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YAESU FOR HF — SMC FOR YAESU
SMC FOR TWO YEAR WARRANTY



FT707

FT707 NEW SOLID STATE TRANSCEIVER

The FT707 'The Wayfarer' is an ultra-compact solid-state transceiver covering 80-10m, including 30, 17 and 12m — all factory installed, with 100W output (10W 'S' model) 50% out developed in 3:1 VSWR, digital (bright LED's in mode sensitive counter) and analogue readout, status at a glance (from string LED and single displays) 16 poles of crystal filtering adjustable IF bandwidth 2.4kHz to 300Hz. Noise blanker of most advanced design using local AGC loop, Schottky diode ring module, power transistor buffers, ultra-clean low noise local oscillator provide remarkable receiver performance.

FV707DM Ext. Dlg. VFO	£157.00	FT707 Transceiver 100W	£455.00	FP707 12 Volt P.S.U.	£95.00	MMB2 Mobile Bracket	£12.00
FC707 Antenna Tower	£83.00	FT707S Transceiver 10W	£425.00	NR7 Rack Mount Cabinet	£11.50	YM35 Scanning Microphone	£11.00
FTV107(2) Transverter	£181.50	FL2100Z Linear	£355.00	FRB707 Switching Box	£19.00	YM36 Desk Mic.	£18.50



FT107M

FT107M NEW SOLID STATE TRANSCEIVER

All solid state transceiver, 160-10M (+ WWV Rx and 2 Aux). 12V DC. SSB, CW, FSK and AM. 240W pip. The fan cooled (thermostatically controlled) no tune "broad band" power amplifier delivers 75% power output into 3:1 VSWR. Analogue and digital readout to 100Hz. Sensitive and with excellent dynamic range (hard driven schottky diode ring mixer). Continuous variable bandwidth 300Hz to 2.4kHz plus optional "basics" of 350/600Hz and 6kHz. Full equipment includes: audio peak/notch filter, full metering including SWR, RF speech processor, advanced noise blanker, semi break-in with side tone, VOX, clarifier on Tx, Rx, or both, 20dB attenuator etc. The optional memory system provides 12 stored channels (with fine tuning), and offers scanning from the microphone. The store employs DMS — digital memory shift — to allow tuning, via a photo interrupter of any of the memorised frequencies (equivalent to 13 VFOs!!).

FT107M Transceiver	£660.00	FV107 Ext. VFO	£90.00	FTV107 Transverter frame	£96.50	YM34 Mic. desk	£18.50
DMST1107 Memory/Scan	£87.00	FC107 Antenna Tuner	£92.50	430V107 70cm module	£158.50	YM35 Mic. hand scan	£11.00
FP107E AC PSU Ext. + Spkr.	£92.50	SP107 External Speaker	£24.00	144V107 2m module	£88.50	YM36 Mic. noise cancel	£11.75
FP107 AC PSU Internal	£85.00	FTV107(2) Transverter	£181.50	50V107 6m module	£68.50	YM37 Mic. Hand	£7.50



FT901DM

FT901DM THE SUPERB PERFORMER

160-10M (+ WWV Rx), 12 and 234V (PSU Built-in). SSB, AM, CW, FSK and FM (Tx & Rx). 180W PIP. 80W F1 Analogue 1kHz and digital to 100Hz. Sensitive μ V with AGC controlled Mosfet RF, to push pull FET RF. Balance active mixer, push pull IF amp, to crystal filter then noise blanker. Continuously variable selectivity 300Hz to 2.4kHz and fixed 350/600Hz, 2.4kHz, 6kHz and 12kHz (at 6dB). 80dB cross mod rejection, 90dB desensitisation immunity (at 20kHz off at 14MHz). Audio Peak and separate notch tuning. Negative RF feedback on 6146B stage (-31dB 3rd order). RF processor, VOX, Curtis electronic keyer, tune button (10sec on full power). PLL VFO with memory for any Tx, Rx or T/Rx frequency. Modular plug-in construction, permeability tuning (for new band allocations) 25kHz calibrator, 20dB switchable attenuator, sidetone, clarifier and an advanced noise blanker, etc.

FT901DM Transceiver	£800.00	YK901 Keybd (ASC II etc.)	£100.00	FTV901 Transverter inc. 2m	£245.00	FC2100Z Liner Amplifier	£355.00
FT901D Transceiver	£710.00	YVM 1 Video Display	£125.00	430V901 70cm Module	£188.00	FV901DM Synth. Ext. VFO	£215.00
FT901DE Transceiver	£700.00	Y0901 Monitorscope	£240.00	50V901 6m Module	£50.00	FV101Z External VFO	£110.00
YR901 Morse/RTTY Rdr	£395.00	Y0901P Y0901 with pan adapt.	£280.00	70V901 4m Module	£75.00	SP901 External Speaker	£24.00
60MAR90160mA Mod. Kit	£15.50	PAN 0901 Band scan mod. kit	£47.00	FC901 Antenna Tuner	£115.00	SP901P Phone speaker patch	£44.50



FT1012Z

FT1012Z PERFORMANCE WITH ECONOMY

A hybrid HF transceiver, 160-10M (+ WWV Rx + Aux). 234V AC and 12V DC (inbuilt inverter option). SSB, CW and AM. 180W PIP from a pair of 6146B with negative feedback. Analogue and "mode sensitive" digital readout to 100Hz. Continuously variable IF bandwidth 300Hz-2.4kHz plus optional "basic fixed" of 350/600Hz. Full equipment includes: adjustable level RF processor, advanced adjustable level noise blanker, front panel adjustable VOX, semi break-in with side tone, 0-10-20dB attenuator, switchable ACC, Slow/fast/stop, clarifier (RIT) selectable on Tx, Rx or both, etc., etc. The FT1012Z is compatible with nearly all the FT901 accessories listed above — morse reader and video display, monitor scope with panadapt, 3 band transverter, ATU, linears, speakers, and a choice of synthesized or conventional (NEW FV101Z) external VFOs.

FT1012Z Transceiver Digital	£575.00	FT101Z Transceiver Analogue	£500.00	FL2100Z Linear	£355.00	FV101Z Ext. VFO	£110.00
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FT7B & YC7B
FT7B Transceiver £375.00
YC7B Digital Readout £60.00

FT7B MOBILE AND BASE TRANSCEIVER

A compact all solid state HF transceiver, 80-10M (full 2MHz coverage of 10 with optional crystals). USB-LSB CW-AM, 100W PIP (A3 and A1), 25W (A3). VFO control with clear analogue scale to 1kHz, plus an optional digital readout unit that can be conveniently sited above the transceiver, on the dash or steering column. The front panel remains remarkably uncluttered for a transceiver boasting a: crystal calibrator, vox, clarifier, side tone, and an excellent audio peak filter for CW. A mosfet RF stage for sensitivity, and a Schottky diode ring mixer for dynamic range. Complete with mobile bracket, microphones, leads, plugs, etc. The FT7B provides the economic answer to world wide communications.

FP12 12V 12A PSU	£67.00	YD148 Desk Mic.	£18.50
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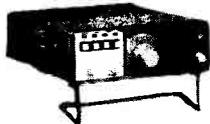


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GM3GEC	Jack	Edinburgh	(031665) 2420
G13WVY	Mervyn	Tandragee	(0762) 840656
GW3TMP	Howarth	Pontybodkin	(035287) 846/324
GW4GSW	Alan	Swansea	(0792) 24140

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YAESU FOR VHF — SMC FOR YAESU — YAESU FOR VHF
SMC FOR FREE SECURICOR (MAJOR ITEMS, UK MAINLAND)



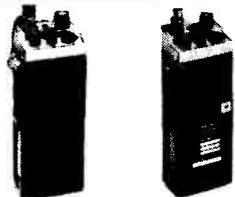
FT720R Control Head £130.00
S72 Switching Box £47.50

720RV 2m Deck 10W £148.00 720RU 70cms, 10W £179.00 E72S Cable 2m £20.00
720RVH 2m Deck 25W £153.00 MMB3 Bracket for deck £4.50 E72L Cable 4M £23.50

FT720R NEW 'REMOVABLE'

The FT720R is a new concept in mobile FM. Take a neat 'removable' control head (2m or 4m of extension cable and your choice of 2m (10 or 25W) and 70cm 10W main units. Add if you wish a switching box and then both 2 and 70cms are available from the one money and space saving controller.

The package offers sophisticated microprocessor PLL control system, optical coupled tuning, 5 memory channels, priority channel, up/down scanning from the mic (stop on busy or empty), auto or man. Tone burst up/down repeater shift and a string of yellow and red leds for power out and 5 meter etc.



FT207R Transceiver £103.50
NC-1 AC charger '202 £16.50
PA-1 12V PSU '202 £16.50

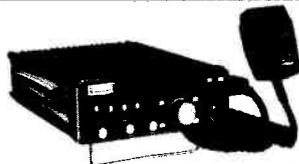
FT207R Transceiver £173.00 NC-9C Small charger £6.50 YM24 Speaker/mic £14.50
NC-1A Slide-in charger £16.50 NBP-9 Nicad packspare £14.50 FLC1 Heavy duty case FT202R £18.00
NC2 Fast charger/Eliminator £34.50 FBA-1 Pack/charger adaptor £2.25 AA nicads, each £0.87

FT207R — FT202R: 2m HANDHELDS

The FT207R is a microprocessor controlled synthesized handheld that offers 12.5kHz channel steps!! 4 memory channels are provided and these may, as can the whole band, be scanned. Any one of the memories can be used as a priority channel. Simply operate as normal on any frequency, designate one of the memories as priority, and every few seconds, for a few milliseconds, the set will check occupancy of the channel. All frequency entry is by the keyboard (which includes touch tone). The readout displays frequencies (to 100Hz), memory channel number and 'P'. Switches are provided for keyboard lock (prevents accidental operation) and display 'time-out'. A 600kHz shift, and any programmable split, is available, both of course plus and minus. Memory back-up is provided but can be switched off for long-term storage. 2.5W + 200mW outputs and a whole host of accessories complete the brief specification of this exciting transceiver.

The FT202R is an economical 6 crystal channel handheld physically similar to the FT207R.

CPU2500 MICROPROCESSOR CONTROLLED



CPU2500R 25W standard £292.00
CPU2500S 25W c/w stepper £319.00

CPU2500RKS 10W key mic. £292.00 CPU2500RK 25W key mic. £308.00 CPU2500S 10W standard £272.00
CPU2500KSS 10W key, stepper £319.00 CPU2500RKS 25W key, stepper £335.00 CPU2500RSS 10W c/w stepper £279.00

The CPU2500 family are 2 metre FM transceivers available in 25W or 10W output form with keyboard or standard push tune microphones. CPU stands for Central Processing Unit and it is this microprocessor that governs the synthesizer functions. Frequency control is possible either by rotating the main tuning knob (optically coupled), by using the up/down push buttons on the front panel, by using the up/down buttons on the microphone or by tapping in the data on the keyboard microphone. Plus and minus 600kHz repeater shift and any split (up to 4MHz) can be programmed in. Four memory channels with back-up are provided and these may be scanned, as can the whole band, the scanner stopping at the first vacant or occupied channel.

The SMC stepper (S) provides 25kHz steps between 145-146MHz (and entry of 5kHz direct from the keyboard) rather than the 10kHz (+ 5 up) synthesizer steps only, when it is switched into circuit.

FT227 SYNTHESIZED MOBILE TRANSCEIVER



FT227

The FT227s are 10W output 2 metre transceivers whose receiver performance — sensitivity and immunity to overload has become the standard against which others are compared. They use a signal knob (photo interrupter) to control the synthesiser, which basically turns in 10kHz steps with a 5kHz 'fill in' oscillator.

FT227RXS is an FT227R fitted with SMC's scanner. This maintains all the normal features of the 227 but the neat internal installation provides automatic tuning from 145 to 146 in 25kHz steps. When it finds an occupied frequency the scanner pauses for about seven seconds and if not held will move on. A flick of the P.P.T. will lock out one (or all) uncleared channels next scan around. FT227RBXSt is an FT227RB fitted with SMC's stepper. A four channel memory is provided in this model and tuning may also be accomplished by push buttons on the microphone. A single push moves the transceiver 25kHz, the button down for ½ second and it scans the band until a station is found.

FT217RXS Transceiver £252.17

FT227RBCS Transceiver £247.82

FP4 12V 4A PSU £35.00

YD148 Desk mic. £18.50



FT225

FT225RD MULTIMODE 2 METRE TRANSCEIVER

144-146-148MHz, USB, LSB, AM, FM, CW (semi-break-in with side tone). Smooth dual speed VFO control and 11 (x4) crystal channels. Simplex and (auto tone burst) repeater, 600kHz and auxiliary shifts both up and down. Single signal mix, with phase locked conversion oscillator, for spurious free output. Mains 234-100V 50/60Hz and 12V DC for world wide portability. Excellent selectivity, SSB 2.4kHz with 1.75:1 SF, FM 12kHz at -6dB. High sensitivity with modern MOSFET RF stage. Good strong signal handling by careful gain distribution, mixer and crystal filter design. High power output 10W AM, 1-25W CW and FM, SSB 25W + + with great reliability and low IMD's. Mode sensitive digital readout to 100Hz and easy to service superior plug in board construction. Front panel controls for: SSB mic gain, FM power, squelch, Vox/Mox sensitivity, noise blanker, AGC, readout brightness, meter functions (S/centre plus relative power) etc., Digital and Analogue versions and memory option.

FT225RD Transceiver £485.00

FT225R Transceiver £445.00

DIGT225 Counter R/RD £50.00

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150 Horncastle Road,
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9-5 Tuesday-Saturday (+ appoint.)



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 safe, quality design and manufacture.



Bearcat® 220 FB Specifications

Frequency Range:	
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 $\frac{1}{2}$ " 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 μ v for 12dB Sinal on L and H bands.
 μ bands slightly less

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

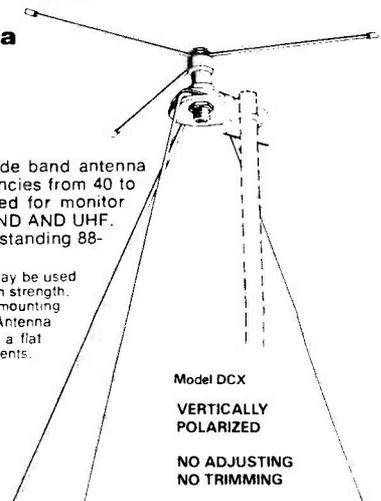
The Hustler Discone Model DCX is a wide band antenna and has complete coverage of all frequencies from 40 to 700 MHz. This design is especially suited for monitor radio reception of LOW-BAND, HIGH-BAND AND UHF. As a plus feature, use the Discone for outstanding 88-108 MHz, FM stereo reception.

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 $\frac{1}{2}$ " 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



Model DCX

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POLARIZED**

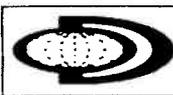
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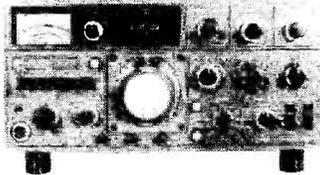
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Cables: Radio Shack, NW6

Telex: 23718

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RB20 RECEIVER

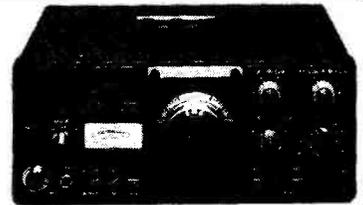
THE ULTIMATE IN RECEIVERS

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



The TR9000 is a compact lightweight 2 mtr FM/USB/LSB/CW Transceiver with an outstanding array of functions. FM1 for 25KHz steps (for mobile use) FM2 for precise 100Hz steps (for base station use). Microcomputer control giving many advanced features. Built in 5-channel memory. New type microphone with UP/DOWN switching. Built in high performance. N. Blanker. Side tone for CW. **ALL THIS PLUS MUCH MORE FOR £345.00 inc. VAT.**



TRIO TS120 TRANSCEIVER

ALL SOLID STATE HF BAND TRANSCEIVER

Freq. 3.5-30 MHz Amateur Bands and WWW. 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**



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. **With digital readout. £679.65**



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**

TRIO

RB20 Receiver	£690.00
TS820 Transceiver	£669.30
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DSIA 12v. DC Inverter	£42.93
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TL922 Linear Amplifier	£672.75
VFO520S	£98.80
SP520 Speaker	£17.25
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
TR2300 2m. Portable Transceiver	£166.75
TS520SE HF Transceiver	£437.00
TR2400 Hand held 2m Transceiver	£210.45
TS120S 200 watt Transceiver	£432.40
TL120 Linear Amplifier	£128.80
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HS4 Headphones	£10.35
MC50 Desk Microphones	£24.15
MC30S Hand Microphone 50K	£13.80

Crystals and accessories in stock

RECEIVERS AND TRANSCEIVERS

(inc. VAT and Postage)

SR9 Tunable 144-146MHz 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	£199.00
Phillips FM321 70cms FM Transceiver	£264.00
Yaesu FRG7 Receiver	£214.00
Yaesu FRG7000 Receiver	£375.00
FDK TM563 Scanning 2m Receiver	£109.00
'SkyACE' Hand held Aircraft Band Receiver	£49.50
Bearcat 220 Scanning Receiver	£258.75

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.

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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.

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5V/2m 8 element yagi	£10.24
8V/2m 8 Element yagi	£13.23
10V/2m 10 Element	£28.41
PBM/14 2m. 14 element Parabeam	£40.38
5KY/2m. 5 element crossed yagi	£25.88
BXY/2m. 8 element crossed yagi	£24.27
10XY/2m. 10 element crossed yagi	£31.51
Q4/2m. 4 element Quad	£21.51
Q6/2m. 6 element Quad	£28.52
D5 2m. 5 cover 5 slot fed yagi	£18.29
D8/2m. 8 cover 8 slot fed yagi	£24.84
UGP/2m. ground plane	£9.37
MBM48/70cms. Multi-beam	£28.18
MBM88/70cms. Multi-beam	£37.49
TAS 2m. Whip mobile	£15.30
C5/m. Colinear	£40.02
C8/70cm. Colinear	£45.43
D15/1296 2.3cm. 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.

TR7800



Continuing TRIO's policy of presenting the Radio Amateur with the finest equipment available, we are pleased to announce the NEW TR7800 2m FM Mobile Transceiver. 15 memory channels - Priority channels with simplex ± 600 KHz or non-standard operation. "Priority alert" beeps when signal on M14 priority channel. Frequency coverage 144.00, 145.955 in switchable 5 KHz or 25 KHz steps. Front keyboard for selecting frequencies, programming memories and controlling scan function. **ALL THIS and MORE for about £270.00.**

NEW ANTENNA MODELS

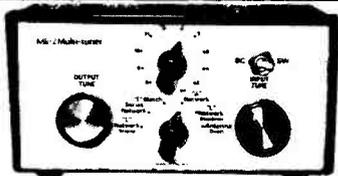
H.S. HFS Vertical 10-80m	£41.40
HFR. Ground Plane Kit	£23.00
GDX 2 Discone Antenna 50-460MHz	£36.80

ROTATORS	CABLE
DR7500X £98.04	UR43 24p metre
DR7500R £107.98	UR67 80p
ART 300C £97.50	300 ohm Ribbon
Sky King SU200 £40.40	12p metre
Sky King SU400 £75.00	75 ohm low loss 24p
DR7600X £135.00	
SRX-30	
Solid State Receiver 550kHz-30MHz	£178.00

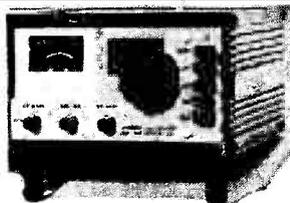
Mobile Antenna Range	
5' 8th Whip PL259 fitting	£6.50
Magnetic Mount PL259 fitting	£8.50
7' 8th Whip	£11.00
Basemount and lead	£3.00
Gutter mounts	£3.50
Bantex Magnetic mounts	£12.59
Bantex S-S Whip 5' 8th	£9.50
Bantex G. fibre 5' 8th whip	£9.10

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 0.500MHz	£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
DL 20 20 watt 50ohm Dummy Load	£6.30
DL 50 50 watt 50ohm Dummy Load	£7.50
DL 1000 1 kW Dummy Load 50ohm	£31.00
Morse Keys Lightweight	£3.25
Oscerblock SWR200B Twin Meter	£40.19
Hy/Mound HK70B	£10.50
Katsumi EK150 Electronic Keyer	£79.00
Katsumi MK 1024 Electronic Keyer, with memory	£135.00
DX-003 Programmable Frequency Counter	£116.25
HP3A High Pass Filter	£3.25
Twin Keying Paddle Chrome plated with heavy base. Precision Unit	£26.50
Full Range of Insulators - plus Valves - Etc.	

Mini Products	
C4X 3 band Vertical	£48.00
HQ1 Mini Beam	£96.00
Hy Gain	
12AV/0 3 band Vertical	£43.12
14AVT/WB 4 band Vertical	£60.32
18AVT/WB 5 band Vertical	£87.40
Diawa 144 Mhz and 70 cms Antennas in stock	



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. £29.00 inc. VAT and postage



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

S.T.E. Prices include VAT and postage

AAl Audio Module for AR10	£4.10
AD4 FM Discriminator	£5.00
ATAL 2m AM-FM Tx	£129.00

STANDARD	
C8800 2M FM Mobile Transceiver	£252.00

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
Multimobile 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
Extendarod 40"	£11.50

DRAKE

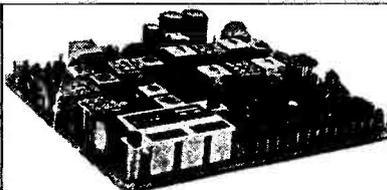
TR7 Digital Transceiver	£1035.00
PS7 Power supply	£207.00
RV7 Remote VFO	£138.00
MS7 Speaker	£29.90
R7 Digital Receiver	£989.00
Filters for TR7	£39.10
FA7 Fan for TR7	£20.70
MN7 ATU/RF Meter 250 Watts	£124.20
MN2700 ATU 2 KW	£207.00
DL300 Dummy Load 300watts	£20.70
DL1000 Dummy Load 1 KW	£37.95
TV3300 Low Pass Filter	£18.40

MICROWAVE MODULES

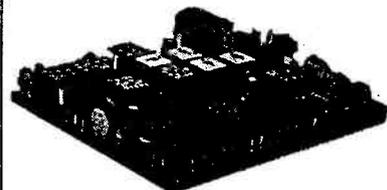
MMT 1296/144 1296 MHz Lin/Transverter	£159.85
MMT 70/144 4m Lin/Transverter	£99.00
MMA 1296 Receiver pre-amp	£25.88
MML 144/40 40 watt Linear Amplifier	£69.00
MMA 144V 2m RF Switched preamplifier	£24.90
MML432/20 Lin Amp and Pre-amp	£69.00
MMT 144/28 2m Transverter	£90.85
MMT432/28S 70cm Transverter	£136.85
MMT432/144R 70cm Transverter	£173.65
MMT 70: 144 4m Transverter	£99.00
MML 144/25 2m 25 watt Linear	£48.30
MML 144/100 2m 100 watt Linear	£142.60
MMC 70/28 4m Converter	£21.85
MMC 144 28L0 2m Converter	£24.15
MMC432 28S 70cm Converter	£29.90
MMD 1296/144 23cm Converter	£32.20
MMD050/500 500 MHz freq. conter	£69.00

COMING SHORTLY

From the SHIMIZU-DENSHI group the SS-105-S Solid State 10 watt mobile Transceiver, 3.5 MHz to 30 MHz with USB/LSB CW and FM (ideal for use with VHF Transverter). Small compact - more details next month.



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



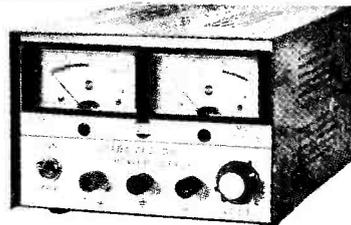
AT23. 12 Channel PM Transmitter 3 watts 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v DC operated AF input sensitivity 2mV adjustable to 50mV Price £50.00



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

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Model 153S 4-20V 3 amp Dual Meter	£29.35
Model 156S 4-15V 5 amp Twin Meter	£35.00
Model 1210S 4-20V 10 amp Digital Readout	£85.00
Model 1210SV 4-20V 10 amp Digital	£110.00
Model 153SV 4-20V 3 amp Digital Readout	£38.00
Model 1220 1 13.5V 20 amp	£90.00
Model 1220/2 13.5V 12 amp	£80.00



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This month we scoop the pool with news of YAESU's latest, the exciting

FT-280/480

A demonstration model of this fantastic new 2m All-Mode Mobile Transceiver is here for you to try NOW. So, don't just read the spec. Come in and use it on the air. It's superb.

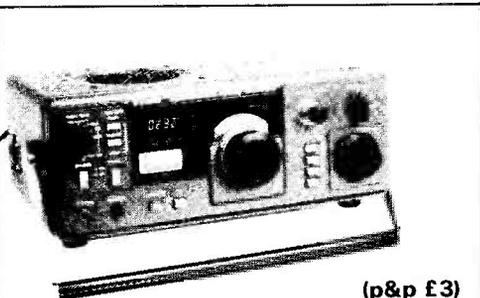


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- ★ Step or scan control from mic
- ★ Scan stops or pauses on signal
- ★ Scans whole band or memories
- ★ Auto tone-burst with repeater shift
- ★ Listen on repeater input selectable from mic
- ★ Monitors priority channel and locks on when busy
- ★ Digital clarifier plus or minus 10 KHz
- ★ Clarifier shift displayed
- ★ LED S-meter true peak reading on SSB
- ★ Semi break-in and sidetone on CW
- ★ "Satellite" mode cancels all shifts and permits tuning during transmission.

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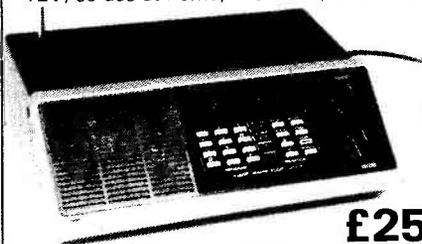


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THE FABULOUS R-1000 **£289** inc. VAT

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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.



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THE YAESU FRG 7

only **£199** Inc. VAT & Carriage

This receiver offers high stability, high sensitivity and general performance that has made it almost the 'Standard' receiver for amateur and short wave enthusiasts.



TRIO TR2300 IDEAL FOR PORTABLE, MOBILE OR HOME USE

£166 Inc. VAT & Carriage

A fully synthesised 25kHz spaced rig offering full band coverage, digital readout of frequency and auto tone burst. The excellent 1 watt transmitter and very sensitive receiver make this rig excellent value for money and comes complete with case, charger, power lead etc.



SR11 VHF MARINE RECEIVER

ONLY **£69** Inc. VAT & Carriage

6 Channel Scanning + Tunable 156-162 MHz

The SR11 is a self-contained VHF Monitor receiver suitable for use at home or mounted in a car or boat using the bracket supplied. It requires only a 12V supply. The automatic scanning of up to six crystal controlled channels is ideal for continuous monitoring of the important services whilst the VFO allows you to listen to the complete band.



FDK TM56B VHF MONITOR RECEIVER 12 fixed + 4 scanning channels

£105 Inc. VAT & Carriage

This receiver is designed for use as either a Base Station incorporating a 240V A.C. supply or as a Mobile Monitor in a car or boat. The four scanning crystal channels can continuously monitor priority channels and immediately lock onto any signal. The Rig comes complete with mobile mounting bracket, hardware, power lead, etc.

TRANSCEIVERS

H.F.	
Trio TS 120V	£347.00
Trio TS 120S	£432.00
Trio TS 5205E	£437.00
Yaesu FT 707	£523.00
Yaesu FT 101Z	£574.00
Yaesu FT 101ZD	£661.00
Trio TS 180S	£679.00
Yaesu FT 107M	£859.00

2 M MOBILES

Icom IC 240	£169.00
FDK Multi 700EX	£199.00
KDK FM 2025	£250.00
Standard C8800	£250.00
Icom IC 255E	£255.00
Trio TR 7800	£265.00

2 M HANDHELDS

FDK Palm II	£99.00
Yaesu FT 202R	£119.00
FDK Palmsizer	£149.00
AOR AR 240A	£165.00
Trio TR 2300	£166.00
Yaesu FT 207R	£199.00
Trio TR 2400	£210.00

2 M MULTIMODES

Icom IC 260E	£339.00
Icom IC 251	£479.00
FDK Multi 750	£295.00
Trio TR 9000	£345.00

RECEIVERS

H.F.	
Lowe SRX 30	£178.00
Yaesu FRG 7	£199.00
Trio R 1000	£298.00
Yaesu FRG 7000	£359.00

2 METRE F.M.

Search 9	£45.00
AR22	£99
FDK TM56B	£105.00
Bearcat 220	£258.00

MARINE V.H.F.

Search 9	£45.00
SR 11	£69.00
TM56B	£115.00
Bearcat 220	£258.00

AIR BAND

Waltham W144	£29.95
R517	£49.95
AP12	£120.00
Bearcat 220	£258.00

★ ★ SPECIAL OFFER ★ ★

SR11 V.H.F. MARINE BAND

V.F.O. TUNES 156 162 MHz
Scanning of 6 Xtal channels

ONLY **£69** inc. VAT & Carriage

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(C & P)
75p

Mobile Safety Mics	£20.95
500Ω Hand Mics	£6.75
World Clocks QTR 24	£18.40
QTR 24D	£24.50

HEADPHONES

YH55	£10.00
Trio 454	£10.35
Trio 455	£21.85

SWR METER

SWR 25	£13.00
SW 110	£35.00
CN620	£52.81
C	2U

COAX SWITCHES

2 way Toggle	£6.75
5 way Rotary	£10.20

A.T.U.'s

KX2 for Listeners	£29.95
Trio AT 120	£55.20
Trio at 200 AT 200	£82.80

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2 M Mobile Antenna	petitive
High Gain HF Antenna	prices

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COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

TO make a start on this piece is something of a hardship right now: a scorcher of a day with the weather turning sultry and unpleasant later in the afternoon, and now absolutely still with just a hint that thunderstorms are on their way up from the West Country. The old — and we mean *old* — shack fan has been pressed into its once or twice annual exercise in fustigating, and will doubtless in due course shake something off its accustomed spot. But at least some changed air is breathed!

A sad event for amateurs, whether of the VHF or HF persuasion, who are interested in the experimental side of our hobby is the failure of the *Oscar 9* launch. It appears that it lifted with only seconds to spare in the launch "window" but lost one of the four engines and so could not keep on course. The range safety officer had to destroy the vehicle which landed in water some 50 Km from the launch site at Korou in French Guiana. To replace it, some two to three years of work will be required, the original having absorbed some 150,000 dollars and thirty man-years of effort; however, the "engineering" part is of course completed, and some hardware and solar cells are available. It is sad that the Phase 3 beast should have been lost in this manner, as it is understood all the telemetry was functioning perfectly at lift-off. AMSAT are definite in their intention to replace the bird, and we hope they can have luck with the launch vehicle next time. On the other hand there is some consolation that the earlier ones have been such an outstanding success.

China & Albania

There have been reports — the *DX Bulletin* in particular — of a BYIUSA being heard and worked by many on the evening of May 9, while coincidentally *Ham Radio Report* was running a report that a fairly QRO delegation of FCC people was visiting China. A subsequent edition of the *DX Bulletin* indicated that there had been a group of Connecticut businessmen in China, with the latter country expressing an interest in high-

technology equipment purchases. No doubt something will mature in this area, and about all that can be said is to advise you to work them first and worry later!

Turning to Albania, there is no doubt that the Albanian DX-pedition of ZA2RPS several years ago by DL7FT removed the attractiveness of ZA as a pirate prefix; DL7FT is now openly hoping to re-activate the call, although it is quite clear that at least two trips will be required, the first to set everything up in the way of permissions, and the second for the actual operation. That says money is going to be required too; the thing to do will be to wait and see what the next moves look like and then decide about the degree of support to give. One does not like, on principle, a DX-pedition that needs to be supported in this way, but we guess this is one that would most definitely be a non-starter without some help.

A general point next; there does seem to be a feeling that, in general, QSL cards for African stations should be plain and unadorned envelopes, without the decoration of the call-sign after the recipient's name, if they must be sent direct.

That volcanic eruption at Mount St. Helens on May 18 had, by June 2, come to be blamed for the high static levels observed by West Coast stations on all HF bands; and it is interesting to note that the ash from the eruption reached the East Coast by May 23. At that sort of rate it seems likely that it might be seen over Europe by a week after this piece is finished. Just goes to show how puny our nuclear explosions and nuclear power outputs are, when compared with Nature in an angry mood!

The Bands

At the time of writing we have been well and truly into summer conditions. The writer had hoped that it would be the case that his two phased verticals would serve to make up for the shortfall to some degree, but in the event, when the second aerial went back up, all was less than perfect. Firstly, the feeder to the second vertical decided

that the moment when the OM was climbing down the ladder was as good a time as any to decide to disconnect itself. Once that little snag had been dealt with, we found problems down below, and nothing of any consequence has been done to resolve them, due to the rush of work caused by the ending of the printing difficulties and the impending return visit of the writer to hospital for a few days. However, it doesn't need a genius to decide that the summer doldrums are well and truly on us; and it becomes more and more obvious as the years go by that the poorer your aerial system is, the more you will be aware of the fall-away, unless, as can happen at this stage in the cycle, you can spend some late-night sessions when things have calmed down a bit — but that is a function of work commitments and one's liking for slumber!

Ten Metres

G2ADZ (Chessington) takes up the story initially with a list of the beacons recently heard, with the frequencies on which he measured them: 28.200-28.205, DL01G1; 28.207 N4RD; 28.210, 3B8MS; 28.216, GB3SX; 28.220, 5B4CY; 28.236, VP9BA; 28.238, LA5TEN; 28.239, OA4CK; 28.245, A9XC; 28.257, DK0TE; 28.270 to 28.274, ZS6PW; 28.280, YV5AYV; 28.284, VP8SB; and 28.316, ZS6CDN. As for band conditions, at the times when Bill could get on, things were patchy, but good at times, with CW QSOs to OH2OT/OH0, SU1MI, 8P6KY (QSL to WB4RRK), CE3WD, HP1XJU, HP1XAT, VU2BK, A22DW (QSL to VK7CH), KG4WM, ZE3JO, A7XE, A4XH1, DF5FM/5N0, 8Q7AW on the Maldives for a new one (QSLs to DJ2BW who gives a fast turn-round), VP2MFJ, ZD8TC, YB0ADT, CP8AL, C6ABA, KA6IRM/DU who takes his QSLs via ARRL, W7LPF/DU2 (QSL via N2CW), VK, and UA0. Bill also worked YJ1AL, whom he reckons to have been a YL phoney, calling for QSLs via Box 88 (!) and with quite good CW, and the right beam heading.

G2HKU (Minster) used his FT-101Z on Ten to work K7CS/0 (Colo.), W8VSK, PY7AOR, W4AI, and DL2HI/W5.

In Knutsford, G4HZW has his FT-75 and two-element Quad, with 25 watts output SSB; however there is an intermittent fault involving the loss of drive to the PA which has provoked Tony into trying to turn himself from a self-confessed appliance operator into a home-brewer of equipment, starting with "The S.C.D." project featured in three recent issues of *Short Wave Magazine*. To revert to the DX we note W0ROI and WD0HMR (both in Sioux City, Iowa), W6IH; and on the evening of April 3 at 1925, W8GPZ, W3HUV/M3, N7ZL and WA1OPF, the latter running five watts input. At 2223 VK3NPX and VK2NVA were both hooked on the long path, FGODYM/P/FS7, LU1AY, VK3VRC, again around 2210 and long path, G3RJS/MM and SV0WEE, both at lunch time, and on the same evening (April 6), WA2PSU/M, K9PSN, WD9IXI. The next few days were blank and then HK3DJV, OX3CO, HK4EIM, W9PAM, WD4EEM, N6ADG, KA9BZE, W0QEV and W0JCA both in Missouri and K4DWH. Then came a spell as GM4HZW/P while bird-watching in Inverness-shire, which, with a vertical dipole gave SV1DC/A (Mount Athos), UK9CAE, UB5QCU, UA4CGF, UB5GAC, VE7DG, WA3JZR, and on 21st VK7OC at 1058 for a half-hour QSO. April 23 gave W6OCU, KB7CH (Arizona) and WA6VRC. Back home and the saga continued; one interesting bit was to find a sudden opening from 0530 which gave a couple of JAs, UA9XWA, another JA, UKOJAA, and an S9+40 report from a neighbour's stereo, causing G4HZW to enquire plaintively if anyone else has a neighbour who plays his stereo from 0600 on a Bank Holiday Monday morning. DX was worked through to May 22, and after that it was Sporadic-E openings into Europe, including LX1GH who managed to fade from RS59+20dB, down to RS0 in just 20 seconds!

G3OUC (Newbury) writes sadly to report the death of Bert Wheeler, G8VP, well known on Top Band and operating there the day before he died; Bert lived in Faringdon, Berks. As far as G3OUC's own activities go, he has had ten watts of AM operating /M,

and with it has been getting contacts from W and UA9. Pat has also been home-brewing a solid-state transceiver, using a 2N3866 in the final at 0.5 watt output; the first on-the-air contact with this rig brought back UA6APP in Sochi on the Black Sea; three days later a valve linear comprising a brace of 5763s in grounded-grid and three watts p.e.p. driven from the same transceiver yielded a QSO with UA6ARK — who lives a kilometre away from UA6APP. A little light relief was obtained during a QSO with a UA5 who was being given instruction in what to say by a UA6 in Russian; as Pat remarks, the BBC's Russian language programme does have some advantages! G3OUC also notes that the UAs have AM and FM above 28.8 MHz — we have noted the odd ten-metre FM signal in G, too, around this neck of the woods.

Now we turn to G3NOF (Yeovil) who notes the change to summer conditions as occurring more suddenly than usual, occurring about a fortnight prior to his letter of June 4. This means more activity in the evenings, although one never can be certain — a trait that has ever been one of the more endearing habits of the band. A few short-path VKs have been heard around 1000-1200 and some W4s in the afternoons and early evenings; a few openings to the Pacific, DU, YB0, H44, P29 were noted and contacts to YB0 and VU worked as late as 1900z. In the afternoons also there were a few Africans and South Americans. SSB QSOs are noted with A4XGC, A6XJA, DA1WA/HB0, DU1BAL, FK8DH, FM7ITU, FR0FLO, H44WH, HS1ABD, JA3NAY, JT1KAI, OD5MR, P29NUK/P, S8AAW, VK4NMW, VK4NMU, VK4VDP, VK9NM (Norfolk Is.), VP5WJR, VP8QG, VS6IC, VU2MKS, WA4EHS/KH2, ZD7SE, ZS1CO, YB0ACL, 3D2WR, 5H3PA, and 5Z4WD.

G3ZPF (Dudley) is still playing with his micro-computer and developing programs of interest in Amateur Radio; indeed for the benefit of others he is venturing into the business of writing such programs for other people, and selling them, as readers of our advertising may have noted. On the operating side, there is mainly the local net on 28.3 MHz in the evenings, with up to ten stations in attendance, and all good copy even at ten watts

unless a particularly whiskery motor or thermostat starts up locally. Other QSOs on Phone have been with KA9FBZ, WB1ANT, the local Gs, and H44PT in the Solomons. However, despite the relative inactivity, David still finds time to "keep BCI/TVI an on-going situation." As a final to his letter, David comments that they should have put a couple of pints of the local cider into *Oscar's* ARIANE launcher which he claims would be enough to lift *anything* off!

Ten metres still, now with G3CED/G3VFA: George's two watts and Joystick. With ZE2JD, George has some doubt as to whether he made it, as the pile-up was like "Wembley on Cup-Final day" and the ZE disappeared under them all; UA9CLY similarly "went west" under the heavy QSB, while the contact with UK1ABC developed into a QRQ contest.

G4BUE (Upper Beeding) has made the 200 countries with QRP, by way of 3B6CD on 28 MHz SSB, and as he has 184 of them confirmed he will now doubtless have a purge on the outstanding ones to claim the CQ QRP/DXCC 200 Trophy; only two have been awarded so far. On the question of QSOs, at the QRP level it has been CW to CX7BY and 4X4UH, with SSB to 3B6CD and JY3ZH. The QRO also added ZS3LK/3 who was on from Walvis Bay, which for a long while now has been rumoured to be going to receive DXCC country status.

21 MHz

G3NOF's analysis indicates that in general day-time conditions were poor. 0600-0900 has sometimes been good to the western reaches of USA, KL7, KH6, and the Pacific over the North Pole; the long-path morning openings to VK have disappeared and been replaced by short-path events around 0730. 1500-1900 has often been good to JA, while around 1800 KH6, KC6, KX were audible over the North Pole, accompanied by S9 signals from VU, AP, and HS. Ws were notable for their absence during the day save as already mentioned, but then the East Coast types surfaced about midnight. South American and African representation was sparse. For Don, it added up to QSOs with AH6P, AP2MQ, DF3FN/ST, DA1WA/HB0, FO8FO, FW8BA, FR0FLO, HS1AMI, HS1AMM, HS1AMT, JAs, KA7DQQ (Ariz.),

KA7ESS (Idaho), KC6IN, KX6PJ, KH6CF, KH6HHM, KH6IJ, KH6JE, N4ADJ/KH2, OE3REB/YK, P29GC, SV0AW (Crete), TN8AJ, VE8RCS, VKs, VK5KE/M, VS5KV, VS6CZ, XT2AU, W7DND, W7KTI, W7LXR, XE1IS, YS9RVE, ZD7HH, 3D2CC, 3D6BQ, 9L1FC, and 9Q5GB.

An unusual contributor to this section is G2NJ (Peterborough) who was out in the back seat of the G5NX/M set-up, chasing CW DX, while the gov'nor drove and operated two-metre phone. Nick had some twenty QSOs during the run from Peterborough to Hatfield and back, of which the most notable was K9KQ, Jim, of Green Valley; K9KQ is a WAB merchant and the QSO lasted some 45 minutes of the homeward journey, only signing-off once they had entered Cambridgeshire.

'CDXN' deadlines for the next three months—

(August issue — July 3rd)
 September issue — August 7th
 October issue — September 4th
 November issue — October 2nd

Please be sure to note these dates.

Another one who isn't often this low in frequency is G2ADZ, who comments that the bars to QSOs on this band are mainly time and QRM, plus our lower power in a pile-up — albeit the QRP DX-ers would dispute the latter! Bill found W, VK, ZL all easy, plus HM5PB, KG6JFO, 8J3ITU, HL9TO, JT1KAA and JT2AA in one go (JT never having been even heard before!), KH6HIQ/KH3 on Johnson Island, KH6IJ, PT9MF deep in the Amazon marshes, VP8AI, VY1AC for Bill's first Yukon station, UA0GF and UA0CA both near the Chinese border, ZE2JS, HS1AMC, and 9V1TK.

We come next to G2HKU who used his Big Rig to work N5TP and W1PL, while the QRP box — which one not specified — accounted for VE3CYA, K4IEX, VE3BSA, PY8ZLC, JA2FUA, UA3HH, WB3CWN, WB8GSN, I4IND, HA8EK, 4N4Y, and W3MM.

G3ZPF believes in snapping-up unconsidered trifles, in this case SV0AW for Crete — not a rare one, or a new one either, but the previous

clients there didn't QSL, so David hopes this one will be a bit more forthcoming.

G3CED/G3VFA made a Freudian slip in his log on April 26 when he mentioned a couple of QSOs on "15080" with indoor frame test aerial — wonder whether they were really 14 or 21 MHz? A bit more certainty attaches to JR3HII in Kyoto, back to a CQ with the two watts and Joystick. The QSO started at 559 all round, dropped right out and then recovered to an even RST339. There was also G4DVF, N2AIF, and at the QRO 100 watts, SM3KMB, WB1FDC for a long natter, K9VGE, KA3AKY, WB4RRA, WB2JST, UA3DCK, UB5GBN, W1GWA, LZ1IA, another long natter this time with W6JQA, plus the odd European further down the log.

G4BUE seems to have stuck to CW as far as the QRP side went, with 8J3ITU, FM7ITU, KP2A, 8P6GG/P, K9EF/8R1, and PY1BOA. The QRO CW also raised ZS3LK/3 in Walvis Bay.

Here & There

A very annoying mishap occurred over the Kenwood Trio International club: the bottom of p. 172 (May issue) is the offender, and for 14230 read 14320. Now this was one of these minor things, so why so annoying? Well, of course, G3WW got hold of it, he being a SS/TV addict, and promptly writes to G3RKC a rude letter, leaving time for Bill to pass the word back to your scribe that there was an error; and then, right on the deadline, in comes a letter from G3WW, which, while first admitting that *no* one group has any prescriptive right to any frequency, then goes on to say in words of one syllable that "persistent slow-scan TV will shift them most times." A remark hardly in the spirit of amateur radio. The point, though, is that if there is an error in a column about which you feel strongly, then write to the columnist first. If the error is in his information then he can bend the ear of the offender. However to write as in this case without making any attempt to check that a print error was not the cause, direct to the unfortunate G3RKC and rocket him, was inexcusable bad manners.

After that unpleasant task, we turn to more interesting things! July hardly seems a month for contesting, except for CW on July 19-20. The WAB LF

CW contest; the SEANET world-wide DX CW contest, mentioned in an earlier *CDXN*; the AGCW-DL QRP contest which runs from 1500z to 1500z on the Saturday to Sunday, with a nine-hour break for single-op stations. The QRP chaps will know all about this one from *SPRAT*; and between the three of them the CW ends of the bands should provide a lot of fun, particularly for the QRP lads once the others catch on to their presence.

Twenty

G2HKU mentions in his letter that he has been playing with his new Argonaut 515, which is an improved version of the old 509 and is styled to look like the Triton, obviously to generate a "house style" for all the QRP and QRO machinery they make. Ted is quite clearly well chuffed with his new toy! With it, on CW, he worked UC2ACO, UB5AAF, HA3KNA, W3ARK, OK2BMA, who was running an HW-8, and UK5MAF. The QRO accounted for the regular skeds with ZL1VN, ZL3SE, ZL3RS, ZL3FV; VK3PX, 8R1AG, and DA1WA/HB0 on SSB; while the same rig, but CW, dealt with VK5FG, VK6RU, VK2QL, ZL4AW, and KL7PJ.

G3NOF found too much of interest to spend much time on 14 MHz, apart from the 0600 opening to VK/ZL, so his sum lot of QSOs on the band added to: C31TT, DA1WA/HB0, KA7ESS (Idaho), KG4WM, P29GC, VE8TL, VK7AE, W7FU, W7WQC (Utah), and 8P6BN/P.

An even thinner offering in this direction from G4BUE, who mentions his QRP working 8Q7AW on CW and JW1SO on SSB.

G3CED/G3VFA, like most of the others, seems to have found his DX higher in frequency, and so most of his 14 MHz QSOs were in Europe. However, he got a bit of a surprise when he worked EA1ZA — name Manolocarnero, and QTH Noceda-Rubian-Lugo — sending at a sparkling 10 w.p.m.

Top Band

Activity on the band is most definitely on the increase; G2HKU offers DA1WA/HB0 and PA0PN on SSB, while CW walked off with PY1RO, UP2PAP, F6DYY, UK5MAF, OZ1W, YU2OB, DK1DU,

UC2AAK, R2B, UC2OAG, SP5IX1, RP2BET, SP3FLR, OK3CQF, OH2OT/OH0, GI3LFH, and OL8CIR.

G3OUC has a double-sideband at one watt peak, plus a direct-conversion receiver and home-brew vertical aerial. This is some 45 feet high, and its upper sections are made from 22 feet of hollow fibreglass roach pole which weighs-in at *five ounces*, then centre loading, and the lower part an appropriate grade of electrical conduit. Sounds like the veritable stuff of an article in these pages?

W1BB (Winthrop, Mass) has this eternal knack of keeping going, despite his own repeated assertions that he is going to stop sending out the twice-yearly bulletin. And, say what he will, he is as active as ever on the band, and as keen. On a different tack altogether, there is much discussion

going on in the States over the question of bandplanning, and the need (or otherwise) to make legislation to that effect when the band becomes exclusive. One hopes it will not be needed, but of course the SSB chaps in the main just don't realise why there should be 5 kHz at the low end of the band, and another five called a "DX Window" in which they can't identify DX because it doesn't talk; and even if they read the dots and dashes, they think it's not very well populated when it goes quiet on the alternate time periods! On the other hand, we get it from others on this side — many G stations on CW do not realise the limited allocations of some European countries and claim their nationals are "working SSB in the CW allocation" as a result. Perhaps the real answer is world-wide acceptance of the need for legislated band planning on all bands, particularly in view of the world

deterioration in the standard of honesty and observance of anything resembling a gentleman's agreement.

80 & 40

Space becomes tight, and *time* tighter if we are to get this little lot cleared, so for this time only we are dropping the reports on these two bands. Stress 'em a bit more next time, and we'll try to give them a bit of extra to make up for chopping off their prime this time.

Finale

Again! Dates are in the 'box'. Everything addressed to your scribe, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. CU further down the log, and 73.

ANTENNAS — THE WEAK LINK, PART XII

MORE DIRECTIVE ARRAYS

A. P. ASHTON, G3XAP

IN the previous article we discussed the Yagi and the Quad, the most common directive antennas used in amateur radio. However, there are other directive arrays available and this article attempts to describe some of them.

Phased Verticals

In an earlier article we discussed the merits of vertical antennas but indicated that their lack of directivity could be considered to be a distinct disadvantage. This shortcoming can be overcome by the use of a technique which has probably not received the attention it deserves — the phasing of two simple vertical antennas in order to achieve some degree of directivity.

The simplest form of phased verticals consists of two quarter-wave verticals sited a quarter-wavelength apart and fed a quarter-wave (90°) out of phase. This phasing is carried out by simply having the feeder to one antenna a quarter-wave longer than the feeder to the other; the layout is shown in Figure 1. The two antennas must be accurately matched to their feeders since, if standing waves are present, the impedances on the feeders at the point where

they are joined will be different: this means that the two antennas will receive different amounts of power and the radiation pattern will be distorted. The two feeders are connected together through a coaxial 'T' piece (obtainable from most suppliers of coaxial fittings), and another piece of feeder runs from this 'T' piece to the transmitter/receiver. One method of constructing the array is to make the verticals 113° in length instead of 90° (quarter wave) and cancel out the reactance present with a series variable capacitor at the feed-point as shown in Fig 2. Adjustment of the capacitor will enable a practically perfect match to be made to 75-ohm coaxial cable which is led to the 'T' piece. Such an arrangement will give an impedance of 37.5 ohms (75/2) at the input to the 'T' piece, and if 50-ohm cable is used between this point and the transmitter, an SWR of 1.33:1 (50/37.5) will be present on this feeder section — which is an acceptable figure.

Such an array gives rise to a cardioid (heart shaped) radiation pattern as shown in Fig. 3, maximum radiation occurring in the direction leading from the antenna with the shorter feeder to the one with the extra quarter-wave of feeder (*i.e.* from Antenna 1 to Antenna 2 in Figs. 1 and 3). It is interesting to consider why directivity results from such an arrangement and in order to do this, consider Fig. 4 which shows the radiation from Antennas 1 and 2 — note that the phases are displaced by 90° owing to the difference in their feeder lengths. Note also that time is shown in terms of wavelength, λ denoting the time taken for one complete cycle at the frequency in question; this notation greatly simplifies the following discussion.

Consider the situation at a point in time 0.25λ — radiation from Antenna 1 is at a maximum whilst from

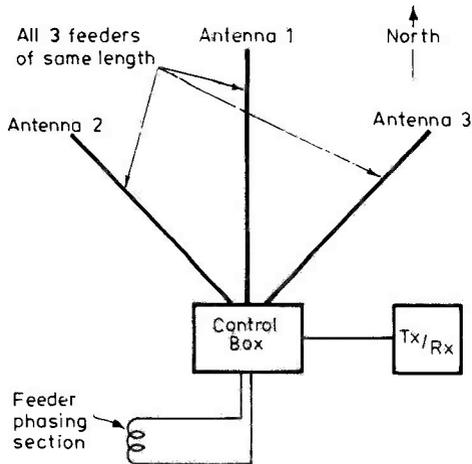


Fig. 5 Layout for the three vertical phased array discussed in the text D 506

By using different lengths of phasing line plugged into the control box, different radiation patterns can be formed, e.g. if the two sockets are effectively "shorted out" by plugging a very short length of coaxial cable between them, any two of the three antennas can be fed "in phase" because their feeders are now the same length. This arrangement gives bi-directional radiation along a line at right angles to a line drawn between the two antennas, see Fig. 7(a). A similar pattern but rotated through 90° can be achieved by having a phase difference of 180° — by plugging a half-wavelength of feeder into the control box, the pattern being shown in Fig. 7(b). Obviously there is an infinite number of combinations of phasing angles and antenna spacings (i.e. other than a quarter-wave apart) which can give rise to a vast number of different radiation patterns, but such a discussion is outside the scope of this article.

Some amateurs have used multiband verticals in phased configurations ("Discussing Phased Vertical Antennae", by B. N. Tait, G3DDN, *Short Wave Magazine*, August 1979) but note that the antenna spacing in terms of wavelengths will be different on each band with such an arrangement.

f MHz	Free space $\lambda/4$ (ft)	Feeder $\lambda/4$ (ft)	113° Antenna Height (ft)	Approx C for resonance
3.5	70.3	46.4	83.9	250p
3.8	64.7	42.7	81.6	250p
7.05	34.9	23.0	41.7	120p
14.2	17.3	11.4	20.7	60p
21.2	11.6	7.7	13.8	40p
28.5	8.6	5.7	10.3	25p

Table 1. Data for construction of phased vertical antennas D 505

Finally it should be noted that in the case of 80 metres, and possibly 40 metres, the antenna heights listed in Table 1 cannot be attained, so the antennas can take the shape of inverted-L's, and in this form they appear to behave in the same manner as pure verticals. However, the top wires of the 'L's' should be positioned in directions leading away from the other antennas in the array or they may interfere with the operation of the other devices.

Wire Yagis

In the previous article, the construction of Yagis was discussed, but this particular antenna was treated as a self-supporting rotatable array; it can, however, be constructed of wire although in this form it is usually used as a fixed directional array. Wire Yagis are usually supported between two support points in the manner shown in Fig. 8(a). Note that the method of construction of the Gamma Match is the same as that described for the Quad antenna in the previous article.

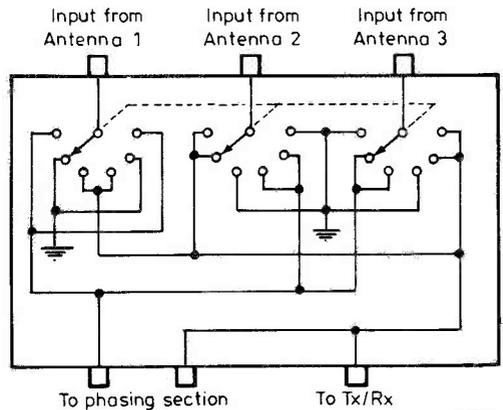


Fig. 6 Control box for switching directivity of three phased antennas D 507

A far simpler approach is to use a folded driven element and feed the antenna directly with 75-ohm twin-feeder as shown in Fig. 8(b). This results in a good compromise and the SWR on the twin feeder will be low. For best results, however, the antenna should be resonated by adjustment of the length of the driven element exactly as with the normal "tubing" Yagi. Although 2-element devices are shown in

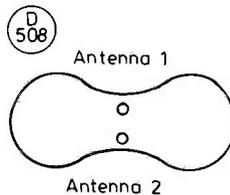


Fig. 7a

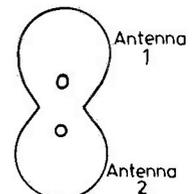


Fig. 7b

Fig. 7(a) shows the directive pattern of two vertical antennas, spaced one quarter-wave apart with 0° phasing (i.e. fed in phase); Fig. 7(b) shows the directive pattern of two vertical antennas, spaced one quarter-wave apart with 180° phasing.

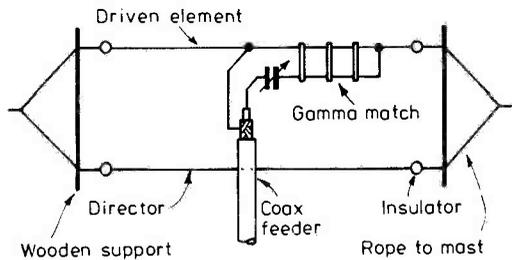


Fig. 8a A Gamma matched wire Yagi antenna.

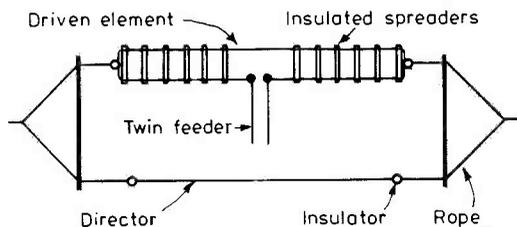


Fig. 8b Wire Yagi antenna with folded driven element

(D 509)

Fig. 8, reflectors can be added to make 3-element antennas if required. Note that although the array is a fixed directive type as shown, the direction of the main lobe can be moved through 180° by simply “flipping” the structure over so that the elements change positions: this can be achieved by having four pieces of nylon rope suspended from the ends of the wooden supports. (This operation is not as simple as it sounds and some practice is required!).

Band	Driven Element	Director	Reflector	Element Spacing
20	33' 3"	31' 5"	35' 3"	8' 0"
15	22' 2"	20' 11"	23' 7"	6' 7"
10	16' 1"	15' 11"	17' 6"	4' 1"

Fig. 9 Dimensions for Wire Yagi antennas

(D 510)

Typical dimensions for wire Yagis are given in Fig. 9; in practice the wire Yagi rarely settles in a horizontal plane — with a 2-element device with folded driven element, the antenna tends to hang with the driven element lower than the director (because it is heavier) and this tilting increases the angle of radiation of the array. The four nylon ropes mentioned above can therefore be used as simple guy ropes and the antenna can easily be made to assume a horizontal attitude.

Fig. 11. Dimensions for the ZL-Special antenna. Note that dimensions refer to the construction method shown in Fig. 10: if elements are constructed of 300-ohm ribbon feeder, their lengths should be increased by about 3 inches for 20 metres, 2 inches for 15 metres, and 1½ inches for 10 metres.

The ZL Special

The ZL Special consists of two folded dipole elements spaced one tenth of a wavelength apart and fed 135° out of phase — this arrangement giving a practically uni-directional radiation pattern. The antenna is shown in Fig. 10, and it will be seen that the method of construction can be similar to that used with the wire Yagi. Also it will be noted that, unlike the Quad and the Yagi, both elements are receiving power directly from the feeder, i.e. the antenna is a driven array.

The device is fed at the centre of one element (the shortest one) with 75-ohm twin feeder — the other element receiving power via a length of 300-ohm ribbon feeder connected between the centre points of the two elements. It is important that this section of ribbon is twisted (Fig. 10) as it is this “transposition” (along with the element spacing) that establishes the phasing between the two elements and, hence, the antenna’s directive pattern. Assuming that the construction method shown in Fig. 10 is followed, the dimensions can be those listed in Fig. 11 (note that the elements can also be made from 300-ohm ribbon feeder, as discussed with folded dipoles in an earlier article). In this case the centre of one conductor is “opened” to form the feed-point, whilst the conductors are shorted at the ends. If this method is used, the elements will require lengthening slightly to obtain resonance — typical lengths are given in Fig. 11.

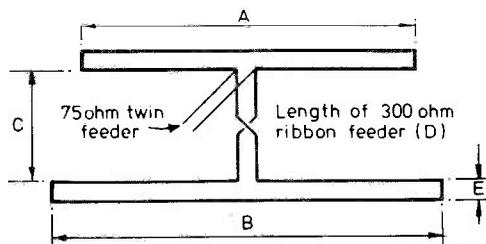


Fig. 10 The ZL-Special antenna.

(D 511)

The figures quoted were obtained at G3XAP after considerable experimentation on a 28 MHz ZL Special, and agree closely with those published in other sources. G3XAP established resonance on the shortest element by monitoring the SWR on the 75-ohm feeder — the result being confirmed by use of a GDO — and the length of the longest element was determined by adjusting it for maximum gain of the array (as determined by receiving a signal from a 28 MHz beacon and comparing it with the signal from a half-wave dipole antenna).

To be concluded

Band	Element A	Element B	Spacing C	Length of 300-ohm ribbon, D	Conductor Spacing, E
20	31' 2"	32' 6"	7' 2"	7' 9"	4"
15	20' 8"	21' 6"	4' 8"	5' 2"	3"
10	15' 5"	16' 0"	3' 6"	3' 10"	2"

AN RF ATTENUATOR FOR THE FT-7 TRANSCEIVER

I. H. Keyser, G3ROO

HAVING run the FT-7 mobile for some time and having had very good results, it was decided that it was time to try it on the home station rhombic. On the HF bands the results were superb, almost any station could be worked and usually with the same report that could be given. However, when coming onto Eighty and Forty at night the cross modulation became a problem; experimentation showed that only 10dB was required in most cases to bring the situation under control.

Various attenuators were tried, the saturated ferrite was the first attempt, but attenuation and insertion loss varied on the different bands. The next attempt used a single PIN diode, but the range of attenuation was insufficient. A small attenuator was already in use in another experimental Rx, this used three diodes, and on testing had a maximum attenuation of just under 20dB, Fig 1; the origin of this circuit is unknown, however, it is very conventional and works well. The control voltage has very little effect below 6v., the attenuation then steadily increases to a maximum at 11v. The RF control on the FT-7 serves very little purpose in practice, so it was decided to use this for the attenuator control. This pot is only 1k so use was made of the flat part of the attenuation curve between 0v. and 5v. by placing a 1k resistor in series to decrease the dissipation and limit the control voltage to between 6v. and 12v. The pot was also wired backwards so that minimum attenuation was at '0' on the scale and maximum attenuation at '10'.

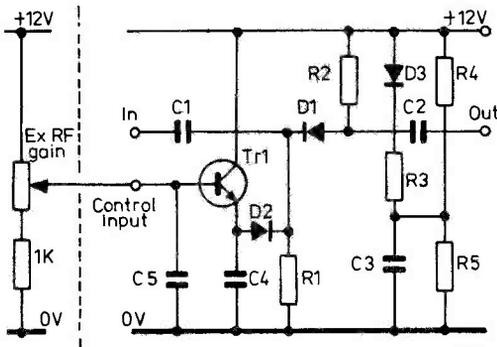


Fig.1 PIN DIODE ATTENUATOR

(D 519)

Table of Values

Fig. 1

- R1, R2 = 2K2, 1/4w.
- R3 = 47 ohm, 1/4w.
- R4 = 1K5, 1/4w.
- R5 = 1K8, 1/4w.
- C1 to C5 = 0.01 µF, 30v. ceramic
- D1, D2, D3 = HP5800 — 3080
- TR1 = BC107

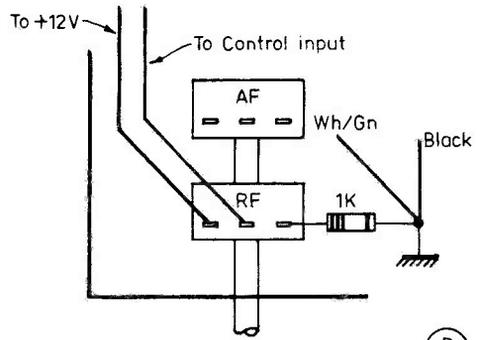


Fig.2 RF/AF POTENTIOMETER ASSY.

(D 520)

Fitting

Both covers and all the knobs were removed. This gives access to four Phillips screws, two on the top lip and two on the bottom lip of the fascia. With these screws removed the fascia can be eased off the chassis, this will remain attached to the chassis by the "S" meter leads. The front section of the dual pot. is the RF section, there is a black wire connected to the left hand tag, and a white/green connected to the centre and right hand tag, Fig. 2. These two wires are removed from the tags, and twisted together with one end of the 1k resistor soldered to the chassis at a suitable point, using a hot iron; this safely anchors the wires and runs the Rx at full gain. The other end of the resistor is taken to the right hand tag of the RF pot. Two lengths of suitably coloured wire are soldered to the centre and left hand tags and threaded through the cableform towards the rear of the set; the front panel is then replaced.

The attenuator can be built on a small printed circuit board, or even a piece of Veroboard, in either case layout should be symmetrical and all unused strips of copper should be earthed. This board will be fitted upside down in the RF compartment and supported by short wire 'feet' soldered to the chassis. Looking at the base of the set the RF compartment is the rear exposed compartment on the left hand side, and the rear switch

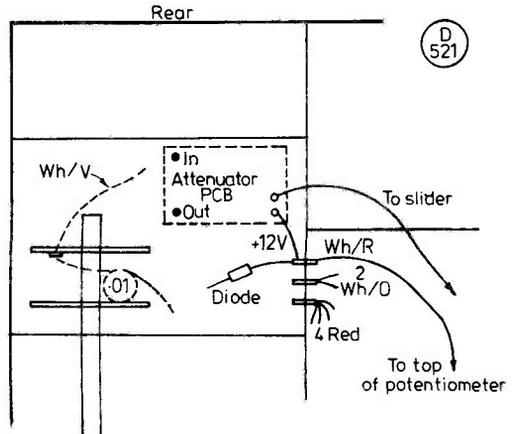


Fig. 3 FT-7 UNDERSIDE

(D 521)

wafer switches the aerial input into the RF tuned circuits, Fig. 3. The tag to isolate to insert the attenuator is the wiper tag to the left of the bolt assembly with the white/mauve wire and .01 μ F capacitor attached; the wire and capacitor are left connected together and taken to the input of the attenuator, the output of the attenuator is taken to the tag vacated on the switch. On the screen to the right of this compartment there are soldered feedthrough capacitors, the rear one of these on the top has a red/white wire connected on the outside, and a diode

connected on the inside (this connection is used for the supply to the attenuator and the control pot). The wire from the slider of this control is taken to the control input of the attenuator. The board is mounted, as mentioned earlier, using wire feet soldered to the chassis and p.c.b.; this makes a very rigid assembly.

The modified set has been in use for some time now and has enabled night-time DX-ing on 80m. It is almost miraculous how DX pops out of the mess as the attenuator is wound in!

A SIMPLE VHF REFLECTOMETER

I. D. POOLE, G3YWX

IN any amateur station, particularly a transmitting station, time spent in improving the aerial system is well spent. However good the transmitter and receiver are, if the aerial is poor then the performance of the whole station will accordingly be impaired. Many amateurs are limited in the aeriels that they can erect and therefore have to ensure that the aeriels which they can put up are operating at their maximum efficiency. Probably one of the most useful tools in a transmitting station is an SWR meter or reflectometer.

Whilst many designs have been published for the HF bands comparatively few have been seen for the VHF bands. The design described here has been in use for some time at the author's station on 144 MHz and has proved itself a very useful tool. Not only can it give an assessment of the efficiency of the aerial from the amount of reflected power, but it can also be used to check that the SWR of an aerial system is low enough in the low power mode before applying full power and risking an expensive power device.

Circuit Description

Referring to Fig 1 it can be seen that the design is simple, it was felt that there was very little to be gained by using a more complicated one.

The one pickup wire is used for both forward and reflected power measurements with a switch being used to reverse the connections of the pickup wire to the rest of the bridge. R2 is the balancing resistor for the bridge, and the value of this should be 150 ohms for a 50-ohm line and 100 ohms for a 75-ohm one.

The sensitivity is varied by VR1. The design is such that when used at the author's station at power levels of between 1 and 15 watts there was still plenty of adjustment outside this range. If higher power levels are to be consistently used and the instrument is too sensitive, then this can easily be reduced by increasing the value of R1 as necessary.

Construction

The unit was built in an old aluminium chassis which had been left unused from an old valve project, and as it measured 6" x 4" x 2" it was ideal for the unit.

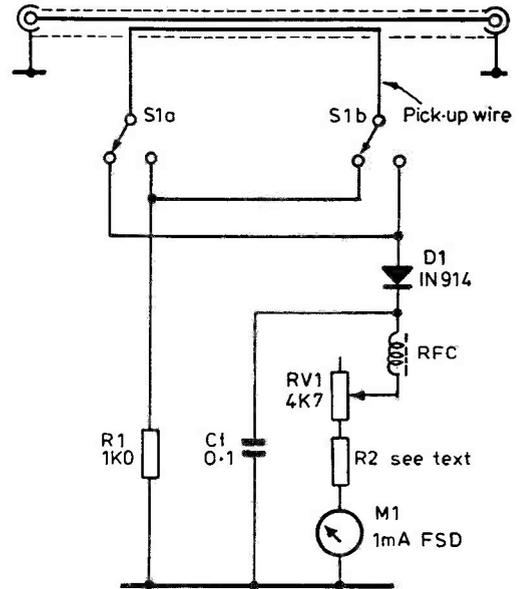


Fig.1 Circuit of VHF Reflectometer

D
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The co-ax used is the semi-airspaced type and the pickup wire, approximately 6 inches long, is fed down one of the air space holes. Care should be taken in assembly to keep the length of the pickup wire outside the co-ax to a minimum. (In fact in the author's model, the pickup wire is inserted about half way along the co-ax for this reason.)

The RF choke is constructed by winding three turns of enamelled wire on a ferrite bead. The capacitor consists of 0.1 μ F capacitor in parallel with a 100 pF one to ensure that all the RF is bypassed to earth.

Conclusion

The meter has been in use for some time, and it has proved itself a very useful addition to the station. It has not only been used to optimise aeriels, but it is usually left in circuit to give an indication of any failure which may occur.

CLUBS ROUNDUP

By "Club Secretary"

ONCE more into the breach, dear friends! At least we now know that we are printing again, so your scribe will press on regardless. That is, always assuming that the dog and the teen-age son and the telephone and other interruptions can be suppressed!

Talking about suppression, Mike Marlow, G3IAF has a piece in the **Guildford** newsletter, artfully pointed out to us by the Hon Sec, G4BHQ; Mike is upbraiding the RSGB for their inability to deal with interference problems by negotiation with the authorities. Now we think this is less than fair to RSGB. They do make representations, and plenty of them, but we feel G3IAF grossly overstates his case (suggesting, perhaps, a matter of "t'aint me — let *them* sort it out!") about the noises around him and the problems of TVI, interference to audio gear, BCI and the rest. Now while it is true that many of these boxes can only be described as a blasted nuisance, it is not unreasonable to make sure — before complaining in the newsletter and thereby, maybe, putting off some SWL's from going further with the hobby — that one's own house is in order. For instance, recently, two chums of your scribe were nattering away on the HF bands, when one had his pleasure somewhat abated by the discovery that, although clear himself, he was in trouble with two of his neighbours. The solution to the problem involved (a) removing an earth to the rising water-pipe, and (b) tying up the twin feeders, which lay in the loft, to the roof beams such that they were further away from the mains cable in the loft. Their experiences, and the writer's too, have almost all been of the same very simple kind. However we must return to the doings of one of the nicest groups of characters around: they are based on Guildford Model Engineering Society Hq at Stoke Park, and the dates this far ahead will have to be checked by reference to the Hon. Sec. at the address in the Panel.

Now **Cray Valley** where the report is of a rather tame AGM, but the pleasure of hearing that G3ANK is now the Club President. Again, the date for the next session at Christchurch Centre, High Street, Eltham (first Thursday in July) is known, but not the nature of the event; all we can say is contact the Hon Sec for the programme details, although "officially" he resigned at the AGM; he remains, for this time, in the Secretaries Panel.

For **Sutton & Cheam** we see July 11 down for an evening at Sutton College of Liberal Arts, which is in Cheam Road.

Nothing succeeds like success; we recall, not too many years ago, **Hereford** indicating struggle, but now they can be sure that the "management" will come up with something to entertain and they roll up in force. They have the first and third Fridays in each month, and are in County Control, Civil Defence Hq., Gaol Street, Hereford.

New clubs appear, but rarely does Scotland come up with an addition to the ranks of those we know about. We can celebrate this time though, to hear from a thriving group

called **Auchenharrie**; but strangely, while we note among the "small" print a reference to *two* venues, the club name we got by looking up the club callsign in the Callbook! We get it from the very good programme of events that they are to be found every Tuesday evening. The Hon Sec is in the Panel, and would one of the members please ask him to get in touch with the other details for the records. And, please, don't get upset, Mr. Hon Sec — everyone does this sort of thing once in a while!

On to **Surrey** where the venue at *T.S. Terra Nova*, 34 The Waldrons, South Croydon is due for a revamping and extension over the next years, with collecting funds a priority at the moment. This means that not only are there the usual events, but quite a few others, so that we feel a call to the Hon Sec — *see* Panel — should be made if you intend to make a visit, just to make sure you know how to find them and their activities!

Next we have **R.A.I.B.C.** catering for the invalid and blind among our fraternity; they had a spot at Ally Pally, and it was nice to meet up with the timeless G3L WY once again after a break of some years.

In a letter from **Edinburgh** we hear that the temporary Hon Sec appointed last year has finally wriggled off the hook and been replaced by the name shown in the Panel — from whom all the details of the group can be obtained.

Deadlines for "Clubs" for the next three months—

(August issue—June 27th)
September issue—July 25th
October issue—August 29th
November issue—September 26th

Please be sure to note these dates!

The **Bury** newsletter has suddenly blossomed into a real beauty — we only hope the editor can keep up the standard and diversity. They have a programme right through the year, and are to be found at Mosses Community Centre on Tuesdays. For July, the "main meeting" is moved to 29th and will include a Surplus Sale; while the July 8 date is a Fox Hunt using 2m. FM and horizontal polarisation.

Now we head for **Edgware**, at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, where the group are to be found on the second and fourth Thursdays. On July 10, we see G3SJE is down to give a talk on Modern Teleprinter Techniques, and on July 24 G6JP will be talking about the business of Valve Production — and the members will be listening to one of the most knowledgeable people in the country on the subject.

Looking at the back page of the **Cheltenham** newsletter for the programme, we find it says against July 3rd "Microcompressors and Amateur Radio" which we are sure is not what G4BBR meant it to read! Find out by making a visit to the Old Bakery, Chester Walk, Clarence Street, Cheltenham.

Magnificent!

The prime activity at **Southgate** recently has been to present the sum of £789.13 to the Mayor of Enfield, the

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 CRAY VALLEY: P. J. Clarke, G4FUG, 42 Shooters Hill Road, London SE3. (01-858 3703)
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. (01-699 6940)
 DERBY: Mts. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. (0332 56875)
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 DOVER: P. Chamberlain, G8EGT, Capel-le-Ferne, Folkestone. (Folkestone 42387)
 DUDLEY: N. Rock, G3RLY, 28 Conway Avenue, Kingswinford. (Kingswinford 77617)
 EDGWARE: D. L. Lisney, G3MNO, 119 Draycott Avenue, Kenton, Harrow HA3 0DA. (01-907 1237)
 EDINBURGH: A. Nadauld, GM3FRQ, 171 Causewayside (2F/1), Edinburgh EH9 1QP.
 GRAVESEND: F. P. Donovan, G4ALD, 4 Rembrandt Drive, Northfleet, Kent DA11 8NQ.
 GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey. (Guildford 76375)
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 I.R.T.S.: G. Gervin, EI8CC, 185 Elton Court, Leixlip, Co. Kildare.
 MAIDENHEAD: J. Patrick, G3TWG, Bedford Lodge, Camdon Place, Bourne End, Bucks. (Bourne End 25275)
 MEDWAY: S. Small, G4HJE, 102 Crestway, Chatham, Kent ME5 0BH.
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 2AN. (021-422 9787)
 PEMBROKE: M. A. Shelley, GW3XJQ, 30 Hop Gardens Road, Sageston, Tenby, Dyfed. (Carew 06467) 610)
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.
 SOUTHGATE: J. Fitch, G8EWG, 16 Kent Drive, Cockfosters, EN4 0AP. (01-440 7353)
 STEVENAGE: E. Godfrey, 94 Common View, Letchworth. (Letchworth 72184)
 SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. (01-642 9871)
 SUTTON & CHEAM: G. Brind, G4CMU, 26 Grange Meadow, Banstead.
 STOURBRIDGE: C. Williamson, G4IEB, 14 Lawn Street, Stourbridge. (Stourbridge 2006)
 TORBAY: H. Davies, G4DZH, 18 Bowland Close, Paignton, Devon TQ4 7RT. (Paignton 523063)
 WEST OF SCOTLAND: I. E. McGarvie, GM4JDU, 3 Kello Avenue, Paisley PA2 9JE.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

results of their sponsored amateur radio station, from which they worked some 93 countries in 24 hours. As a result, the order can now be placed for the tail-lift ambulance for the use of the handicapped children of the Borough. Of course the membership of the club, who are based on the Scout Hut, Wilson Street, Winchmore Hill, covers the whole of both Enfield and Southgate — plus some. For details of the club, contact the Hon Sec — see Panel.

Stevenage are still at the British Aerospace Plant 'B' in Gunnels Wood Road, on the first and third Thursdays in the month, where they have had their base for all but twenty years now. They have a station on the air on July 3, and a demonstration of radio-controlled models by G8KHI on 17th. An additional event is a D/F Hunt, on July 24, starting at 7.30 from Fairlands Valley Lakes car park.

We now pass to **Crystal Palace**, where we see the July meeting is at Emmanuel Church Hall, Barry Road, London SE22, on Saturday evening, July 19, when the series of talks about components will be continued by Bob Burns, G300U, who will be talking about resistors, in all their multiplicity of types, and the respective applications. A talk some professional engineers could well do to attend!

At **Crawley**, the programme list on the front of the newsletter indicates they are in for VHF NFD, and the informal on July 9 is *chez* John Wolfson. From July 12-19 they have an exhibition at Crawley College, and on July 23 a D/F Pub Hunt. No mention of an "at home" at the Ifield Hq this month; so we recommend a call to the Hon. Sec. if you want to attend the informal on 9th — and at the same time you can ask them to let us know whether they have an Hon. Sec. alteration to be recorded here!

On to **Stourbridge** where for July they have 7th for Construction, and 21st for their visit to the Birmingham

P.O. Tower; the Library, Longlands School, Brook Street, Stourbridge, is the Hq address for the "at home" evenings.

Over in Dublin, **I.R.T.S.** have a new newsletter editor, Karen Wright, EI2DW — but on the back page we see an indication that the Morse test has been passed, so a change of callsign must apply! Details on just about anything that happens in EI can be obtained from the Hon. Sec. — see Panel.

The single-sheet newsletter put out by **Dudley** this time contains a quite hilarious account of their 2m.QRP contest. It seems the editor of the newsletter was required to be at the top of Sedgley Beacon at 0800 on a *Sunday* morning — Ye Gods! However such impetuous activity before the rest of the country is awake has its own result — someone forgot the operating chairs! For details on the club, contact the Hon. Sec. — see Panel.

It is the first and third Friday for the **Bournemouth** crowd, and the venue as always the Dolphin Hotel, in Holdenhurst Road, Bournemouth.

Now on to **Gravesend**, and the new Hon. Sec. sends us the address for correspondence, which we have entered in the Panel — for details of the club you will have to get in touch with him, as he has given none! All we can say is that there has been a club in that area for a long while now, as the call G3GRS held by the club indicates.

Not so far away we find the **Medway** gang, with their Hq at the Aurora Hotel in Gillingham on Friday evenings. They look forward to seeing visitors and newcomers, and G6NU's coffee brews are said to be quite something!

Another change of Hon. Sec. — this one is at **Torbay**, and again for details we must refer you to the Panel for his address and 'phone number; however, we can say the club venue is at Bath Lane (rear of 94 Belgrave Road), Torquay.

For our next we visit **Yeovil** based on Hut 101, Houndstone Camp, Yeovil, every Thursday. In addition they have club nets on Sundays at 1030 on 3.660 kHz, and Tuesdays at 2000 on S21 FM. Looking at the programme for July we see on July 1, G3DSS discussing a 144 MHz Collinear. On 10th various members will discuss how they made their start in the hobby; G3BEC takes over to talk about licence regulations. August 24 rounds things off nicely when G4GNV talks about his home-brew computer.

Dover means the SE Kent YMCA Radio Club, Godwyne Road, Dover, on Wednesdays. July 2 is a natter-nite with VHF NFD planning thrown in, and on 9th G8KEN talks about *Oscar* Phase 3. July 16 is a 144 MHz Fox-hunt for the mobiles, 23rd a Midsummer Junk Sale, and on 30th some Contest planning for the 2-metre QRP battle.

Don't quite know what happened at **Brighton**, as we have a slip of paper which says that the club QTH is 47 Cromwell Road, Hove, Sussex every other Wednesday: but it also says "programme inside newsletter" — and we didn't get a newsletter! Oh well, contact the Hon. Sec. — see Panel — or just go along and see must be the answer!

Now **Derby**: they foregather at 119 Green Lane, where they have the top floor, on July 2 for a Junk Sale, 9th for a 144 MHz D/F practice, 16th for a demonstration by *Low Electronics* of Home Computers, and for a Night on the Air on 23rd. That leaves July 30, for a Bring and Buy Sale. These, it will be noted are all Wednesdays; they also may be found on other evenings, doing things like slow Morse, faster Morse on a different evening, and whatever — details can be obtained from the Hon. Sec. at the address in the Panel.

Pembroke write to say they have decided to reinstate their "Bucket & Spade Party" this year, on Sunday September 14, commencing at 1100, at the Regency Hall Saundersfoot, with talk-in on S22, R7, and RB4. There will be refreshments, including a licensed bar. Details from the Hon. Sec. — see Panel.

The Red Cross Hall, The Crescent, Maidenhead is the Hq of the **Maidenhead** crowd; July 3 is a demonstration of gear by members, and on July 15 G4IOW will be talking about Phase Lock Loops.

Returning to the Big Smoke again, to **Acton, Brentford, and Chiswick**, where the date will be July 15, and the topic for discussion the new-type RAE. Hq these days is the Town Hall, High Road, Chiswick.

Back to **Derby**, this time to Nunsfield House. For July, we see on 4th that they are preparing for VHF NFD, and operating it that weekend. On 11th, the gang get together to sort out the contest logging, and on 18th there is a good old Top Band D/F event. That leaves the month to be rounded off with a Night on the Air.

No lack of notice for the Scottish Amateur Radio Convention, which is being organised this year by **West of Scotland**. It will be in the Palace of Arts, Bellahouston Park, Glasgow on September 13 from 11 a.m. until around 5.30. RSGB will have a Region 14 ORM during the event, and things will be rounded off by a dinner/dance in the Dean Park Hotel, Renfrew, in the evening.

On the Friday evening of the Ally Pally Rally the **York** contingent detoured to their Hq at the United Services Club, 61 Micklegate, York, to find 5N6RED waiting for them, we having read about the gang in this piece! You can find them on every Friday evening *except* the third one in each month. On a different tack, they note that they have

got G3MUM into their area, "Twinkle-toes" having been moved to the Cheshire Homes at Alne: G3MUM has 2m. FM gear with great help from RAIBC, and York members are planning and scheming for a bit of "proper" HF operation too. Older members will recall G3MUM on the bands, and that he was given the call because his mother went to the trouble to learn Morse so that she could teach him; and as for the nickname, that's the place where the operating happens, so those toes can move fast!

At **Midland**, this month the newsletter has so much "meat" in it that there isn't any room for details of meetings. However, things being as they are, with then new place coming along, we would have recommended a call to the Hon. Sec. before setting off for a visit anyway; and he can also give you the dates as well!

Now we head for **Ipswich**, where in the back page we have data on *eight* other Anglian groups who never report themselves! Ipswich foregather on the second and last Wednesdays when the school term is on. Thus, they have July 2 for VHF NFD preparations, and July 9 for a Brains Trust, both at Handford House, Renelagh Road, Ipswich, on the corner of Crane Hill (which is the A12).

Finis

So — there it is again; send us the dope in time for the dates in the 'box' in the body of the piece; and if your series entry wasn't up-dated this month that's why you fell off the list — we did tell you we wanted the up-datings regularly! Anyway, post to "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ, to arrive in time for the deadline. 73.

SPECIAL EVENT STATIONS

July 12 and 13, Barking Radio and Electronics Society (G3XBF/G8GPK) will be operating GB2DTS at the Dagenham Town Show, on 20-10m., and 2m. Full details from A. Sammons, G8IZN, QTHR.

The next three stations will all be operated by Yeovil Amateur Radio Club (G3CMH), and full details of each event may be obtained from G3NOF, QTHR (Tel: 0935-24956). **August 2**, GB2FAA operated on behalf of RNARS at the International Air Day, R.N.A.S. Yeovilton, Yeovil, Somerset. **August 16 and 17**, GB2MSS, Mid-Somerset Show, Shepton Mallet, Somerset. **August 25**, G3CMH/P, "Dillington Day Fete", Dillington House, Ilminster, Somerset.

CORRECTIONS

In "The S.C.D. — Part I" (*Short Wave Magazine*, January 1980), there should not be a capacitor between L2 and TR4 in Fig. 1 on p. 599; also, in Fig. 2 on p. 600, C9 should be C8.

"Digital Frequency Readout and Other Improvements for the Yaesu-Musen FRG-7 Receiver, Part II" (*Short Wave Magazine*, February 1980) contains the following errors in Fig. 9, p. 676: (a) pins 11, 24 and 14 on the ICM 7217 1J1 should be connected to the +5v. supply, not pins 1, 4 and 14; (b) pin 9 is omitted on the second 4518, and should be connected to 'ground' or Ov.; (c) capacitor C4, with C17 across it in the BFO, should be C434; (d) the 'common' or Ov. pin of the 7805 is missing; (e) the 4027 pin to which R15 attaches should be pin 3.

THE DX-ER'S GUIDE TO PLANNING CONSENT

RON STONE, G3YDX

WITHOUT an efficient aerial in the clear, two things are inevitable. You won't work much, and you will get raging TVI.

In 1978 the author moved from a terraced house in East London to a 'semi' in the relative countryside of Basildon New Town. Having used a small quad in East London, with excellent results, another beam was required at the new QTH.

Enquiries from the local amateur population established that Basildon was a desert as far as amateur aerials were concerned. (The most ambitious local installation was a 30-foot pole with some small VHF aerials on it.) Outside the Borough, HF quads and yagis sprouted like weeds. The reason for the lack of aerials seemed to be the firm line taken for years by the local authority and the New Town Development Corporation. This stance was based upon a quasi-obsessional dislike of external aerials and their effect on the local 'wirescape'. Indeed, a piped TV system had been installed to rid the skyline of domestic TV aerials.

The Town and Country Planning Act, 1971, stipulates that any 'development' (and an aerial and mast constitutes 'development' within the meaning of the Act) requires planning consent. The only exception to this rule is in connection with structures which are less than three metres above ground level. These do not need permission, but they are not of much use to radio amateurs.

Do not take any notice of the many self-appointed experts who assure you that "anything connected to the house" . . . "lower than ridge height" . . . etc., is OK. Anything and everything requires planning consent if any part of it is more than three metres above ground level.

Several courses of action were therefore open: (a) work 2m. FM with an indoor aerial; (b) give up; (c) move; (d) put up tower and beam regardless; (e) apply for planning consent.

However (a) is laughable . . . it is *because* so many amateurs take this course that inadequate TV receivers are still churned out by the million: if we all went on the HF bands during TV hours, instead of creeping off to 2m. FM like mice, the statistics would show that there was a problem, and then maybe TV manufacturers would be forced to design their sets adequately; (b) is unthinkable; (c) is uneconomic; (d) is very risky: Councils are empowered to issue enforcement notices against unauthorised development, with heavy daily penalties for those who do not remove the offending structure; an amateur who has followed this course and who receives an enforcement notice should contact his solicitor *at once* (after a structure has been up for more than four years it acquires squatters rights, but even then permission, which is rarely refused in such cases, must be obtained to regularise the matter).

This leaves (e) as the only course of action that remains. To achieve one's ambitions, a full understanding of the procedures involved, determination, and a great deal of patience, are required.

How to proceed with an application

Get in touch with the RSGB: The Society produces an excellent broadsheet entitled "Planning Notes" by Bob Price, G4BSO. The main points of the Town and Country Act that affect amateurs are mentioned, and there is some guidance on applications and appeals. Also available from the Society is a specimen application which contains some very useful material. The Society also has amongst its membership a small number of amateurs who are solicitors. These volunteers can help members of the Society with advice on planning matters; but since they are acting in a voluntary manner, they cannot be expected to devote an inordinate amount of time and trouble to any one particular case. There would, however, be no objection to engaging any solicitor to give advice on a strictly professional basis.

Go to the next Planning Committee meeting: Your Council will be able to tell you the date and venue of the next meeting of its Planning Committee. It is worth attending, as it will give you a better idea of the procedures involved.

Meet your Council's local planning officer: The Council's local planning officer's job is to assist and advise all parties with regard to planning applications. He will give you much valuable advice. However, he is employed by the local authority, and should you eventually appeal, he will probably prepare the Council's case against you: it is therefore best to treat him with respect. It will be easier for both parties to discuss a possible application if you arrange to meet him on site. If he has been in his post for some time, the planning officer will have a good idea of how the Planning Committee will react to an application. However, they may surprise him from time to time and reject something he felt would be certain to pass! The planning officer will probably know of other masts, and this may or may not help your case. Incidentally, *never* talk to anybody about a 'tower'; always refer to a 'mast'. A 'tower' is a thing like an electricity pylon to most people, and they will not want one of *them* next door.

In the author's case, the planning officer looked at the prepared drawings and said that he thought that an application *might* succeed. Do not ask a planning officer to commit himself. He is only a servant of the Committee, after all.

Go and see your neighbours: This step will require some nerve, *but it is worth it*. If you have TVI, let's hope you have put in the required amount of time, effort and firmness with the neighbours, to cure it. If you haven't got to grips with TVI you don't deserve a tower and beam anyway; you don't even deserve to hold an amateur licence.

Tell the neighbours what it is all about. Ask them what their hobbies are and express an interest in them. After all, you have invaded the privacy of their home to talk about *your* hobby and you want to get a conversation going. Show them that you are interested in what *they* think and how they feel about your proposal. Then when they bridle a little at the thought of a 60-foot monstrosity over the fence, assure them that you couldn't possibly talk to King Hussein with anything less, and how would they feel if *they* couldn't enjoy *their* hobby. Remember all the time that they can make a lot of trouble for you by writing to the Council objecting to your proposal, and that objections will *not* be heavily against you.

The specimen application from the RSGB contains an excellent idea which prospective applicants are advised to follow. After discussion, neighbours are invited to sign one of three lists headed as follows:—

- (a) I object to the proposed mast and aerial because . . .
- (b) I have no objection to the proposal, provided that . . .
- (c) I have no objection to the proposed mast.

By that stage you know which one they will want to sign! If you really want your mast, they should all be converted to (c). The doubtfuls will put something minor into (b). In a face-to-face confrontation situation like this, people will only rarely sign (a). If they do, you have probably said something out of place. If you get signatures to (a), all is not lost, as at least you have an idea of how things stand and you have some evidence in case they produce a different story later on.

A tower and beam being a thing of beauty and a joy forever, the author did not bother to consult his neighbours. He just made an application.

The result was that when the local press included the author's proposal in their weekly 'planning applications received' column, a self-appointed rabble-rouser went around with a 'petition' which read "I oppose the application for a radio mast at . . .". Needless to say, they all signed it. Why not? Got him off the doorstep, didn't it?

When the author learnt that the Council had received objections, he then visited the neighbours. Unfortunately the application for consent had already been made, so to some extent the damage had been done. Discussions demonstrated just how useful a properly timed visit would have been. Three householders had signed the petition because they thought that a mini-cab firm was going to commence business and that cabs would be coming and going 24 hours a day. Another (who had gone to the Council Offices to examine the application) objected because his newly-built house was not shown on the site plan! However, they all withdrew their objections after the true nature of the application was explained. Another complainant agreed to withdraw his objection if the mast was shifted a few feet. The only failure was a woman who said "I just don't want it" and slammed the door in the author's face.

The author was asked more than once if he would cause interference. If you are asked this question, do not say "No". You may want your tower very badly, but if you lie to your neighbours, how will you manage that 100-footer in a few years' time?

The correct answer must be something like: "Breakthrough can sometimes appear because most TV receivers are not designed to work near a radio transmitter. However, a condition of the amateur licence is that amateurs must not cause any interference to other broadcasts. The Home Office will close down any amateur who does not comply with this condition. Breakthrough problems are often due to poor set design. If I cannot cure the problem by fitting a suppressor in the mains or aerial lead of your set, then I will stop transmitting while the Home Office investigates. Please come and see me if any interference appears."

You have told the truth. The Home Office can put you off the air for a month in any case, when it is investigating a TVI complaint. You have therefore lost nothing, but when TVI appears (and it will) you have started to cure it *before* it

appears. Your neighbours now know that TVI is an effect and not a cause, and they also know that you are approachable and will deal with their difficulties quickly and sympathetically.

Join 'Raynet': Unfortunately, the public image of radio amateurs is, at best, vague suspicion and, at worst, "those b*** who interfere with the telly". As members of the Council's Committee are also members of the public, their ideas about amateur radio are likely to be just as vague. Besides the services that Raynet can provide, amateur radio is of virtually no direct use to the community. (Should the reader be incensed at this assertion, perhaps he should ask himself how many new frontiers he has broached recently. It's no good going back to the Empire Wireless Service and the pioneers of radio: that was sixty years ago.)

If you *must* put something in the application (*see* below), mention satellites and Raynet, but little else. Raynet is a winner. It has shown itself to be useful, recently, in the case of the Birmingham ambulance drivers' strike. Find out if there is a Raynet station at County Hall, Police HQ, etc. Draw attention to this in your application. Official recognition lends weight to your hobby and therefore to your case.

Having joined Raynet, play fair and join in Raynet activities. Planning applications aside, Raynet is worth joining anyway.

The Application: Forms to apply for planning consent are available from the Planning Department of the local authority. When you fill them in, remember that it is important to make a good case. At the Planning Committee meeting, it is likely that a Planning Officer will read out a summary of your application. It is therefore in your interests to make your application concise whilst not omitting any important points. Do not forget to mention that the mast and aerial have no connection with any commercial use.

The author's application read as follows:— "Proposed development: Erection of aerial support mast and aerial for use in experimental amateur radio transmission and reception. In order to minimise the visual impact of the aerial support and aerial upon neighbours' amenity, the mast will be retracted when not in use. The support structure shown on the appended sketch is to British Standard, and is purpose-built. The aerial illustrated is an example of the type of aerial to be mounted on the mast. As my main interest is in technical experimentation with aerial systems, the aerial structure could change from time to time, but the mast will not. The mast will not require additional guys."

As we will see later, there were some important omissions which contributed to . . .

The Notice of Refusal: Having determined a planning application, the local authority is bound to issue a notice of consent or refusal. When you get a notice of refusal, do not give up. After believing that no one would refuse consent for your lovely mast, it may come as a shock, but you have just lost a battle, not the war.

The notice of refusal received by the author read as follows:— "The proposal would intrude into the landscape qualities of the area to the south and east, which is intended to be conserved and improved for open space purposes."

At this point, two essential questions are raised: "What went wrong?", and "What now?"

The first question should be fairly easy to answer. In the

author's case, he had not bothered to visit his neighbours, so there was a petition against the mast, and he had not bothered to mention Raynet in the application. In addition to this, perhaps a 60-footer had been a little ambitious for a Council that had never approved a tower before.

To respond to the second question, a compromise application would be drawn up, and an appeal to the Department of the Environment (DoE) made against the Council's decision to refuse planning consent. They are to some extent interconnected.

The Compromise Proposal: Now is the time to exercise some common sense and, most importantly, to show all parties your willingness to compromise. Should your generous compromise be trampled in the dust by the Council, it is likely that the DoE Inspector will view your case more favourably if you have shown yourself to be reasonable.

A second application was therefore made, and in order to contrast it with the first one, the text is given:— "Proposed development: Erection of aerial support mast and aerial for use in amateur radio transmission and reception. The mast is required for an amateur radio station that is licensed by the Home Office. The station is also a member of the Essex Voluntary Radio Amateur Emergency Network. The network serves as a back-up for Fire, Police, Ambulance, etc., when their communications are overwhelmed or not operational. The aerial illustrated is an example of the type to be mounted on the mast. As the applicant's main interest is in technical experimentation with aerials, the aerial may change from time to time, but the mast will not. The mast will be approximately 45 feet high when extended and about 26 feet high when retracted. Guying will not be necessary. The mast will be retracted when not in use."

This time, the application was for the same aerial, but for a 45-foot mast instead of a 60-footer. The position within the garden was also changed to accommodate an objection. Do not try to be clever and apply for the mast and then sneak the beam up later without applying for it first. (Somebody in Kent did just this and got consent for a 60-foot tower. However, he has never been able to put up a beam, as he cannot get permission.) In the author's application, there was also a clear reference to Raynet, and a covering note said that the neighbours had been consulted and that a majority were in favour!

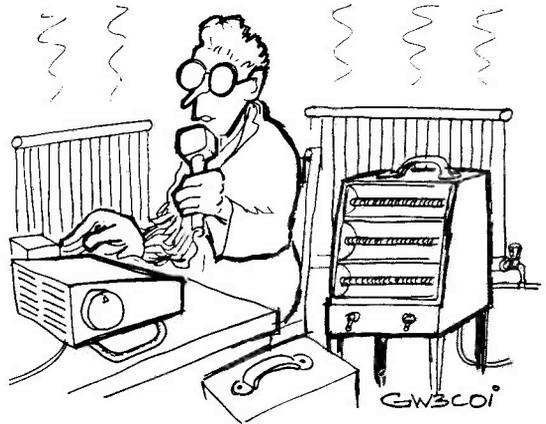
However, if your application follows this road, do not leave it at that. Get an appeal on the boil, because this will both show the Council that you mean business, and it could result in them accepting your compromise. After all, an appeal is a serious matter and can mean a lot of extra work for a busy Planning Department. Who knows . . . the appeal may even succeed!

The Appeal: Forms for appeal are available from the Department of the Environment. They will also send a useful explanatory booklet called "Planning Appeals — a Guide to Procedure". Appeals can be made in writing, or there may be a public enquiry, which is very much like a court of law. As the author did not have the resources to brief counsel (and wanted to 'have a go' himself) he decided to elect for a written appeal.

It is important to understand clearly the sequence of events, which is as follows:—

(a) A written appeal is drawn up by the applicant, who sends it to the DoE.

- (b) The DoE acknowledges receipt and sends a copy of the appeal papers to the local authority concerned. The local authority has 6 weeks within which it must respond in writing with their case.
- (c) The Council will write to all parties who have objected, asking them to put their specific objections in writing.
- (d) The DoE will send you a copy of all these objections. When you visit the neighbours, it is not bad policy to let this be known, as this may moderate what they have to say. A local authority has the right to keep such things in confidence, but objectors lose this option when an objection is made during an appeal.
- (e) The DoE will send you a copy of the local authority's case for your consideration.
- (f) The local authority will then be able to comment, in writing, upon your case and upon any representations received. You, also, will have the right to comment upon the local authority case and upon any objections. The parties concerned have another 6 weeks within which to do this.



"... my main purpose in using QRP is to help the 'SAVE IT' campaign . . ."

- (g) The Inspector appointed by the Secretary of State for the Environment will consider the evidence before him. He may make a site visit, and he is not obliged to tell the appellant when he intends to do so. It is probably against your interests if you have already put up mast and aerial in anticipation of a favourable decision.
- (h) The Inspector will issue his decision. There is normally no appeal against the decision, apart from processing the case through the House of Lords. This course, however, seems a little extreme and will certainly not come cheap.

The costs of the appeal are normally borne by the parties involved. The DoE is empowered to award costs to one of the parties if it considers that the appeal was bound to fail anyway and this was clear to all parties from the start, or if the appeal covers a matter that has already been the subject of a previous appeal, or was so closely similar to it that differences were not of a material nature.

The staff of the DoE will be ready and willing to assist with appeals. However, they are only permitted to comment upon the appeals procedure and cannot and will not comment upon the merits of any case.

As the author's appeal covered four closely-typewritten pages, it is not feasible to set it out here.

Results: The compromise application was put before the Planning Committee of Basildon Council, virtually eleven months to the day after the original application had been made. The author was present at the meeting and recorded verbatim the comments of the Committee into a hand-portable tape recorder. This procedure raised some eyebrows, but may have caused the Committee to ponder its words carefully. If the application was rejected, a concise record of the proceedings would be at hand and could be used in an appeal. In the event, planning consent was given for a temporary period of five years, provided that the mast was retracted when not in use. The appeal was subsequently dropped. The remarks of the Chairman are worth recording: "This sort of thing could be useful in an emergency; we must encourage it . . .", and another said: "Forty-five feet is not very high . . ."

Like so many things in life, presentation would seem to be of the utmost importance.

Information: When the author first approached the RSGB, it became evident that there was no file of case histories of applications, successful or not. It would be useful, especially when drawing attention to precedents during an appeal, to quote instances where consent has been given. In this connection the RSGB (Membership Services Officer) will be pleased to hear of cases so that such a file may be compiled. Such information would be invaluable in future cases and is a prime example of the way in which amateurs can help each other under the auspices of the Society.

Conclusion

Certain golden rules emerge, and they must not be neglected:—

- (a) Never give up;
- (b) Your neighbours can help;
- (c) It doesn't hurt to compromise;
- (d) For goodness' sake, join Raynet;
- (e) Presentation is paramount;
- (f) After-sales service to your neighbours includes dealing with TVI.

Good luck with your application. With determination, you must succeed!

• • • **SWL** • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

ONE of the minor mysteries of this piece is the very marked lack of correspondents who do any constructional work towards the improvement of their stations (or at least they keep very quiet!) and also the oft-repeated expression of the difficulty of building electronic equipment. That jist ain't so! Here's an example. Old G3KFE doesn't get a lot of time on the bands or in his workshop for that matter, but once in a while he decides something ought to be built. This time it was to be a Top Band QRP rig. First of all, rather than design a circuit he "lifted" a proven one, save that the first two T05-can transistors to fall out of the baccy-tin became, respectively, CO and PA. The "printed board" was a nice piece of single-sided stuff, and the copper was divided into a lot of squares by careful use of a junior hacksaw. It was put together — and it didn't work. Rumble, rumble. Eventually, the main fault was that a 220 resistor had been replaced by a 2.2K one: both of the same impeccable manufacture, but quite indistinguishable to old 'KFE under either a white or a "warm white" fluorescent tube light. However a look under tungsten light (electric light bulbs to you, Joe!) and he was instantly swearing fit to bust without even bothering to reach for his glasses! Hint: put the right value in, and it fires-up instantly. With 12 volts stabilised HT it gave 1¼ watts measured output on a 'scope with a

nice wave-form, and left running for 20 minutes continuously it was still happy when he returned to it.

The case initially envisaged for it was a used *Jiffy* bag with power and key leads hanging out of the open end. He was prevailed upon to do better, and eventually put it inside a die-cast box (which already carried coax-sockets and a switch to enable switching from the TS-520, the PM2 QRP rig, and the KW-77 receiver), stuck to the bottom of the box with lumps of *Blu-Tack*, and some masking tape. This wasn't quite good enough, and in any case the earth side wasn't connected to the case, so he cast around for ways and means of securing the thing more carefully; this eventually turned out to be by using a half paper-clip for the RF output to the switch, carefully tinned and inspected for a good soldered joint at each end with a glass, while the earth was formed at the board end in the same way, with the other end bent round to fit under a washer that was already fitted in the box. This, with the *Blue-Tack*, resulted in a very fine fixing, and the thing was then pumping 800 milliwatts output into the ATU; which in turn was using the entire vertical antenna as the upper half of the aerial, with a croc-clip lead joining the coax inner to outer, and a separate earth connection to radiate a fat signal.

We understand he was so pleased with the result that the beast will have a VFO made for it next. Again the circuit to

be used won't be original, and again we doubt if the transistor used will be the "right" one for the job, but will be the first silicon one to fall out of the tin!

So — nothing venture, nothing gain, and a lot of fun to be had getting a simple rig to go while learning a-plenty at the same time.

Of course we've been talking about the simple transmitter; but why any SWL ever buys a commercial receiver until he has "got his feet wet" with a home-made simple receiver eludes us. After all, by noting the shortcomings of the simple receiver and the add-on bits which tend to accumulate, and by tuning around the bands, you must get to know (a) what your interests in SWL are, and (b) in conjunction with (a), what you want your receiver to do for you when you part with your money. What more often happens is that we get sad little letters saying "please, sir, I've looked at the ads. and I can't see a receiver that I can understand, so which is right for me?" (Impossible question!). With thirty bob's worth of bits (£1.50 to the youngsters!) and a few hours of patient research in the files of, say, this journal, literally hundreds of pounds will be saved by not buying something which can't satisfy your needs. Armed with this knowledge and experience, the SWL will "know what he wants" when it comes to buying commercial gear, enabling him to get something nearest his specifications and a pretty sound idea as to how to get it 'just so'.

Prefixes

A couple of major points here. Firstly the construction of a callsign, which defines the *prefixes*. The callsign, taking G3SWM as example, is 'SWM' — which says that G3 is the *prefix*. So, only one G3 counts as a point for the ladder, one G4, one GB4, one GW2, and so forth. The Rules, which are published two or three times a year (and appear in this issue) should be scrutinised for an understanding before an entry is made.

The second point concerns the changes in prefixes which are continually going on, and the use of a *DX* or *U.S. Listings Call Book* as a *prefix* reference. It isn't really "on" to expect the *Call Book* to be bang up-to-date, as they must close for press quite sometime before publication date; then they have to be shipped and delivered, and lie on our shelves until you buy — all of which may total a *year* after the pages were finalised. This applies to any printed word to greater or lesser degree. What you need is to get a copy of Geoff Watts' *DX Prefix List*, which is advertised every month in our pages; and if you want to know what goes on in the great big world, a sub. to his *DX News Sheet* is the thing — this carries all new and changed prefixes as they occur so you can up-date your prefix list. When you get a prefix list, it will be up-to-date to the morning it was posted, by way of a up-dare slip or some additions with a mapping-pen, and *DXNS* keeps it up to date — or at least gives you the data.

The Mail

Our first comes as a hail-and-farewell from *Ron Barker (Workshop)* — he of the famed FRG-7 mods. and the way to reduce the noise of the colour TV timebases. Ron is now G4JNH, and is using an FT-101ZD to his SWL dipoles in the loft, fed with ordinary coax and an ATU to protect the precious new box at the bottom from the possible SWR

HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series; thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
- (3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE2UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar callsigns.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and 5Z4 both count.
- (5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor may any MARS stations be claimed.
- (7) G2, G3, G4, etc., all-count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, WB2, WC2, WN2, all count separately, even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ, if possible to arrive before the SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) Lists will be based on those shown in the current "Radio Amateur Prefix-Country-Zone List," published by Geoff. Watts (see Advertiser's Index in any recent issue of SHORT WAVE MAGAZINE).

caused by the indoor location. The apex is at 23 feet, and already, a fortnight after the receipt of the "piece of paper" the excitement of the DX chase is on. Doubtless he'll be talking to "CDXN", so we shan't lose touch for a long time yet!

K. Kyezor (Brandon) is another of those who comment on the disappearance of Africa from the air, as bit-by-bit callsigns become owned personally by the dictators or their puppets. A very sad state of affairs.

The gent with the cock-eyed list mentioned in an earlier piece is not a first timer, but *M. T. Hill*, in *Bedworth*, who seems to have put the skids under himself in the matter of the G and assorted-W prefixes. We'll have to dig out the first list and combine the two before we can wield the red pencil and get a correct score out.

On now to *J. Goodrich (Bognor Regis)* who has returned to his SWL after a 15-year break. The original spark was W/Op wartime service, followed by the purchase of an S28 from Jim Fish, G4MH, which seems to have done yeoman service over the years till 1965, when domestic reasons resulted in dropping the hobby until now; he now operates a Realistic DX-300, with a Joystick and ATU awaiting putting up in due time. In with the first list comes a pile of queries and some interesting gen on daily doings. To take the queries, the two UPOL stations are, we believe, Russian research efforts among the floating ice (we could stand corrected on that) and that the permission to work licensed amateurs is a safety thing. The DA prefix is perfectly OK and has been about for years, ever since DL4s were taken over for German amateurs and a new series had to be found for replacement, preferably with the indication that the call was a non-German on German soil. The C13LSS we just don't know about, albeit we believe it is OK. The J2 prefix covers Djibouti; and WP4ROH is a normal sort of USA-and-possessions "shambles" callsign from the Lord only knows where — probably Florida way. As for the /SJ he wasn't using an official suffix there, but of course he might have had some sort of "special" status.

We can pass over the list from *R. Baker (North Walsham)* as there is no extra detail or query in the covering letter; but we must comment that it is about as near to the ideal list as we could imagine, and although it isn't typed, it is perfectly readable.

Another CW list, from *H. Scott (Wetherby)* who has been buying *Call Books*, and in going through his logs noting where all the stations are, he has come across many places reminding him of the old-time Westerns; and on a world-wide basis, it can't be bad practice at geography, knowing where all these towns and villages in foreign countries are.

Another nice tidy list from *M. Rodgers (Harwood)* takes him a little further along the line with no snags this time round.

Now *R. D. Newall (Bracknell)* who has a bit of a problem since he "dropped the ATU and bent the shafts." Cruel man, never a word about the horse! Still, he will doubtless be able to disassemble the offending bits and then carefully place in vice for straightening.

From *D. Casson (Reading)* we have his list number 12, bringing him up to 779, including VR6TC and VQ9WE. On the other hand, Derek has found time to return to the RAE-study business after a break of some years, so he is now deeply immersed in transistors and things. Good Luck this time.

Just a list this time from *H. A. Londesborough (Swanland)* and a note that we slipped with his score as recorded last time round — we turned his 1180 on to the list, from 1188 on the claim — for which your scribe hangs his head in shame.

Now we come to a problem, in that we have *M. Shaw (Huddersfield)* who hopes to pass RAE and take out a "B" licence and wants to know whether he can stay on the Ladder on that account. We have always said this is an SWL piece and stuck by that, and it would thus be unfair to the others to let Malcolm carry on as an exception. We have to admit that after listening to the HF bands for so long we are a bit surprised that he doesn't elect to go on with the Morse test, and get on the air and chase the DX he has heard. We feel sure it won't be all that long before he becomes disenchanted with the carryings-on at the upper-end of the band, and the slow-coach cloth-ear operating even at the lower end, while his years as an SWL have fitted him to know just what *good* operating is like on the HFs. This is a problem of some magnitude for the experienced SWL; most new licensees don't listen till they have a ticket, and that in turn doesn't tell them enough about the difference between good and bad operating. On HF, in general, they blunder about a bit and then give up in disgust, or someone tells them what is right or wrong. On VHF on the other hand, they are — at least at the channelised end — far in the majority and so it is unlikely that anyone will be able to explain good operating without being dubbed a "Smart Alec", especially with a new callsign. So much more pleasant to pass the Morse test, and so easy too, with tapes and things like the Datong tutor to make it a pushover.

J. F. Hobson (Ely) wonders about a "ZB7HH" he heard in the Pacific net one morning. Far more likely to have been ZD7HH on St. Helena, heard either off the side of his beam, or, more likely one would think, having gone right round the world in which case his beam heading would bring him straight back to U.K. and Europe, at a time when we would expect the VK/ZL contingent and the Pacific to be coming in on the long path anyway.

A "quicke" from *S. Foster (Lincoln)* to bring his totals up to date and to mention a couple of points from last time: 4X6 is now becoming a fairly normal allocation for the Israeli stations; and the FY0EOO is quite OK, being now the habit for FY7 only to be used for residents, the FY0 being used for all visitors. So — A. Rowland will be happier now!

We made a couple of 'blacks' in the book of *D. J. J. Williams (Reading)*, firstly when we said it looked like "Wiltans" and secondly in that somehow we managed two deadline dates for this piece, which confused many people, particularly as the printing argy-bargy meant we didn't reach lots of people until later than 15th; sorry about that, folks! However, regardless of how the printing argy-bargy turns out (and at this writing the section of the industry in which we are printed is still locked in combat), we will continue to operate the deadlines as they are, in hopes that a settlement will come soon.

We have next a letter without a signature; but the "spiders web" from *Chesterfield* says, unmistakably, *M. Law!*

Several interesting comments from *H. M. Graham (Moulton)*; firstly the old one about people nattering-on

ANNUAL HPX LADDER

Starting Date, January 1, 1980

SWL	PREFIXES	R. Baker (North Walsham)	298
R. D. Newall (Bracknell)	493	J. Weston (Borehamwood)	246
D. J. F. Gordon (Chepstow)	441	Miss J. Ribton (Oxted)	243
B. Musselwhite (Warrminster)	335	C. M. Nagle (Lisburn)	221
B. A. Payne (Leeds 18)	303	M. Hill (Bedworth)	207
J. Worthing (Shrewsbury)	299	T. Morgan (Swansea)	200

200 Prefixes must have been heard for an entry to be made, all since January 1, 1980, and in accordance with HPX Rules, see p. 299, this issue.

HPX LADDER

(All-Time Post War)

SWL	PHONE ONLY	PREFIXES		
K. Kyezor (Brandon)	2335	J. F. Hobson (Ely)	762	
B. Hughes (Worcester)	2153	Mrs. R. Smith (Nuneaton)	738	
S. Foster (Lincoln)	1959	M. Mullins (Croynon)	732	
E. W. Robinson (Bury St. Edmunds)	1692	J. Doughty (Bloxwich)	710	
J. Fitzgerald (Gl. Missenden)	1655	D. G. Sim (Southampton)	677	
M. C. P. Bennet (Datchet)	1522	L. Joyce (Grimsby)	616	
M. J. Quintin (Wotton-u-Edge)	1514	F. C. D. Barnes (Cardiff)	606	
H. A. Londesborough (Swanl'd)	1450	G. F. Green (Middlesbrough)	563	
H. M. Graham (Moulton)	1257	B. Shepherd (Staines)	563	
M. Rodgers (Harwood)	1182	T. Anderson (Stroud)	549	
M. Law (Chesterfield)	1167	D. Williams (Wednesbury)	518	
M. Ribton (Oxsted)	1091	B. L. Henderson (Laverstock)	509	
M. Shaw (Huddersfield)	1038			
R. Middleton (Bury St. Edmunds)	840	CW ONLY		
K. Linge (Willington)	867	H. A. Londesborough (Swanl'd)	1222	
L. Stockwell (Grays)	794	D. W. Waddell (Herne Bay)	1024	
P. Ford (Longlevens)	792	T. Grimbleby (Hull)	722	
D. C. Casson (Reading)	779	J. Goodrick (Bognor Regis)	439	
		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. 299, this issue. A 'Nil' return is allowable in order to hold a place.

without callsigns — blast 'em — and secondly a 28 MHz WAC in 20 minutes, thus: 1546z TU2GU, 1548 HP1ACK, 1554 YB4HR, 1600 UK6LTG, and 1611 VK8CC/M. Not a "common" one among the lot!

Continuing to thin down the pile, we come to *B. Hughes* of *Worcester*, and watch how again he slides up the list. This time it is quite surprising how many of the new ones are "common" prefixes from around Europe with the odd real gem in the middle to add some lustre!

Now we come to *D. J. F. Gordon* (*Chepstow*) who has it that XL3 is a special prefix to mark the umpteenth anniversary of London, Canada, and SR50 is the Poles marking their 50 years at the amateur radio game.

Mrs. R. Smith (*Nuneaton*) was turning out some old papers as a chore and came across her old log from 'way back', as a result of which (plus a little bit of listening) she rockets up to 738 — nearly 200 up. We hope that made the chore worth while!

A couple of lists next; one comes from *M. J. Quintin* (*Wotton-under-Edge*) to take him to 1514, while the other is *Mike Ribton's* unmistakable one with the electric typewriter and rather "sharp" typeface, which certainly makes for easy reading.

P. Ford (*Longlevens*) has some interesting ones: KA3CBB Interim BM and KA8AOT Interim DT are both no doubt the result of the "speeding-up" operations of a computer issuing licences (!) and the third our old friend

USARTEK, back again on the air after quite a while QRT; he is quite OK for the HPX Ladder.

A. Twelves (*Rhos-on-Sea*) has again to send in a "hold" report, but still hopes to be back in business before long.

By the time you read this, *R. Middleton* (*Bury St. Edmunds*) will be like a cat on hot bricks waiting for the RAE pass slip, when of course he's not having to do a bit of gardening just to keep control of it!

G3WW writes to dispute our comments to *B. A. Payne* (*Leeds*) about the old AM days, by digging from his log of the time (January-March 1956) for quite a collection of prefixes. True, but *G3WW* was the exception that proves the rule, having the power and the patience to battle his way through, like the late GM2DBX, with the help of some good aerials and gear. But, primarily, AM phone DX-ing was a test of *character*, while today's SSB DX is just a matter of simple pile-ups whichever end of it you happen to be, without all the ear-shattering carrier QRM which used to come from Europe.

E. W. Robinson (*Bury St. Edmunds*) doesn't miss a lot, and he notes how good the morning and afternoon openings have been on Ten, albeit with signals not so strong as last year.

B. Musselwhite (*Warminster*) is now settled in his new place, and operational, with a starter for 335 in the 1980 Table; so he is using the reduced travelling time to advantage!

It rather looks as though *F. C. D. Barnes* (*Cardiff*) has room for an aerial farm — he has some three long wires aimed in different directions, and with the help of a switch-box gives him seven combinations; the little ATU in the box extracts the marrow from the bones and the DX-300 thrives on the result. Good-oh! No doubt about it, aerial-farming does provide a lot of satisfaction, when the "crops" can be persuaded to "grow" right.

Finale

That's it for this time; there are no doubt a lot of letters still in the pipeline, but we'll give 'em a run-through next time, so as to get this one away on the dot — that way no-one can say we held up the printing process! Meantime, the deadlines for the next two *SWL* pieces are July 17th and September 18th — and these dates *are* right! Hold to them regardless, and address it all to your scribe, "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts AL6 9EQ. Meantime 73 and good DX.

August issue due to appear on Friday, August 1st.

FIVE-FIFTY FM TRANSMITTER

F. G. RAYER, T.Eng (CEI), G3OGR

RUNNING up to about 50 watts and with five switch-selected channels, this transmitter will put out a potent signal, and is fully compatible for QSOs with the many commercial FM channel rigs. Assuming a communications type receiver is already to hand, adding a 2m. converter provides for reception at no great additional cost. Where power can be drawn from an old CW or AM transmitter, as mentioned, overall expense is further reduced.

Valves are used, in a thoroughly proved and tested circuit; the necessary valves are found both new and ex-equipment, the latter at quite low price. With a valve power amplifier, a watchful eye on the meter and quick switch-off during tuning up can always save the tube. Even this is unnecessary here, with a low-power switch position provided.

Of the five channels, four are permanently set up; the other has a panel trimmer. By inserting a different crystal, any other frequency can be used, or contact to mobile through a repeater, by having a tone oscillator for access. This avoids being tied down to five channels, though in over twelve months' usage it has been found that these are usually easily enough, for fixed station working.

Power Supply

It seems reasonable to make the power supplies available first, and a single PSU was constructed for this, including a 12v. output for the converter. There is no need to follow this PSU circuit exactly, as shown, unless wished. Suitable supplies may well be available from a disused AM or CW transmitter, or it may be wished to utilise a transformer, or other items from such equipment.

If power is borrowed from other equipment as it stands, take out the valves, excluding rectifiers, or disconnect the heater line. Power requirements for the 2m. FM Tx are 3A at 6.3v. (including the modulator) for all heaters, and about 45mA at 260v. for the oscillator, multiplier and driver stages. With under about 220v. here, grid drive to the PA tends to become marginal. As the load is steady, higher voltages considerably in excess of about 300v. may be employed, by raising the values of the various HT series resistors, or by adding one large wattage resistor in the HT line to this section.

Maximum ratings for the QV03-20A or 6252 power amplifier vary according to the individual maker. These extend (for up to 200 MHz) up to 100mA at 600v. for anode (60 watts), with 250v. on the screen grid, and 60v. negative bias at 1.4mA grid current. (The valve has not been used at over 50w. in this transmitter). One maker suggests 500v. 80mA (40w.) and 2mA grid current.

Excellent RF output is obtainable with these and lower inputs. The PA draws a steady current, so it is in order to

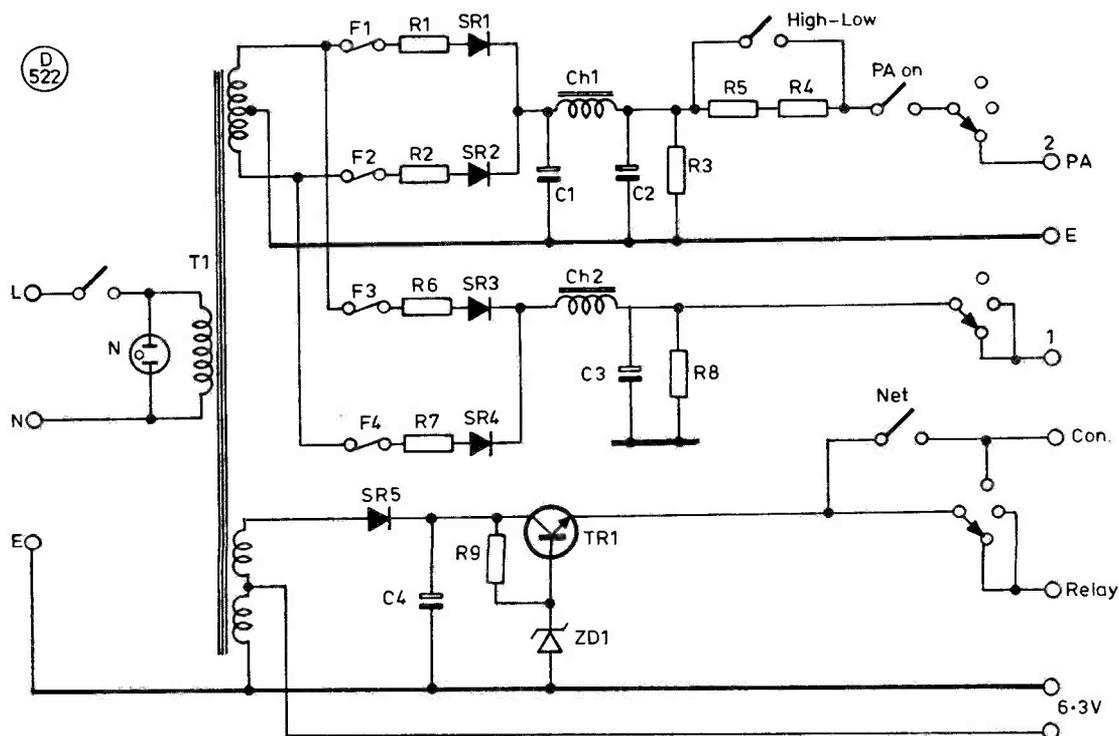


Fig.1 PSU (INCLUDES SUPPLY FOR CONVERTER)

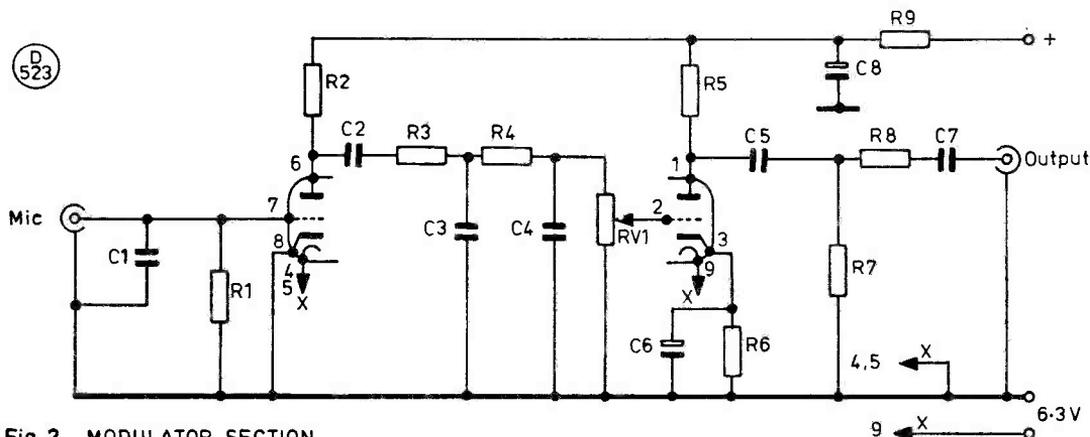


Fig. 2 MODULATOR SECTION

Table of Values

Fig. 2

R1 = 1.5M	RV1 = 470K, or 500K log pot.
R2 = 220K	C1 = 100 pF
R3, R4, R8 = 47K	C2, C5, C7 = 10 nF
R5 = 100K, $\frac{1}{2}$ w.	C3, C4 = 1 nF
R6 = 2.7K	C6 = 47 μ F, or 50 F 6v.
R7 = 330K	C8 = 100 μ F 300v.
R9 = 22K, $\frac{1}{2}$ w.	

Also: ECC83/12AX7 valves; B9A holder and can.
Note: all resistors are $\frac{1}{2}$ -watt unless otherwise stated.

lose HT volts with a series resistor, and a low-power position is provided for on the PSU; this gives some 7w. to 10w. or so input, with normal tune-up — ample for most of the more local QSOs, and very useful for tuning purposes at reduced anode dissipation.

After using various PSUs with this transmitter, one was constructed as a single compact unit utilising a 350-0-350v. 150mA transformer for both HT supplies. This PSU, shown in Fig. 1, gives 360v. at 100mA for the PA, and 260v. at 45mA for the earlier stages. This has proved to be very satisfactory.

Table of Values

Fig. 1

R1, R2 = 100 ohm, 1w.	F1, F2 = 1A
R3 = 22K, 12w.	F3, F4 = 250mA.
R4, R5 = 3K, 10w.	SR1, SR2, SR3, SR4 = BYX94
R6, R7 = 270 ohm, 1w.	SR5 = 1N4004
R8 = 22K, 10w.	CH1 = 250 ohm, 5H, 120mA.
R9 = 220 ohm, $\frac{1}{2}$ w.	CH2 = 25H, 75mA.
C1 = 8 μ F, 500v.	ZD1 = 12.6v, 400mW Zener
C2 = 32 μ F, 450v.	TR1 = 2N3053
C3 = 200 μ F, 300v.	T1 = 350-0-350v. 150mA;
C4 = 4700 μ F, 16v.	6.3v. 3A; 6.3v. 1A.

Also: Neon indicator with internal series resistor; mains on-off switch; three non-miniature slide switches; non-miniature 3-pole rotary switch.

Modifications, to use items to hand, would include using a 250-0-250 60mA or similar transformer for early stages, and second transformer for the PA. If the latter has a higher secondary voltage, check smoothing capacitor and rectifier voltages, to suit.

Negative bias is obtained by about 2mA grid current through a 22k grid resistor, so needs no other provision.

Fig. 1 is the circuit of the PSU generally used, and divides into three sections. The HT secondary of T1 supplies silicon rectifiers SR1 and SR2 through protective fuses and surge limiting resistors. This HT line employs capacitor input with C1, followed by the choke CH1 and C2; R3 is a bleeder. R4 and R5, with the High-Low switch across them, allow for the low-power and normal power PA operation mentioned.

The second HT line is derived from SR3 and SR4, with choke input (and thus reduced voltage output). This supplies oscillator, multiplier and driver stages of the RF section, and the audio section.

The third and low voltage supply is from two heater windings in series (reverse leads to one winding if found necessary). DC is obtained across C4, and dropped for the Zener diode ZD1 by R9, thus maintaining the base of TR1 at about 12.6v. TR1 thus supplies about 12v. for the receiver converter, and aerial change-over relay of the transmitter.

The remaining output point is 6.3v. from a 3A winding, for the heaters.

Switching

Transmit-receive control is by a single switch on the PSU. This is the 3-pole, 3-way switch in Fig. 1. One pole supplies 12v. to the converter in the Receive position, the relay then taking the aerial to the converter. Second and third positions energise the relay, to transfer the aerial to the PA.

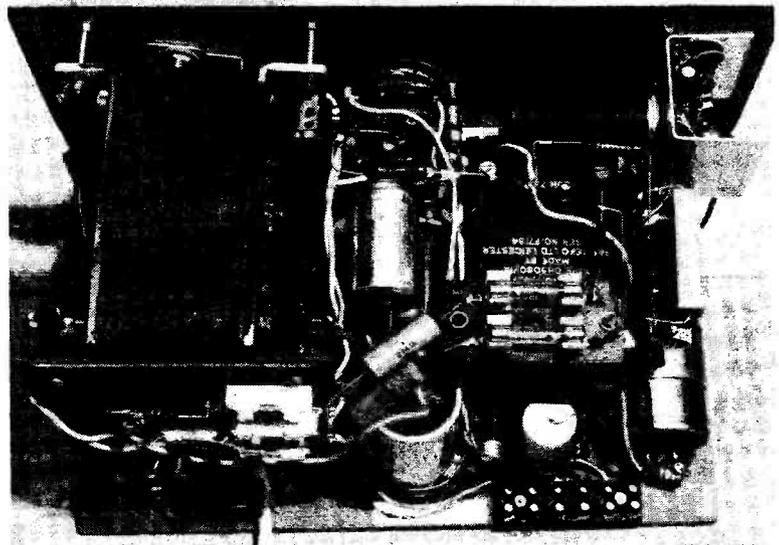
Occasionally it may be useful to have the converter on also, as when spotting a crystal frequency on the receiver, and the 'Net' switch can be closed to allow this.

The next switch section provides HT at Point 1 (for oscillator, etc.) in two positions. The remaining pole provides HT at '2' for the PA in the Transmit position, if the 'PA On' switch is closed.

'Net', 'PA On', and 'High-Low' switches are in a row on



Front of PSU showing sockets for the microphone and AF output; the R/T switch controls the converter, relay and transmitter.



The PSU; the modulator chassis is at top right. The boards and tags mount rectifiers, fuses and power resistors; the 12v. regulated supply board is near the 6-way output connector.

the PSU panel. Normally, the 'Net' switch is open, 'PA On' switch is closed, and 'High-Low' switch at wanted power. The 3-pole switch has only two positions, for Transmit and Receive, but since the PA comes on a trifle later than the driver section and relay, and goes off a trifle earlier, there are no troubles such as hoots or sparking.

Construction

This was to use a case approximately $10 \times 7 \times 5\frac{1}{2}$ in. *Paxolin* panels bolted to the back of the transformer and top of the larger choke are supporting boards for the rectifiers, resistors and fuse-holders; the large capacitors are mounted with tag-strips or clips, as appropriate.

TR1 and its associated components occupy a small board behind the larger choke; a 6-way connector block is fitted, marked for common negative, converter, relay, 6.3v., 260v. and PA HT connections.

Power is drawn by a 3-core cord to provide earthing; fit a 2A or 3A fuse in the plug.

A space about $4 \times 1\frac{3}{4} \times 2$ in. at the left of the panel takes the modulator. Two 3.5mm jack sockets are also situated here — one for the microphone, and one for a screened lead which carries audio to the RF section of the transmitter.

to be concluded

VHF BANDS

NORMAN FITCH, G3FPK

Oscar Nine Sunk

THE culmination of several years of painstaking building and meticulous development and testing came on May 23 when the second of the four test *ARIANE* launch vehicles lifted off the launch pad at Kourou in French Guiana. The launch window was 1130-1430 GMT and amateurs worldwide tuned in to W1AW, the headquarters station of the ARRL, to hear live coverage of the proceedings relayed through several stations.

There were two interruptions in the countdown by the computer controlling and monitoring the proceedings. At 1248 a tropical storm caused a further hold up. *LO-2* lifted off with just 20 seconds to spare before the "closing" of the launch window. For 4.4 secs., all engines worked normally, then, for 1.6 secs. the chamber pressure in engine "D" began to oscillate at a frequency above 1 kHz. From +6 to +28.3 secs. this engine worked normally again followed by another slight hiccup lasting just over a second. Thereafter, up to +63.8 secs., this engine behaved normally with the temperature in the propulsion bay rising linearly from 24-56°C.

At 63.8 secs., things really began to go wrong as the temperature shot up to 100°C with a simultaneous pressure drop to 10 bar. By now, *LO-2* was experiencing a powerful roll torque. In spite of this, the flight control system maintained the launcher on its nominal trajectory plane even though the roll rate was 60° per second. At +104 secs., the chamber pressures in engines "A" and "B" began to fall, with only "C" still functioning normally.

The final disaster occurred at +108 secs. when engine "C" failed and the launcher was destroyed, "... proba-

bly initiated by the breaking of a structural connexion as a result of considerable general stresses. Consequently, the self-destruct system fitted to each tank operates. Tank pressures have been nominal up to this point," to quote from the official *ESA* preliminary investigation, as published in the special edition of *Oscar News*, mailed on June 7.

Naturally the amateur satellite programme has suffered a major setback. The financial loss has been mentioned as \$156,000. Very soon after the total loss of the first *AMSAT* Phase 3 satellite which formed part of the payload of *LO-2*, *AMSAT-USA's* (Washington) Board of Directors stated they planned to carry on with the Phase 3 programme. It is estimated that a replacement could be ready in about a year if the necessary funding and manpower are forthcoming. The experience and knowledge gained in designing and building what should have been *Oscar 9* has been invaluable so that the actual construction of next satellite could be completed much quicker.

Obviously *AMSAT* needs funds urgently and already donations are coming in. *AMSAT-UK* Secretary Ron Broadbent, G3AAJ, asks that donors either make out their cheques to "AMSAT-UK (International Account)," or to "AMSAT-UK (AMSAT-USA Account)" so that the funds can be placed in trust until needed.

Other Satellite News

Oscar 7 appears to be in Mode "B" all the time for the present. The telemetry is usually rubbish so it cannot be ascertained just what is the problem. Sometimes the 2m. downlink is very noisy. Whether this is a transponder malfunction or non-amateur transmissions on 432 MHz getting in is not certain. Hopefully, it may be possible to command it into Mode "A" later in the summer.

Oscar 8 is working well and no doubt there will be a revival of interest in Mode "J" now that *O-9* has not materialized. The *UOSAT* project is progressing well and the scheduled launch by a U.S.A. *Delta 2310* vehicle is September 4, 1981. At the date of editing, there is no news of any Soviet amateur satellites being sent up.

AMSAT-International will be launched at the meeting at the University of Surrey in Guildford planned

for Sept. 19-22 this year. Several national *AMSAT* organizations overseas have already confirmed they will be attending this important event. The basic idea behind *AMSAT-International* is to pool all resources, worldwide, to fund and build future amateur satellites. Full details can be obtained by sending on *s.a.e.* to G3AAJ at 94 Herongate Road, London, E12 5EQ.

Beacon Notes

The Ulster 2m. beacon GB3GI on 144.945 MHz was taken out of service recently to have its aerials replaced. Brian Bower, G3COJ, mentions that 15TDJ (Florence) has permission to operate a 10 watt 6m. beacon on 50.203 MHz. It is rather difficult to detect as it only sends its call sign once every 15 secs. on A1 with no carrier in between. Piero monitors 28.885 MHz for 6m. reports. Brian has noticed that the ZS6PW beacon keying sequence is not quite as reported in the May column in that there is 100 secs. of keying followed by a 10 secs. break. On 10m. the QRG has been altered to 28.273 MHz due to QRM. GB3SIX (Anglesey) on 50.020 MHz runs 20 watts to a 4-ele. *Yagi* pointing west and is only on between 0100 and 0830 local time. Reports to G3UUT. (QTHR).

Contest News

Both *GB2RS* and *Radio Communication* got the results of the Feb. 3, 432 MHz contest wrong. Geoff Brown, GJ4ICD, was *not* -/A and was a single operator entry. Accordingly he won that section being 7 pts. ahead of G4BEL. No doubt it will all be corrected in due course.

Moonbounce

In the second leg of the *E-M-E* contest on May 17/18, Dave Price, GW4CQT, worked 34 stations and gained 20 multipliers. Half way through a QSO with JA6DR, the MUF shot up to over 100 MHz and all signals from the Moon vanished for a while in Cwmbran. However, Dave mentioned it did not seem to affect G5CSZ in N. Yorks. G4DGU told your scribe that G3WDG had a QSO with LX1DB on 1,296 MHz in this event, and that in September, a couple of SM2's will have the use of a 32 metre dish for 1,296 MHz *E-M-E*,

which means that those with a 6 ft. dish should be able to work them.

Sporadic E

Unlike last year, May did not provide any potent *E*'s openings on 2m. in the British Isles. There were several days when Band 2 FM was full of European broadcasting stations. Concerning the CW contact logged by the G4JAR/P team at 0720 on May 4 with a YO5AVN/3 in NE01h, that would seem to be a phoney. G3POI spoke to the real YO5AVN, actually in NE31d, who told Clive he had not had any *E*'s QSOs or worked a G station. John Hunter, G31MV, contacted HG1YA on the 20m. VHF net and learned that HG5KDQ did hear John call him on CW that same day.

On May 11, GJ4ICD worked I7ECT (HB27c) for a new 1980 country. Geoff writes that the French stations have enjoyed a number of 2m. *E*'s openings in May into IT9, LZ and YU. On May 22, for example, F6ETI (YH) and F1FHI (ZH) worked many I's and YU's, but in Jersey, the MUF only reached 108 MHz.

What is believed to be a notable "first" occurred on May 31 when OE1WEB (II) worked N4AS/4X in Israel at 1756 GMT; this gleaned from the 20m. VHF net. There were a couple of small openings on June 1, a day when Hungarian TV on channel R4, 85.25 MHz, was being received strongly by G4CMV and others. Between 1754 and 1804 approx., Clive Penna, G3PO1; (AL) worked OH2AXE, OH2BUW, OH2BWL, OH2HK, OH2RK and OH3MF. Your scribe's "CQ DX" call was answered by OH2CX at 1757, while John Hunter, G31MV, (Bucks.) was working UR2GZ (MS) and UR2EQ (MT). All those on CW but a few stations worked OH2BRW on SSB.

Brian Bower, G3COJ (Bucks.) said the OH's that G3PO1 was working were inaudible with him but he thinks he had a contact with HG0DG (KH39f) at 1855 in heavy QRM. Clive Morton, G4CMV (W. Yorks.) brought his all-time countries total to 33 with UQ2GFZ (NR57a) at 1752 and YO2IS (KF17e) at 1842. He reports that Mike Allmark (Leeds) was copying *E*'s signals throughout the period from 1850 to 1920.

Ken Osborne, G4IGO (Bristol) worked UR2EQ (NT) at 1755 and heard him again at 1900 along with HG0DG. Paul Gobey, G8IYG

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3PO1	—	—	282	282
I4EAT	—	25	238	263
DK3UZ	—	—	218	218
G31MV	—	—	213	213
G3CHN	—	—	185	185
G3SEK	—	—	179	179
9H1CD	—	13	178	191
9H1BT	—	11	163	174
G3FPK	—	—	159	159
G4ERG	—	16	168	184
GM4GOK	—	12	154	166
GJ4ICD	—	54	150	204
G4CMV	—	52	145	197
G3YF	—	60	138	198
EA3LL	—	15	137	152
GM4CXP	—	25	136	161
G4IGO	—	—	132	132
G4IJE	—	—	131	131
G8HYV	12	73	130	215
G8GML	11	74	122	207
G3BW	3	26	120	149
G38KNV	—	46	118	164
G4BWG	—	29	118	147
G4AWU	—	22	110	132
G4DEZ	—	—	110	110
G4IJW	—	30	108	139
G81NG	—	—	106	106
G30HC	4	33	104	141
G8HHI	—	36	103	139
G8LEF	22	62	101	185
G8LHT	7	39	98	144
G4FBK	—	5	98	103
G8KGF	—	20	95	115
G31XN	36	73	94	203
G3COJ	24	66	93	183
G2AXI	2	54	93	149
G8ATK	5	43	93	141
G3KPU	—	25	91	116
G6UW	—	1	89	90
G8LGL	—	15	87	102
G8KPL	—	7	87	94
G8OPR	1	30	86	117
GMSNCM	—	12	84	96
G4HYD	—	40	83	123
G8HJF	—	—	83	83
G8JAG	—	7	79	86
G8MEJ	—	17	78	95
G8JJR	—	9	78	87
GD2HDZ	12	41	76	129
G8KSP	—	2	76	78
GJ3RAX	1	27	73	101
G4ERN	1	41	72	114
G4GET	—	—	72	72
G3SPJ	10	36	71	117
G8IFT	14	30	68	112
G3FIJ	—	27	68	95
GIREWM	—	25	67	92
G4GHA	—	—	67	67
G3PBV	—	35	64	99
G8KAX	—	40	63	103
G4AEZ	5	29	61	95
G4GEE	—	28	60	88
G8GXE	3	33	56	92
G4GXT	—	1	56	57
G8JGK	—	—	52	52
G4GSA	—	1	50	51
G8PRG	—	12	39	51
G8RWG	—	—	29	29

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 2m.

(Stafford) has a professional spectrum analyser with assorted converters which enables him to watch the progress of *E*'s happenings up the

frequency spectrum. On June 1, with this fine "early warning system," he was able to contact HG8CE (KG) at 1857 and has the precious QSL already.

Dave Price, GW4CQT (Gwent) told your scribe that UB5JIN (RE01f) your reckons he worked G5BX at 1732 on June 1 via *E*'s, a QRB of about 2720 kms. It will be interesting to learn if this one is ever confirmed.

Four Metres

A satisfying amount of 4m. news has been received and it seems that more readers are getting going on this interesting band. Jimmy Bruzon, ZB2BL, is presently on CW only using the ZB2VHF beacon Tx on 70.26 MHz. During the contest on June 1, he worked G3COJ and GW3CBY and a few others. He operates the beacon when he is at home and, if there is a gap after the call sign, it indicates he is monitoring the frequency and 28.885 MHz. He hopes to modulate the Tx with some AM soon.

Dave Sellars, G3PBV (Devon) got back on the band in time for the contest with 50 watts PEP output and a 2-ele. beam. He heard ZB2BL via *E*'s working GW4ALE/P (YM04f). Alan Scott, G4BYP (Cheshire) was on for the contest and added a few to his table tally — G3FDW/P in Durham, GW4ALE/P in Gwynedd and G4ERP/P in Glos. Dave Thorpe, G4FKI (Essex) heard ZB2BL and worked GD2HDZ and GW4ALE/P for a couple of new countries this year. He is proposing a club be formed to promote 4m. activity, fixed and mobile and asks anyone interested to contact him at QTHR.

Gary Allitt, G4HNS (Notts.) has scrapped his home brewed 4m. rig and now has a *Microwave Modules* 2-to-4m. transverter. Using an indoor dipole, he contacted GW4ALE/P, and GM3WOJ in Dumfries. From Jersey, GJ4ICD has 125 watts PEP on the band and tells that GJ3RAX and GJ3YHU have 100 and 10 watts respectively. Dave Lewis, GW4HBK (Gwent) has been on since March, "... from the depths of a Welsh valley," and can normally hear GB3SU but not GB3SX. He uses a Yaesu FR400/FL400 combination with a home brewed 2/4m. transverter. Power input is 40w. DC to a 4-ele. *Yagi* at 20ft. and Dave has worked G2AOK, G3LIT, G3UKV, GW4BCD and GJ3YHU. Finally, there is a

report that, on May 11, GM3WOJ had a "half QSO" with ZB2VHF.

Two Metres

G3PBV is still looking for a few northern counties and has heard G8ATA in Cumbria and G8TFR/A in Cleveland. He liked the low power contest as a worthwhile addition to the calendar. Dave is QRV on 144.30 MHz after 8 p.m. each evening and offers to advise visitors to the Dartmoor area of their QTH locators. On June 3, conditions were up with ON's coming in well and FX0THF up on normal.

G4CMV has sent a long letter covering recent activity and enters the annual table in second place. From N. Yorks., Clive heard on *Aurora* on May 25 between 1500 and 1630 but, with only 10 watts and a 5-ele. beam, he did not work anything. LA3WU, LA3EQ, LA7KK and an SM4 were heard. Welcome to new correspondent John Wilkinson, G4HGT, from Leeds, whose university exams finished on June 10 to allow more time for the hobby. he uses an *Icom* IC-202E driving a 4CX250B amplifier. The aerial is an 8-ele. *Yagi* at 30 ft. and a *Signetics* U310 pre-amplifier is used to improve reception. His home location is badly screened from the east through to the southwest by multi-storey flats some 100 ft. high and also by 40 ft. high ones between north and northwest. he wonders if 70 cm. signals go through reinforced concrete framed buildings better than do 2m. ones?

G4HNS found conditions quite good in the first half of May. Gary mentions the good opening to Denmark in the early hours of the 11th when OZ1BRJ (EQ) was worked and another 11 OZ's heard. Unfortunately his 10 watts was insufficient to get through the pile-ups. Stations further north from Nottingham were heard working into LA and SM.

Since the end of March, G4IGO has added some nice squares *via* MS including LA5KK (FU); SM5CNQ (HS); LA3UU in both FT and FV; SM5CUI (IT); SP6ARE (IL). On tropo., PE1CCN/A was worked in "wet" square BN, while on May 25 in the *Aurora*, Ken worked GM4JLD (YP). Paul Widger, G8AGU, did some camping in GM recently and mentioned the reasonable 2m. activity up the west coast. He reckons it well

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	—	—	64	17	46	8	135
G4CMV	—	—	64	15	41	12	132
G4HNS	14	3	57	11	35	8	125
GD2HDZ	15	3	48	10	35	6	117
G14ICD	—	—	54	14	37	9	114
G3PBV	5	2	50	10	37	8	112
G8IFT	—	—	56	11	35	8	110
G8FMK	—	—	58	11	33	6	108
G8GXE	—	—	48	10	36	9	103
G3BW	—	—	57	13	25	7	102
G4BYP	20	5	40	9	21	3	98
G8MFJ	—	—	55	12	24	6	97
G8KGF	—	—	48	14	17	6	85
G4DEZ	—	—	60	24	—	—	84
G4ERX	15	2	30	10	18	8	83
G3FPK	—	—	66	17	—	—	83
G6HHI	—	—	31	8	34	9	82
G4VLQ	—	—	52	10	16	3	81
G3KPU	—	—	33	5	28	6	72
G8KAX	—	—	26	8	29	8	71
G3FIJ	12	1	37	8	10	2	70
G4IGO	—	—	47	21	—	—	68
G8JJR	—	—	28	7	19	1	55
G8VJJ	—	—	47	8	—	—	55
G8RWG	—	—	45	9	—	—	54
GW3CBY	7	4	25	6	5	3	50
GM8TSI	—	—	41	6	2	1	50
G4HGT	—	—	42	6	—	—	48
G8RZA	—	—	36	9	—	—	45
G4FKI	18	3	16	3	3	1	44
G8JGK	—	—	33	9	—	—	42
G8TIN	—	—	35	7	—	—	42
GM8MNG	—	—	33	5	—	—	38
G3EKP	9	4	12	4	2	2	33
GM4CXP	—	—	16	7	—	—	23
GM4COK	—	—	4	9	—	—	13

worth while to monitor the SSB and FM calling frequencies.

Ray Cox, G8FMK (Oxon.) sent in his first claim for this year's table and says he runs an all home built station. The Tx is a multimode affair with USB generated by the polyphase method. On 2m. this delivers 2 watts to a 50 watts amplifier, the aerial being an 8-ele. *Yagi* at 36 ft. Tony Collett, G8GXE (Berks.) is still seeking a Lancashire contact on the band. He was out portable for the low power contest and made 193 contacts worth a claimed 1,060 pts. Conditions favoured the northwest but there was deep, slow QSB. Ian Gordon, G8IFT (W. Midlands) made 122 QSO's in the contest, best DX being GM8MNG (YP16h). He found the north/south path above average, but the east/west one poor.

Commenting on the low power event, George Gullis, G8MFJ (Wilts.) did not work anything new, nor hear anything of the *Aurora*, but did mention some very bad signals. Roger Gregory, G8TIN (Oxon.) is another new correspondent who was licensed last September. A *Quartz* 16 transceiver with a slant polarised, 5-ele. *Yagi* was used initially. At the end of 1979, a *Belcom* Liner-2 was

acquired along with a 6-over-6 slot fed *Yagi*. The fitting of a BF900 preamplifier improved the receiving capability and a visit to the recent Alexandra Palace exhibition resulted in the purchase of a *S.O.T.A.* 80 watts amplifier.

Ken Willis, G8VR (Kent) who was very active on 2m. in the 60's and 70's is just getting going again after some years abroad where he operated from the U.S.A. With 50 watts from a World War 2, 829B PA driven from a *Trio* TS-700, and a 10-ele. *Yagi* he managed quite a lot of interesting QSO's during the June 3/5 period. Ken worked 7 GI's on the night of June 3/4 and GM8TAK was the first GM on *tropo*. The morning of June 5 found the band full of DL's from EL, EN and FN squares and Ken worked about a dozen at over S9. At 0850, a CW QSO with OZ1LO proved to be the Dane's first G contact. Ken is in the MS scene and his first sked was with SM5CUI but was not quite completed.

Arthur Breese, GD2HDZ, did not catch the *Aurora* on May 25 but was on for most of the day in the low power contest using a *Trio* TR-7010. Ian Raine, GM8TSI (Midlothian) found the conditions in the May 3/4

contest poor with LA6HL the only Scandinavian heard. Best DX was G8FAB/P (ZL53g) at 513 kms. Strangely, no continentals were heard in the May 10/11 period during the lift when many GM's worked into DL, ON, OZ and PA. Using the call GM8MNG, the low power contest was entered but conditions were poor. They resisted the temptation to turn up the power and work in the *Aurora* and kept the beam south. However, Ian reckons few G's point their beams towards Scotland, so their 46 QSO's were only worth 306 pts.

As this is being edited, Hal Glen, G8ODN, from Carlisle, is in Scotland aiming to operate from all mainland squares. he runs 400 watts of SSB to a pair of 16-ele. *Yagis*. Although he was quite a good signal into London from several of the earlier sites, he was only giving "4 and 1" reports to many stations running similar *e.r.p.* He is offering to award a trophy to the operator who works him at all the sites activated. If several stations manage it, it will go to the one at the greatest distance. Claims to P.O. Box 20, Carlisle, Cumbria by July 20.

Seventy Centimetres

GCMV has been making good use of some of the good conditions recently. With 10 watts to a 48-ele. *Multibeam* Clive added five new squares in OZ and DL over a four hour period from 2200 on May 10. He contacted 6 OZ's, a couple of DL's and several Dutch stations. The period May 17/18 also produced more Scandinavian QSO's, this time 4 SM's in FS, GQ and GR squares and 3 OZ's in EQ and FQ, bringing the 1980 countries total to a healthy 12. (Last year, no entrant in the annual table reached double figures!).

In common with most others, G4HNS found conditions on 70cm. better than those on 2m. On May 11, he worked OZZOE (EP10f) who, in a subsequent letter, told Gary that there are only 20 stations with 432 MHz gear in the area. On May 16, while 2m. was quiet, propagation to the continent on 70cm. was good, best DX being DF3XU (FN). The following evening, DL2NO (EN) was worked and was using 3 watts, while PE1AIU was still readable at 100 milliwatts.

G8GXE now has an 88-ele. *Multibeam* up at 35ft. and has been adding to his counties total as a result. Tony could hear the east coast folk working

the Scandinavians in mid-May but could not hear them in the Slough area. He did work some Dutch and Belgian stations on the 19th in BK, CL and CM squares, though. During the lifts in mid-May, Simon Freeman, G3LQR, in Suffolk, worked SM6CKU/*Mobile* which must be rather a rarity. During an *Aurora* on April 11, Chris Bartram, G4DGU (Oxon.) worked G3AUS (Devon) and got a 55a report. This was when the *Ar* was fading out on 2m. Chris recorded a 1 kHz *Doppler* shift on the HF side, by the way.

Gigahertz Bands

What is believed to be the first G/SM contact on 13cm. was made on May 17 when the prevailing anti-cyclone brought excellent sea ducting across the North Sea. G3LQR worked SM6ESG in GR72h, a new European record of 880 kms.

On 23cm. G3PBV has a set of *muTek* boards as a converter, the transmit side being a *varactor* tripler for CW and NBFM with SSB later on envisaged. On June 3, Dave was copying the GB3AND beacon at good strength and by 2000, GB3BPO was positively identified. To the northeast, GB3CLE was a good signal. he made his first QSO on the band with G3JXN in London over a 254km. path.

G8FMK asks, "What about a 4 band VHF table?" mentioning his 1980 score of 13 counties and one country on 23cm. Ray runs 15 watts on 23cm., all modes, to a 27-ele. beam at 44ft. G8GXE also has a 27-ele. *Quad Loop Yagi* below the 70cm. beam at 32ft. Tony is using the *Microwave Modules* transverter giving one watt output.

From Birmingham, G8IFT now has SSB on 23cm. from a *Trio* TS-700G, DF8QK transverter, into a 2C39A amplifier giving about 10 watts output. In the contest over May 3/4, Ian had 13 QSO's the best DX being G8BFX at 132 km. PE0MAR/P was heard very weakly. Other outstanding signals were GW3OXD/P, G3LCH/P and G3LRS/P, all at over S9 and over 80km. away. More recent contacts include G8CVO (Bolton), G4FXW (Sheffield), G8TRS/P near Banbury, G6FK (Wolverhampton), G8MFP (Rugby), G8MWR (Coventry), G3DY (Peterborough) and G4BEL (Cambridge). GJ4ICD hopes to have six 2C39A's on 23cm. any time and

says that GJ8KNV has 200 watts on the band. According to G3PBV, efforts are being made to get GB3IOW back on the air on 23cm.

DX Notes

Portugal seekers will be interested to read that FIKCP plans portable operation from CT in August on 144 and 432 MHz. GJ4ICD promises more details. F6EYM/P will be on from BE44g from 1,700m. *a.s.l.* on 144 and 432 MHz, between 0900 and 1200 *french* time on Sunday mornings in August, according to G3PBV. Operation from the rare Irish square UO is planned by ON5FF and ON6UG, using the call EI2VAH/P, probably from about August 4. They will have QRO on 144 and 432 MHz and maybe gear for 10 GHz as well. They will be on during the *Perseids* shower. PA0RJV/MM has been operating from BO66 on 144.151 MHz recently.

Final Jottings

When the G8-plus-three calls run out, the new series will be G6-plus-three. On 6m. EI6AS and EI2W have been restricted to operation outside TV hours which are 1700-2330 local time. Another *E's* opening occurred on June 10 on 2m. The first part lasted about a minute when G8SVG (W. Yorks) worked HG8ET (KQ02j) at 1600 and heard an OE6 and YU2CBE. The next signals heard at G3FPK were just before 1740 when all Hell was let loose on the CW end. Stations identified included UC2ABN (NN), UK2CAU (NO) and SP2LU which latter seems a little out of context. G3POI reports some LZ's on his tape of the event. More details next month.

Deadlines

A very early deadline for August. It is July 2. The next date to ring on your calendars is August 6. As usual, all copy and claims to;— "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

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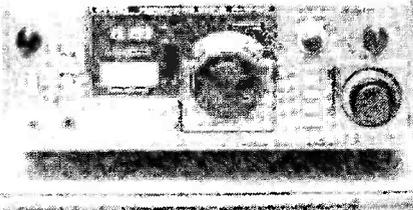


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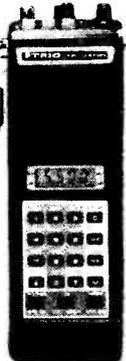


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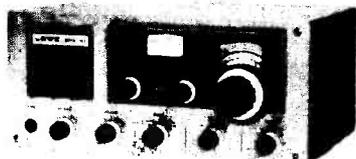
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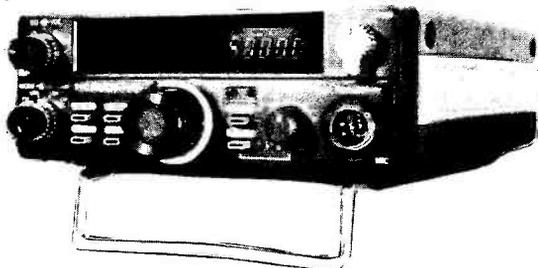
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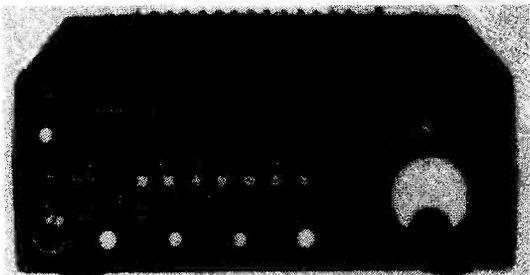
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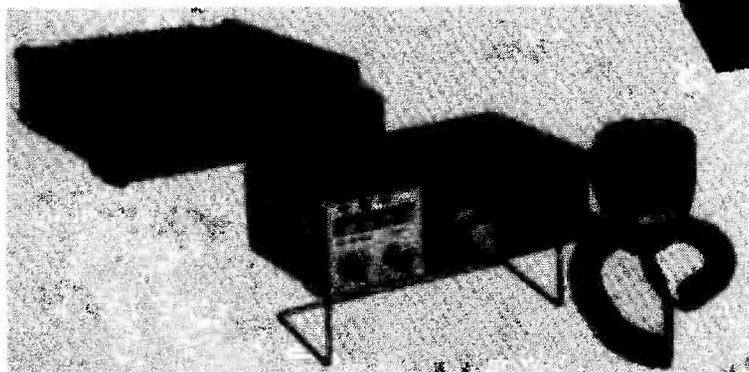
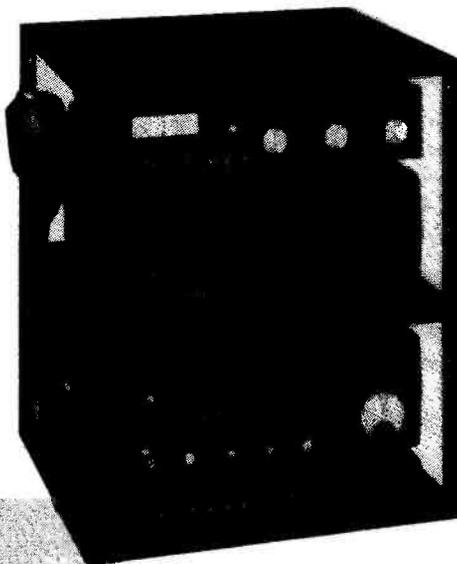
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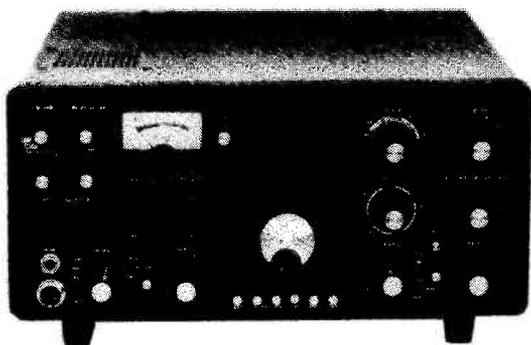
FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into 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 100yds veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.

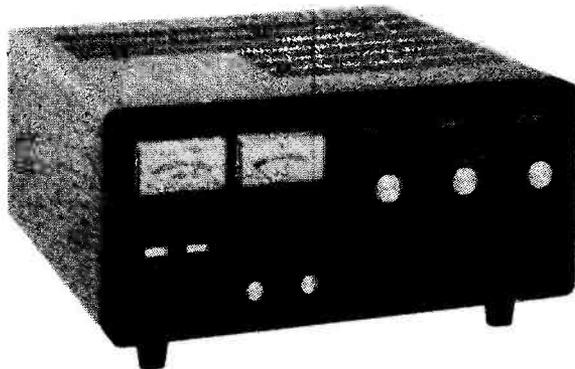
FROM THE WEST AND SOUTH-WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

AMATEUR ELECTRONICS UK

source for YAESU MUSEN



YAESU FT-101ZD



YAESU FL-2100Z

Keep ahead with Yaesu — not just a typical advertising slogan or empty phrase but a fact of life that when you buy Yaesu Musen equipment you get the benefit of the superb Research and Development Department which is located at the Yaesu headquarters in Tokyo. This is quite separate from the extensive Yaesu manufacturing facilities elsewhere in Japan and has to be seen to be believed, but then again what else would you expect from the world's largest manufacturer of amateur communications equipment.

This month we feature some new developments by Yaesu in the HF, VHF and UHF field with the fabulous new mobile HF transceiver FT-707 which we picture on the facing page, together with its matching ancillary units for base station operation also. The new FT-720R is a completely new innovation for VHF UHF mobile operation giving the user the benefit of both bands with a single control head and with such features as a five memory channel bank and an automatic search ability. Finally, in answer to numerous enquiries we show the new Yaesu FL2100Z 1200 Watt Linear Amplifier which matches in style the superb FT-901 and FT-101ZD HF transceivers and we hardly need remind you that the FT101ZD is the finest transceiver in its price range available from any manufacturer today.



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!



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 EAST ANGLIA — Dr T. THIRST (Tim) G4CTT, NORWICH. 06925 403.
 NORTH EAST — NORTH EAST AMATEUR RADIO, DARLINGTON. 0325 55969.
 AMATEUR ELECTRONICS, UK — COASTAL, CLIFTONVILLE,
 KENT. KEN McINNES, G3FTE, THANET (0843) 291297, 9 a.m.-10.30 p.m.

508-514 ALUM ROCK ROAD
BIRMINGHAM 8

021-327 1497
Telex 337045 6313





Western

Western FOR GENERAL COVERAGE RECEIVERS



TRIO R-1000

The newest on the general coverage scene. Full coverage 200 kHz-30 MHz with digital frequency readout and clock/timer. Switched selectivity for optimum performance and other features making it a joy to use and first-class value for money.



YAESU FRG-7

The well established, budget-priced favourite. Covers 500 kHz to 30 MHz continuously; mains, battery or 12v DC operation. A first-class receiver at a price that won't break the bank.

Western FOR HF TRANSCEIVERS

FROM TRIO — KENWOOD

TS120-S A really popular solid-state mobile (or base) transceiver. Small in size but big on features and performance. Digital readout, IF shift to beat the QRM, VOX and CW break-in keying are all standard. 100 watts RF out on all bands 80-15m, slightly lower on 10m. Outstanding value in the HF field.

TS-180S/DFC The truly de-luxe solid-state HF transceiver. Full band coverage, 160-10m, with allowance for adding new WARC frequencies. Digital Frequency Control (DFC) and 4 memories allow for full operating flexibility. RF power control, digital readout, VOX and compressor are all fitted-as standard. Try one today!

TS-820S Trio's well-proven base station transceiver for those who prefer valve PAs. In use world-wide, tried and respected, this is one of the classics among transceivers. Full coverage 160-10metres; 6146Bs in the PA for years of dependable service. factory-fitted digital readout, IF shift control. Top Trio quality as always.

FROM YAESU MUSEN

FT-101Z (ZD) Latest in a famous line, but what an improvement! Full band coverage, IF width control for superior selectivity, excellent performance and Yaesu's well-known quality. ZD model has digital readout built-in, both models in excess of 100 watts RF out (lower on 10m). Try our price for size!

FT-707 Truly christened the "Wayfarer". Yaesu's new solid-state rig goes anywhere, base or mobile, and has all the facilities of the bigger rigs. Digital readout, IF width and other features. This is the HF rig you Yaesu lovers have been waiting for — ALL THE NEW WARC BANDS FITTED!

FOR VHF/UHF TRANSCEIVERS

ICOM and FDK
ALSO AVAILABLE

TRIO

TR-7625 A fully synthesized, 25 watt 2m FM mobile with all the up-to-date features you need. Remote control feature using optional RM-76 microprocessor unit.

TR-9000 The one everyone is talking about! A complete 2m multi-mode transceiver in a size you normally imagine an FM only box! SSB/CW/FM, 25 or 12.5kHz channels on FM, 100Hz tuning steps on SSB/CW (and FM if you wish). Search and scan modes, 5 memories, repeater shift, tone access. This is the one that makes all the others obsolete!

TR-2400 Trio ingenuity in your hand! Fully synthesized, microprocessor-controlled 2m FM hand portable transceiver. Ten memories, scan, tone access, keyboard frequency, entry with continuous LCD readout — it's all there! Includes battery pack and charger — good value in a portable!

YAESU

FT-720RV Yaesu's new modular approach to 2m FM mobile. A 10-watt transceiver module with separate remoteable control head for maximum freedom of vehicle mounting. Fully synthesized, including scan and memory facilities

FT-720RU The 70cm counterpart to the FT-720RV. Similar modular concept, using the same control head (FT-720R). 10 watts output on 70cm FM, 25kHz channels. One control head can be used (with optional S-72 switch unit) to operate two rigs (one on 2m, one on 70cm).

FT-227RB Fully synthesized 2m FM mobile, 10 watts up/down scanning from microphone, full band coverage, tone-burst and 4 memories.

ALL LISTED PRICES INCLUDE VAT AT 15% AND CARRIAGE

HAVE YOU GOT YOUR **Western** CREDIT CHARGE CARD YET?

SPECIAL OFFERS

Yaesu CPU-2500RK Reduced to **£299**
Yaesu FT-301D Transceiver (ex-demo.) **£599**
Drake SPR-4 G/C Receiver **£375**
Alda 105 5-band Transceiver **£399**

Alliance U-200
VHF rotators **£39**
All new except
where noted. VAT INCL.

WHILE STOCKS LAST

Electronics (UK) Ltd

Western CAN ALSO FIX YOU UP WITH ...

ROTATORS

from the well-known EMOTO range — now with 360° DIAL PRESENTATION! (Models 103 and 502 only)

- EMOTO 103SAX (NEW!)**
For light HF and large VHF arrays £86.25
- EMOTO 502SAX**
For heavier HF beams plus VHF/UHF £125.35
- EMOTO 1102MXX**
The really big one for the largest HF monobanders and big VHF/UHF arrays £189.75
- EMOTO 1103MXX**
As the 1102MXX but slower rotation speed and greater tuning power £194.35
- EMOTO MB-300**
The well-known rotary mast bearing £13.80
- COMMANDER EP-20 (NEW!)**
A budget-priced, light weight but robust rotor for VHF/UHF arrays only £29.95

UNBEATABLE VALUE FOR MONEY

HF ANTENNAS

Designed and manufactured in UK by

Western

Terrific Value! Terrific Performance!

- WESTERN DX-5V** 5-band vertical, 10-80m £89.00
- WESTERN DX-31** Rotary dipole, 10/15/20m £46.00
- WESTERN DX-32** 2-ele. beam, 10/15/20m £80.50
- WESTERN DX-33** 3-ele. beam, 10/15/20m £121.90
- WESTERN DX-34** 4-ele. beam, 10/15/20m £161.00

Also available: CONVERSION KITS to upgrade DX-31 to 32 etc.

TRAP DIPOLES ALSO AVAILABLE

POWER/SWR METERS

Western

PEAK READING WATTMETERS
(Patent Protected)

PM-2000 Reads peak or RMS RF power from 3.5 to 30MHz. Patent peak-reading facility for direct reading of SSB, PEP during normal transmission. Impedance 50 ohms, power ranges up to 2kW ... £51.75

PM-2001 Similar to PM-2000 (above) but covers VHF from 50 to 150MHz and has power ranges up to 200W £51.75

OSKER SWR-200 An established favourite, this power/SWR meter has a place in many shacks. Power measurement up to 2kW (RMS only) with 1% accuracy; dual impedance 50/75 ohms. frequency range 3.5 to 150NHZ.

Now reduced in Price to £39.00

HF MOBILE ANTENNAS

NOW IN STOCK AGAIN — the best HF mobile antenna system there is for 10 to 80 metres.

BY

HUSTLER

- Choose from:
- BM-1** bumper mount £11.44
- or **C-32** ball mount £4.95
- Then add:
- MO-2** fold-over mast (54" long) £13.63
- Then choose your resonators:
- RM-10** for 10 metres £6.50
- RM-15** for 15 metres £6.56
- RM-20** for 20 metres £8.17
- RM-40** for 40 metres £10.06
- RM-80** for 80 metres £11.44
- Accessories (optional):
- RSS-2** resonator spring £4.08
- QD-1** quick disconnect £10.06

Add carriage £2.30 (Antenna) or 60p (accessories).

THE VERY BEST FOR HF MOBILE

STATION ACCESSORIES

DUMMY LOADS —
W1 type, **MDL1000**. Extruded finned, heat-sink housing, oil-filled load resistor, 52 ohms, 1 kW for 3mins., or 300W continuous. A high quality load at a good price.

(Similar to Trio RD-300 — but not in price!) £29.95

WESTERN DL-1000 can-type, 250 watts £14.15

MORSE KEYS

SRK-1 High quality "straight" key as made for the professional users and now available to the amateur £12.65

VIBROPLEX

"Original" Standard "bug" key £39.65

"Champion" "bug" key — the economy version £37.35

NEW "Iambic" twin paddle for el-bugs £39.65

"Vibrokeyer" single paddle for el-bugs £39.65

Valves — 6146B, 6JS6C, 6KD6, 12BY7A and Others. SAE for prices.

Also Baluns, Traps, Plugs, Cable, Etc., Etc.

VHF/UHF ANTENNAS

BY

PANORAMA

"Modular" Series of VHF/UHF and 10m mobile antennas. Choose whip and base combinations below:

- AV/C58M/145** 2m $\frac{1}{2}$ whip and coil £7.25
- ACU/433** 70cm. Gain colinear £6.21
- AC10** Centre loaded 10/11m whip £5.75
- NEW! 1BB** Miniature ball-joint base with 4m coax £5.75
- MB** Boot-lip base (no hole) with 4m coax £5.29
- MM** Magnetic mount with 4m coax £15.18
- M4** Standard base, $\frac{1}{2}$ " hole fixing £3.28
- NEW! MLW** Window clip base (needs counterpoise) £6.15
- PVX** Counterpoise for MLW (2 metres) £4.72
- FXU** Counterpoise for MLW (70 centimetres) £5.06

Carriage — add £1.75 for up to 5 whips/bases

Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)

FAIRFIELD ESTATE
LOUTH, LINCAS LN11 OJH

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Our Agents

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

Scotland: Jim Henderson, GM4HKW, Falkirk (0324)

25559

N. Ireland: Les Lyske, G13CDF, Newtownards (0247) 812449

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LOUTH: 9-12: 1-5pm Mon-Fri. By appointment Sat 9-12.
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Mon-Sat 9-6pm; closed Thurs.



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and
TOWERS**

Western

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and
TOWERS**

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WESTOWER

A range of steel lattice telescopic, tilt-over towers offering high strength at moderate prices. Used extensively by commercial and professional bodies, the WESTOWER is designed to the latest British Standards by our own Chartered Engineers and manufactured in our own factory using modern electrically controlled welding techniques.

FEATURES

- ★ Heights from 25 ft to 120 ft.
- ★ Self supporting (no guys) up to 58 feet.
- ★ Full headloads up to 75 mph (Standard Series) or 100 mph (Heavy Duty Series) — reduced loading above these speeds.
- ★ Unique Framed Base Plate for mounting. Post or wall mounts also available on Standard Series.
- ★ All have reinforced head units.
- ★ Heavy duty towers have auto-braked winches.

DON'T FORGET!

With WESTOWER you deal DIRECT with the DESIGNERS/ MANUFACTURERS and NOT WITH THE AGENTS. FIRST-HAND INFORMATION AND ADVICE is YOURS for the asking.

... AND NOW FOR SOME PRICES

23/FBP 42 ft. framed base, standard	£396.75
35/FBP 58 ft. framed base, standard	£515.20
25/W 42 ft. wall mounting, standard	£354.20
2HD/FBP 42 ft. framed base, heavy duty	£516.35
3HD/FBP 58 ft. framed base, heavy duty	£631.35
4HD/FBP 75 ft. framed base, heavy duty	£759.00

* Carriage is FREE — except Cornwall/Devon/Scotland. VAT at 15% is included in above prices.

OR AS A LIGHTER ALTERNATIVE . . .

THE UNIQUE ALUMAST

“THE TOWER THAT COMES IN A TUBE”

A COMPLETE 30ft (9.15m) MAST for **£240.35**
375/PSS/3; HB-1; RMP-1; TP-1

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

CREDIT FACILITIES AVAILABLE

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

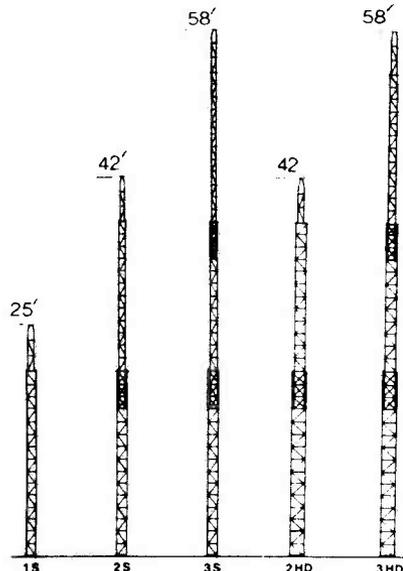
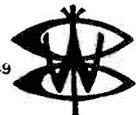
Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)
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Opening hours:
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LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662).
Mon-Sat 9-6pm; closed Thurs.





MICROWAVE MODULES LTD



RTTY TO TV CONVERTER: MM 2000



FEATURES

- ★ Complete terminal unit/TV interface
- ★ Latest state of the art microprocessor system
- ★ Automatic speed sensing
- ★ Automatic carriage return/line feed
- ★ Includes modulator to enable direct connection to a standard UHF TV set
- ★ Automatic letter shift facility

SPECIFICATION

POWER REQUIREMENTS	: 12.5V at 1 Amp nominal.
POWER SOCKET	: 5 pin DIN
AUDIO INPUT SOCKET	: Phono
TV (UHF OUTPUT) SOCKET	: Phono
MODES OF RECEPTION	: (i) Amateur standard ASCII (1.2/2.4 KHz, 300 baud) (ii) Murray coded RTTY, 45.5 baud (iii) Murray coded RTTY, 50 baud (iv) Murray coded RTTY, 75 baud
	IN EACH OF THESE FOUR MODES, THE CONVERTER WILL ACCEPT BOTH FSK and AFSK SIGNALS
WEIGHT	: 1 Kg (2lb 2oz)
OVERALL SIZE	: 187 × 120 × 53 mm (7 $\frac{3}{8}$ × 4 $\frac{3}{4}$ × 2 $\frac{1}{8}$ inches).

DESCRIPTION

This converter, MM 2000, contains a terminal unit and a microprocessor controlled TV interface, and requires only an audio input from a short-wave receiver, and a 12 volt DC supply, to enable a live display of "Off-air" RTTY and ASCII on a domestic UHF standard TV set.

The converter can accept the following modes of reception:—

- (i) Amateur standard ASCII (1.2/2.4 KHz, 300 baud)
- (ii) Murray coded RTTY, 45.5 baud
- (iii) Murray coded RTTY, 50 baud
- (iv) Murray coded RTTY, 75 baud

IN EACH OF THESE CASES, THE CONVERTER WILL ACCEPT BOTH FSK and AFSK SIGNALS

The converter automatically senses the speed in use, when the front panel mounted "auto" switch is in the "on" position.

LED status lights provide a visual indication of correct "centre-tuning" and the RTTY or ASCII speed being received. The inclusion of automatic software routines eliminates the possibility of information being corrupted or over-written, by the incorporation of automatic carriage return/line feed (RTTY signals only).

After 15 different characters in figure shift have elapsed, the converter will automatically return to letter shift. This feature alleviates the problem caused by a corrupt character forcing figure shift, but allows for repetitive underline characters.

This facility may be overridden when the front-panel mounted "auto" switch is in the "off" position. This enables reception of continuous figure shift characters, e.g., Oscar prediction tables (RTTY signals only).

The converter utilises two microprocessors and 21 integrated circuits, and all circuitry is constructed on two, high quality glass-fibre printed circuit boards, coupled with edge connectors.

The unit is housed in a highly durable black diecast enclosure, and plugs for the DC power socket, audio input and TV UHF output sockets are provided.

The Murray/ASCII conversion program is contained in a user interchangeable E-PROM, facilitating re-programming should software modification be required (e.g., alternative code/speed etc.)

PRICE £169 inc. VAT. Any further information on this new product and others from our extensive range may be obtained by contacting our Sales Department, who will be only too pleased to help.

MICROWAVE MODULES

BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND

Tel: 051-523 4011

Telex 628608 MICRO G

S.E.M.

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Pre-Amplifiers, Power Amplifiers, Converters, Transverters, A.T.U.s — *Something for Everyone*

NEW! SEM IAMBIC KEYS

We showed these at Ally Pally and the response was fantastic. As so many people said, "I've never been able to use one of these things before". They use the famous CURTIS custom made C.M.O.S. I.C. with all facilities. Price: **£34.50 Ex Stock**.

SENTINEL 2 METRE and 70 CM PRE-AMPLIFIERS

Ultimate performance pre-amps using for 2 metres a selected J FET in a neutralised circuit giving a 1 dB N.F. and 18dB gain. Makes the difference between solid copy and just noise.

We have four models to choose from:—

1. SENTINEL AUTO 2 METRE PRE-AMPLIFIER

From the inventors of r.f. switched pre-amplifiers. 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**. 70 cm version **£23.00* ex. stock**.

2. PA5 AUTOMATIC 2 METRE PRE-AMPLIFIER

Same as the Sentinel Auto but for 240V mains operation in a pretty little case. Size: Front panel $3\frac{3}{4}'' \times 6\frac{1}{4}''$, $2\frac{1}{4}''$ deep. SO239 sockets. Price: **£28.75***.

3. SENTINEL STANDARD 2 METRE PRE-AMPLIFIER

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

4. 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**. 70 cm version **£10.00**. Both **ex stock**.

THREE SENTINEL 2 METRE POWER/PRE-AMPLIFIERS

All are linear, ALL MODES. Switch straight THROUGH when switched OFF. 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 above. SO239 sockets. Nominal 12V supply.

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. All available without Pre-Amp. **£8 less**.

SENTINEL H.F. WIDEBAND PRE-AMPLIFIERS

2-40 MHz, 15dB gain. Ideal units for pepping up receivers on 15 and 10, for OSCAR reception and as an ACTIVE AERIAL. 9-12V supply. Size: $2\frac{1}{4}'' \times 1\frac{1}{2}'' \times 3''$. We make the following two versions:

1. SENTINEL STANDARD H.F. PRE-AMPLIFIERS

Performance as above **£10.00* Ex. stock**.

2. SENTINEL AUTO H.F. PRE-AMPLIFIERS

Same performance as above with a change over relay, r.f. operated by your transceiver for direct connection in your aerial co-ax. **£16.93* Ex stock**.

S.E.M. Z MATCH

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

It will match aeriols of 15-5000 Ohms, to your equipment. BALANCED or UNBALANCED at 1kW at 50 ohms. SO 239 and 4 mm terminals for co-ax or wire aeriols, both end fed and open wire. Price: **£47.15 Ex stock**.

S.E.M. FORWARD/REFLECTED POWER METER —

£29.17 Ex stock.

S.E.M. EZITUNE

Makes SWR Bridges obsolete. Tune up your Transmatch etc. without transmitting. See last month for full details. **£28.75* Ex stock**.

S.E.M. EUROPA C 2 METRE TRANSVERTER

£126.50. Repeater shift **£15.00**.

SENTINEL DUAL GATE MOSFET CONVERTERS

SENTINEL 2 metre converters: IFs, 28-30MHz, 4-6MHz, 2-4MHz. 2dB N.F. 30dB gain. **£23.00 Ex stock**.

SENTINEL X 2 metre converters — same as above with internal mains supply — **£26.50 Ex stock**.

SEM 70 70 cms to 2 metres — **£23.00**.

SENTINEL TOP BAND CONVERTER — **£20.80 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.

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TR7/DR7/L7

Note our Drake Tx/Rx, 1.6-30 MHz
Continuous.

BEARCAT. 210/220/FB/250FB.

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Agents required.

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line in stock.

SYT. Land line, interface equipment.

Stockist of: J. Beam and Cushcraft.

DANCOM Landmobile — MPT + P&T
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H BAND — L BAND + MOCMS

QUARTZ — Crystals — fastest delivery.

Microwave Modules Products Stocked.

DATONG — Morse Tutor

LUNAR — Amps and Pre Amps.

SPECTRUM — Repeaters — Duplexers
Amateur and Commercial to order

DANCOM — Marine, Type Approved.
Fitted 55Ch + AUTO WATCH on 16

SAXTON — RG8u + 58u — Agents
required.

Sure Bros - microphones.

ANNOUNCING THE BEARCAT 300

We also have all the accessories and hard-to-get plugs, sockets, etc.



STAFF HOLIDAYS — Please note we shall be closed from 9th to 30th August inclusive. Any inconvenience to our customers is regretted.

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 30pF TX	HC6/U 30pF TX	HC25/U 40pF TX	HC25/U 30pF RX	HC25/U 25pF and 20pF TX	HC6 & 25/U 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	14.9667	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 (RRO). 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.

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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.

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PRICES ARE EX VAT. PLEASE ADD 15%.

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	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
	5	50	1.50 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
3rd OVT	11	10	21.00 to 59.999 MHz	£4.55 £3.60
5th OVT	12	10	60.00 to 99.999 MHz	£5.00 £4.00
	13	10	100.00 to 124.999 MHz	£6.15 £5.20
5th, 7th & 9th OVT	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.

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CRYSTAL SOCKETS HC6/U and HC25/U 16p

MINIMUM ORDER CHARGE £1.50.

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144.4 (433.2)	b	e	e	e	e	e	e	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e	e	e
144.800	e	e	e	e	e	e	e	e	e	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e	e
145.000/ROT	a	a	a	a	a	a	a	a	a	a	a	a
145.025/R1T	a	b	a	a	a	a	a	a	a	a	a	a
145.050/R2T	a	b	a	a	a	a	a	a	a	a	a	a
145.075/R3T	a	b	a	a	a	a	a	a	a	a	a	a
145.100/R4T	a	b	a	a	a	a	a	a	a	a	a	a
145.125/R5T	a	b	a	a	a	a	a	a	a	a	a	a
145.150/R6T	a	b	a	a	a	a	a	a	a	a	a	a
145.175/R7T	a	b	a	a	a	a	a	a	a	a	a	a
145.200/R8T	a	b	a	a	a	a	a	a	a	a	a	a
145.300/S12	e	e	e	e	e	e	e	e	e	e	e	e
145.350/S14	e	e	e	e	e	e	e	e	e	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	e	e	e	e	e	e	e	e	e	e	e	e
145.475/S19	e	e	e	e	e	e	e	e	e	e	e	e
145.500/S20	e	e	e	e	e	e	e	e	e	e	e	e
145.525/S21	a	b	a	a	a	a	a	a	a	a	a	a
145.550/S22	a	b	a	a	a	a	a	a	a	a	a	a
145.575/S23	a	b	a	a	a	a	a	a	a	a	a	a
145.600/R0R	e	e	e	e	e	e	e	e	e	e	e	e
145.625/R1R	e	e	e	e	e	e	e	e	e	e	e	e
145.650/R2R	e	e	e	e	e	e	e	e	e	e	e	e
145.675/R3R	e	e	e	e	e	e	e	e	e	e	e	e
145.700/R4R	e	e	e	e	e	e	e	e	e	e	e	e
145.725/R5R	e	e	e	e	e	e	e	e	e	e	e	e
145.750/R6R	e	e	e	e	e	e	e	e	e	e	e	e
145.775/R7R	e	e	e	e	e	e	e	e	e	e	e	e
145.800/R8R	e	e	e	e	e	e	e	e	e	e	e	e
145.950/S36	e	e	e	e	e	e	e	e	e	e	e	e

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.

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ORDERING: When ordering please quote (1) Channel; (2) Crystal frequency; (3) Holder; (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

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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), SUB (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), Pocketone (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

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100 kHz in HC13/U and 100 kHz in HC13/U and 200 kHz and 455 kHz in HC6/U, £2.95
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Adj. tol ±50ppm. Temp. tol. ±100ppm 0 to +70°C
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20 to 29.999 kHz £17.75 (£19.97) 100 to 149.999 kHz ... £6.68 (£7.51)
30 to 59.999 kHz £15.51 (£17.45) 150 to 499.999 kHz ... £6.20 (£6.97)
60 to 79.999 kHz £12.41 (£13.19) 500 to 799.999 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 30 MHz (fund) ... £7.56
* 1.0 to 1.499 MHz (fund) ... £9.45 * 15 to 20.99 MHz (3 O/T) ... £4.72
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* 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 or 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.

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Deposit £335.00	Deposit £150.00	Deposit £91.00	Deposit £99.00	Deposit £109.00
12mthly rpymts £43.92	12mthly rpymts £18.92	12mthly rpymts £9.05	12mthly rpymts £12.75	12mthly rpymts £13.84

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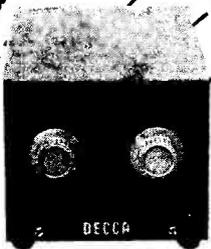
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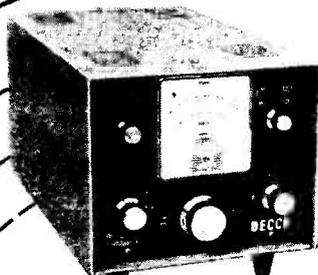
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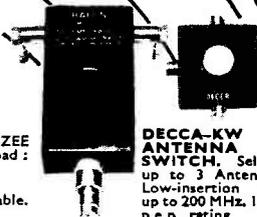
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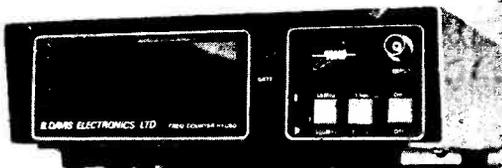
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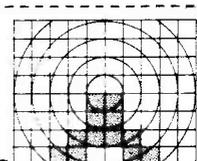
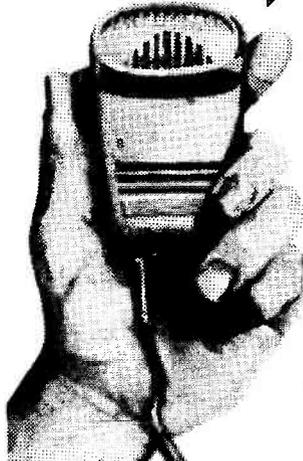
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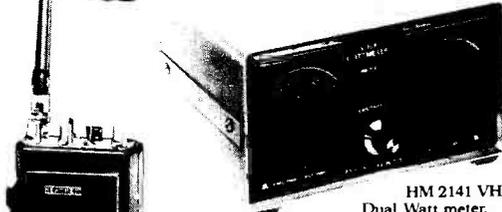
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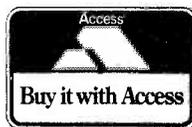
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