

# THE SHORT WAVE

# Magazine

VOL. XXXVI

NOVEMBER 1978

NUMBER 9

OPEN UP THE EXCITING WORLD  
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# LOWE ELECTRONICS LTD



## TR2300

### 2 METRE SYNTHESISER PORTABLE

Trio once again lead the field with the introduction of the new TR2300 2 metre FM portable. Following the established TR2200 line, the all new 2300 combines all the virtues of small size, ease of use and rugged go-anywhere construction but introduces for the first time full band coverage in 25 kHz steps from the same advanced synthesiser used in the TR7500. The synthesiser provides 80 FM channels from 144-146 MHz together with 600 kHz repeater shift, and a single auxiliary channel which can be crystal controlled to your favourite net frequency.

Automatic tone burst is provided for repeater operation and all in all, the TR2300 looks like being the new definitive 2 metre FM portable.

Although not so obvious from the photo, the TR2300 is actually smaller than the existing TR2200 and is a totally new design with an improved specification. 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.

Switchable dial illumination is provided so as to ease dial readout in dimly lit situations.

Needless to say, in line with Trio advance planning, the TR2300 will allow for incorporation of the new IARU region 1 adoption of 12½ kHz FM channels as this is gradually introduced.

Once again, Trio sensible design, attention to detail and care in providing equipment designed specifically for the user, rather than hand-me-down Japanese designs, is reflected in the TR2300—why settle for anything less! Price: £210 including VAT.



## TR7500

### THE SENSIBLE 2 METRE RIG

When comparing other rigs with the TR7500, you may become dazzled by the thoughts of 800 5 kHz channels at your fingertip—forget it—think commonsense and remember that FM in Europe is organised on 25 kHz channels so why tune five times as many frequencies as you really need. The TR7500 is the only imported FM box to be designed for the British user, the others are simply hand-me-downs from the Japanese home market.

With the TR7500, you can enjoy mobile 2 metre operation at its best. Need S20? turn the dial until display reads 20. Move to S17? turn to 17, it's simplicity itself. Repeater operation is equally easy requiring only the touch of a switch to select either 600 kHz normal receiver up shift or reserve repeater operation as desired. Dial readout? you guessed, it's simply 7 for R7, 4 for R4 and so on.

Full band coverage 144-146 MHz is standard on the TR7500 and as a final point to muse upon, consider when happens if we adopt 12½ kHz channels in Europe. With your 5 kHz step rig you are up ye creek without ye paddle but with Trio foresight, you are covered since the TR7500 is basically a 12½ kHz channel rig and 12½ kHz channels are available.

TR7500, the sensible choice. Still only £225 inc. VAT. Matching PS-6 mains PSU, £58 inc. VAT.

### ANNOUNCEMENT

Other firms in the U.K. are not officially authorised Trio dealers and Trio equipment purchased from these companies is not backed by the Trio service and spares organisation in the U.K.

FOR FULL CATALOGUE AND ANTENNA BOOK,  
SEND 45p IN STAMPS TO MATLOCK

# LOWE ELECTRONICS LTD



## TS120

### MULTUM IN PARVO

We introduce yet another exciting innovation from Trio in the new TS120V HF transceiver. Equally at home in mobile or home station situations, the TS120V packs more features into a small package than any other comparable model. Measuring only  $9\frac{1}{2}'' \times 3\frac{3}{4}'' \times 9\frac{1}{4}''$ —which is about the size of a packet of cornflakes, the TS120V can best be described as a miniature TS820. The rig covers all bands 80–10 metres—and all of 10 metres 28–30 MHz so it's ideal for transverter driving, has digital readout built in, vox, break-in CW, RIT, noise blanker and the unique Trio passband tuning system used in the 820. The power output is 10W, and a matching linear will be along shortly.

The TS120V is clearly a winner for mobile operation but is equally attractive at home and is perfect for the VHF/UHF enthusiast who requires a high performance I.F. system for his transverters.

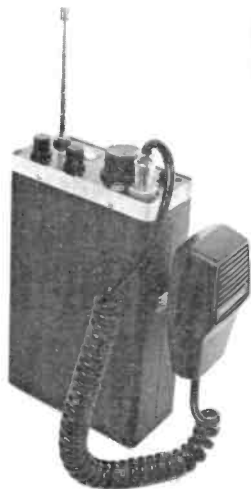
The transceiver is based on an advanced PLL system and the digital readout gives you the correct operating frequency at all times unlike many other rigs. Remember my previous comments about Trio attention to detail!

For ease of operation, the TS120V is unsurpassed; simply select the band required, tune the VFO to the frequency you want and there you are: no prescaler or PA tuning to worry about, and a distinct safety feature for the mobile operator.

We at Matlock, have all fallen in love with the TS120V and we feel sure that you will too. At its projected price of around £425 including VAT (and including digital readout, vox, etc.) we have no doubt that this transceiver will be another winner from Trio. See it soon.

## SB2M

### MIZUHO 2 METRE SSB



The SB-2M portable SSB/CW transceiver makes a welcome change from the procession of FM boxes and offers the user real DX performance in a small, easily carried package. Power output is around 1 W. pep (2.5W. input) and sideband generation is by 76514 double balanced modulator and high quality 9 MHz crystal filter thus ensuring very good carrier and unwanted sideband suppression. A further 76514 is used in the heterodyne mixer to guarantee not only a clean transmission but also a receiver free from unwanted spurious responses.

Frequency control is by a wide range VXO giving 50 kHz coverage from one crystal. As supplied, the SB-2M is fitted with four crystals giving a total tuning range of 200 kHz which is adequate for most operators' needs. Alternative crystals can be fitted by the user at any time without the necessity for realignment.

The receiver performance is really outstanding and we can normally hear the Wrotham beacon in Matlock using only the telescopic whip on the rig. As a mode comparison, we can seldom if ever, hear the London repeater GB3LO even using a 10XY at 40 feet and the most sensitive FM rig available. Real DX is yours with the SB-2M and SSB.

Current consumption is low enough to make operation from dry batteries perfectly feasible. However, a Nicad battery pack and charger are also available at modest cost. The SB-2M comes complete with manual, microphone, carrying strap, etc., and is fitted with crystals to cover 144.1–144.3 MHz. Other crystals will be available shortly. Why not try sideband: you'll really enjoy it after a dose of FM repeater operation. After all, where does everyone on 2 metres vanish to when there's a lift? You guessed; they're working the real DX around 144.3 and you can join in with the SB-2M.

**SB-2M £155 inc. VAT**

**HEAD OFFICE:** 119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE. Tuesday-Saturday 9 a.m.–5.30 p.m.  
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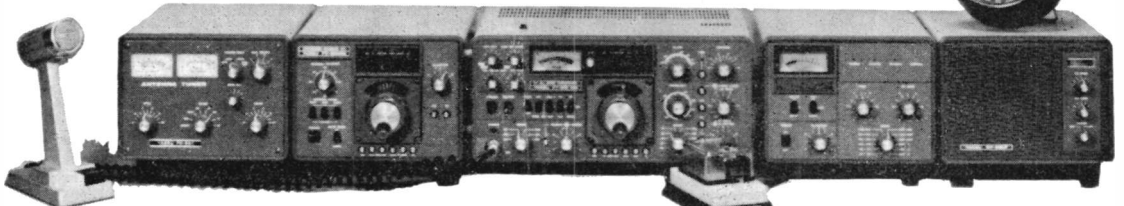
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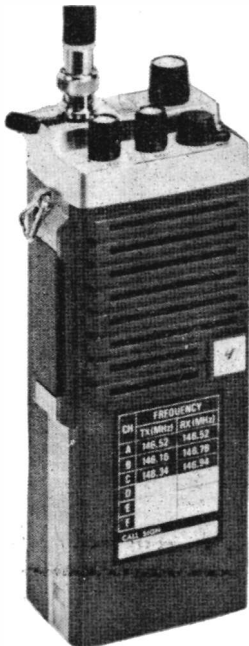


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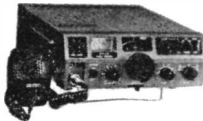


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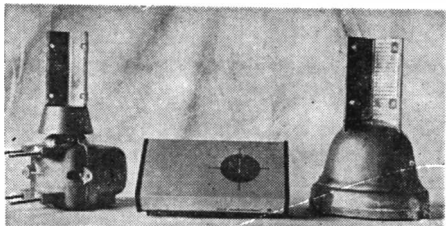
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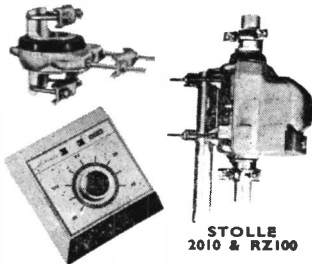
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## CDE & STOLLE

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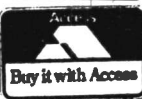
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160-10 metres Amateur Band transmission, including capability for Mars, Embassy, Government and future band expansions.

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- TS-599S 80-10m. HF Transmitter. CW/SSB/AM ... .. £388.00
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- HS-5 Tailored response headphones ... .. £23.00
- TS-700G 2m. TRANSCEIVER CW/SSB/FM/AM ... .. £458.00
- VOX-3 Matching VOX unit (free with TS700G) ... .. £19.00
- SP-70 Matching Speaker ... .. £20.00
- TS-700S 2m. DIGITAL TRANSCEIVER all mode ... .. £580.00
- VFO-700S External VFO (split-freq. facilities) ... .. £89.00
- TR-7010 2m. TRANSCEIVER SSB/CW 10 watts ... .. £189.00
- PS-5 Matching AC psu/digital clock ... .. £58.00
- Spare 2-pole DC power plug ... .. £0.25
- TR-7200G 10w. FM mobile. 10 channels auto c.t.b. ... .. £189.00
- TR-7400A 2m. 30w. FM mobile tcvr. 800 ch. p11 ... .. £334.00
- TR-7500 2m. FM mobile 10w. tcvr. p11 80 fm. ch. ... .. £225.00
- PS-6 Matching speaker and AC power unit ... .. £58.00
- TR-2200GX 2m. FM TCVR. with battern charger, mic, carrying case, fitted 3 channels ... .. £142.00
- TR-2200GX As above but fitted 12 channels ... .. £172.00
- RA-1 Helical rubber antenna ... .. £6.90
- MB-1A Quick-release mobile mount ... .. £10.00
- Spare external power lead 2200G/GX ... .. £1.25
- Set of 10 rechargeable ni-cads ... .. £9.72
- VB-2200GX Mobile 10w. amplifier (swr protection)... .. £45.00
- Spare whip antenna ... .. £1.90
- PS-1200 PSU for TR2200G/GX/TR-3200... .. 19.95

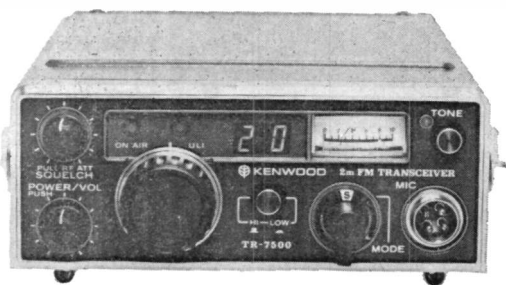
## TEST EQUIPMENT

- CS-1570 Dual trace 'scope DC-30 MHz ... .. £504.36
- CS-1560A Dual trace 'scope DC-15 MHz ... .. £345.60
- CS-1562 Dual trace 'scope DC-10 MHz ... .. £287.20
- (Price includes two matching full bandwidth X10 probes)
- PF-810 Station power meter in-line measurement with 3 ranges. 2-way antenna switch ... £64.80
- CO-1303D Single trace 'scope DC-5 MHz ... .. £118.80
- CO-1303G As above plus station monitor and oscillator ... .. £140.40
- DM-800 Dip resonance meter ... .. £51.84
- TL-922 HF high power linear 2kW. 10-160m. ... .. £763.00

## NEW!

- TR-2300 FM Transceiver 2m. 80 ch. ... .. £210.00
- SM-220 Station Monitor 1.8-50 MHz ... .. £230.00

ALL PRICES INCLUDE VAT BUT NOT CARRIAGE



**SECURICOR ROADLINE**



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# WATERS & STANTON ELECTRONICS



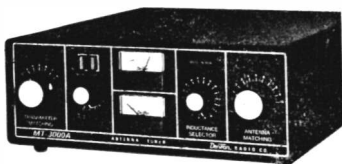
## Den Tron MLA 2500

160-10m. 2kW  
PEP

£695 inc. VAT  
In Stock Now

- ★ 1kW DC continuous
- ★ ALC circuit
- ★ 3 speed cooling
- ★ Military specifications
- ★ 234v./117v. AC
- ★ 2 of EIMAC 8875 tubes

- ★ R.F. Wattmeter RMS/PEP
- ★ Size 5½" x 14" x 14"
- ★ Weight 47lb.
- ★ Ideal for SSTV/RTTY
- ★ 3rd order down 30dB +
- ★ 40 watts drive for 1kW



## Den Tron Military MT 3000A

160-10m. 3kW

£275 inc. VAT  
In Stock Now

- ★ Antenna selector (5)
- ★ Exciter dummy load (250W)
- ★ 3kW continuous
- ★ 3 core balun
- ★ Tuner by-pass switch

- ★ Compact 5½" x 14" x 14"
- ★ Watt meter 200W/2kW
- ★ Forward/Reverse Watts
- ★ Matches any antenna
- ★ Military construction



FRG7 RECEIVER

Choose From  
The Yaesu  
Range:

FRG7: £210

FRG7000: £367

FT901DM: £960

FT901DE £781



FT901DM TRANSCEIVER

## GREAT VALUE GREAT PERFORMANCE

... AND FRIENDLY SERVICE!

IN STOCK AGAIN

NAIGAI

2200 Linear

£481

(carriage £4.50)



- ★ 230v. AC
- ★ 4CX-350F tube
- ★ Receiver pre-amp
- ★ 10-13 watts drive
- ★ SWR meter built-in

- ★ 500W. PEP input
- ★ 400W. FM/CW input
- ★ Fan cooled
- ★ 12v. DC output
- ★ Covers 144-146 MHz

FDK

MULTI-

2700

£499

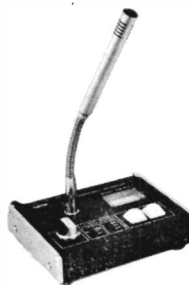


SEND FOR 4-PAGE BROCHURE



FRG7000 RECEIVER £367

ADONIS MICROPHONES—KEEP PEOPLE TALKING!



M802G (illustrated) is the top of the range. Beautiful solid construction yet slim lines and the famous electronic "touch to talk" are but a few of its features. In addition a 3-way switch provides normal operation, medium or high compression. A meter built into the base monitors the compression. The same high quality condenser insert is enclosed in a noise cancelling housing and 3 switched outputs are provided so that the microphone can be fed to 3 different transmitters. Each output has its own output level control. If you want a microphone to match that new rig then we have the answer.

£59 (including VAT)

M502G £39.95

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# WATERS & STANTON ELECTRONICS

## FDK MULTI 800D-25 WATTS

THE MOST ADVANCED FM RIG!



Over 25 watts of high quality FM output at your finger tips. Consider its features and learn why more people are trading up to the 800D. \* Frequency control is electronic from the centre master control—no rotating dial switches to wear out. \* Remote frequency control is available from the new "up/down" microphone buttons. \* Bright LED readout gives true frequency display in 5 kHz steps. \* True frequency counter reads both transmit and receive frequencies in use. \* Instant normal or reverse repeater operation—no re-tuning! \* Xtal controlled tone-burst. \* Variable power control 1 watt to 25 watts (30 watts typical). \* Dual coverage for 70cms. transverting. \* Additional programmable frequency shifts. \* Simple auto-scan modification available. \* Remote digital "head-up" display for dash board mounting. \* Plug-in modular construction for ease of servicing. \* Solid block power module. . . . There are cheaper rigs available, but is that really what you want? . . . Send an SAE for the answer! £289 inc VAT

## FDK Quartz 16



10 watts 10 channels fitted, tone burst—all accessories 2M. FM Only £169 inc. VAT  
HP Terms: deposit £34. Now with Xtal tone burst!

## MIZUHO—2M SSB/CW Hand-Held

£155 inc. VAT!



## FDK PALM II

2M FM

SIZE: 6" x 2 1/2" x 1 3/4"!

WEIGHT: 1 lb. 3 oz!

COMPARE ITS VALUE

COMPARE ITS FEATURES

- \* Smallest held-held available
- \* Over one watt output
- \* AC charger included
- \* 6 channel capability
- \* Simplex or ± 600 kHz switch
- \* BNC aerial socket
- \* Flexible whip supplied
- \* S0/20/22 supplied
- \* Extra channels cost £2.90
- \* Xtal tone-burst option
- \* Ni-cad battery pack supplied
- \* High quality condenser microphone

## Tried UHF?

MORE REPEATERS  
BETTER CONTACTS

## FDK Multi-U11

10 watts 70 cms. FM

Auto scan

10 channels fitted

tone-burst — RIT

£299 inc. VAT

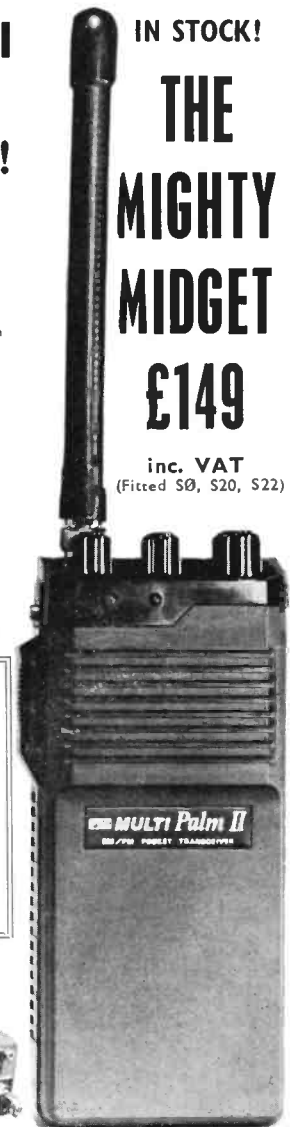
HP Terms :  
deposit £60



### MIZUHO SB2M—ONLY FROM SELECTED DEALERS!

We are pleased to announce that we are stocking the dandy little MIZUHO SB2M SSB 2m. hand-held. This is a real winner and its internal construction is superior to its competitors—so much room—so neat—and its performance is quite delightful. Never heard of MIZUHO—well until now this Japanese firm have specialised in QRP HF equipment but their first VHF product is really something. Of course, you won't find it on every dealers shelf. MIZUHO are pretty particular who handles their products—we pride ourselves in being selected as one of their distributors. Space here is somewhat limited to give full information, but if 2m. SSB from the office, on country walks, on the top of mountains, etc. appeals to you and £155 inc. VAT is not too much for you perhaps you had better send us an S.A.E.

Fitted 144.20—144.40. Extra ranges. £3.00



IN STOCK!

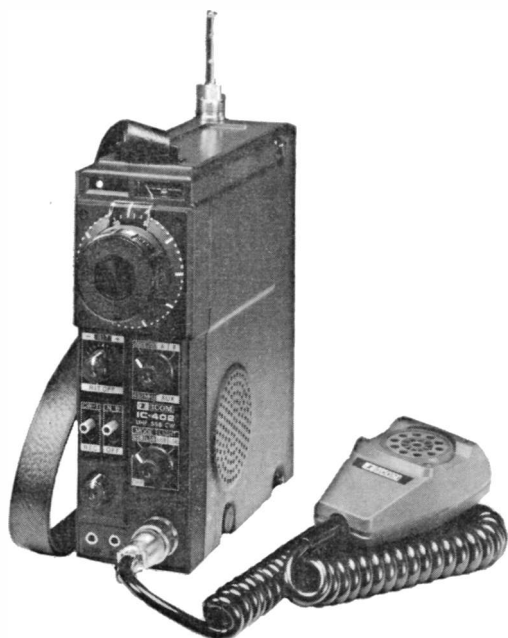
# THE MIGHTY MIDGET

£149

inc. VAT  
(Fitted S0, S20, S22)

THE COMPLETE HAM RADIO CENTRE  
PHONE ORDERS ACCESS BARCLAYCARD MAIL ORDER RETAIL CALLERS  
31 SPA ROAD, HOCKLEY, ESSEX Telephone (03704) 6835 Telex 897406  
AGENTS:— G3PWJ (03844) 7778 G3WRA (0432) 67864 G8NMU (0272) 669454

# FOUR MORE GOODIES FROM



## (1) IC-402

Less VAT £256  
With VAT £288

A 70cm. VERSION OF THE FAMOUS IC-202

IC-402: Utilizing a tunable second oscillator, the IC-402 provides the stability and band spread needed for SSB operation on 430. Crystals are provided for two of the four bands which can be selected from the twenty six 200 kHz segments between 430 and 435.2. Listen to the signals from OSCAR VIII, mode "J" with the superb 0.5uv receiver on either lower or upper sideband.

## (2) IC-202S

Less VAT £192  
With VAT £216

THE IC-202 WITH LOWER S/B PLUS CW sidetone and an even better receiver

Specifications :	IC-202S	IC-402
Opp. Sideband Suppression :	Better than 40dB/1kHz	Better than 40dB/1kHz
Spurious Radiation :	Better than -60dB	Better than -60dB
Microphone Impedance :	600 ohms	600 ohms
Receiver Type :	Single Superheterodyne	Double Superheterodyne
Intermediate Frequencies :	10.7 MHz	57.6-57.8 MHz, 1st I.F. 10.74 MHz, 2nd I.F.
Receiver Sensitivity :	0.5uv at 10dB SINAD	0.5uv at 10dB SINAD
Spurious Sensitivity :	Better than -60dB	Better than -60dB
Selectivity :	±1.2 kHz or better at -6dB ±2.4 kHz or better at -60dB	±1.2 kHz or better at -6dB ±2.4 kHz or better at -60dB
Audio Output :	More than 1W	More than 1W
Impedance :	8 ohms	8 ohms

## (3) IC-RM3 £99 inc.

### COMPUTERISED REMOTE CONTROLLER

The remote controller you have all been waiting for to add to your IC-211E, IC-245E and IC-701 to provide facilities which are just not possible with competitors' rigs. YOU CAN :

- ★ KEY IN any frequency within the operating range of the rig concerned (it even organises the band changing in the IC-701).
- ★ Store the frequency away in any one of FOUR memories for instant retrieval.
- ★ Step up or down the band in variable steps.
- ★ Scan continuously up or down the band in variable steps.
- ★ Operate forward or reverse duplex from the keypad.
- ★ Have remote readout of frequency in case you want to hide your rig in a cupboard!



## (4) IC-280E

Less VAT £240  
With VAT £279

### THE ULTIMATE IN 2m. FM SYNTHESIZED RIGS

For the man who wants all the channels in 2m. from 144-146 complete with digital readout of frequency ICOM have produced the IC-280E which has a few interesting extras not provided by the opposition. Such as :

- ★ THREE memories programmable from the front panel (thus giving you four easy-to-switch-to channels without taking your eyes off the road).
- ★ 25 kHz per step to avoid winding for hours!
- ★ Normal and reverse repeat without using up memory space.
- ★ AND (wait for it!) A FRONT PANEL WHICH CAN BE REMOVED FROM THE RIG AND MOUNTED, COMPLETE WITH ALL CONTROLS, METERS AND DISPLAYS, ELSEWHERE IN THE CAR !!!
- ★ Plus of course the high-quality performance, crisp clear transmission and very hot receiver for which ICOM are so famous as leaders in the quality VHF mobile field.

# ICOM..... Simply the Best

FROM YOUR UK DISTRIBUTOR THANET ELECTRONICS HERNE BAY KENT



## the systems approach !

Designed for the connoisseur, the ICOM IC-701 HF transceiver brings the latest digital technology to Amateur Radio. Study a few more of the vast list of features offered with the IC-701 . . .

### TWO VFO's BUILT-IN

The second VFO, which is an optional tack-on with most other transceivers, is an integral feature in every IC-701. Now you can work those Yanks on 40 and 80 metres!

### OPTICALLY COUPLED VFO

A VFO with no variable capacitors! Made under arrangement with Collins Radio, the IC-701 maximises digital readout with positively no time lag or backlash in display stability, even when using 100Hz steps. The IC-701's free wheeling dial is instantly co-ordinated with the high speed, computer controlled six digit readout using an optical chopper. There is absolutely NO mechanical connection between the smooth bearing mounted flywheel knob and the two dual-tracking VFOs.

### COMPUTER COMPATIBLE INTERFACE

External microprocessor control from a PIA interface is possible via the 24-pin accessory socket on the rear panel of the IC-701. The IC-701 can even be interconnected with the companion 2 metre IC-211 to track frequencies for Oscar work.

### REMOTE CONTROL FACILITY

The IC-701 can be remotely controlled via the new optional RM-3 computerised remote controller. This unit includes scan, duplex, memory and tone functions plus a touch-tone pad with digital readout. You can select frequencies and automatically change bands with this CPU controlled accessory.



### CONTINUOUS OPERATION

The IC-701 features continuous operation with a full 200w. pep or 200w. CW input on all bands and all modes. No need to worry about timing key-down operations as the IC-701 is designed to handle the maximum power continuously! If the heat sink starts to warm-up a built-in fan automatically switches on. If a temperature danger point should ever be reached the fan doubles its speed and the digital display flashes to tell you to quit transmitting!

### NO TUNING NECESSARY

Just select the required band and frequency and start transmitting!

### ALL SOLID STATE

While the others are still fooling around with valves, ICOM have produced a solid-state HF transceiver including protected transistors in the final.

### CROSS MODULATION MINIMISED

Cross modulation—a fact of life with some rigs—is minimised with the double balanced Schottky diode mixer used for both transmit and receive.

### SMALL ENOUGH FOR MOBILE

The IC-701 is extremely compact with dimensions 111 by 241 by 311mm. (HxWxD) and weighs only 7.3kg. No more need to struggle with heavy rigs impossible to mount under-dash!

### FULL METERING

The front panel meter includes swr, power, ALC, compression and collector voltage/current measurement.

### DESKTOP MICROPHONE AS STANDARD

A high-quality condenser electret desk microphone is included as standard equipment with your new ICOM IC-701.

### VARIABLE POWER OUTPUT

In CW and RTTY modes power output can be continuously varied from zero to maximum 200 watts input. SSB output can easily be adjusted for novice use.

### IDEAL FOR THE CW AND RTTY BUFF

The IC-701 includes narrow CW filter as standard plus semi-break-in and sidetone facilities. The IC-701 has switching to select either narrow or wide RTTY shift rates.

### THANET TECHNICAL BACK-UP

Your new IC-701 from THANET comes complete with the THANET one year warranty plus technical and spares support THANET staff have been factory briefed on the service and alignment procedures.

### PLUS—

- ★ Separate front-end RF stages using dual gate MOSFETs for each band, providing optimum performance.
- ★ Diode matrix to define band edge parameters.
- ★ Operation on all bands 1.8 thru 30 MHz includes WWV.
- ★ Modes include USB, LSB, CW, CW-N (narrow), RTTY.
- ★ Unique ICOM bandpass tuning.
- ★ VOX, Semibreak in CW, RIT, AGC, effective noise blanker.
- ★ Built-in speech processor using advanced circuitry.
- ★ All filters built-in.
- ★ Automatic front panel light dimming to suit ambient light conditions.
- ★ Separate VCOs for each band to reduce spurious and birdies.
- ★ Receive triple conversion.
- ★ Built-in DC power supply, external AC PSU with speaker.
- ★ Full line of matching accessories to come.
- ★ Internal speaker.

**COMPARE THE IC-701 WITH THE OTHERS!  
And see what extras you DON'T have to buy.**

**Complete with AC PSU as shown £999 inc. VAT  
IC-701 alone £855 inc. VAT.**

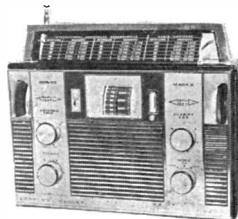
THE ULTIMATE! IC-701 state of the art

**THANET ELECTRONICS for** 

# STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, TELEPHONE  
LEIGH, LANCs WN7 3EA (0942) 676790

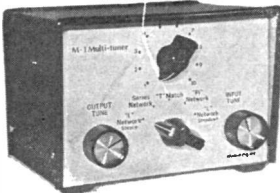
# G3MCN



Midland and North West distributors for the XCR30 unique crystal controlled receiver. This receiver is designed to provide precision frequency tuning over the full short wave spectrum up to 30 MHz with exceptional frequency stability for both AM and SSB. Separate tuned whip antenna.

XCR-30 FM Receiver with FM band 87-5 to 101 MHz.

£170.00 inc. VAT



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

Price £17.00 including VAT and Postage

**Mk. 2 VERSION,** £23.50. Covering 550 kHz to 30 MHz. Send S.A.E. for full information and Test Report.

See Test Report in February "Short Wave Magazine".



**YAESU FRG-7 RECEIVER.** Mains and battery operated receiver 0.5 to 30 MHz. Solid state. Advance circuitry offers excellent performance for the DX listener at a moderate price.

Yaesu FRG7000 Receiver ... £368.00  
Yaesu SP101B Speaker ... £19.68  
Yaesu Desk Microphone ... £22.00

TRIO		
TS520 Transceiver	£693.00	
VFO820 External VFO	£120.00	
DGI Digital Readout	£136.00	
DS1A 12v. DC Inverter	£42.00	
YG88C 8 pole CW Filter	£37.00	
SP820 Speaker	£38.00	
TS520S Transceiver	£215.00	
VFO520 External VFO	£101.00	
DGS Digital Display	£134.00	
E559D Receiver	£433.00	
TS700S VHF Transceiver	£580.00	
SP70 Speaker	£20.00	
TR7010 VHF SSB Transceiver	£189.00	
P55 Power Unk Clock	£189.00	
TR7500 VHF Transceiver	£225.00	
MB1A Mobile mount	£10.00	
R82200 GX 10 watt mobile PA	£45.00	
TR8300 UHF Transceiver	£244.00	
R300 General Coverage Receiver	£184.50	
AT200 Antenna Tuner	£93.00	
MC50 Desk Microphone	£27.00	
H55 Headphones	£23.00	
TR7400 2m. 30 Watt FM Transceiver	£334.00	
TL922 Linear Amplifier	£763.00	
MC36S Microphones	£13.00	
DM800 Dipmeter/Wavemeter	£51.84	
PLB30M 50 ohm 40/120 Watt D. Load	£28.08	
PLB31M 50 ohm 200/500 Watt Dummy Load	£54.00	
TR2300 FM Transceiver	£220.00	
Crystals and accessories from stock		

<b>ANTENNA SPECIALISTS</b>		
ASPR332 1/2" Gutter Whip	£8.10	
ASP201 1/2 wave Whip	£3.26	
ASP677 2m. Whip	£16.75	
ASP2009 Standard Whip antenna	£10.12	
K220 Magnetic Mount	£7.87	
K220A Magnetic Mount	£7.57	

<b>DRAKE</b>		
SSR-1 Solid State Receiver	£150.00	
TV3300 Low Pass Filter	£18.00	
Most Drake models available to order.		

<b>HY-GAIN</b>		
I2AVQ 3 Band Vertical	£39.94	
I4AVT/WB 4 Band Vertical	£56.19	
I8AVT/WB B Band Vertical	£81.45	
BN86 Balun	£14.06	

<b>F.D.K.</b>		
TM56B VHF Monitor receiver. 230V AC or 12v. DC operation. 12 channels plus 4 on Auto Scan. 10 channels fitted. PRICE (inc. VAT)	£103.40	

PALM II Transceiver	£ 149.00	
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<b>MICROWAVE MODULES</b>		
MMC70 4m. Converter	£20.25	
MMC144/28 LO 2m. Converter	£22.50	
MMC32/28 70cm. Converter	£27.00	
MMC1296/28 23cm. Converter	£31.50	
MMC1296/144 23cm. Converter	£31.50	
MMV1296 23cm. Tripler	£33.75	

MMD050 50 MHz Counter	£66.96	
MMD500P Prescaler	£27.00	
MMD500P 500 MHz Counter	£85.32	
MMT432/28 70cm. Transverter	£133.88	
MMT432/144 70cm. Transverter	£169.88	
MMT144/28 2m. Transverter	£88.87	

<b>G-WHIP</b>		
Tribander Helical 10-15-20m.	£19.68	
LF Coils for Tribander	£5.62	
LF Telescopic Whip Section	£2.25	
Basemount standard type	£3.37	
Multimobile 78, 10-15-20m.	£21.08	
MM Coils	£5.91	
MM Telescopic whip section	£2.25	
Flexiwhip basic 10 metre section	£11.24	
Basemount standard	£3.37	
Ball type Basemount	£5.00	
Coils for Flexiwhip	£5.91	
Base thread adaptor USA/G Whip	68p	
Extendard 40"	£9.56	

<b>OMEGA</b>		
TE-701 Antenna noise bridge to 30 MHz	£23.76	
TE-702 Antenna noise bridge to 300 MHz	£29.70	
<b>ROTATORS</b>		
AR30	£46.13	18p metre
AR40	£53.54	UR67 65p
CD44	£106.87	300 ohm Ribbon
AR22	£48.38	10p metre
KR400	£96.00	75 ohm low loss 18p
DR7500	£105.00	

<b>JAYBEAM</b>		
5Y/2M 5 element yagi	£7.70	
8Y/2M 8 Element yagi	£10.00	
10Y/2M 10 element yagi	£21.31	
PBM1/4/2m. 14 element Parabeam	£31.16	
5XY/2m. 5 element crossed yagi	£15.97	
8XY/2m. 8 element crossed yagi	£19.91	
10XY/2m. 10 element crossed yagi	£26.32	
Q4/2m. 4 element Quad	£16.31	
Q6/2m. element Quad	£21.71	
D5/2m. 5 over 5 slot fed yagi	£13.61	
D8/2m. 8 over 8 slot fed yagi	£18.22	
UGP/2m. ground plane	£7.03	
NBM48/70cms. Multibeam	£21.65	
NBM88/70cms. Multibeam	£28.96	
TAS 1/2" 2m. Whip mobile	£13.05	
C5/m. Colinear...	£30.93	
CB/70cm. Colinear...	£39.37	
D15/1296 23cm. Antenna	£23.06	

<b>SRX-30</b>		
Solid state Receiver 550 kHz-30 MHz	£175.00	
<b>BARLOW WADLEY</b>		
XCR30 Solid State Receiver	£150.00	
XCR30FM Solid State Receiver	£170.00	

<b>TEK</b>		
5D Multi Band Trapped Dipole 80-40-20-15-10 metres. 50 ohm fed. 23 metres in length. This is complete, not a kit. High quality Traps and wire. 2kW PEP rating.		
PRICE (inc. VAT)	£50.00	

<b>WESTERN</b>		
Western Alumasts and Beams now in stock.		
Bantex Magnetic Base Mount	£10.40	
1/2" glass fibre Whip	£8.44	
1/2" stainless steel Whip	£9.40	
UHF stainless steel Whip	£8.63	
Standard base mount	£2.70	
<b>ACCESSORIES</b>		
Single Meter SWR wall mounting	£9.50	
Single Meter SWR desk type	£9.50	
Twin Meter SWR desk type	£12.50	
EK150 Katsumi Electronic Keyer	£60.75	
Hymound Morse Keys	£8.10	
Nye King 312-001 Morse Keys	£6.75	
Nye King 312-002 Morse Keys	£7.88	
Nye King 312-003 Morse Keys	£8.45	
Standard Type Morse Keys	£3.00	
3 way antenna switch	£5.75	
6 way antenna switch	£16.85	
HP3A High Pass Filter	£2.95	
Plastic Antenna Insulators	18p	
PL259	31p	SO239 45p
PL289	75p	Cable reducers 15p
Twin Keying Paddle	£25.00	

<b>SECONDHAND EQUIPMENT</b>		
KW1000 Linear Amplifier	£265.00	
Barlow Wadley XCR 30 Receiver	£110.00	
Eddystone 940 Receiver	£145.00	
Eddystone 888 Receiver	£60.00	
Yaesu FR101D with extra crystals	£425.00	
Yaesu FR10D digital with extra CW Filter	£495.00	
Drake TRAC with MS41AC PSU	£450.00	
Yaesu TR7500 Transceiver	£195.00	
Swan 144 DC Converter	£20.00	
TRIO TS700S Transceiver	£325.00	
Barlow Wadley XCR30 Receiver	£120.00	
Heathkit SB601 Monitorscope	£95.00	
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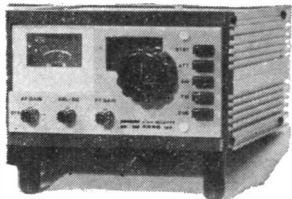
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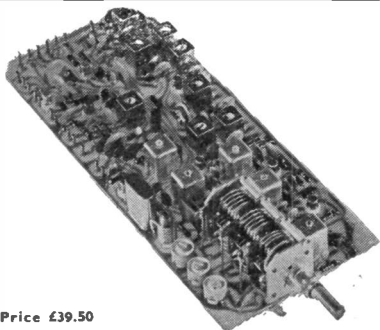
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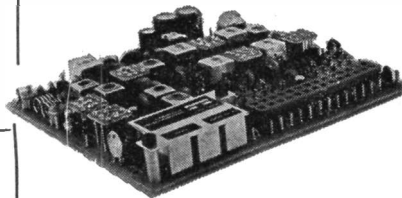


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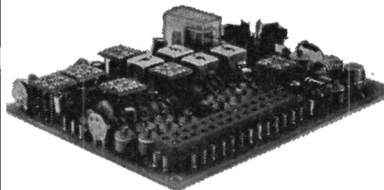


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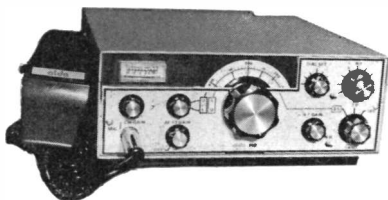


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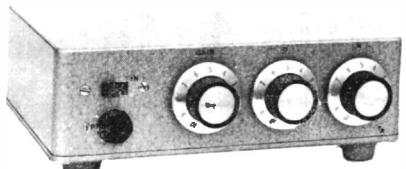
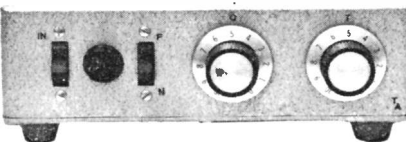
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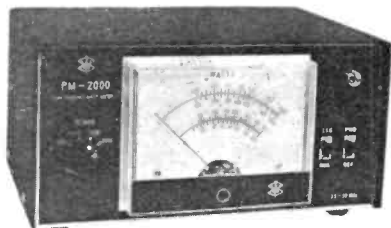
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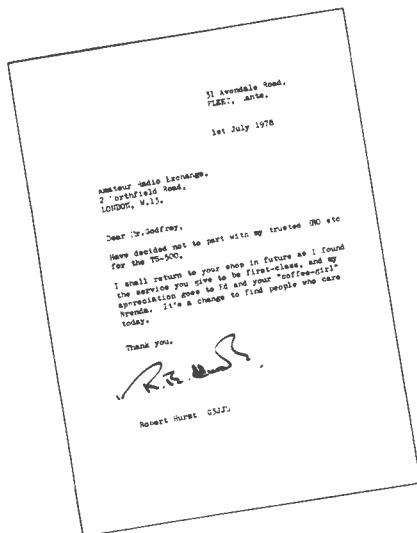
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# SHORT WAVE MAGAZINE

(GB3SWM)  
ISSN: 0037-4261

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Vol. XXXVI                      NOVEMBER, 1978                      No. 421

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**Editor: PAUL ESSERY, G3KFE/G3SWM**

**Advertising: Charles Forsyth**

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The  
**SHORT WAVE**  
Magazine

EDITORIAL

**R S G B**

'QTC' in the September issue of *Radio Communication* carries a reply from the RSGB to the editorial in the June issue of *Short Wave Magazine*. The Society states that the fault over the non-arrival of *CQ* magazine to British subscribers lies entirely at the door of *CQ*, as they had failed to notify the Society of a policy change to 'payment with order.' This is indeed a reasonable reply.

However, as we all know, 'the facts' of a matter are always very hard to unearth, and it does still seem strange to us that *CQ* should publish something of this nature if they knew it to be such a gross distortion. But if the truth is as the RSGB has it (we cannot prove otherwise) then we accept it wholeheartedly as just that.

It seems that we have to put on record once again that we are *not* 'anti-RSGB': such a position would be, at best, myopic (the editorial in August's *S.W.M.* is hardly anti-RSGB). As a completely independent journal, in fact our attitude lies in quite the opposite direction: a healthy, well-organised and efficient national society is to the benefit of *everyone* connected with Amateur Radio in the U.K., including ourselves. It follows, therefore, that from time to time we see it as our right and duty to comment on—and criticise if necessary—matters relating to the Radio Society of Great Britain.

*Ed. Stevens*  
G3KFE.

# COMMUNICATION and DX NEWS

**E. P. Essery, G3KFE**

## The Mail

**L**OTS and lots this time, or at least it looks like it! The feeling aroused during the collation of it is that the bands have been pretty good for much of the time, and indeed by the time this piece comes to be read we should be well into the autumnal lift conditions, if not almost through (depending on your outlook and favoured band).

On a totally different tack, one of the first things the writer reads in *Radio Communication* each month is G3FKM's DX column—and we must congratulate John on his appointment as HF Manager for the RSGB. He should bring a welcome breath of fresh air to activities in this area.

## Top Band

Firstly, what happened to MCC? Well, it seems that possibly a change from Top Band might be appropriate, as the number of entries to MCC on this band, having peaked at well over 100 in past years, has tailed off recently to a quarter or less of that total as interest and fashion brought "everyone's band" from 1.8 MHz to 144 MHz and FM. So we shall be thinking up something else for 1979.

Quite a lot of people, though, are about on Top Band of late; for example Dave Sharred G3NKC who has taken his transceiver back to the University in sunny(?) Manchester. Before he left Birmingham the Top Band score looked quite good, as the table indicates, and there is an implied threat to enter a second score from Manchester which we would love to see fulfilled.

G3PKS (Wells) mentions that he has a regular sked on Monday evenings with G3TWO, GW3UTE and G4ASK around 1900 and 1880 kHz, with pauses left for any potential breakers. The device is the Heathkit HW-101 which has undergone minor surgery to get it to listen to Top Band, while a whiff of its RF is taken away to an outboard PA giving excellent reports from the stations which hear it.

We have a promise of both CW and SSB activity this winter.

As for your scribe, there is the wherewithal in the shack for CW or AM but no SSB or aerial; various experimental replacements for the one lost have really not been all that hot.

G4GIE (Gt. Moulton) sticks to his QRP last, but has added a Codar AT5 at ten watts input, the Joystick at 18 feet, and an FRG-7, which so far have netted him QSO's with G4GKC, G2ACG, G3WPG, GM3PFQ, DJ9NH, G3NHC, OK2SAW, GM3TMK, G3SFT, OL5AWJ, DJ2RE, G3JMJ, G4ASH, DJ8WL, OK1DFW, OK1JDX/P, G4GIR, YU3SE, G4GTF/A, G4FWY, and OK1DFF/P. Far the most interesting was the one with GM3TMK which lasted almost two hours, which should do improving things to the muscles of the keying hand!

G2HKU (Minster) mentions that he hears EP2WR will be on 160 this winter, and that amateurs in Russia are pressing for Top Band facilities. For himself, there was the usual PAØPN on SSB, plus CW to GM3TMK, GM3PFQ, and GM3LWS.

G4AEJ (Birmingham) says the activity on Top Band in that neck of the woods is quite high, although Len himself hasn't been able to do all that much. However a prize Gotaway was registered when, on August 26 at 2200z, the 579 signal from HFØPOL calling "CQ G" was noted, the frequency being in the region of 1845 kHz.

A new reporter to this column is G4GFN, who also hails from the Birmingham area; a Vespa Mark 2 and AR88 are the weapons, with an end-loaded 135 feet at about 35 feet above ground, the other feed-point being an earthing system comprising a couple of earth stakes and about 50 feet of buried wire. Simon has an entry into the Tables and seems, with G3NKC and G4AEJ and Co., to have been reviving interest in Top Band—the more the merrier!

## Ten

A spot of horse-trading recently brought your conductor the base mount and bottom section of a G-Whip—a device which by itself is said to be resonant on Ten metres, so that with an Eighty or Top Band loading coil on, one can gain two-band operation; and he also found himself with an odd collection of loading-coils that would fit (mechanically, that is) plus a top piece of extendable whip. Thus equipped, we set off to take the junior op. to a badminton trial at Hitchin thinking, naturally, that a spot of /M with the TS-520 on various bands would while-away the three hours or so before we could get on the road back home. Alas for our hopes, as the day was one on which there was no significant activity on Ten to be heard, and the trusty GDO didn't want to play properly on the square-wave "240-volt 50 Hz mains" which was all we could feed it with; but 14 and 21 MHz look to be fine once we get things "on the nose."

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

December issue—November 2nd  
January issue—November 30th  
February issue—January 4th  
*Please be sure to note these dates.*

G3NOF (Yeovil) notes that there have been many openings to the Pacific area in the mornings, and in the early afternoons there have been openings to P29, VS6 and SE Asia. W's have been noted from 1130 till 2030. SSB QSO's were made with FG7TD, FR7BE, FY7BI, JAOMWV K5FJ, K7GLL, (Wyoming), K7IDX (Washington), HS1BG, N5GJ, N7AGL (Wyoming), P29NKV, P29PN, TG5NW, VE7CML, VS6FE, W4EV/VP9, W7RM (Washington), W7YU (Arizona), WAØJRZ/KH2, WDØEVD (S. Dakota), WDØHXF (S. Dakota), and 5B4MO.

Once in a while we hear from G3ZGC/MM, aboard *Esso Scotia*, this time from Capetown. Richard

managed quite a few QSO's on Ten; from the Caribbean right to St. Helena the W's were appearing daily, with occasional openings to Europe and beyond. At 2020z on August 17 G3JHK was 59, but a sked for the following day was not too good—G3JHK was there but extremely weak. On August 22, a dead band was attacked with a CQ call which brought back 9K2FP who is an ex-G. European signals reached a peak when Richard was west of St. Helena, at which time the band seemed to contain nothing but G's and W's with a few other EU signals—this was August 27, at which time between 1350z and 1600z GW3MOP, G3XUL, G3IY, G3FUI/M, GW4DWN, G4BHE, G4FRD, and G5AQZ were all worked at good strength; but from then until the time of writing no other G's were heard.

A nice letter comes with an account of his "first few days" from G4HKE (Huntley, Glos.). It seems that Ray was all tied up to go on holiday for three weeks in VP2L and was hoping to get his "ticket" before he went—no luck. However, arrangements were made for a landline call to be made to him in VP2L just as soon as it was known what his call was to be. G4HKE had already got a couple of local amateur QTH's, and hoped that one or other of them might agree to keep a sked with UK. Of course, what happened was a good dose of the old-time ham hospitality, with sincere invitations from all over the place. The first QSO, it was hoped, would be with G4CHD who took the R.A.E. course, but while waiting for the moment he couldn't resist a quickie with G8PX (the sked in fact was with G4CHD's XYL, Mary G4GAJ). The second time the sked was run, G4CHD had three of the classmates in the shack and G8PMA, G8PNH, and G8PZD all got a taste of the DX "thing." The contact was from the shack of VP2LCT who came home to find his 90-foot tower down, and so shinned up his 70-footer to lash a vertical up top just so the sked could be kept! A lesson to be learnt right at the start of one's career is to be at the sharp-end of a pile-up, and to find it so difficult to QRT. SSB QSO's from VP2L included LA9GV, C6ACA, W6HFB, G3GIQ, SM2BFL, XE1XR,

VE1HH, I1ENN, 8R1X, 8KBAR, VE3BWY, 4X4JU, YU1OIZ, HK3SO, UK3DAH, YV5AE, KP4DHY, HI8XPO, HR1FVA, HK1SH, HP1GO, OH2VZ, and ZS4JB. Since getting home the Rex DG100 rig has been fired up into a dipole at 25 feet, with no pile-ups, but among the QSO's were VP2LDF.

A note from G2BJY (Walsall) indicates that he has turned to 28 MHz CW only, and conditions have been pretty fair with such as AE4X, JK1IYM, JH1BBJ, KA9BWR (a novice from Illinois), ST2SA, UA9AEH, and then a gaggle of UA9's all from Ufa: UA9WRO, UA9WCK, UA9WCZ, and UW9WI; all on the same day UAOACM, UA9XDB, UK9ADV, UK9UUU, RA9XAA, 9H1R and 9H1FA. No VE's or W1-3 even heard!

D. Whitaker (Harrogate)—of the ten-metre SLP's last time—has now heard some 161 countries on the band in 1978, and reckons there is more activity on the band now than there was in previous sunspot peak years; this may be just the greater number of licences in issue worldwide or, more likely, the modern boxes are nothing like as deaf as their predecessors on the band!

F9UO (Verrieres le Buisson) responds direct to a request from G3CED to pass on his DX. Rene has a TS-520 into a Joystick, and he reckons conditions for the past few months have been in the doldrums; and his own activity somewhat down since he took on a part-time job which can mean anything from 5 to 20 days a month of 8 a.m. till 7 p.m.

We have a letter from S. B. High of Flat M9, 122 Marsala Road, London SE13 who has been an SWL since 1921 and still, at 72, manages to do a remarkable lot, including Old-Time dancing classes and a part-time job—which leaves only early morning and late evening for listening. Now, the point of mentioning him here is that he feels R.A.E. is out, and we wonder if a few readers from among the locals will show him just how easy it really is!

Just before he left home for Manchester at the beginning of term, G3NKC took a quick peek at the HF bands, and on Ten this resulted in a VK6 and C5AAD to remind Dave while he studies.

"It's been spasmodic activity this month," says G3PKS; he offers W9YWY, SM5CLE, UK4LAM, UF6QAG, ZS7WT for whom the hunt had been on for some time, W4WV, AA7C for a nice ragchew from Oregon, UK6AAJ, and WB2MAN. In a final note Jack wonders about the BW2SQ and the KA6ANB/SD heard calling CQ with no takers, and concludes the smell of fish put off the rest of the world!

## 21 MHz

G3NOF mentions a few morning openings to VK/ZL, but not a lot of JA's, although W's have been around from 1100 right through to the early hours. SSB dealt with CE9AT (S. Shetland), CEOAE (Easter Is.), CT2BB, DL2RL/YV6, G3MRR/W6, HSIWR, J3AG, JA1PIG/PZ, K6JA, K6SMF, K6TS, K7NN (Arizona), KH6BZF, KL7CD, ST2SA, STØRK, VE4SW, VE7ANF, VP2MAY, VP2VEM, W6LZV, W6OCU, W6SUN, W6UL, WD5BXP, WD7ANH (Utah), W7MAF (Montana), W7TYN, WA6EEZ, ZS1FP, and 5Z4RH.

It was all CW on 21 MHz for G2HKU, who mentions his contacts with UL7XE, UA9CAL, EP2WR, W6TLA, and W6OV.

Nice to hear again from G4GIE, and his HW-8 at two watts input to a Joystick at 18 feet; this rig worked out to UA3IM, IT9ULN, VE3ARN, YV1WD, and YO1BDN.

G3PKS spent some time on September 4 on the band, and found it just about open to the whole world. JA's by the bucketful, and a weak N4 was heard during the morning, the latter possibly long-path; in the afternoon stations worked were JA4DZ, AD6C, G4AMJ/VP9, WAØDGV, and UL7PBI.

In his last fling before returning to Manchester G3NKC tried 21 MHz, which yielded him several JA, VE7 and W7 stations to make a nice finale.

While G3CED/G3VFA (Broadstairs) only found time for the odd EU contact on 21 MHz, he coined a new word to account for his short log—"hectic-ism."

G4HJH operates from home in Keighley, but spends most of his time at Lincoln College Oxford. The rig is an FT-101, through a

KW-107 ATU, and on up to a multi-band dipole. With this, the very first day raised JA3API/MM, and 21 MHz after the first week saw him tangling with EP2PE, ZE7JW, KØAX/DU2, and VK5MQ in Woamera.

For G3ZGC/MM, 21 MHz seems to have been quite good but, sadly, usually at times when he is working; it is rather interesting that conditions approaching the Caribbean were far better than conditions once there.

G4GEE (Coventry) reports on the activities of the special event station set up at Stoneleigh, Kenilworth, in conjunction with the Town and Country Festival. The best of the 21 MHz crop was probably PY1ZBJ/PY8 who told the surrounding group that he was up the Amazon. This station must have been quite a shop-window for the hobby, with some 116,000 visitors.

#### Miscellany

Those looking for QSL cards from the various K5YY operations should be aware that since his return to the States he has been "under the weather" to quite an extent, and doubtless will have to get fully fit before he can tackle the QSL chore. So—don't moither him with duplicate cards or letters!

The Mellish activity: we know at the time of writing that they got there—a king-sized pile-up calling VK9ZR (noted by the writer and also by G3NOF on SSB). The meat of the operation, though, was to have been CW on this occasion, which is only the second time the place has been active.

We have a long letter from VE6AUV which was addressed to Justin Cooper but we felt was possibly of equal or greater interest in this piece. Norman has been over here on a month's visit, and brought along his Sanyo CF-1500 receiver complete with crystal calibrator and an earpiece for 0300 listening. With this, he was able to compare the European scene with the one back home, and these are some of his conclusions. Firstly, and maybe most important, is that just about all he heard from here was either DX to him, or were available here in bigger quantities—of course he rapidly latched on to the early-morning openings. A second thing

noted was our eternal scourge—the assorted UA, I, HA, and OK stations with long CQ's and just one call sign before a quick listen and repeat performance; usually there is some useful DX near the frequency or underneath it! But of course the types who make long CQ's don't have sharp-eared receivers, and VE6AUV cites the case of an I station who worked a JA and then called "CQ JA" while no less than 4 JA's calling him were just not noticed! Norman reckons the noise levels here, man-made and natural, are both lower than in the States (blimey!) which is one of the reasons for the wide-spread use of beams and QRO over there; and of course they have to battle it out from right alongside those Californian Kilowatts, so strong-received signals are needed if the DX is to be heard. Just to prove to himself that the long CQ's are a "thing" over here, a listen on his return convinced him that it just doesn't happen over there, *but* tail-ending is far more common among the W/VE chaps.

This very weekend of writing there is some more H5 action, this time from Baja Bophuthatswana, the southern enclave; for the moment it just counts as H5 but in the future it may well be that the southern enclave may rate separate country status.

The lift in conditions is such that Lloyd and Iris Colvin are about to look at things again; a six-month trip is in the offing, and of course the OT's will all know that YASME QSL's go to Box 2025, Castro Valley, California 94546.

Those who are gasping for a 9LINP QSL card will have to wait a little; at the moment Norman is on leave, his things have been transferred to Ghana but he will not be there for some months, having first to travel round some other African countries for a while. The arrival in Accra is timed to be around mid-1979 at which moment, with any degree of luck, there will be time to dive into the pile of QSL's instead of operating his 9G1DY call.

Our old contributor G3LZQ has now, we hear, parted with his ZS6ZE call in favour of EP2WR, his QSL Manager being G3JXE. In the same packet, up comes a letter with a note that Stephen Lowe is now

EP2SL, and G3XCS is his QSL Manager; Colin also sent a copy of the membership list of the Radio Society of Iran, which makes quite interesting reading!

#### Twenty

The thirsty types waiting for Desecheo to give them a new country can relax a bit, as we understand the environmental questions are not going to be resolved in a moment; meantime you might like to listen on Twenty where you might hear a phoney BY1MAO. But if you hear another one, just recall that there is more chance of a BY than there is of a ZA, and indeed some limited activity from BY looks to be not impossible.

Twenty opens around 0630z, rather later than in earlier years, says G3NOF, who found VK/ZL and some Pacific stuff at this morning session; but Don doesn't seem to have thought a lot about it because he mentions QSO's with AF5D, CO2JA, DL2RL/YV6, JA1WVK, KA1NC (Marcus), KH6GAN, KL7HR, KX6BU, P29JS, VK's, VP2EKK, W7ZGA/KH2, several ZL's, and 4UJUN in the United Nations Hq. in New York.

G6TC (Wednesfield) reckons that Twenty has lost a bit of its sparkle of springtime, but he managed SSB with VK5CY, VK3XX, and VK6KK, while the CW went out to W6, W7, VE6AY1, VE6CJG, YV1AD, VK3AJY, VK3AGN, VK3BWF, VK3MR, VK3VF, and VK3XX.

Reverting to that BY1MAO, he was heard at 589 on August 21, 0650z on 14050 by G4GOF (Hastings), and giving name Chin Liu from Pekin—G4GOF has exchanged his earlier gear for a nice shiny FT-101E, and had to give it a try-out! Our own view about any of these is that one should work 'em first and worry later—it just may turn out to be OK, and if you'd turned up your nose at it, you would at the least feel a bit daft!

G4HLN (Bristol) is another first reporter to this column, and at the moment is awaiting a new stick to be delivered; meanwhile he has a dipole in the approved direction running from the house guttering at one end to a corner of the greenhouse at t'other, and with an HT-32A single-bander to activate it. Apart from the



Woodpecker Pest, which has been more active of late, QSO's have been had with C31OZ, U5ARTEK, HI7XWL, I1GCY / MM / 9V1, KV4AA, C6ACA, 4X4HZ, and 4U1ITU, plus a gaggle of IZ's and W/VE callsigns—but Lawrence laments the long list of Gotaways! Not to worry, they'll all go in the log in the end and after all, if you work everything in the first week the rest of your amateur radio career would be an anti-climax!

Readers may have noted the absence of a report from G4DMN (Wirral), the reason for this being that Richard has been to VE/W. Richard enclosed some pictures of the aerial arrays at W2HCW; Arnold has a four-element rotary array at 120 feet for 3.5 MHz, which has a boom of 70 feet and ninety-foot elements—some "mini" beam! In addition there is the Telrex "Christmas Tree" which comprises 10-over-10 for 28 MHz, 8-over-8 for 21 MHz, 6-over-6 for 14 MHz, and a three-element beam for 7 MHz, all mounted on a rotary base at 120 feet. Now we know why some DX has a big signal in UK!

F9UO next, and his Joystick and TS-520 may have been a bit unexercised this month, but that didn't stop them working VK3NR, UV9CO, VK2QL, ZL1MT, N2MD, UA9OGK, W6OV, JA1KYE, UA9CCE, K6KII, UA9LU, and W1EW, plus of course sundry Europeans. Rene comes back to the reporter who wondered why so many French stations are heard calling "CQ F"; basically it is an award called DDF for working the various departments (about 97 of them) and another (DUF) for working the ex-French colonies.

It seems to be all mentions of EP this month; now it is G2HKU's turn, to pass on the message that EP2WR may be on Top Band this coming winter. Other QSO's for G2HKU included such as SSB with ZL1VN, ZL3SE, ZL3RS, ZL3FV, KL7JW, VK5QG, and VU2RAC, while the CW made it to UVOESN, TA2BK, VE3AGH, KL7HF, VK7ZZ, KL7PJ, ZL1NW, ZL3IS, ZS6QU, HC2AO, VK2AMB, JA8APN, and UD6DLJ.

G4GIE can poke the input up to three watts on Twenty, and at this level the Joystick got him to W2, W8, UA9 and sundry Europeans.

## TOP BAND COUNTIES/COUNTRIES LADDER

Call	AM	CW	SSB	Countries	Total
G3NKC	22	50	91	11	174
G4FJU	12	40	68	10	130
G4AEJ	30	14	21	4	69
G4GFN				3	54

Starting date January 1, 1978. Score one point for an SSB QSO, two for a CW, three for an AM QSO; no cross-mode contacts except on Phone, where AM/SSB is permissible and rates two points, scored in the column for the mode the station was using. Thus the AM station scores two in the AM column, and the SSB station two in the SSB one. Each county can be worked once on each mode.

G3PKS, having said the band was in good shape, goes on to remark that when he *personally* inspected it, there wasn't much of interest about!

That seems to about sum up the log from G3CED too, not having worked many stations on the band, and those mainly Europeans—we suspect George finds it too easy!

## 3.5 and 7 Mhz

Space closes in on us again. G6TC says that 7 MHz is definitely down on this time last year, and adds that the boys with the long lists of DX on the band *don't* report! Ted used SSB for YV5CHL and ZL4KE, but the key was enough to deal with all W districts, except the elusive Sixes, VK2AGB, VK2OI, VK3BRC, VK3IM, VK3MR worked both long path and short path, VK3XG, PY2DEH, and OA4IG.

If you hear a GB on Eighty, it'll likely be GB3WM which is the call granted to the Wireless Museum at Arreton Manor in the Isle of Wight of which G3KPO is the Curator; they will have SSB and CW on all bands, plus FM on VHF through the GB2SN repeater.

G2NJ mentions Eighty where he makes it a practice to seek out the QRP chaps and the /MM. Perhaps the most consistent /P in the country, says Nick, is G2CAS of Scarborough who goes out whatever the weather or time of year, and in the recent weeks has been heard from Backwithshaw and then Masham. A very good QRP signal noted was that of G4HGM of Walsall starting at one watt input and dropping down to 500 milliwatts. Another good /MM was 4S7WP/MM who was lost under the QRM and QSB while working continentals, and a good QRP signal was that from G4BZW of London.

G4GIE netted a few EU's on 7 MHz with his HW-8, but only one attempt on Eighty which was a sked with G3CED; George was not to be found so a QSO was made with ON4SK, during which the G3CED ears noted the call and moved on to the frequency. The QSO ended as a 3-way with the ON station doing a superb job of passing the information over in both directions while G3CED, who had begun at 579, gradually disappeared in the fade.

G3PKS simply remarks that on the one or two times he has been up at daylight or just before, W's have been heard in reasonable quantities, on Eighty, while 7 MHz has given its share of both DX and inter-G stuff, even though Jack himself only worked N4DB, PY5WSS, NAYM, W3DF, YO3AWS/MM, K8JK, and K4VJ.

Eighty and Forty were the two main bands worked by G3CED; the times used for both bands were such as to ensure a goodly selection of inter-G contacts and some EU continentals all at good strength.

G4HJH had that wonderful thrill, his first-ever QSO, on Eighty with G3XKB, followed by an hour or two meeting the locals, before the QSY HF to get after the DX.

People are drawn to the shack for a variety of reasons—G3ZGC/MM was awakened at three in the morning by a fire-alarm; when the problem had been dealt with, the band was found to be thick with G's at well over the S9 mark from near the mouth of the Amazon!

## Finis

For this time at least; the deadline is as shown in the box, and should be addressed to your scribe, "CDXN," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. See you in the pile-ups!

# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By Justin Cooper

WITH many of our pages taken up with advertisements for black—or maybe shiny!—boxes at astronomical prices, it is perhaps useful to remind the newcomer that he does not *have* to lash out his life-savings to get started! In fact, this old scribe has a shrewd suspicion that to go straight to an up-market job is definitely a bad thing in the long run. So having said this, and accepting for the moment that homebrew is the only acceptable answer to low-cost listening, how should one set about it?

If one has access to workshop facilities, fine; but we will look at it from the “kitchen-table” angle, and assume an absolute minimum of tools. Perhaps the biggest stumbling-block is confidence, and the second largest the thought of metalwork, with doubts about the circuit wiring to follow. Let’s take a look at these problems: the first one can be dealt with by deciding that an initial effort shall cost so little that a failure can be thrown away and forgotten; for the second, metalwork can be largely eliminated by the use of wood, or plastic food boxes, which can be lined with ordinary kitchen-foil stuck in with an impact adhesive such as *Evostik*. If one leaves some overlaps, a tiny wood-screw through both layers of foil will make sure all pieces are in contact, and it oughtn’t to be too difficult to make the foil of the case connect to the foil of the receiver chassis if one is used.

Now to the circuitry. For a first try, take an existing circuit—“The Direx” on p. 100 of the April 1978 issue of *Short Wave Magazine*, for instance. Use some *Radiospares* “perforated sheet” and turret lugs—one sheet (Part No. 433-567) and one pack (Part No. 433-577) will cover several experiments, and they can be obtained from any local radio shop which deals with *Radiospares*. Alternatively, *Doram*—the “amateur” arm of the *Radiospares* concern—will serve by mail order, or you may have a local *Tandy* outlet or even someone in the local club who can tell you how-and-why to get your bits. Make the VFO first, and make it play—if you need to, no doubt a local amateur will help by letting you put your VFO near his receiver and “tweaking” it into the band. Now tack everything down to the board with a dab of *Araldite*, which should make it stable. Now build up the rest of the circuit, bit by bit, on the sheet, and check throughout that the connections are right—better, get someone else to do this check as well.

Next get the battery connected, the right way round, while the receiver is switched off (this condition should be adhered to whenever a battery is being changed, as it is not uncommon for the clip to momentarily touch the wrong way round). If it doesn’t work first time, go through it stage by stage: oscillator first, even though you’ve just got it going by itself (but is it going now?). Then you can try a pair of high-impedance phones across the junction C5/R6 to the junction C4/R3 for a signal: if this is OK—but don’t expect to hear other than the Big Ones as you tune VC1 at this point—you can go on to look at the volume control VR1. Go across the top and bottom of VR1 with the high-impedance headphones,

and try the effect of S2 closure if signals are still to be heard. If they aren’t, then since there was a signal at the earlier stage, the fault must lie between the points where the first test was satisfactory and the second unsatisfactory. If you look between the junction C7/R8 and junction TR2-emitter/C4, you will be able to establish whether the fault lies in the circuit of TR2 or of IC1; the latter case when the signal is heard, the former when not so. Finding the fault is merely a matter of substitution at its crudest, the assumption being that any component in the dud area or any connection can be at fault.

“Grope and hope” sums it up. (Don’t forget your headphones may be u/s or the aerial not connected!).

If all is well up to this point, but output is dead, the fault has to lie in the circuit of IC2 and the same advice applies. Finally, as the reverend gentleman did with his original, stick the boards into the box with *Blu-tack*, add knobs to the outside end of the shafts, label it all up with transfers or *Dymo* tape, and sit back and congratulate yourself!

### The Mail

Last time around several letters arrived after the deadline, which of course had to be held over to this month. Thus, where we have more than one letter from any particular reader we have bunched them all together.

*A. Twelves (Rhos-on-Sea)* has a total of three letters in this time, which brings him into the HPX Ladder, and adding various comments. Alan finds his home—like so many of us!—is not laid out on the plot with the SWL in mind, so that dipoles are more or less “out” as they must face the wrong way. Perhaps architects should be taught to remember those things!

*K. Steele (Littleover, Derby)* used to listen on Eighty, but now has changed his interest to DX. Listening is from 1800z to around 2100 on weekdays, with an overnight session at weekends if things are looking good.

On to *R. Jacobs (Margate)* who notes as a query a KN1 saying that he had this odd prefix because of “a difficulty with the licensing authorities.” One would suppose that is a good description to give of pirate status! There was a hang-up over there some time ago, but we don’t think this was one of the results! On a different tack, Bob uses the HAC two-transistor kit which cost him a tenner, with an outside wire for aerial; it can’t be bad if it yields some 532 prefixes in all continents of the world, some of which can definitely be classified as rare DX.

*J. Acton (Brussels)* finds it hard to meet the deadline because his issue takes so long to arrive, but he did manage to write and comment on the slow-motion drive idea we carried in this piece back in May. He himself has done something similar to an 840C, plus a calibrated slow-motion drive for its BFO. Both it and the home-brew gadget beneath, in the photograph he sent of his shack, are reckoned to be comparable to the FRG-7 which sits on the operating table—what a pity we can’t print colour shots.

Two letters from *R. G. Williams (Borehamwood)* both

cover HPX entries; the first one missed the bus but the second duly landed in time. All the prefixes were heard with a Trio 9R-59, unmodified, plus a Joystick and some 13 feet of feeder, all horizontal. The latter situation is reflected in the HPX entry, which has cleaned up Europe pretty well but not taken much DX (for which some means of getting the Joystick vertical will have to be thought up).

S. B. High (London SE13) wrote to comment about his experience with a triangle aerial within the confines of the retired person's self-contained flat in which he now lives, and to ask what he should read in order to make progress. He has been interested in "wireless" since he was a boy of 15, and back in those days was keen on building kits until the advent of mains-driven receivers in a house without electricity rather put a damper on things. We recommend either the RSGB or ARRL "Handbooks" for a start, and we rather hope that someone from the local club will bring him into the circle.

B. Musselwhite (Warminster) sent in a couple of letters, one of which contained a starter for HPX, and containing some quite nice DX.

### Congratulations

These are due to N. A. Phelps (Devizes) who has turned into G4HJA, accounting for his temporary absence from the HPX CW Ladder movements while he took up the books and studied. It is all the more pleasant to hear this, since we know that Noel has been an SWL since years back, longer indeed than your scribe.

Mr. and Mrs. Brooks (Loughborough) have also been at work—Dave already knew his electronics so he had to get *au fait* with the Regulations, while Judith studied the technical stuff; both passed, with no outside assistance whatever, an achievement in which both can take pride.

Our third batch of congratulations go to J. H. Sparkes (Trowbridge) who studied at Bath Technical College last winter and duly came out with the pass slip—now it is all-out for Morse and an 'A' licence.

Changing tack now, it is nice when we hear that someone has foregone another prefix because they couldn't be certain of their copy under the pile-up: this happened to H. M. Graham (Harefield) when he was after CE9AT on 21 MHz. A rather interesting topic is the comparison between the pre-war days and the post-1963 period when the bug bit again. Nine countries heard pre-war but not since '63 are Burma, China, Ifni, Pitcairn, Rio de Oro, South Shetland, Taiwan, Timor, and Marion Is. On the other hand, some 72 countries figure only in the post-war list.

Turning now to the letter from P. L. Shakespeare (Foulness) he now has the QSL card from VR4CF which confirms the hearing as being on the last day of the old prefix; H44CF heard the following day being the same station. That could raise an interesting thought if one QSL served to answer both reports! Peter is another who couldn't find his man under the wolf-pack, in his case 601FG was heard but at no time was it possible to hear him confirm his own call, so that is not claimed.

K. A. Burch (Plymouth) listened to a group using 5057 and 6999 kHz; one signed G9BJH/M1 at Stonehenge(!), another was G9BTG/M2 at Aldershot, while the base station didn't run to a callsign, just the name

### 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).

Spike at "the factory" in Reading. They went QRT at 1525z for a meeting at "the factory" at 1615-1630z. As fine a group of pirates as we have run across for a while, and we will lay a small bet that they weren't at the three places mentioned!

K. Kniveton (Kingswinford) has now joined the Dudley club, where he ran across G3ZPF, who was on the HPX Ladder back in the sixties. A start will have been made by the time you read this to the R.A.E. course at the local technical college.

B. T. Mackness (Dagenham) was one of those who got left out in the cold by the postman last time, but

we are glad the letter eventually arrived, as well as his next one.

No less than three letters from *J. Nicol (South Croxton)* indicate that he taught maths and computer work at Leicester Poly before an early retirement; the spark of interest in radio was touched off by son-in-law G3SHL, who left his station with Jim while moving home. Other family interest is there too, as daughter Sheena is G8OXY. Thus there is now an FRG-7, and a Mustang beam is up at twelve feet pending clearance of a planning application; and indeed a first exploration of the innards of the FRG-7 has been made to rig up a version of the modification outlined in the July issue by Ron Barker. This was a really *first* try, with even the art of soldering to *Veroboard* to be learned. Next it'll be a licence, we predict, knowing well enough that Jim is going in deeply, and has the backing to go with it.

Oddly enough the very next in the pile is a letter from *Ron Barker (Worksop)*. Ron refers back to our answer to S. Donnelly last time and adds his own feeling that the Q-Multiplier used in its *rejection* mode is quite useful. On a different tack, his FRG-7 now has a digital readout fitted, and using this in conjunction with a good—if ancient—signal generator, Ron has been able to carry out careful plots of the frequency response with and without the modification. The idea of using an extra slow-motion drive which we noted a few months ago was also taken up: ugly but efficient about sums it up, giving as it does a bit less than 20 kHz per turn, which is quite nice for tuning. The next move will be to put that extra drive out of sight behind the panel. On the operating front, Ron is a breakfast-time listener, and he reckons that VK3MO puts in a bigger signal on to the S-meter than any ground-wave local—which just shows how things have perked up since the 1976 doldrums.

Time was a bit short for *M. C. P. Bennett (Datchet)*, having lost time with a repair job—gales brought down his beam, but luckily with no serious damage.

A somewhat similar point was made by *K. Piper (Bognor Regis)* when he commented that it seemed to be work, family, work and yet more work, all conspiring to make him miss his receiver. However, he is going to YU and on this visit has hopes of contacting the YU radio club.

In the letters from *A. Cuthbert (Jarow)* we have an interesting question—can a Codar Q-Multiplier be used with an Inoue receiver and if so, how? Well, we can start with the assumption that the Codar box covers IF's around the 455-470 kHz area; and that means the Inoue receiver must have an IF in that area, or modifications will be needed to the coils of the Codar. We can also go a bit further and say that we wouldn't reckon to find a Q-Multiplier very useful with an IF of higher than 470 kHz; your scribe once tried one on Top Band and it wasn't much use as an IF sharpening machine, although it had uses in other areas. One needs power, at around 6.3 volts and 200 volts, and if one has the correct intermediate frequency one can go in on the first stage; the capacity of the coaxial cable bringing the Q-Multiplier in detunes the IF transformer, and there are a couple of cores in the Q-Multiplier box which need to be twiddled in order to bring things back into shape. Changing tack entirely, reader Cuthbert points up a moral in his tale of the falling performance dipole: the fall-off followed the

antics of some contractors, and was traced to a broken connection. However, since it has been back up it never seemed to stay on the same frequency two days running—probably the effect of wind and proximity to a building, or whatever. Turning back to the Codar question, reader Jarrett would like to know whether the firm of Codar are still about, and if so what their address is—any offers?

Yet another who has looked at the Ron Barker mod. is *Dr. A. Bryce (Wisbech)* who used a Toko device rather than the Collins one, and also replaced the existing ceramic AM filter by a Toko one of narrower bandwidth. The only snag noted was the inability to get S9-plus signals out of the calibrator—something which has affected the receiver from the beginning, and in any case was not a problem as a signal generator was available. Alan says that carrying out this modification carefully puts the FRG-7 into a totally different class.

*L. Stockwell (Grays)* comes back to Gerard Brazil's odd one of last time, by saying that he is himself a Red Cross officer and that they do have their own calls, so this one could well be a good 'un; the only snag we can see is that the call sign is one of the U.S.A. allocation block rather than German.

A nice long list from *B. Hughes (Worcester)* who has changed his FRG-7 for a Drake R4-C; this is soon to have the "full treatment" in the way of extra crystals and filters, so as to wrinkle out the rare ones. Looking at it practically, Bernard reckons he'll have to do something about the aerial system as well.

More on the Ron Barker modification, this time from *A. J. O'Connor (Cabinteely, Co. Dublin)* who points out that a half-way house would be to replace the existing filter with a Yaesu Musen Part No. LF-C2A which has a nose bandwidth of 3 kHz, and 8 kHz at 50 dB down—not as good as Collins or Toko, but still well worth while. A valid point about the Toko filter is the 10 dB insertion loss, although so long as one can look at a minimum signal on the aerial, reduction of surplus gain can only be of benefit. For the record, the Yaesu Musen address is CPO Box 1500, Tokyo, and the price five U.S. dollars or equivalent.

The question of the Russian WSEM is covered by *J. Delpont (Brussels)* who points out that in the Cyrillic alphabet the CW is different; so what we translate into WSEM is to them BCEM and equates to a CQ. On Phone it will be VSIEM, or often Niemanie VSIEM, which means a general call. Must have a try one evening!

## ANNUAL HPX LADDER

Starting date, January 1, 1978

SWL	PREFIXES	SWL	PREFIXES
D. W. Waddell		D. Lightfoot (BFPO 58)	355
	(Herne Bay) 499	M. Ribton (Oxtd)	349
R. E. Thomas (Corwen)	495	N. Rimmer (Port Erin)	342
K. Piper (Bognor Regis)	486	C. Mobbs (Leeds)	334
D. C. Casson (Reading)	433	P. Sharpe (London W.2)	316
R. C. MacKay		S. Farkas (Birmingham)	247
	(New Romsey) 422	P. Matthews (Eastwood)	229
B. L. Henderson (Chetnole)	400	R. G. Williams	
A. Twelves (Rhos-on-Sea)	390		(Borehamwood) 218
D. G. Sim (Southampton)	389	N. Musselwhite	
J. Doughty (Birmingham 44)	319		(Warminster) 205
Mrs. J. Brooks		G. Moody	
	(Loughborough) 368		(Stockton-on-Tees) 204
K. M. Rogers (Lutterworth)	364		

200 Prefixes must be heard for an entry to be made, all heard since January 1978. See also HPX Rules.

## HPX LADDER (All-Time Post War)

SWL	PHONE ONLY	PREFIXES	SWL	PHONE ONLY	PREFIXES
K. Kyezor (Irchester)	1964		K. Linge (Willington)	770	
B. Hughes (Worcester)	1694		R. Towson (Nottingham)	759	
S. Foster (Lincoln)	1692		D. J. Byers (London N.7)	758	
R. Shilvoek (Kingswinford)	1621		D. Brooks (Loughborough)	754	
J. Fitzgerald			M. Shaw (Huddersfield)	711	
(Gt. Missenden)	1552		K. Kniveton (Kingswinford)	674	
R. Carter (Blackburn)	1510		S. T. Bowen (Kippax)	659	
M. J. Quintin			D. Robinson (Felixstowe)	646	
(Wotton-u-Edge)	1394		D. Hill (Crawley)	644	
P. C. Jane (East Loos)	1375		J. Nicol (South Croxton)	617	
E. W. Robinson			L. Stockwell (Grays)	559	
(Bury St. Edmunds)	1349		P. Leather (Camberley)	552	
M. C. P. Bennett (Datchet)	1319		A. Rimmer (Port Erin)	552	
H. A. Londesborough			R. Jacobs (Margate)	532	
(Swanland)	1303		G. Brazil (Dublin)	529	
J. H. Sparkes (Trowbridge)	1159		P. Ramsay (Steventon)	508	
Mrs. J. B. Jane (East Loos)	1095				
H. M. Graham (Harefield)	1060				
M. Rodgers (Harwood)	1019				
A. R. Holland (Malvern)	988				
B. T. Mackness (Dagenham)	881				
D. Taylor (Harborne)	882				
M. Law (Chesterfield)	859				
P. L. Shakespeare					
(Foulness)	858				
K. A. Burch (Plymouth)	856				
P. Rooney (Chester)	789				

Minimum score for an entry is 500 for Phone 200 for CW. Listings in accordance with HPX Rules and to include only recent claims. A "Nil" return is permissible in order to hold a place.

*D. C. Casson (Reading)* only started recently, when he got an SMC-73 and Joystick VFA; more recently the SMC-73 was turned into a FRG-7. Derek has a largish list, which is all good stuff, his only mistake being with the U.K. prefixes where he split them up into their different ITU Zones, all-same Geoff Watts. Sorry, only one UK1 counts regardless of location, as the rules imply.

On to *J. Doughty (Great Barr)* who seems to have been hearing some of the good stuff—YII for instance, albeit we hope this was the true-blue YIIBGD and not one of the bogus ones occasionally noted.

Paint-pots and garden-spades figure largely in many of your letters this time, doubtless driven on by the biting wit of an XYL who sees herself doing the job unless she lays it on a bit thick. *M. Shaw (Huddersfield)* reckons he's got both chores safely earthed down for the moment; all we can do is to remind him of Finagle's Corollary to Murphy's Law which states clearly that Murphy's Law is optimistic.

*D. J. Byers (London N.7)* mentions hearing GB3PRA/M operating in the Barnet Carnival from inside a pram! On a different line, he wants to claim a new series for the /MA (Maritime Anchored) stations, and particularly G4DVJ/MA; we feel this should only count as a normal /MM. Dennis is signing on for the R.A.E. class under G3ZKE, while hoping to make his pass in the December examination. Of course, normally this would be a "dummy run" anyway, but this December one is the last of the present type.

*E. W. Robinson (Bury St. Edmunds)* continues on his merry way, and among his list we note that of our old friend ZE3JO, still on the air and putting a fine signal into the U.K. He also enclosed the list from *D. A. Robinson (Felixstowe)*, who has been somewhat inactive but reckons to be doing something about it when autumn comes.

*R. C. McKay (New Romney)* has a difficulty of considerable proportion by way of a pole at the end of his garden which radiates noise by the bucketful, and aerial which of necessity goes to the fence at the same end—which isn't much help when the AMSAT-UK Net is buried underneath, nor for that matter when trying for *Oscar 7* or 8, neither of which have yet been heard. A pre-amp was built for Ten, but it seems to have brought up the noise as well as the signals—we fear this is almost certain to be the case in such a location. Perhaps the best way of attacking the problem is to sling the gear in the car and head for somewhere as far as can be from electricity lines and other noises; then sit static with dead engine and try again. If nothing else, it should give you a better idea of the local noise level at home and so of the size of the problem.

A great fat effort from *D. Hill (Crawley)* advises that this is a complete new list—it would appear that the XYL tidied-up the shack and tossed all the old check logs out! So-back to the original log-books and completely re-do the lot: some 644 on Phone and 284 on CW, not to mention a fine crop of phonies and oddities.

### Set Listening Period

Coincident with WARC '79 it is proposed to run an SLP on the first weekend in each month, all bands 1.8 to 30 MHz; the sparkplug for this is once again SWL Whittaker of Harrogate, who has undertaken to correlate all the results into a world-wide survey of reception conditions. Logs to show dates, station heard, station being worked or called, RS(T) and time GMT. Reports to Dave at Hillcourt, 57 Green Lane, Harrogate, North Yorkshire HG2 9LN. For a copy of the resulting survey, include an *s.a.e.* if in U.K., or an IRC from overseas. The times set are 1500-1700 on 21 MHz on January 7, 0700-0900 on Top Band February 4, March 3/4 2300-0100 on Eighty, April 7 1600-1800 on Ten, May 6 0700-0900 on Twenty, and June 3, 0500-0700 on Forty. The odd months to be Phone listening periods, and the evens for CW. The form continues with July 7 0500-0700 on 7 MHz Phone, August 4 1000-1200 on 21 MHz CW, September 2, 1300-1500 on 28 MHz Phone, October 7 0600-0800 for 3.5 MHz CW, November 3 0600-0800 1.8 MHz Phone and a Grand Finale on December 1, 1800-2000 on 14 MHz CW. All times are GMT of course. This is not a competitive activity as such, but a small prize may go to the SWL with the best selection of entries in the SLP's. The details are being circulated world-wide, and it is hoped that this will give the SWL's a chance to add their weight to the case for retention of our bands. We might just add that in our view SWL Whittaker is taking on a mammoth task of collation and he deserves all the support we can give.

### Others

We also acknowledge and thank the following for their contributions: *J. H. Rosling (Bakewell)*; *M. Rodgers (Harwood)*; *M. Law (Chesterfield)*; *P. Leather (Camberley)*; *R. Shilvoek (Kingswinford)*; *D. Taylor (Harborne)*; and *D. W. Waddell (Herne Bay)*.

### Deadline

Is a little tight at November 9, addressed as always to "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ. *Cheerio!*

## ANTENNAS—THE WEAK LINK PART VI

### FEEDERS

A. P. ASHTON, G3XAP

THE antenna is, in the vast majority of cases, located at some distance from the transmitter/receiver. An answer to this would be to bring the antenna right down to the operating position, *e.g.* in the case of a half-wave dipole we could simply locate the shack in the centre of the available space and bring each half of the dipole right to the output socket of the transmitter. The obvious disadvantages of this approach are that: (a) the antenna is best sited "up in the clear" away from surrounding objects, (b) we would find it difficult to maintain the correct shape of the antenna, *i.e.* the legs would have to be bent to fit them into this configuration, and (c) being so close to the ground, the feed impedance would be extremely low.

Another, more sensible, solution is to place the transmitter and receiver "up in the air" with the antenna, and have remote controls for operation of the equipment. This is actually done in some cases—usually fixed-frequency VHF or UHF installations—with only a microphone (or key), loudspeaker, changeover switching and a few simple controls taken to the operating position by interconnecting wires. However, with the tunable, multiband, multi-mode equipment used in most amateur stations this is not really a viable proposition.

We are left, therefore, with the only workable solution, and that is to have a system where the antenna is remote from the transmitter/receiver location, and RF energy is transferred between them through RF transmission lines or feeders. If the feeder meets certain criteria, this transference of energy can be extremely efficient. On the other hand, inefficient or unsuitable feeders can give rise to very large losses resulting in radiated power being much less than it should be, and received signals being of similarly low strength. A well sited, efficient, high-quality antenna can be rendered practically worthless by simply using the wrong feeder, or failing to match the antenna and feeder together in the correct manner. A study and understanding of feeders is therefore vital if we are to ensure that the system is not to be "degraded" in this manner.

#### Single Wire Feeders

Early feeders consisted of a single wire connected between the antenna and the transmitter, though this kind of feeder was merely an extension to the antenna itself. The "return" circuit for such a system is, in fact, the earth and its behaviour is dependent to a large extent upon the type of ground over which it is installed. It is possible to connect such a line to a point of correct impedance on the antenna and have a single wire feeder without standing waves, but in practice such matching is difficult to achieve. Single wire feeders always radiate energy and this has the effect of reducing the amount of energy radiated by the antenna itself, distorting the radiation pattern, and in some cases causing or

aggravating interference by bringing radiation closer to TV aerials or domestic electronic equipment. Because of all these difficulties such feeders are seldom used today—preference being given to two-conductor transmission lines.

#### Parallel Wire Feeders

Referring yet again to the current distribution of the centre-fed half-wave antenna (Fig. 1) we see that the current flow is such that in a two-conductor feeder there is a requirement for the current in one of the conductors to be in the opposite direction to the current in the other. All conductors carrying RF currents radiate to some extent—this was the problem with the single wire feeder. However if we have the two conductors running parallel to one another, and relatively close together, and carrying RF currents of the same magnitude but in opposite directions, the electromagnetic field from one will tend to be cancelled by the field from the other. This is because, as the currents are travelling in opposite directions, the resultant fields are  $180^\circ$  out of phase. For complete cancellation of the fields, the two conductors would need to be in exactly the same position in space, but in practice it is obvious that this condition cannot be met.

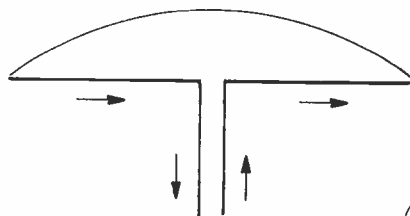


Fig. 1

Current distribution on half-wave centre-fed antenna, showing direction of current in the antenna and feeder.

Fig. 2 shows two conductors having equal and opposite RF currents, *i.e.* the radiation from them is exactly  $180^\circ$  out of phase. When the radiation from conductor A reaches conductor B, the current in B is not exactly out of phase as (since we are considering alternating currents) the amplitude is in a state of continual change. The amplitudes were the same when the radiation left A, but when it reaches B (a fraction of a second later) the current in B has changed. Fig. 3 will help to clarify this point—the solid line represents the radiation in conductor B in close proximity to it, whereas the broken line represents the radiation from A when it reaches B. As the two fields are not exactly out of phase, the field cancellation is not complete, and a small amount of radiation still takes place.

In practice, with the conductor spacings used, the residual radiation is small, but it should be noted that as we go higher in frequency, the phase difference between

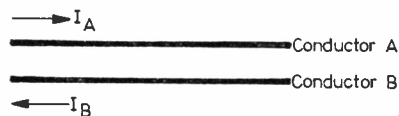


Fig. 2

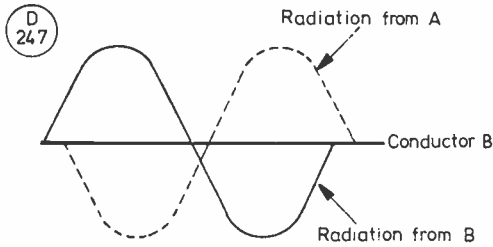


Fig. 3  
The radiated fields from the two conductors shown in Fig. 2, as seen in close proximity to conductor B.

the two components becomes greater and the amount of radiation therefore increases. For example, if our conductors were spaced 4 inches apart, the phase difference would be 0.2° and 1.8 MHz, 3.7° on 28 MHz and about 18° on 144 MHz; obviously at 1.8 MHz cancellation is virtually complete, whilst at 28 and 144 MHz the residual radiation is becoming significant.

**Coaxial Feeders**

As we have seen, it is impossible to completely suppress feeder radiation by placement of parallel lines alone, but the placing of the two conductors in a concentric or coaxial configuration does achieve this end. This is because the current flowing on the outer conductor (screen) of coaxial cable is on the inner surface and, due to skin effect, does not penetrate very deeply. Hence the residual radiation discussed above is contained inside the cable (between the two conductors) and no radiation takes place outside the cable.

**Characteristic Impedance**

Looking at feeders simply as two parallel conductors—either concentric or side-by-side, it would appear at first sight that as the actual resistance of the conductors is very low, the current would be of a very high order. However, feeders display both capacitance and inductance, and it is convenient to consider these two properties in the manner shown in Fig. 4.

For ease of understanding, we consider the feeder to be comprised of a large number of short lengths all connected together in series. In any length there is obviously capacitance between the two conductors as shown, but each section has inductance as well. As a current is passed down the feeder, each “capacitor” will charge as the current reaches it (the inductors tend to limit the rate at which they do charge). The effect is to form a definite relationship between the current and the applied voltage—hence there is an apparent resistance. This is known as the “Characteristic Impedance” of the feeder and is dependent upon such factors as the diameter of the conductors, their distance apart, and the nature of the dielectric between them. If we increase the distance between the conductors, we increase the impedance, whereas if we increase the conductor diameter, we decrease the impedance.

It is difficult for beginners to appreciate that the characteristic impedance of the line is the same no matter what length it is (except where very short lengths are concerned) and why this is so is, perhaps, best explained by the example given by Glanzer[1]: consider a line made up of pure resistances, and assume a network

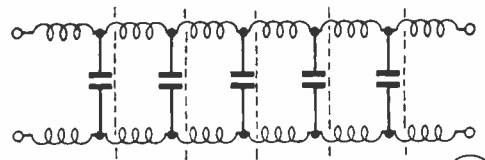


Fig 4

The ‘circuit’ of an RF feeder, shown in terms of ordinary circuit constants.

of series and shunt resistances (Fig. 5) where all series resistances have a value of 10 ohms, and all shunt resistances have a value of 100 ohms. Obviously the resistance from X to Y with only one section of line is 110 ohms, but when two sections are considered, the resistance is 62.4 ohms. The resistance gradually decreases as more sections of line are added until an infinite number is reached, when the resistance from X to Y will be 37 ohms (note that the value is already close to this figure after only 6 sections have been added). Hence, except for very short lengths of feeder, the value will be 37 ohms no matter what the actual length may be.

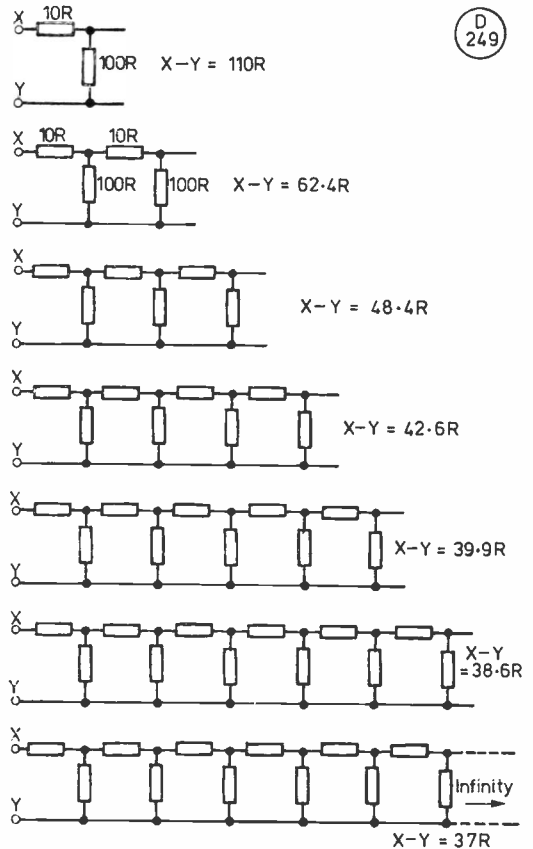


Fig. 5

Showing how the impedance of a length of feeder approaches a constant value as its length is increased.

### Velocity Factor

We have already noted that RF energy does not travel as fast through conductors as it does in free space, and we are now familiar with the term "free-space" velocity. The "slowing down" is even more marked in feeders, and is due to the effect of the inductance and capacitance mentioned above. As the actual magnitude of these properties varies from feeder to feeder, so too does the actual velocity of RF energy: the ratio of the velocity in the feeder to the velocity in free space is called the Velocity Factor and is the factor by which the length of feeder has to be multiplied when compared with a free space length.

For example, if our free-space half-wavelength is 34.00 feet, and we have a feeder with a velocity factor of 0.66, then a piece of that feeder one half-wavelength long will be  $34 \times 0.66 = 22.44$  feet. It is important to be able to accurately cut half and quarter wavelengths of feeder, as these are significant lengths in impedance matching applications; hence velocity factor is an important property.

### Typical Feeders

The most common feeder used today is the flexible coaxial type with which every reader is no doubt familiar. These cables are normally around either 50 or 75 ohms characteristic impedance, but other values are produced. Fig. 6a shows the construction of coaxial cable: the dielectric is normally polyethylene (either spongy or solid), but some types use other materials. Often the two conductors are semi-air spaced, with polythene being moulded in such a way that it simply maintains the correct positioning of the inner conductor—the majority of the dielectric being air, see Fig. 6b.

The inner conductor is sometimes stranded wire and sometimes a single wire, and the screen usually a copper braid (in some cases being very closely woven and completely covering the dielectric, whilst being of somewhat lower density in other cases). Yet other types use a thin metal foil as the screen, with a very low density braid forming the outer conductor. The outer cover is a waterproof cover and is usually made of a plastic material. The outer diameter of coaxial cables for normal usage varies considerably and can be anything from 0.2 inches to over 0.5 inches.

It will then be seen that there are many different variations on the general theme of coaxial cable, and the beginner may well wonder which is the best to use. The first decision is whether to use 50 or 75 ohm cable—the actual antenna should decide this as will be seen later, although when carrying out certain impedance matching techniques, the most suitable value will often be the one which, at first sight, seems the least likely! (Again this will be discussed later but, an example, a vertical antenna with a feed impedance of around 25-30 ohms may be better fed with 75 ohm cable after inserting a "transformer," than with the 50 ohms cable which most writers favour). The next decision is whether to use a standard cable, or whether to obtain the more expensive "low-loss" type. As its name implies, the latter cable has a lower loss—losses being mainly associated with leakage across the dielectric.

Feeder losses are not directly proportional to the length of the feeder, as it is a 'logarithmic' loss: for

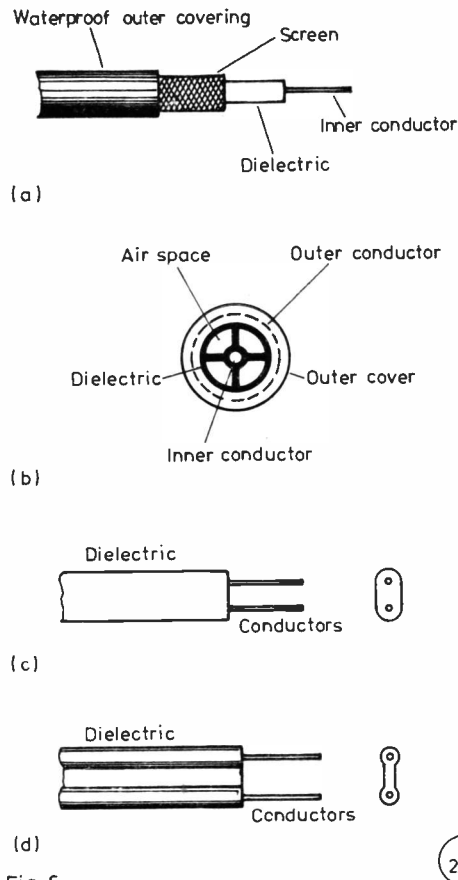


Fig. 6

Fig. 6. (a) the construction of coaxial cable; (b) the construction of semi air-spaced coaxial cable; (c) 75-ohm twin feeder; (d) 300-ohm twin feeder.

example, if 5 per cent of transmitter power is lost in a certain length of feeder, 5 per cent of the remainder will be lost in the next section of the same length (*i.e.* the total loss is not 10 per cent of our original power, but 5 per cent + (5 per cent of 95 per cent) = 9.75 per cent). Losses are therefore expressed in decibels, as this is a logarithmic measure—the unit dB per 100 foot is the usual figure quoted. Hence a feeder with a loss (usually termed "attenuation") of 0.5 dB per 100ft. will have a loss of 1 dB on a 200ft. length and 0.25 dB on a 50ft. length. Note that this attenuation also applies to the received signals.

Feeder losses vary with frequency—increasing as frequency increases. One typical feeder, for example, has an attenuation of 0.3 dB per 100ft. at 3.5 MHz and 2.3 dB per 100ft. at 150 MHz; therefore it is apparent that although low-loss feeders become an economical proposition at VHF/UHF, losses up to about 30 MHz do not usually justify the additional expense. A cable with an attenuation of about 1.5 dB per 100ft. at 30 MHz is usually suitable for the HF bands—actual losses can be measured and this will be discussed in a later article dealing with test instruments.



The only other decision is the cable diameter: this is often determined by the output power to be used as some small cables will not take high powers—especially if there are standing waves on the feeder. The cable retailer should be able to supply details of all the cable's properties (including power handling capabilities), and this information should be obtained before making the final choice. Note that cable diameter can also affect the type of plugs/sockets used as, in general, the Belling-Lee coaxial plug cannot be fitted to the larger diameter cables.

#### Twin Feeders

It is possible to buy 75-ohm and 300-ohm "twin-feeder," and these are shown in Figs. 6c and 6d. It will be noted that the dielectric is the plastic in which the conductors are encapsulated, but with the 300-ohm "ribbon" the conductors are further apart, and it is possible for moisture and grime to collect on the surface of the dielectric between the conductors, thus altering its characteristics and, hence, its impedance. This feeder is therefore susceptible to weather effects, whereas the 75-ohm twin feeder is considerably less susceptible. Because of the residual radiation discussed earlier, twin feeders should not be routed close to metallic structures such as masts, antenna booms, window frames, etc. as the feeder can "couple" to them; reflections can take place from these "coupled loads," raising the standing wave ratio (SWR) on the feeder: a correctly used coaxial cable does not suffer from this problem.

In addition to these commercially produced twin feeders, it is possible for the Amateur to make his own twin feeders—these often being known as "open-wire" feeders. Basically they consist of two conductors held parallel by means of spacers—these being constructed of insulating material and placed at regular intervals along the line—usually about 12-18 inches apart. If insufficient spacers are used, the two conductors will tend to move in relation to one another in windy conditions, thus altering the impedance of the line. The material used to fabricate the line must be low-loss such as high density polythene, or dry wood treated with a suitable varnish—ingress of moisture into wooden spacers leads to increased leakage and hence increased feeder losses.

The actual impedance of the feeder can be calculated from the formula:

$Z = 276 \log (b/a)$ , where  $b$  is the distance between the centres of the two conductors, and  $a$  is the radius of the conductors.

So, for example, for wire of 0.1 inches diameter (radius 0.05 inches) and a spacing of 3 inches, the feeder's characteristic impedance would be

$$276 \log (3/0.05) = 276 \times 1.7782 = 490 \text{ ohms.}$$

Lines of this type are very efficient (provided that leakage is of a small order), but the radiation loss will be high at the higher frequencies if spacings are wide. The velocity factors of open-wire feeders are typically 0.95–0.975, the actual figure depending upon the distance between adjacent spacers and the material from which they are made.

The author has made open-wire feeders using wood dowell which was cut to length, drilled, and then dipped in polyurethane varnish—details of the construction are shown in Fig. 7. This dipole was used as a "tuned" feeder for an 80 metre dipole (tuned feeders will be discussed in the next article which deals with impedance

matching), and appeared to be extremely efficient in operation.

#### Balanced v. Unbalanced

The feeders discussed above can be grouped into two distinct categories—balanced and unbalanced. Twin feeders are "balanced," because both conductors are identical, and the construction is symmetrical with regard to them. However the construction of coaxial cable is such that the two conductors are not symmetrical, and such feeders are termed "unbalanced."

Antennas which are symmetrical about their feed-point (*e.g.* dipoles) should be fed with balanced feeders and, conversely, non-symmetrical antennas (*e.g.* quarter-wave verticals), should be fed with unbalanced feeders. If we wish to use coaxial cable to feed a symmetrical antenna, we must use a balanced-to-unbalanced transformer (usually known as a balun)—such devices take many forms and will be discussed later. If such a feed system is used without a balun, RF energy will be present on the outside of the cables outer surface, and the feeder will radiate. Also, the current in the two halves of the antenna will become unequal and a distortion of the radiation pattern will result—this being more important with directive arrays than with simple dipoles. The feeding of unbalanced antennas with balanced feeders causes unequal currents to flow in the two feeder conductors, producing radiation and, hence, power loss. This latter case is uncommon, but the use of coax (minus balun) to feed balanced antennas is often seen in Amateur Radio, and the author suggests that losses are usually much higher than the operators realise.

#### Voltage and Current in Feeders

By now it should be apparent that it is possible to have a situation where we have an antenna feed impedance which is numerically equal to the characteristic impedance of the feeder, *i.e.* 75-ohm feeder is designed to match the feed impedance of the centre-fed half-wave dipole. If this condition is met, then the feeder is correctly "matched" to the antenna, and all the power put into the feeder by the transmitter will be radiated by the antenna. As impedance is the ratio of voltage to current and impedance of the feeder is constant down its entire length, then it follows that the ratio of voltage to current is also constant down its entire length; further, this ratio is exactly the same as that which exists at the feed point of the antenna.

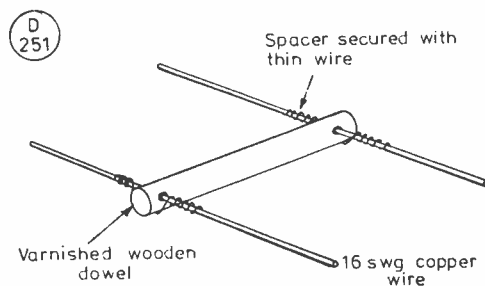


Fig. 7

Construction of open-wire feeder.

Therefore, if we draw the voltage and current distribution on the feeder (Fig. 8a), we produce straight lines which will drop slightly as they progress due to feeder losses (no feeder is completely without loss). However, this condition is not always met in practice, and a 75-ohm feeder may "see" a completely different impedance at the antenna's feed point, and Figs. 8b and 8c show the two extremes of mis-match: a short circuited line (equivalent to a feed impedance of zero) and an open-circuited line (infinite antenna impedance). Note that the voltage and current are no longer constant, but show a similar variation to that seen on the antenna itself; the result is a wave pattern, and the feeder now has "standing waves" (as does the antenna). Between these two extremes there are obviously an infinite number of impedance mismatches, and Figs. 8d and 8e show the voltage and current distribution on a 75-ohm feeder when connected to antennas with feed impedances of 37.5 and 150 ohms—both cases representing a mis-match of 2 : 1. It will be noted that standing waves are again present, but the maximum and minimum values of voltage and current are not the same as those experienced on the open and short circuited lines. As the degree of mis-match is increased, the maximum values of voltage and current increase, while the minimum values decrease.

All the examples considered so far have been concerned with impedance mis-match between feeders and resonant antennas; if the antenna is not resonant reactance is present, and this alters the voltage and current distribution on the feeders still further. Fig. 9a and 9b show and voltage distribution on feeders terminated in a mis-matched resistive load (*i.e.* resonant antenna), and a load with capacitive reactance (*i.e.* non-resonant antenna), and it will be seen that the effect of the reactance is to "shift" the voltage nodes and antinodes. (In both cases the load impedance is lower than the feeder's characteristic impedance).

In the example shown, it will be noted that the shift is about 30°, but had the reactance been inductive, the shift would have been in the opposite direction. It should be apparent that the feeder is no longer working in the manner for which it was designed, and that as the voltage antinodes increase in value with the degree of mis-match, the voltages can be so high as to actually damage the feeder's dielectric, and complete breakdown can occur. In a similar manner, the high currents experienced can lead to overheating, with similar damage resulting. Discoloured areas on feeders can often result from overheating, and these can point to the presence of standing waves.

### Standing Wave Ratio

Standing wave ratio (SWR) is a measure of just how badly mis-matched the system actually is. Referring back to Figs. 8d and 8e, it will be seen that the ratio of the maximum voltage on the feeder to the minimum voltage is 2 : 1, and that a similar ratio exists for the current. The SWR in this case is said to be 2 : 1, and it will be noted that this is also the ratio of the impedances involved—75 and 37.5 ohms in one case, and 75 and 300 ohms in the other. Had the antenna feed impedance been, say, 500 ohms, then the ratio of maximum to minimum voltage (and hence the SWR) would have been 6.667 : 1 (*i.e.* 500/75).

It is important to understand why standing waves on the feeder can cause power loss, and there seems to be very great confusion amongst amateurs on this point. Basically the losses are owing to the fact that, as SWR increases, so do the values of maximum voltage and current in the feeder—these higher values lead to greater leakage through the dielectric and to greater "ohmic" losses in the conductors (heat). It follows, therefore, that the actual loss for a given SWR and power input is higher with a poor quality feeder than it is with "low-loss" feeder. The standing waves appear on the feeder

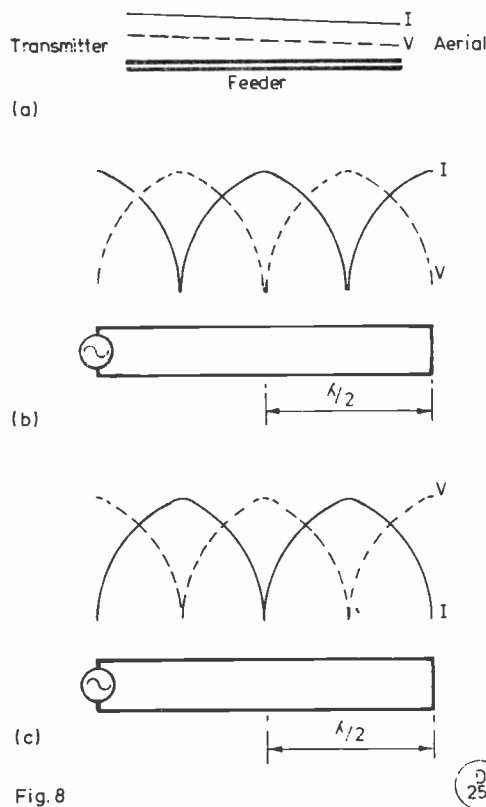


Fig. 8. (a) Voltage and Current distribution on a perfectly matched feeder. Note the slight drop in value along the feeder owing to losses; (b) Voltage and Current distribution on a short-circuited feeder; (c) Voltage and Current distribution on an open-circuit feeder.

because, in a mis-matched system, the antenna is not able to absorb all the power supplied to it by the feeder and some of this power is therefore "reflected" back down the feeder towards the transmitter. It is the interaction between the "incident" and "reflected" components on the feeder that creates the standing waves. *The reflected power is not lost, however, and provided that the coupling between the transmitter and the feeder can be adjusted to cope with the input impedances encountered, then the only losses are those mentioned above.*

The situation regarding the operation of feeders with large values of SWR will be discussed later when dealing with impedance matching, but as a general rule coaxial type feeders should not be operated at high SWR because of the greater losses and higher possibility of damage which results.

**The Complete System**

We can now understand more fully why we should not regard the antenna and the feeder as two separate entities but should look upon the Antenna/Feeder combination as a complete system. Once the antenna is erected and the feeder is attached, there is nothing we can do from the operating end to rectify any mis-match. True, we can use a matching unit at the transmitter end of the feeder to ensure that any reflected power is returned to the antenna but, due to the losses that are inherent in any feeder, the overall efficiency of the system must be lower than would be achieved by matching the antenna and feeder.

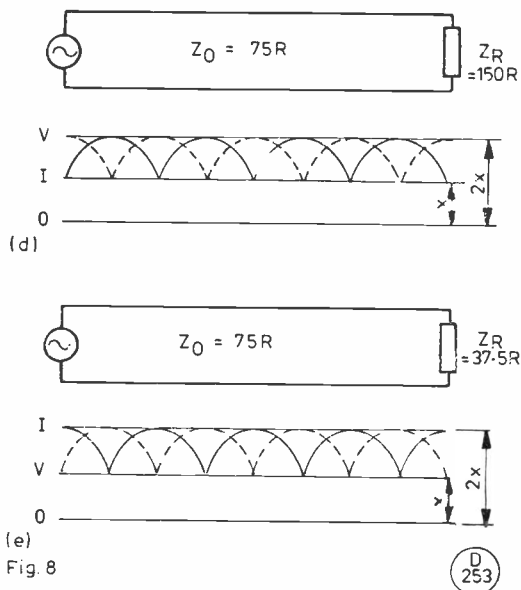


Fig. 8. (d) Voltage and Current distribution on a feeder with an SWR of 2:1 ( $Z_0$  less than  $Z_R$ ); (e) Voltage and Current distribution on a feeder with an SWR of 2:1 ( $Z_0$  greater than  $Z_R$ ).

For example, a feeder which exhibits a loss of 1 dB when correctly matched to the antenna will have a total loss of only 1.2 dB when operated at an SWR of 2 : 1, but this loss rises to 1.8 dB at 4 : 1 SWR, 3.5 dB at 10 : 1 SWR, and a staggering 5.5 dB at an SWR of 20 : 1. These figures refer to feeder of average quality—the actual losses experienced with high-loss feeders can be considerably higher than the figures quoted. The author's opinion is that prevention is always better than cure, and the prevention of high SWR's will always be preferable to curing the problems that can arise when high SWR's are present.

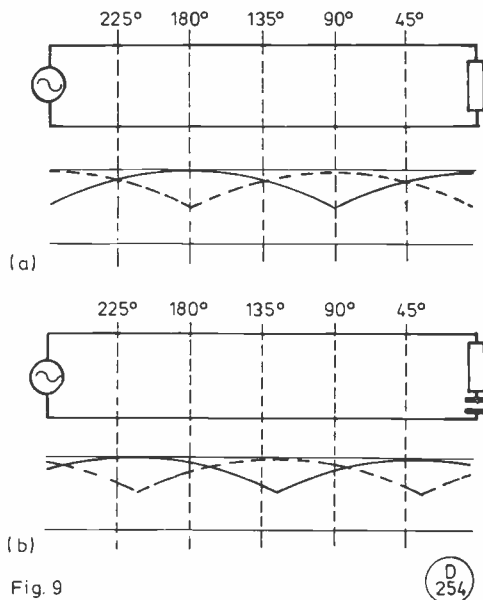


Fig. 9. (a) Voltage and Current distribution on a feeder connected to a resistive load ( $Z_0$  greater than  $Z_R$ ); (b) Voltage and Current distribution on a feeder connected to a non-resonant load displaying capacitive reactance ( $Z_0$  greater than  $Z_R$ ).

**Summary**

Having now discussed the theory of feedlines and discovered the dangers of using them in a mis-matched condition, we must consider the whole question of impedance matching in order to ensure that our system will be efficient. Impedance matching is a very important subject as practically every system requires some degree of matching—the next article will therefore be devoted to this topic. We will also discuss baluns—both the impedance matching types and the "1 : 1" type.

**Reference**

- (1) K. GLANZER, K7GCO, *Antenna Handbook, Volume 1* Cowan Publishing Corporation, 1966.

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## THE MONTH WITH THE CLUBS

### BY 'Club Secretary'

THE old problem of what to do at club meetings comes up for consideration time and time again—and there are almost as many solutions as there are clubs! The possibility of a tape-and-slide lecture is often put to one side because of the postal costs involved, and the fact that there are not an infinite number available. It does occur to us that where a club or group knows it is on to something good in the way of a talk, the speaker's permission could well be obtained to record the talk, and to photograph the blackboard drawings as he does them. This would then be a tape-talk in its own right, and could be made available to other clubs or offered to the RSGB library. We feel that to photograph the blackboard and speaker at the right moments offers a way out of the "impersonal" air of the average tape-talk, which sometimes causes it to fail to attract the attendance it deserves.

#### The Month

We will be going straight down the pile this time, as time for us is short due to that old reprobate, G3KFE, having sneaked off for a few days holiday in U.K. when his proposed trip to W came apart in the planning stage. (Old Moaner!—Ed.)

At Peterborough the Radio & Electronics Society (we believe there is another club in the area so we must be careful with titles!) are to be found at the Scout Hut in Occupation Road, at 7.30 on the third Friday of the month. This is a very important third Friday—November 17 for the Annual General Meeting.

At Cheltenham they have the first Thursday (no details to hand) and the third Friday; the latter will be set out for a "flea-market" with a charge of 50p for a half-table of space. All meetings take place at the Old Bakery, Chester Walk, which is at the rear of the Public Library in Clarence Street.

A.R.M.S. is the one for anyone who is interested in operation under what we in the U.K. would describe as the /M department. The editor of Mobile News is our own VHF columnist and we were rather amused to note him writing an editorial defending the club against the allegation that A.R.M.S. does not cater enough for the VHF mobileers! This old scribe will admit to a feeling that, if anything, the balance is a bit the other way, although G3FPK does his best with the material he gets and that which he himself generates.

Now to Crawley where the front page makes reference to a "fabulous free gift" in the next issue. November 8 is down for the informal, and on 22nd they will be at United Reformed Church Hall, Ifield, for a lecture on Contests to be given by G3MXJ and G3FXB—and who could be better qualified than they?

Down on the South Coast we find Southdown, with a meeting-place at the Chaseley Home, South Cliff, Eastbourne, where they may be found on the first Monday in the month. This gives us November 6, for a talk on Oscilloscopes by G3XUS. Looking forward a month, there is the AGM on December 4.

At Cray Valley, the Programme Organiser sent us a sheet with the information that they are in session on the first and third Thursday in the month; nothing is given for November 2, but the latter-session is on November 16, both dates being held at Christchurch Centre, High Street, Eltham. However, past experience indicates there will be something of interest laid-on on the November 2 evening.

An Open Day is the business of the Dumfries & Galloway on November 19. There will be a bring-and-buy stall, raffle, grand junk sale, demonstration stations showing HF, VHF and *Oscar* operation, and various trade stands, all at Cargenholm Hotel, New Abbey Road, Dumfries. The idea is to get local amateurs and SWL's to look in (and hopefully, to join!) but, above all, to show themselves to the general public; we might hesitantly offer the suggestion that while commercial gear will probably be used for the demonstration stations, if only for the speed of erection and dismantling, it would be a good idea to set up a non-operational station of the "surplus receiver plus home-brew" kind with an indication of how much it cost. This will not mean a lot, except that the public will have dispelled from their minds the "expensive hobby" tag which so often deters people from starting. Yes, we know, once they do get started they nearly always splash out on gear; but that is after they're hooked!

Now to Bournemouth, where Wessex are based on the Club Room at the Dolphin Hotel, Holdenhurst Road, Bournemouth. It is always a pleasure to hear from their Hon. Sec.—he assumes, rightly, that we're either idiots or in a hurry, and marks out the essential data with a felt-tip pen on our copy of the *Newsletter*—thanks, G4EMN! From this we see that on November 3 they have a talk on Amateur TV—the high-definition "proper" TV, rather than the Slow-Scan variety; this will be a joint effort between G3PYB, G8ADM, and G8GYS. November 17 is down to G5XB who will take as his subject the Intruder Watch which he organises for RSGB (and we expect he doesn't mind reports of use from non-members, come to think of it!). On the very next day, Saturday November 18, there is the club Dinner at the Yenton Hotel, Gervis Road, Bournemouth.



During NFD 1978, Thames Valley ARTS operated in the luxury of a member's caravan from the heights of Henley Fort, Guildford. Seen here are G8SM, with G3JEQ on the key, picking them off on 20 MHz.

A familiar handwriting next, that of GW3IGG on behalf of B.A.R.T.G. It seems the Convention at Harpenden was a huge success (not for your scribe—he forgot the date!), and that the group membership is now in the 700 mark. He also notes that a new version of their "RTTY the Easy Way" will be available soon, and that the AGM will be held in London House, opposite RSGB Hq., Meclenburgh Street, London WC1, timed to start at 1400 prompt.

A new fist puts in an appearance for Clifton in the shape of G3JKY and we are sure he won't mind us mentioning, for the benefit of others who may be offering a report for this feature, that the club name was buried in the after-part of his letter. It would be a great help to us if the club name were to be underlined or otherwise made obvious at a glance, so that we can get through the sorting process when doing the piece by areas. Don't give up the informal style, as we enjoy reading every newsletter (or just plain letter) from stem to stern, and the variety of approach from different scribes tells us a lot. For November 17, there will be a Junk Sale, and they are in residence every Friday evening at 225 New Cross Road, London S.E.14, a venue which is opposite the New Cross Bus depot.

There are three evenings down for Walsall in November, namely, 1st, 15th and 29th. The first one sees G4FJU and G3UNM combine forces for a talk on Radio Frequency Interference, and on 15th there is a Junk Sale, with the usual commission to club funds. Finally, G8KOK takes the stand with a Film Show. All this happens at Forest Comprehensive School Library, Hawbush Road, Leamore, Walsall. And, we note, a post-script reminds that Morse lessons are available to anyone who might need them.

**Deadlines for "Clubs" for the next three months—**  
 (For December issue—October 27th)  
 For January issue—November 24th  
 For February issue—December 29th  
 For March issue—January 26th  
*Please be sure to note these dates!*

A change of venue for Verulam occurs soon whereby the fourth Thursday evening date will be transferred after November 23 from the Market Hall in St. Albans to the ex-Civil Defence Hq. Hall in Chequers Street Car Park, St. Albans. However, as noted, they are still at the Market Hall on 23rd, when they will be hearing from G6YP on the subject of the development of the Metropolitan Police Mobile Radio System. In addition, in the winter months they have informal evenings on the second Thursday each month in the R.A.F.A. Hq. in Victoria Street, St. Albans.

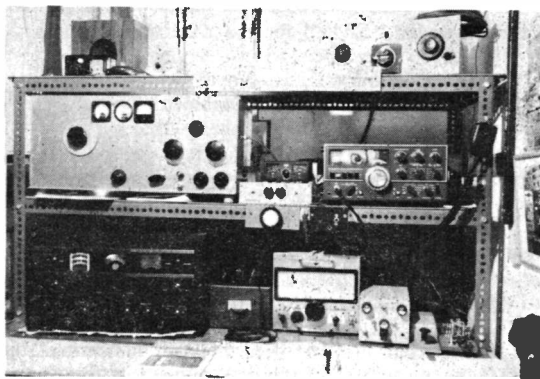
It's a while now since we last heard from Sheffield but it seems they are still alive and kicking; a letter from the new Hon. Sec. tells us that they have a place at the Sheaf House Hotel in Bramall Lane, on the third Monday in each month. At the time he wrote, the new officers had not had time to compile a programme, but we are assured they are "getting stuck in" to the matter! This club make a note of their willingness to welcome visitors or intending new members, and in particular the SWL types.

The year seems to be tearing along at a great rate, says the Hon. Sec. at York—too right, chum! They are to be found at the United Services Club, 61 Micklegate, York on every Friday, *except* the third one, and on 17th

#### Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (01-992 5778.)  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ.  
 B.A.R.T.G.: J. P. G. Jones, GW3IGG, Heywood. Lower Quay Road, Hook, Haverfordwest, Dyfed.  
 CLIFTON: R. A. Hinton, 42 Sutcliffe Road, Welling, Kent.  
 CHELTENHAM: G. Gearing, G3JJG, 158 Leckhampton Road, Cheltenham (34287).  
 CHILTERN: N. C. Ambridge, G4FRL, 53 The Avenue, Chinnor, Oxon OX9 4PE.  
 CORNISH: S. T. S. Evans, G3VGO, "Glengormley," Carnon Downs, Truro, Cornwall. (Devoran 864255.)  
 CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. (01-858 3703.)  
 CRAWLEY: A. V. H. Davis, G3MGL, 41 Gainsborough Road, Crawley (20986), West Sussex RH10 5LD.  
 DUMFRIES & GALLOWAY: C. Rodgers, 5 Elder Avenue, Lincluden, Dumfries.  
 HARROW: C. D. Friel, G4AUF, 17 Clitheroe Avenue, Harrow, Middx. HA2 9UU. (01-858 5002.)  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237.)  
 IRTS (Region 1): J. Ryan, EI6DG, 23 Dollymount Grove, Clontarf, Dublin 3.  
 MAIDSTONE YMCA: G. A. Hastie, 79 Rochester Crescent, Hoo, Rochester, Kent ME3 9JJ. (Medway 251387.)  
 MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leics. LE13 1TZ.  
 NORTH DEVON: H. G. Hughes, G4CG, Crinnis, High Wall Sticklepath, Barnstaple, Devon EX31 2DP.

PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.  
 R.A.I.B.C.: Mrs F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.  
 REIGATE: F. H. Mundy, G3XSZ, Westview, rear of Manor Farm, off Reigate Road, Hookwood, Surrey. (Horley 73878.)  
 SHEFFIELD: R. G. Harris, G4APV, 321 Fulwood Road, Sheffield 10.  
 SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.  
 SOUTH EAST KENT YMCA: T. Cassidy, G8PZA, Firbank, Guston, Dover (204856), Kent CT15 5ET.  
 SOUTH MANCHESTER: W. L. Seddon, G3VIW, 12 Barwell Road, Sale, Cheshire M33 5FF. (061-973 3355.)  
 STEVENAGE: T. Tugwell, G8KMV, 11 The Dell, Stevenage, Herts. SG1 1PH.  
 STOURBRIDGE: S. Shacklock, G4IP, 12 St. Peter's Road, Stourbridge, West Midlands DY9 0TY.  
 SUTTON & CHEAM: J. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey. (01-255 8729.)  
 VERULAM: B. Pickford, G4DUS, "Netherwood," 130 The Drive, Rickmansworth, Herts.  
 WALSALL: K. Boucher, G8KML, 22 Emery Close, Walsall (39457), West Midlands.  
 BOURNEMOUTH (Wessex): G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth BH2 6PD. (0202-20027.)  
 WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent TN14 5AF. (0732-56708.)  
 WOLVERHAMPTON: J. Cook, G4EDG, 75 Windmill Lane, Castlecroft, Wolverhampton WV3 8HN.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.  
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.



The station operated by Dr. Eric Pawson, ZLIAT, in Hamilton, New Zealand. Eric started with an AA licence (2AFU) in 1936, obtaining G8AP later in that year. After the war, 15 years were spent in various African countries; while in Uganda he operated VQ51B, and this station was described in *Short Wave Magazine* for July, 1962. He and his family settled finally in New Zealand in 1964, where he continued his work as an agricultural chemist. Chief radio interests are CW, construction, and aeriels. The photograph shows, left to right, on the shelf, a home-built 60W Tx, 50-ohm and 75-ohm reflectometers, and a TS-520S transceiver; underneath, left to right, is the AR88D, card index, additive frequency meter, Accu-keyer, Junkers key and McElroy bug. ZLIAT hopes to have aeriels for 14, 21 and 28 MHz soon, and re-establish contact with the UK.

November they also have the Annual Dinner. Looking backwards a little, they recently had a very entertaining evening with VE1APO, Gordon, from Halifax, Nova Scotia.

The Adult Education Centre, Monson Road, Tunbridge Wells provides a home for the West Kent chaps; on Friday November 10, they will have a talk about the new-style R.A.E. based on a sight of the trial paper, November 24 being set over to a discussion on Contest Operating and how to improve one's performance. A nice balance here of theory and practice. The Tuesdays following each Friday date mentioned above are given over to an informal, November 14 being noted for a Junk Sale at the Drill Hall in Victoria Road.

No sooner do we receive a note from a club sec. about a talk covering the new R.A.E. than we have an hon. sec. who is recovering from the traumatic experience of taking the old one—successfully, we might add, as the Panel will show under South East Kent. The gang get together every Wednesday in the month at South-East Kent YMCA, Godwyn Road, Dover, and some members are doing an R.A.E. class on Monday evenings at the same place, we understand.

Every Friday evening it still is at Maidstone YMCA at the "Y" Sportscentre, Melrose Close, Maidstone, where they have a new Chairman and Hon. Sec. since the AGM. They have a fairly flexible programme, but in general have things of interest to the beginner-members on the first and third Fridays and on the other dates something of general interest; this time November 10 is devoted to Spectrum Analysis and 24th to a Junk Sale.

From 7.30 until 8, when the main action starts, the Stevenage gang have Morse, on their meetings of November 2 and 16. The first date is on "obtaining Weather Satellite pictures" by G8LOK, while the second one is a talk on the 10 GHz beacon by G4ALN. Here

again there is an R.A.E. class, at Stevenage Tech. running through the winter.

Up to the Midlands now, to Wolverhampton, and Neachells Cottage in Stockwell End, Tettenhall, where they are to be found and inspected by visitors, or potential new members, on Monday evenings. Thus, on November 6 there will be a discussion about a club Project, so bring your ideas! November 13 is a natter evening and on 20th there will be a talk on HF mobile operation. The committee meeting is on 27th, and on December 4 they have a demonstration of their wares by *Amateur Electronics UK*.

One of the pleasures of writing this piece is the "keeping in touch" aspect, particularly when one knows the club; such is the case with North Devon, where the meetings alternate between Bideford and Barnstaple. Thus November 8 is down for a Junk Sale at Barnstaple and 22nd is a film show—courtesy G8MWW—at Bideford. The latter QTH is not known, but the Barnstaple ones are at G4CG's home, and it would thus be courtesy to contact him first before turning up, especially as the club is now all but outgrowing George's hospitality.

November 2 it is for Cornish, at the SWEB Club-room, Pool, Cornborne, and they will fill the room even fuller than usual, no doubt, for a Junk Sale; your scribe recalls a visit there and the Hq. room was well and truly packed full with fifty-odd present, a number that is still kept up. Not a little of that is due to the consistently high quality of the "Cornish Link," we are sure.

On now to Acton, Brentford & Chiswick, where on November 21, G3XPC will be giving a talk about his trip to Nigeria—the venue as usual will be 66 High Road, Chiswick.



G3COI BY G3COI

Every Thursday at Building 101, Houndstone Camp, sees the Yeovil group in session; November looks to be a busy time for G3MYM as he is down for talks on November 9, 16, and 23. His topics range from The Roller-Coaster L-Match, through 7 MHz Propagation, and on to Circuit Ideas.

Stourbridge have their booking at the library of Longlands School, Brook Street, Stourbridge; November 6 for an evening of Construction, and November 20 for the Grand Annual Sale of Members Surplus Gear (crikey, what a long name for a junk sale!).

The Sutton & Cheam lads have an evening at Sutton College of Liberal Arts, Cheam Road, Sutton on November 17, subject unspecified, and on November 29 they are off to see the *Oscar* control station at the University of Surrey.

A very familiar name appears on the front page of *Radial*, the newsletter of the R.A.I.B.C., namely that of Frances Woolley, G3LWY, who has come out of retirement (as it were) and taken over the reins of office again; for the moment, the blind, invalid, supporters or representatives, and any who want to join in one or more of these capacities, should contact her at the new address shown in the Panel. Since the club started some 24 years ago she has been in touch, much of the time in an active way.

They are still scratching heads about the programme at Chiltern; or, rather, the *Newsletter* editor is, and blaming it on a combination of holidays and amnesia! However, the date to remember is November 29 at 42 Castle Street, High Wycombe.

For Hereford we see November 3 as being down for a talk and slides on his visit to U.S.A. by G4CNY, while the details for November 17 are still in the fluid stage. However both will be held at County Control, Civil Defence Hq., Gaol Street, Hereford.

At Harrow the new Hon. Sec.—see Panel—has sent his first offering to us. From it we note that they are in session every Friday evening, so November 3 comes out as a Junk Sale, 10th as an informal, 17th as a Film Show, and 24th a talk on RAEN. Unfortunately he omitted to tell us the venue, and so for that we must refer you to him.

We always find the IRTS Region 1 *Newsletter* of great interest, and this one is no exception; our only sorrow is that the first mention of the proposed (at the time of writing) ER/GI Convention at Dundalk came too late for readers of this piece. However, we hear of North Dublin Radio Club, who are based on the Irish Wheelchair Association Hq., of Fingal Radio Club, and of the goings-on at 91 Lower Baggot Street on Monday evenings. More details from the Hon. Sec., at the address in the Panel.

A telephoned report—shoot that scribe!—from South Manchester shows November 3 as a discussion evening, and shack operating, November 10 as the Annual Dinner at Bowden Hotel, and November 17 for a lecture on Noise and its Implications in VHF Receiving Gear by G3VYB of *Microwave Modules Ltd.*; November 24 rounds things off nicely with a talk on multi-channel recording by G8RAG. As always, Hq. is Sale Moor Community Centre, where they also open up every Monday evening for a session of operating

from the club shack at the same venue.

Once a year regularly we hear from Melton Mowbray, with notice of the AGM; however this year they guessed that they were a bit adrift on the deadline stakes and so we got a second note indicating that the Hon. Sec. is carrying on, and that meetings will continue to be on the third Friday in each month at the St. Johns Ambulance Hall, Adfordby Hill, Melton Mowbray. Various things are lined up for the coming year, and settling the details sounds to be mainly a problem of slotting things together.

At Reigate the *Newsletter* seemed very fat indeed, until we realised that it carried as an annex an interesting paper on "aerial and mast mechanical design," which really deserves a greater audience. However for the programme details we must refer you to the Hon. Sec. at the address in the Panel.

That seems to be about the lot, so for now our 73's. Deadline dates are to be found in the "box" in the body of the piece, and must be regarded as *last* dates of arrival with us: "Club Secretary," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

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## OBITUARY

As mentioned briefly in the October issue, Thomas Darn, G3FGY, died on September 25, aged 56 years. Tom made an impressive contribution to Amateur Radio across a wide range of activities. Joining the Derby and District Amateur Radio Society in 1950, he was soon elected a committee member and became chairman in 1968 (a post he held until last year). G3FGY was the organiser of the Derby Mobile Radio Rally, regional representative of the RSGB, and organiser of the Amateur Radio Retailers' Association annual national exhibition held in Leicester. He was a member of the R.A.F. ARS and the Radio Amateur Invalid and Bedfast Club, as well as an oral examiner for the R.A.E. on behalf of the City and Guilds of London Institute. In addition to all this work, he found sufficient time to help local charities in many ways, including repairing 'talking books' for the blind.

In other words, Tom will be greatly missed by many people: in particular, of course, his family to whom we extend our deepest sympathy.

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## CORRECTION

The following corrections should be applied to the article "Memory Addition for the G4CIK Morse Keyer," by N. Hout, G4CIK, which appeared in the September issue. *Fig. 1:* IC11c should be connected to IC7 Pin 1, not IC10c; IC3d should be connected to IC3b & c, not IC3a; the label on Pin 4 of IC12d should be '2,' not '3'; Pin 13 of IC6 should be  $\overline{CE}$ , not CE; Pin 3 should be  $R/\overline{W}$ , not  $R/W$ . *Fig. 4a:* Pin 13 of IC6 should be  $\overline{CE}$ . *Page 428:* In the footnote to the first paragraph, 'positive earth' should be 'negative earth.' *Fig. 5:* The links 'to restore normal operation' should be between Pins 2 & 3, 4 & 5, 7 & 8, and not as shown. *Fig. 6:* For consistency with Fig. 1, label 'W' should be '3.'

# A USEFUL 45 MHZ CRYSTAL OSCILLATOR

I. D. POOLE, G3YWX

WHEN the author was modifying an old valve ship-to-shore radiotelephone for two-metre use, a 45 MHz crystal oscillator was needed. It was necessary that it could be switched by a single-pole switch, and ideally this would mean that one end of the crystal would be grounded whilst the other switched into the oscillator. The first experiments using the traditional Colpitts oscillator only managed to produce an oscillation at the fundamental from which the third harmonic could be extracted. This was, however, no use as the frequency of oscillation in this mode was different to that in the overtone mode which was required. As this oscillator was being used as the receiver local oscillator, it meant that it was several kilohertz off-frequency.

### The Solution

Looking at Fig. 1 it can be seen that an AC voltage is developed across RFC and a portion of this is fed back to the crystal to maintain the oscillation *via* C1. However RFC with the two capacitors across it forms a resonant circuit whose resonant frequency is well below the resonant frequency of the crystal and hence the circuit appears inductive. This means that more signal is fed back at the fundamental than at any overtone frequency and the oscillator will tend to oscillate at the fundamental.

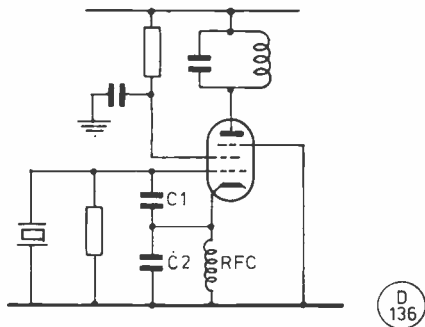


Fig 1

The solution was to only allow feedback at the required frequency. The first method which was tried was to place a series resonant tuned circuit in series with the crystal, but unfortunately this method was found not to work in the case of the author!

The second method which was tried was to make RFC (RFC1) resonant at the frequency of operation as shown in Fig. 2; the feedback from the cathode to the grid is *via* the internal capacitance of the valve. The anode resonant circuit was removed to ensure that

the oscillator was only controlled by the crystal and that no spurious oscillations would occur. This meant that, as the impedance of the cathode circuit is high and the anode circuit comparatively low, the output is low. This is then amplified in the second-half of the valve.

### Operation

The circuit proved to be very tolerant of lead lengths to the crystal; 6 inches being used in the author's transceiver. However it is always very advisable to keep all leads as short as possible, especially at these frequencies to keep spurious oscillations to a minimum.

When the oscillator is first turned on, the cathode circuit will require tuning to the correct frequency before any oscillation will start. In spite of this, the bandwidth was found to be more than adequate for operation over the two-metre band, with only a small change in output being detected.

The circuit described here is designed for use around 45 MHz, but there is no reason why it could not be used on almost any frequency with suitable modifications.

### Conclusion

The circuit, whilst being somewhat unconventional, works well and it was thought that it may be of use to others needing a switchable third overtone oscillator.

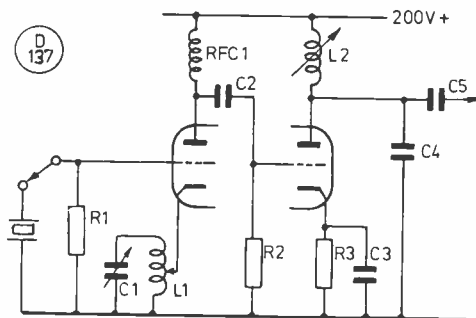


Fig. 2

### Table of Values

R1 = 100K	L1 = 4 turns centre-tap; 2 turns on 1/4 in. former
R2 = 47K	L2 = 4 turns on 1/4 in. former
R3 = 220 ohm	RFC1 = 40 turns on 1M resistor
C1 = 3-30pF	Valve = ECC81
C2, C5 = 18pF	
C3 = 100pF	
C4 = 10pF	



# VHF BANDS

NORMAN FITCH, G3FPK

## VHFCC Award

PHIL Johnson, G8JKNV, from Grouville in Jersey, receives VHF Century Club Certificate No. 304 for 2m. operation. He was first licensed in August 1975 initially operating in Surrey using a *Belcom* Liner 2. In October 1976, this was changed for an *Icom* IC-201 plus a new QTH in East Sussex. In May 1977, Phil moved to Jersey. A *Nag* 144XL linear amplifier has been added to the 2m. station and the aerial is a *Jaybeam* 10-ele. Parabeam. For 70 cm. operation, a *Belcom* Liner 430 transceiver into an *Ampere* 50 watts amplifier is used, the aerial being a *Jaybeam* 48-ele. Multibeam. Phil uses *Oscar 7* and 8, all modes and also works *via* meteor scatter. Other interests include SS/TV and fast scan TV, with gear under construction for several of the UHF/SHF bands. A check through the records suggests this is the first 2m. VHFCC award issued to a Jersey station in this series.

## Contests

**Results:** First the 144 MHz QRP event of July 30, the portable part of which was won by GW4ERP/P with 1636 points from 238 QSO's, with GW4BCH/P runners up with 1458/227. The fixed section was won by G8LZU with 574 points from 115 contacts, and G4APL's 113 QSO's earned him 446 points and second spot.

Second, the 70 MHz Open Contest of August 12/13 in which Scotland carried off the honours in the portable half with GM3WOJ/P winning the RSGB's VHF Manager's Trophy thanks to 856 points from 66 QSO's. Only four points behind was G3FDW/P who had 74 exchanges. Clear winner of the fixed half was GU3HFN whose 56 QSO's brought 640 points. In

second place was G2AMV, 453/51. **Coming events:** The 144 MHz CW event starts on Nov. 4 at 2000 GMT and lasts for five hours with fixed and portable sections. The last four sessions in the 432 MHz Cumulative Contest are scheduled for Nov. 6, 14, 22 and 30 from 2000-2230 GMT. No separate sections but all operation from the one location.

The Marconi Memorial Contest is an all-CW affair on the weekend of Nov. 4/5 from 1600-1600 GMT, in which our own CW event is "buried." So why not enter for this as well? Scoring is one point-per-kilometre. MMC entries to: I4LCK (ARI VHF Manager), Via Sigonio no. 2, I-40137 Bologna, Italy, and post them by Jan. 1, 1979.

## Satellite News

*Oscar 7* continues to give AMSAT headaches. As the RTTY and CW telemetry has been gibberish for some time, it is impossible to deduce what has gone wrong with Mode "B" operation. It is most important even so that TLM reports are sent in and this is where short wave listeners can play a vital role. TLM copy should be sent in on special forms available from G3AAJ, 94 Herongate Road, London, E12 5EQ. Please send a 9 x 4 inch *s.a.e.* marked "TLM Forms" in the top left corner.

AMSAT has authorised normal use of *O-7* on both modes "A" and "B" from Oct. 11 but *please* keep your power down to 100 watts *e.r.p.* and use the least amount of power you can, otherwise an early demise of the satellite is certain. There is a nationwide AMSAT net on Sunday mornings from 1015 local time on 3780 kHz from which the latest news can be gleaned. In the London area, there is a net on Sunday evenings at 7.30 local time on 144.28 MHz.

There still seems to be several sets of figures for *Oscar 8's* orbit, but the following are the official AMSAT-USA ones on which the 1979 Orbital Calendar has been worked out. They are: *Period*, 103.233890 minus 1.016 x 10<sup>-6</sup>N minutes and *Longitude Increment*, 25.809236 minus 2.071 x 10<sup>-7</sup>N degrees West, where N is the orbit number. The "minus" parts are drag factors and to put these into perspective, it

means that the orbit will have shortened by *one second* by the end of May, 1981! Based on the foregoing, the reference orbit for October 29, no. 3310, works out as 00.11 GMT at 44°W equatorial crossing, in round figures. Subsequent orbits for November can be worked out using a period of 103.23 minutes and longitude increment of 25.80°.

The W6PAJ Orbital Calendars are not expected to arrive in time for the New Year. However, the January 1979 pages will be available by mid-December from AMSAT-UK Secretary Ron Broadbent, G3AAJ. Inquiries *with s.a.e.* to 94 Herongate Road, London E12 5EQ.

## Repeater Topics

A further nineteen UHF repeaters have been licensed. GB3PT, located at Barkway Ridge, Herts. (AM71f), is the first RTTY repeater on RB12, which is 434.90 MHz input and 322.30 MHz output. The output is 25 watts *e.r.p.* to a vertical aerial 130ft. up the GB3PI tower. The Tx is F2 at 45.45 *Bauds*, 170 Hz shift (1275/1445 Hz). Further details from G4BAO whose phone no. is: 0223 61222.

## Scottish VHF Convention

Your scribe had fully intended to attend the Scottish VHF Convention on Sept. 30 but other commitments made this impossible. Consequently, these notes have been compiled from information from some who did. The trade exhibition included a display of vintage wireless gear by the Aberdeen club, and stands by the GB3CS and GB3HI repeater groups. AMSAT-UK had a stand as did the RSGB and the bring-and-buy stall was well supported. New items on show were the *Tonna* aerials from the F9FT stable, the U.K. agents for which are *Random Electronics* of 12 Conduit Road, Abingdon, Oxon., OX14 1DB, and the very sturdy, German *WISI* range of aerials obtainable from Paul Gobey, G8IYG, 5 Buckland Road, Parkside, Stafford.

The lectures comprised a meteor scatter talk by G3SEK and G4DGU, a session on digital techniques by GM3ZBE, and Charlie Newton, G2FKZ, on his beloved *auroral* topics. It seems that the RSGB

Open Forum was somewhat disappointing.

The dinner was a sell-out with the maximum of 200 attending. Organiser Graham Knight, GM8FFX, had to disappoint 100 others who wanted tickets. A mysterious gift-wrapped box presented to the RSGB President and General Manager was eventually opened to reveal a wreath. "In memory of the RSGB Repeater Programme!" The unanimous opinion was that this was a very successful event.

### Project CAMEO

Many readers will have heard reference to *Project CAMEO* on GB2RS News Service in recent weeks. This is an experiment to release vapourised Lithium metal in the northern auroral zone at an altitude of 970 kms. This would produce both visual and radio auroras. However, *NASA* has had problems with tape recorders in the *Nimbus G* satellite which is to be carried by the same launch vehicle, so much so, that, at the time of editing, the earliest launch date is Oct. 23. The *CAMEO* package cannot be released till 4/5 days later—just about publication date if all goes to plan.

It will now be a daytime release to the north of the U.K. so we will be denied the chance to witness a spectacular, red aurora. However, it is possible that radio auroral propagation could be enhanced, perhaps up to 100 MHz. News of the launch should be broadcast by GB2RS, after which daily up-dated information can be obtained from a telephone answering machine on 01-388 1744. The actual experiment will be controlled from Tromsø in Norway. Your reports of abnormal VHF propagation following release of the Lithium would be welcomed and they will be passed on to the appropriate researchers.

### Auroral Propagation

According to Charlie Newton, G2FKZ, the cause of the background auroras so frequently reported in Scottish latitudes is associated with "coronal holes" on the Sun. These are where the Hydrogen is converted into Helium so huge energy is involved. These

### THREE BAND ANNUAL VHF TABLE

January to December 1978

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3SPJ	58	7	66	16	41	9	197
GD2HDZ	45	5	59	11	36	7	163
G3CO	49	7	54	15	23	8	156
G2AXI	43	7	54	14	30	7	155
G4ERX	27	2	57	16	29	10	141
G4BWG	23	4	58	17	19	7	128
G8BKR	—	—	72	16	31	5	124
G8HHI	—	—	62	19	33	6	120
G8LEF	—	—	53	14	38	13	118
G8GXP	—	—	55	12	40	7	114
G4DEZ	—	—	75	26	—	—	101
G3FPK	—	—	78	22	—	—	100
G8MFJ	—	—	61	14	22	2	99
G18EWM	—	—	62	12	18	6	98
GJ8KNV	—	—	51	17	21	9	98
G4AEZ	23	4	36	10	19	5	97
G3FIJ	31	3	40	6	14	2	96
G4BYP	9	3	44	9	25	6	96
G4GEE	—	—	54	8	29	3	94
G8KSS	—	—	69	17	—	—	86
G4FRE	—	—	48	7	24	3	82
G8ITS	—	—	46	9	23	3	81
G4HAO	—	—	67	12	—	—	79
G8APZ	—	—	57	16	4	1	78
G8KGF	—	—	60	16	—	—	76
GJ8ORH	—	—	42	16	7	6	71
G8GML	—	—	31	8	25	6	70
G8OGD	—	—	42	9	9	5	65
G8JJR	—	—	51	10	—	—	61
GM4CXP	—	—	44	14	1	1	60
G8BIJ	—	—	50	9	—	—	59
G3KPU	—	—	51	8	—	—	59
G4GXT	—	—	51	8	—	—	59
G8GRT	—	—	35	4	15	3	57
G8MKW	—	—	47	9	—	—	56
G4FK1	6	1	29	6	9	1	52
G8NYS	—	—	44	8	—	—	52
G4GET	—	—	42	9	—	—	51
GJ8AAZ	—	—	31	6	7	5	49
G8LHT	—	—	36	10	—	—	46
G8JGK	—	—	29	9	—	—	38

"holes" can only be detected spectrally by observing where the Helium line at 10,830 Angström units occur, by scanning the Sun which one observatory does. Using past data from the National Bureau of Standards Propagation Section in Boulder, Colorado, it has been possible for Charlie to correlate many past auroras with coronal holes with a big "success rate."

However, intense events, such as the August 28 and September 29 ones, are undoubtedly caused by a different mechanism. The former followed the sudden collapse of a "filament" measuring 0.8 solar diameter into a relatively short stump over a twenty minute period. It seems the remnant of this filament was shot at the Earth at high velocity. As these filaments are unprecipitable, this explains why these very intense auroras take us all by surprise.

It seems that solar flares are not the cause of this sort of event, after all. Over the next few years, G2FKZ wants to obtain as many observations as possible from VHF operators on the weak auroras in more southerly latitudes, the kind most operators miss. So, if you hear any, even though you may not work anyone, please report them. Another interesting fact that has emerged over the past year or so is that the time pattern of auroras has changed in that we are getting more morning and early afternoon ones and fewer night phases. Could this be a pattern associated with the run-up period to a sunspot maximum?

### Twenty-three Centimetres

Welcome to new correspondent Nick Grundy, G8PRG, from Doncaster. He has a 23 cm. aerial up already and hopes to be QRV on the band soon. Dave Robinson, G4FRE, from Nuneaton, has been doing tests with Glen Ross, G8MWR, in Coventry, using a *Microwave Modules* converter/Yaesu FT-200 and *Quad Loop Yagi* set-up. Results were disappointing until a G3WJG preamp was built and the Q-L-Y moved 2m. further away from other aerials. This brought about a dramatic improvement. By now, Dave should be transmitting too and mentions various construction products. 23 cm. operation from XN



Chris Rycroft, G4FES, is claiming a 'first' with a 2m. FM mobile-to-mobile contact on July 30th with fellow-motorcyclist Bob Smith, G8NCT. Both riders operate semi-permanent installations: G4FES/M uses a Trio TR-2200G transceiver and whip aerial on his Honda CJ250T, while G8NCT runs an Icom IC-240 and whip aerial on his Honda GL1000 "Gold Wing." These two regularly operate mobile on their machines, and this particular QSO was on simplex; they hope 70 cm. mobile will follow before long.

square is promised for next summer. The high spot for Arthur Breese, GD2HDZ, was working G4FXW (Sheffield) in the Region 1 contest on Sept. 10, the sole QSO on this band.

### Seventy Centimetres

Jack Kay, G3CO (Essex), managed his first GJ QSO the weekend of Sept. 23/24 together with a Frenchman in XI but activity seemed limited in spite of the good tropo. conditions. The same period rewarded Colin Wooff, G3SPJ (London), with GU8IRF, GJ8KNV and F1CBH, the latter being a new country. From Leeds, Clive Morton, G4CMV,

reveals he is now QRV on the band via a *Microwave Modules* transverter to an 88-ele. *Multibeam* at 50ft.

G4FRE relates his exploits during University vacation periods and has done quite well with his FT-200 and *MM* transverter to a 46-ele. *Multibeam* at 6m. a.g.l. Dave now has a BFR91 masthead preamp. He reckons the GB3WHA beacon (AL71d) on 432.81 MHz to be the most reliable signal for tweaking receivers. He has heard GD2HDZ frequently but has never managed to contact Arthur. A coaxial line, single 4CX250B amplifier is on the stocks, hopefully to be worked on

during this term at UCNW at Bangor.

Mike Harsey, G8ATK (Surrey), uses a *Yaesu* FT-221R/MM transverter/QQV06-40A combination with a couple of 18-ele. *Parabeams* at 50ft. His list includes many French stations worked on Sept. 22/23 in the "H," "I" and "J" lines of squares.

During the Region 1 Contest on Sept. 10, John Woodham, G8BKR (Bristol), worked GD2HDZ on SSB. He mentions a narrow duct into the Paris region on Sept. 22 when F1CF (BI12b) was worked. The following morning he raised F6ECI (BI13) and F6APE (ZH76). On Sept. 18, EA1CR was only RS41 with John but Harry Gratton, G6GN, a mere 1 km. away, worked Ruben at RS58. Barrie Moss, G8OGD (Nottingham) has been licensed about a year and is on the band using his *FDK* Multi-2700/MM transverter combo. and 16-ele. slot aerial, used on the satellites as well as for terrestrial QSO's. Ray Elliott, G4ERX (Essex), is another reader who worked GJ8KNV in the Sept. 23 lift and the month also brought QSO's with Merseyside, Lincs., and Hants.

### Two Metres

First time reporter John Parry, BRS 39774, wrote from St. Brelade in Jersey to say he uses an *Icom* IC-245E, mobile, with a five-eighths whip on the front wing. The weekend Sept. 22-24 brought in the Danish repeater, OZ3REK, in Esbjerg on R2, the French Le Mans one on R4 and the Paris one on R6, plus some distant U.K. ones.

G3CO missed most of the good tropo. but reports that Mike Lee (Basildon), G3VYF, worked C31RO and F2PC/P (BC) mid-month. On Sept. 23/24, Jack heard 5 GU's on at the same time while on the 18th, EA1CR was a very consistent signal. G3SPJ worked into GU and GJ on the 24th. G4ERX's log also shows GJ and GU contacts on the 23rd, plus the rare West Glamorgan county on the 17th, thanks to GW3EHN.

G4FRE acquired his *MM* transverter on July 8 and has been making good use of it with a 5-ele. yagi. Dave also operates from the Hall of Residence at UCNW in Bangor, using a *Trio* TS-700G, QQV06-40A amplifier and 14-ele. *Parabeam* 30m. a.g.l. A 2m. linear using eth

G4AJW PSU is on the stocks. Bob Mackean, G4HAO (Liverpool) is delighted with his new *Icom* IC-202 and *MEL* 202-25-P amplifier. In the Region 1 Contest he clocked up 63 QSO's worth around 940 points. On Sept. 17, Bob worked Mike Higgins, EI0CL (VN56d) in Co. Galway.

### QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3POI	—	—	258	258
I4EAT	—	25	217	242
G3SEK	—	—	179	179
G3CHN	—	—	160	160
G3FPK	—	—	153	153
G4DEZ	—	—	142	142
9H1BT	—	—	138	138
G4CMV	—	12	135	147
GM4CXP	—	25	129	154
9H1CD	—	13	127	140
G8HVY	—	59	118	177
G4BWG	—	29	118	147
G3XCS	—	21	111	132
G8BKR	1	26	107	134
G8GML	11	63	106	180
GM4COK	—	9	106	115
G8HHI	—	30	101	131
G3OHC	4	31	98	133
G8LEF	10	52	95	157
G4BAH	—	32	92	124
G4AWU	—	—	90	90
G4FCD	—	22	89	111
G3JXN	26	66	88	180
G8ATK	—	29	88	117
G6UW	—	—	85	85
9H1C	—	—	83	83
G2AXI	1	48	82	131
G8IWA	—	30	82	112
GJ8ORH	—	22	82	104
G4FBK	—	5	82	87
G3KPU	—	12	81	93
G8JHX	—	—	80	80
G8JJR	—	—	79	79
GJ8KNV	—	26	76	102
G8KGF	—	—	76	76
G3COJ	17	61	75	153
G8KPL	—	—	74	74

G8KSS	—	—	74	74
G8LGL	—	1	73	74
G8KSP	—	2	72	74
G8JAG	—	—	72	72
GM8NCM	—	11	71	82
G8LHT	—	1	71	72
G4GET	—	—	70	70
G4DKX	5	30	68	103
G4ERX	1	26	67	94
GJ8AAZ	1	24	67	92
GD2HDZ	10	32	66	108
G8GII	—	22	63	85
G3FIJ	—	27	62	89
G8KLN	—	1	62	63
G4CIK	—	—	62	62
G4GCQ	—	—	61	61
G8KUC	—	7	60	67
GD3YEO	—	8	59	67
G8JEF	—	—	58	58
G4AEZ	2	22	57	81
G8ITS	—	13	57	70
GW4FJK	—	—	57	57
G8HUY	—	28	56	84
OZ9IY	—	—	53	53
G4GEE	—	24	50	74
G8IFT	7	18	49	74
G8MFJ	—	9	48	57
G4GSA	—	1	48	49
G3BW	1	21	47	69
G4EYL	—	—	41	41
G8EOP	8	36	38	82
G8JGK	—	—	37	37
G8JAH	—	1	35	36
G8JAJ	—	—	24	24
G8JKA	—	—	21	21
G8PRG	—	—	15	15

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

Although only licensed on Aug. 23, G8PRG dived into the Open Contest on Sept. 2/3 working 15 squares in his 60 QSO's. Nick's best DX were F6CTT/P in ZJ34a, F6ASP/P (AK19a) and GM3WOJ/P (YP10a), his first GM. The rig is a *TS-700S* to an 8-ele. yagi at 35ft. GD2HDZ added Belgium to the country score for 1978, plus another 5 U.K. and

Irish counties. Steven Ruff, G18EWM (Co. Antrim), used the good tropo. to the south of Sept. 23 to work GU2FCZ. For GJ8ORH, Sept. 9th and 16th provided contacts with DL's and a PE in DJ, DK, DL, DM, EI and EJ squares, while EA2CA (YD60c) was a welcome addition on the 13th. Geoff has now worked 78 French departments and has the Dept. 35 awards on VHF and UHF.

On Sept. 29, there was a spectacular *aurora* which was enjoyed by many stations as far south as Italy. Fausto Minardi, I4EAT (FE60), had about a dozen contacts and I3LGP (GF) was also in on the act. Clive Morton, G4CMV, operated from GM8FFX's QTH for this event and opened his innings at 1205 GMT. Furthest south worked was F6CER (BI22c) with OH3AZW the most north-easterly station logged. The countries listed included, DL, DM, F, OH, OK, OZ, PA, SM and SP. QTF's were 20-30° and operation stopped at 1517. From 1625, he operated portable from

ZR41c for 1½ hours working a few G's, SM and a DF, the last QSO being with G3MOU (AL65j) at 1741. Clive was also in on a couple of earlier events from Graham's QTH. On the 25th, from 1500 GMT, SM4GGC (GT80c), SM7FJE (GQ56b), OZ1OF (EQ78b), SM7GWU (HS75c), LA8AK (ES44j) and LA4YG (FT13g) were worked before closing down at 1600. On the 27/28th from 2327 to 0035 GMT, OZ9KT (EP09a), DJ9BV (EN40c), LA9TL (FT14j?), SM5CUI (IT09b), SMØEJY (IT69b), LA3TI (CU47h) and SM4IJS (HT56d) were contacted.

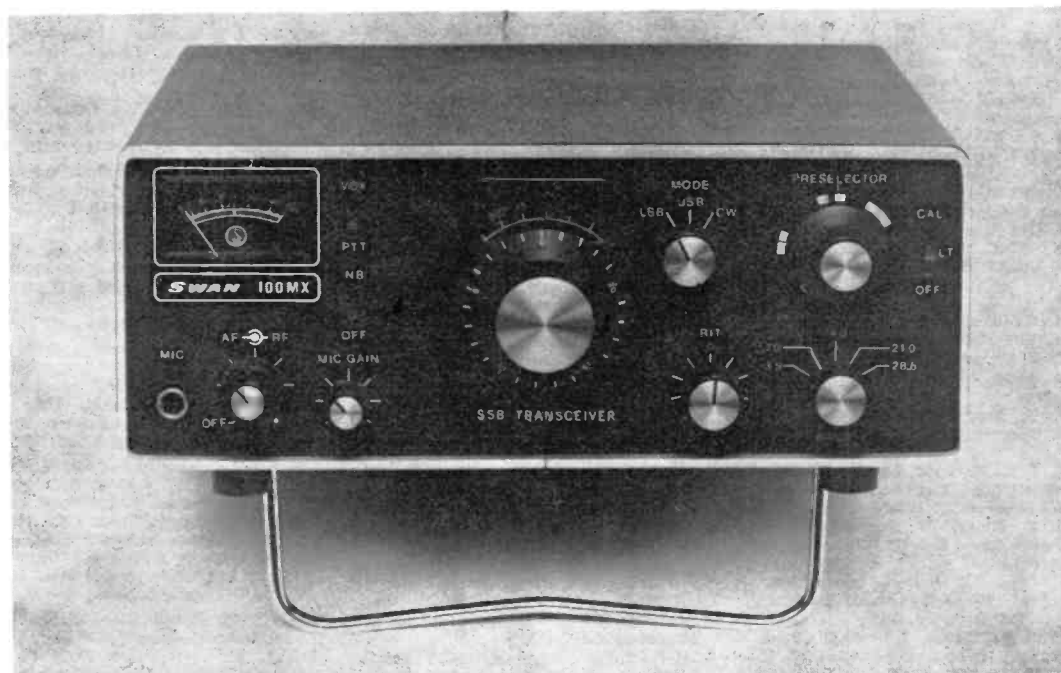
Jon Dougherty, G3FUT (Tyne & Wear) copied the GB3LER and OH8VHF beacons *via auroral E* at 2315 GMT on Sept. 25, the former on-and-off for 15 mins., the latter for 2 mins. He describes the tone of the forward scatter signals as "musical" and reckons, "... they sounded like trumpets!" At 2320 GMT on the 27th, Jon worked OY5NS (WW77f) at RST55a and wonders when OY was last worked

*via Ar* from England?

Steve Etheridge, G8JHX (London) was home for the big Sept. 29 affair the first station worked being at 1450 GMT, G18JPG (WO40d) followed by G18NHV (WO49g) at 1502, QTF's being 30° and 50° respectively. GM8NCM (YQ75h) was contacted at 1517 (45/60°) At 1629 came GM8NRL (YR70j) and lastly G18EWM (XO21j) at 1651. G's in YL and ZO were also worked but Steve reckons SSB activity was very sparse. Ingebrigt Lunde, LA3WU (CU47d) was monitoring the band but heard no *Ar* signals at all. Probably the *aurora* was overhead?

### Deadlines

That's it for another month. All your claims, comments, successes, etc., for the December issue by November 2 please, and for the January feature by November 30. Everything to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.



Swan Electronics' new solid-state 100 MX mobile transceiver, featuring a PTO with 1 kHz readout resolution, built-in noise blanker and VOX, semi-break-in CW with sidetone RIT control, and 25 kHz built-in calibrator and preselector for transmit and receive. Full specification available from *Amateur Electronics UK*.

## NEW QTH'S

This space is for the publication of the addresses of holder of new callsigns, or changes of address, in EI, G, GC, GD GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: "New QTH Page," *SHORT WAVE MAGAZINE*, 34 HIGH STREET, WELWYN, HERTS, AL6 9EQ.

EI1DH, W. T. Byrne, 52 Galtymore Road, Drimnagh, Dublin 12. (Tel. Dublin 507141.)  
 EI2DJ, M. L. Wright (G4GXN), 5 Woodview Park, The Donahies, Dublin 13.  
 G3CNN, R. L. Cherry, 82 Napsbury Avenue, London Colney, St. Albans, Herts. AL2 1LS (re-issue). (Tel. 0727-22142.)  
 G4GKZ, R. Revill, 74 Selworthy Drive, Stafford ST17 0PP. (Tel. Stafford 63387.)  
 G4GMW, M. E. Weaver (ex-G8GMW), "Carlyon," 22 Greenhill Road, Alveston, Bristol, Avon BS12 2LZ. (Tel. 0454-417899.)  
 G4GOG, T. F. Densham, Dew Cottage, Portway, Canon Pylon Road, Burghill, Hereford HR4 8NH.  
 G4GRO, P. M. D. Cronin, Royal Sovereign Lighthouse, c/o Shoreham Airport, Shoreham-by-Sea, W. Sussex.  
 G4GUW, G. G. Baggott, 61 Sutton Road, Walsall, West Midlands WS1 2PQ.  
 G4GWA, G. Scriven, "Kingsthorpe," 9 Coggles Causeway, Bourne, Lincs. PE10 9LN.  
 GD4GWQ, Mrs. Anthea Matthewman (ex-GD8LFA), 20 Terence Avenue, Douglas.  
 G4GXN, M. L. Wright (EI2DJ), 16 Hughenden Road, High Wycombe, Bucks. HP13 5DT.  
 G4GXT, M. J. Pym (ex-G8BJC), 48 Weald Rise, Harrow Weald, Middlesex.  
 G4GXU, G. W. Grieseson, 6 Spinney Bank, King's Sutton, Banbury, Oxon. OX17 3RL (appeared in error under G4GUX in August issue.)  
 G4GYS, J. A. Plested, 24 Farm Way, Bushey, Watford, Herts. WD2 3SS. (Tel. 01-950 6056.)  
 G4GYU, J. M. Coates (ex-G8GFC), 30 Abbott Road, Mansfield, Notts. NG19 6DD. (Tel. Mansfield 27257.)  
 G4GYY, H. C. Rumbelow, 30 Welford Place, London SW19 5AJ. (Tel. 01-947 4326.)  
 G4HAF, J. H. Watt (ex-G8MPN), 19 Princes Gardens, Codsall, Wolverhampton, Staffs. WV8 2DH. (Tel. Codsall 3509.)  
 G4HBI, F. Cassidy (ex-G8KNP), 55 High Bank Road, Droylsden, Manchester M35 6FS.  
 G4HBL, G. Hardy (ex-G8AEF), The Mill House, Theame, Beverley, North Humberside.  
 G4HBX, J. S. Harwood (ex-G8OCZ), 195 Fitzwilliam Road, Eastwood, Rotherham, South Yorkshire S65 1NB.  
 G4HCS, E. Rigby, 79 Slaidburn Drive, Accrington, Lancs BB5 0JJ. (Tel. Accrington 391243.)  
 G4HFL, D. T. Busby (ex-G8ELB), "Caradoc," 50 Derby Road, Duffield, Derby. (Tel. Derby 840353.)  
 G4HFS, M. K. Davies, 7 Newbolt Close, Paulerspury, Towcester, Northants NN12 7NH. (Tel. 032-733 314.)  
 G4HGK, J. D. T. Davis, Hurstborne, West Down Road, Bexhill-on-Sea, East Sussex TN39 4DY.

G4HGO, K. J. Cowman (ex-G8PEI), 67 Halsdon Avenue, Exmouth, Devon EX8 3DN.  
 G4HHR, A. L. Hyner (ex-G8MZT), 22 St. Mildred's Avenue, Birchington, Kent CT7 9LD.  
 G4HIN, R. C. Twiggs, 31 Westlands Avenue, Huntercombe, Slough, Berks SL1 6AH. (Tel. Burnham 04689.)  
 G4HJU, L. Graham, 4 Banks Avenue, Meols, Wirral, Merseyside L47 0NQ.  
 G8BKG, D. F. Wright, 61 Potton Road, Eynesbury, St. Neots, Huntingdon, Cambs PE19 2NN (re-issue). (Tel. 0480 73702.)  
 G8NPT, A. J. Work, 61 Morton Lane, Beverley, North Humberside HU17 9DA. (Tel. 0482-881625.)  
 G8OGD, P. B. Moss, 7 Waltham Road, Ravenshead, Nottingham NG15 9FP.  
 G8OGD/A, P. B. Moss, c/o Trent Polytechnic, Burton Street, Nottingham. (Tel. Nottingham 48248 Ext. 2081.)  
 G8OOW, R. D. Wilson, 112 Uppate, Louth, Lincs. LN11 9HG. (Tel. 0507-2220.)  
 G8OQN, J. M. Short, 130 Essex Road, Southsea, Hants. PO4 8DJ.  
 G8PHW, S. R. Gay, "Highfield," Langdon Cross, Launceston, Cornwall PL15 8NL. (Tel. 056-685 256.)  
 GW8PKA, D. S. Morgan, Penybont, Gellilyon, Blaenau Ffestiniog, Gwynedd LL41 4ED. (Tel. 076-685 341.)  
 G8PKD, M. East, F.S.V.A., Forty One Avenue Close, Avenue Road, London NW8 6DA. (Tel. 01-722 7040.)  
 G8PKU, F. B. Le Cocq, Les Cailloux, Green Road, St. Clement. (Tel. 0534-37166.)  
 G8PMM, E. G. McArdle, "Eymvale," Littleboro' Lane, Marton, Gainsborough, Lincs. DN21 5AB.  
 G8PQD, P. D. Gaskell, 131 Greenfield Road, Dentons Green, St. Helens, Lancs. WA10 6SH. (Tel. 0744- 25472.)  
 G8PQU, S. J. P. Budd, 54 Salvington Hill, High Salvington, Worthing, West Sussex BN13 3AZ.  
 G8PRX, M. C. Walker, 100 Langdale Road, Woodlesford, Leeds, West Yorkshire LS26 8XF. (Tel. Leeds 822968.)  
 G8PSE, A. P. Ball, 11 Burlington Road, Enfield, Middlesex.  
 G8PTB, J. F. Budd, 54 Salvington Hill, High Salvington, Worthing, West Sussex BN13 3AZ.  
 G8PUJ, W. MacDonald, 40 Latchett Road, London E18 1DJ.  
 G8RCT, D. A. Ashton, 12 Juniper Close, Swindon, Wilts. SN3 4DZ.

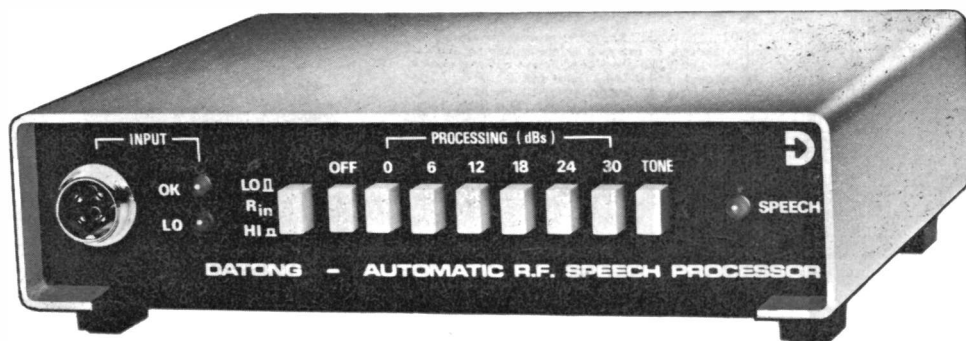
## CHANGE OF ADDRESS

G2BZQ, R. Q. Marris, c/o Danavox Inc., Suite 321, 4550 W. 77 Street, Minneapolis, Minnesota 55435, U.S.A.  
 G3AGF, R. L. Edginton, "The Firs," Gloucester Road, Andoversford, Glos. GL54 4HR.  
 G3FPJ, A. A. Littlewood, "The Bannuts," Broadhempston, Totnes, Devon.

G3LMC, J. Batham, 3 Mill Road, Houghton Regis, Dunstable LU5 5BD.  
 G3LOV, M. J. Francis, Ivanhoe Lodge, 11 Peveril Drive, The Park, Nottingham NG7 1DE. (Tel. 0602-42973.)  
 G3NQX, W. H. Brown, 188 Vicarage Drive, Kendal, Cumbria.  
 GM3ODM, W. C. McCrossan, 16 Westfield Road, Port Glasgow, Inverclyde PA14 6BZ. (Tel. 0475-43896.)  
 G3PPR, Dr. J. R. G. Beavon, 26 St. Catherine's Way, Sherborne, Dorset DT9 6DF.  
 G3PVC, J. E. Merrett, 145 Fawnbrake Avenue, Herne Hill, London SE24 0BG. (Tel. 01-733 3023.)  
 G3RZK, B. R. Tibbert, 32 Prescott Close, Silverhill Estate, Mickleover, Derby.  
 G3SMK, G. Eaton, 288 Norton Lane, Earlswood, Solihull, West Midlands B94 5LP. (Tel. Earlswood 3423.)  
 G3TAS, W. Smith, 13 Hornbeam Road, Stowupland Heights, Stowmarket, Suffolk IP14 4DJ. (Tel. Stowmarket 3308.)  
 G3TFW, Dr. P. Posford, 11 Whitgift Avenue, South Croydon CR2 6AZ.  
 GM3TNT, D. R. McArthur, 5 Langwell Crescent, Wick, Caithness.  
 G3TWX, D. C. Woodhouse, 13 Gannet Close, Haverhill, Suffolk CB9 0JL.  
 G3UFU, J. L. Barry, 10-A Henbury Close, Bronshill Road, Torquay, Devon TQ1 3HR.  
 G3VTC, F. Bolton, 2 Lower Coombe Road, Bindwell Park, Kingsteignton, Newton Abbot, Devon. (Tel. Newton Abbot 3025.) (appeared in error under G3VTO in April issue.)  
 G3XLY, Dorothy Barry, 10-A Henbury Close, Bronshill Road, Torquay, Devon TQ1 3HR.  
 G3XPA, R. W. Bevan, 12 Kitwood Drive, Solihull, West Midlands B92 9FN.  
 G3ZDZ, J. M. Halton, 8 Linden Way, High Lane, Stockport, Cheshire SK6 8ET. (Tel. Disley 3319 (evening), Wilmslow 22860 (daytime).)  
 G3ZOH, B. George, 2 Gleeson Drive, Orpington, Kent. (RSGB QSL Bureau sub-manager for calls G4GAA-G4HZZ.)  
 G4AGM, R. Williams (ex-V8PJR/DA2XW, DJ0HY), Flat 8, Oak House, Oak Grove, Cricklewood, London NW2. (Tel. 01-450 4456.)  
 G4CTW, F. J. Radwell, Flat 16, Charles Ley Court, Dennis Close, Fawley, Hants.  
 G4CZF, D. K. Wilkins, 64 Bedford Road, Reading, Berks.  
 G4EHS, J. Dowsett, "Cornerways," Latchley Plain, Cox Park, Gunnislake, Cornwall.  
 G4EJM, M. S. West, Gorsty Croft Farm, Foxt, Ipton, Stoke-on-Trent, Staffs.  
 G4FHB, W. A. McFaul, 6 Salisbury Crescent, Kilkenny, Londonderry.  
 G4FLJ, A. C. Thompson, "Little Pippin," 11 Lodge Road, Sharnbrook, Beds. MK44 1JP. (Tel. Bedford 781393.)  
 G4GFQ, R. Sheppard, 48 Tennyson Avenue, Thornton-Cleveleys, Lancs. FY5 2ET.  
 G4OG, D. Gordon, Hardwick House, c/158 Sandgate Road, Folkestone, Kent.  
 G5RI, F. J. U. Ritson, Red Lion House, Hexham, Northumberland NE46 1UL.  
 G8AWH, M. C. Marchbank, 5 Croftlands, Idle, Bradford, West Yorkshire.  
 G8HYY, K. Dixon, First Floor Flat, 50 Ferme Park Road, London N4 4ED.  
 G8NQC, P. Manser, 61 Galsworthy Drive, Caversham Park Village, Reading, Berks. RG4 0QB.

# NEW: THE "INTELLIGENT" R.F. SPEECH PROCESSOR

## MODEL ASP — THE FIRST FULLY AUTOMATIC R.F. SPEECH PROCESSOR WITH CALIBRATED PUSH-BUTTON CONTROLS



- ★ No manual input level control required
- ★ Instant selection of 0, 6, 12, 18, 24 or 30 dBs of true R.F. clipping for maximum talk-power enhancement
- ★ Unique "TONE" button simplifies transmitter adjustment
- ★ LO/HI microphone impedance matching

### PUSH-BUTTON CONTROL

Model ASP sets remarkable new standards of performance and ease of operation for speech processing equipment. As well as providing the genuine 6 to 10 dBs of talk power improvement without harmonic distortion which has made our Universal R.F. Speech Clipper world famous, Model ASP adds the ultimate convenience of instant push-button selection of the degree of R.F. processing. This ranges all the way from 0 to 30 dBs in 6 dBs steps.

Input level adjustments or meter watching are completely eliminated and the automatic control system ensures that you always get exactly the amount of processing that you want despite changes in voice level, or even despite changes in microphone.

With Model ASP you simply select the processing to suit conditions: 0 to 6 dBs for semi-local work; 12 or 18 dBs for DX work; and 24 or even 30 dBs for when the going is really rough.

### UNIQUE SET-UP AID

Having eliminated input setting controls, Model ASP goes even further and simplifies the setting of the transmitter microphone gain. Simply press the "TONE" button and the unit generates a sine wave with the same peak-to-peak amplitude as the processed speech output. Once your transmitter mic. gain (or the preset output level control on the back of Model ASP) is set to give the desired peak P.A. current using this tone, it will be virtually impossible to overdrive the transmitter or to radiate a bad signal.

The result is that you can always rest assured that your signal is exactly as you want it, without the need to watch meters or to carefully control your voice level.

### TWO PROCESSORS IN ONE

Model ASP really consists of two processors in one case. The first is an audio processor and the second is a true R.F. clipper.

The audio processor is not intended to give any speech compression or talk-power enhancement; its job is instead that of an intelligent and unobtrusive yet thorough automatic peak level adjuster which ensures that the subsequent R.F. processor always has an accurately defined peak-to-peak input level. It is exclusively the job of the R.F. processor to boost the talk-power.

### PROVEN R.F. CLIPPING TECHNIQUE

The main processor uses the well proven R.F. clipping technique which has been so successful in our Models RFC and RFC/M. A high quality SSB signal is generated at 60 kHz using the phasing technique because of its smooth frequency response and its long term reliability. This SSB is then clipped, filtered, and demodulated back to audio. The result is an increase in the average to peak voltage ratio of the speech waveform yet without harmonic distortion.

Unlike some A.F. or R.F. compression systems which make you sound louder without improving your readability, true R.F. clipping actually increases the intelligibility of speech in noise. This effect acts in addition to the simultaneous increase in your average power level.

- ★ Connects between microphone and transmitter
- ★ Internal or external supply only 15 mA at 6 to 16v.
- ★ Eight ICs, eleven transistors, three LEDs
- ★ Elegant appearance complements any rig

### ADVANCED AUDIO PROCESSOR

The audio processor has the demanding job of maintaining a constant peak-to-peak speech amplitude despite wide variations in input level and yet without introducing any audible side effects. The circuit has been especially developed for this specialised purpose and is highly sophisticated. It involves detection of both positive and negative speech peaks to allow for the marked asymmetry of many speech waveforms; and five second "hang" time after speech ceases so that the background noise remains constant during speech pauses. So that the circuit is not fooled into a long term gain reduction by loud transients (such as from dropping the microphone) dual time constants are used in the control loop together with special logic circuitry to discriminate against non-speech sounds.

### ACCURATE CONTROL

As well as being highly convenient to use, Model ASP gives a far more accurate control of the degree of R.F. processing than processors which rely on the operator controlling his voice level to "talk-up" a meter to a desired reading. Moreover, the self-control needed for the latter method all too often evaporates in the excitement of DX operating. With Model ASP on the other hand, you can afford to get excited; the automatic control continues to look after your signal while you concentrate on the operating.

### FULL MONITORING

Even a control system with the wide range of Model ASP has its limits and three light emitting diodes are provided so that you can confirm at a glance that your input is within bounds. If your voice level is too low, the "LO" lamp will stay on. If your voice level is within the correct range the "OK" lamp comes on instead, and after a few seconds of speech (during which the processor will "learn" your voice level) it will stay on for about five seconds after you stop talking. This represents the "hang" time of the pre-processor. If both "LO" and "OK" lamps go off together your input is too large.

As a further refinement, the "SPEECH" lamp should stay on only while speech sounds are present. If it stays on between words there is too much background noise at the microphone for good intelligibility, and you should talk closer to it.

PRICE : £65 plus VAT (£73.13 total), including postage (UK only)  
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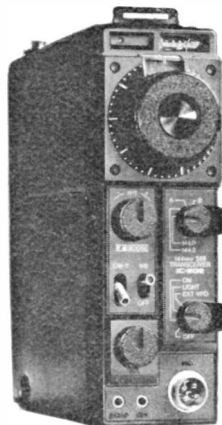
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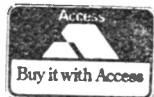
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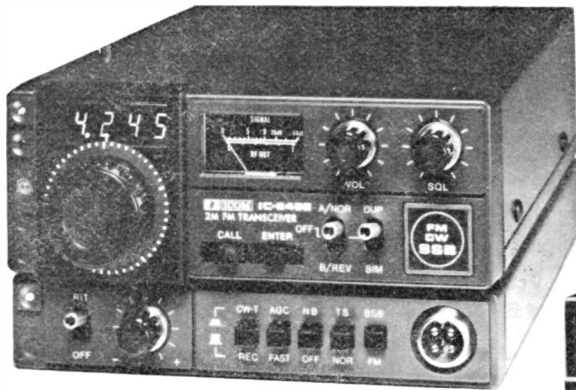
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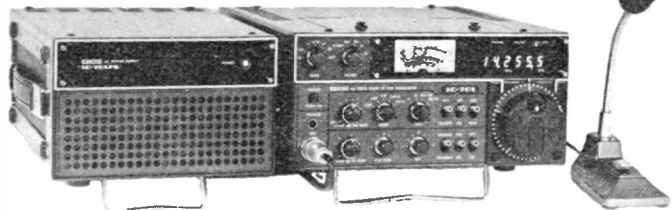
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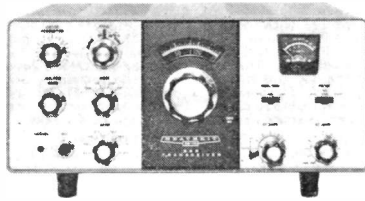
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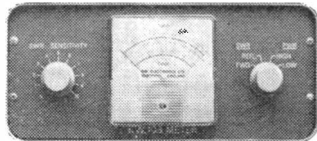
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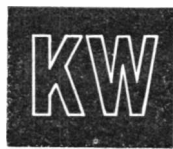
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OUTPUT FREQUENCY													
144-030 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
144-4 (433-2) ...	a	a	a	a	a	a	a	a	a	a	a	a	a
144-480 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
144-800 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
144-850 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
145-000/R0T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-025/R1T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	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	e
145-350/S14 ...	e	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	e
145-425/S17 ...	e	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	e
145-475/S19 ...	e	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	e
145-525/S21 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
145-550/S22 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
145-575/S23 ...	e	e	e	e	e	e	e	e	e	e	e	e	e
145-600/R0R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-625/R1R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-675/R3R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-700/R4R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-725/R5R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-750/R6R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-775/R7R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-800/R8R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
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Adj. tol. ± 30ppm	Temp. tol. ± 30ppm 0 to 60°C
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*63 to 105 MHz 5th Overtone ...	£3-36 (£3-78)

#### C High frequencies:

Adj. tol. ± 20ppm	Temp. tol. ± 30 ppm -10 to 60°C
105 to 180 MHz, £6-48 (£7-29)	180 to 250 MHz, £10-54 (£11-86)

Delivery: \*normally 4/6 weeks—all other frequencies 6/8 weeks.  
Holders: All V. Low frequencies are in HC13/U or similar, otherwise supplied in HC6/U, HC18/U and HC25/U are available at frequencies above 4 MHz. HC17/U (game pins as FT243) available at 25p (28p) above prices. Unless otherwise specified fundamental will be supplied to 30p circuit condition and overtones to series resonance.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS 100 kHz in HC13/U and 455 kHz in HC6/U, £2.95 (£3.19). 1 MHz and 5 MHz in HC6/U and 10 MHz and 10.7 MHz in HC6/U and HC25/U, £2.80 (£3.02).

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We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30—p.m. and ask for Mr. Norcliffe.

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# WILLIAM MUNRO (Invergordon) LIMITED

DISTRIBUTORS FOR NEC AMATEUR RADIO EQUIPMENT

## CQ—P2200E 2 METRE FM PORTABLE TRANSCEIVER

# NEC

### SPECIFICATION

#### General

#### Frequency range :

144.00 146.00 MHz.

#### Channels :

12 channels.

#### Microphone :

Dynamic type (10K $\Omega$ )

#### Speaker :

3W 8 $\Omega$

#### Supply voltage :

Built in batt. DC 12v. HP11 x 8,  
external power supply 13.5v.

#### Current consumption :

900mA at transmission.  
110mA at reception.

#### Semiconductors in use :

29 transistors 3 FET's  
16 diodes 2 IC's  
1 LED.

#### Dimensions :

196(w) x 69(h) x 219(d) mm.

#### Weight :

Approx. 2.6kg.  
(including batteries).

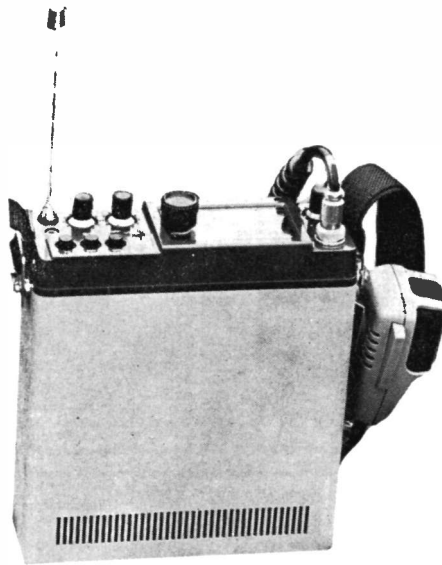
#### Transmitter

#### Emission type :

F3

#### Transmitting power :

3W. (at HIGH, approx.  
1W. (at LOW)



# NEC

#### Antenna impedance :

50 $\Omega$

#### Maximum frequency deviation :

$\pm$ 10 kHz

#### Modulation :

Crystal controlled variable  
reactance modulation.

#### Multiplication :

12

#### Undesired radiation :

$-$ 60 dB or less.

#### Repeater tone :

1750 Hz  $\pm$  2 Hz.

#### Receiver

#### Receiving system :

Double superheterodyne.

#### Intermediate frequency :

First IF 10.7 MHz.  
Second IF 455 kHz.

#### Sensitivity :

S/N 30 dB or more at 1 $\mu$ V input.

#### Squeich :

$-$ 6 dB or less.

#### Pass band width :

$\pm$ 10 kHz or more (at  $-$ 6 dB).

#### Filter :

Ceramic filter.

#### Low frequency output :

0.5W. (rated output)

#### Overall distortion :

10% or less at 1,000 Hz 0.5W.

This is a very well built piece of equipment with robust case and strong webbing carrying strap. All controls are on the top face making operation easy and comfortable. The built-in extending rod antenna can be used at  $\frac{3}{8}$  or  $\frac{1}{4}$  wave whip depending on the number of sections used. The battery compartment is recessed from the bottom of the unit and is held by one bolt giving easy access to compartment and the battery pack slides out without any connecting wires. External antenna socket is recessed into base. The microphone is particularly comfortable to hold and is the right shape and size.

The 1750 Hz repeater access tone operates on release of the P.T.T. switch thus giving a tone at end of transmission.

The transmitted output is switchable 3w. or 1w.

The meter serves as "S" meter on receive, and battery check on transmit.

An LED "ON AIR" Indicator is provided.

RIT is fitted.

FETS are used for RF stage and an IC for IF stage giving excellent sensitivity, cross mod. and limiting characteristics.

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(we will fit the channels of your choice—limit of 12)

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MNC1296/28 23cm. Converter	£31.50
MNC1296/144 23cm. Converter	£31.50
MMV1296 23cm. Tripler	£33.75
MMD050 50 MHz. Counter	£66.96
MND500P Prescaler	£27.00
MMD500P 500 MHz Counter	£85.32
MNT432/28 70cm. Transverter	£133.88
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PMH2/4M 2 way harness	£8.35 (75p)

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YH55	£8.75
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\* These items add VAT 8% others 12 1/2%

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(Inc. Carr. Plus VAT)

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CI44 Medium duty	£95.00
HAM II Heavy duty	£129.00
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2030 Memomatic	£48.00
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CD562 CDE (up to 2" and 1 1/2")	£5.00
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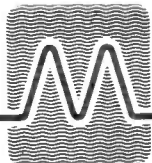
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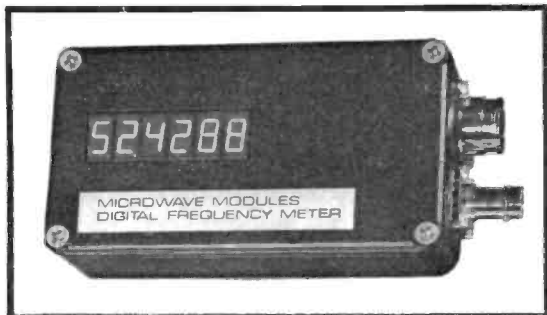
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# MICROWAVE MODULES LTD

## MMD 050/500 500 MHz DFM NOW ONLY £69 inc. VAT!!



SPECIFICATION	
Digit Height	: 10mm.
Display Width	: 45mm.
Case Size	: 111 x 60 x 27mm.
Frequency Ranges	: 0-45-50 MHz : 50-500 MHz
Sensitivity	: Better than 50mV RMS over 0-45-50 MHz : Better than 200mV RMS over 50-500 MHz
Input Connector	: 50 ohm BNC
Input Impedance	: 50 ohm
Power Connector	: 5 pin 270° locking DIN socket
Power Requirements	: 11-15 volts DC at 300 mA approximately

### FEATURES

- ★ 12 volt DC operation
- ★ 0-45-500 MHz coverage in two ranges
- ★ 100 Hz resolution on 50 MHz range
- ★ 1 kHz resolution on 500 MHz range
- ★ Reverse Polarity Protected

### GENERAL DESCRIPTION

Recent advances in MOS technology have made possible the development of this extremely compact frequency meter which for the first time offers the user a convenient cost-effective means of frequency measurement. A close tolerance quartz crystal in the 5 MHz range together with CMOS binary divider integrated circuits generate the accurate 400 mS gating period for the main counter MOS LSI circuitry. This LSI circuitry drives a multiplexed 6 digit LED display through current amplifiers. This display is fed from an internal store which is constantly updated from the main counter register and thus the display is continuous and flicker-free for a constant frequency reading. The display uses the latest high efficiency red LED's with a digit height of 10mm. and overall display width of 45mm. This counter has two ranges which are selected by supplying + 12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0-45-50 MHz range to a wide-band amplifier which drives a high speed TTL divider in the main counter logic. On the 50-500 MHz range the diodes switch in a high speed ECL prescaler and the decimal point is changed accordingly. A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200 Hz at 50 MHz, or 2 kHz at 500 MHz. The counter has reverse polarity protection and operates satisfactorily from a nominal 12v. DC supply. A suitable 5 pin DIN plug is supplied.

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- G.E.C. LANGOM V.H.F. POCKET SET FM, 3 channel, size 8 x 4 x 2, with mic., speaker and data ... .. £35

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HAMMARLUND HQ180 Receiver	£180-00 (£4-00)
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NOTE: 12½% VAT must be added to all prices, new and secondhand, except Test Equipment which is 8% inc. carr. and packing.

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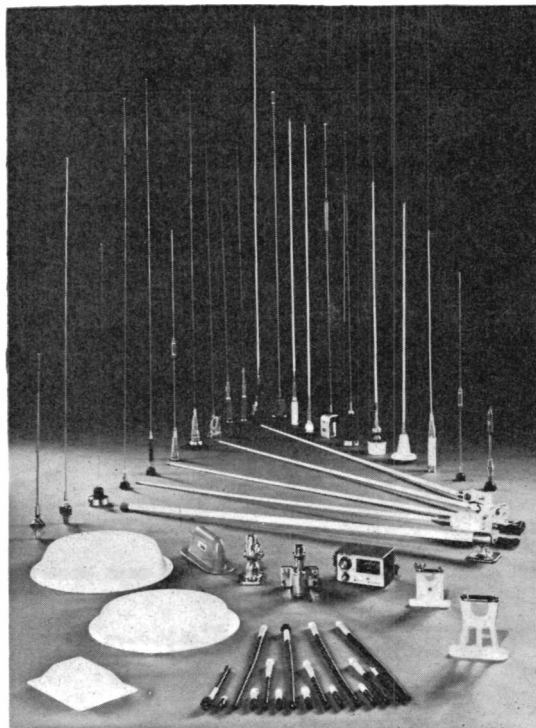
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**Wanted:** KW-2000B/E, will collect reasonable distance. Details and price please.—Dawson, P.O. Box 21, Addlestone, Surrey.

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**Selling:** American VHF Tx, originally rated 100w. AM continuous, 4X150A's in driver and PA stages, with matching AC PSU/Modulator, all connectors, mic., manual, large and heavy, ideal basis for QRO 2m. rig, £65 or near offer. Sommerkamp FL-200B SSB Tx, with spare 6JS6's and manual, £80. Would exchange either or both for VHF/UHF SSB equipment, with cash adjustment. Also selling B.41C Rx, 15-700 kHz, rough but working, £7. **Wanted:** Oscillator, frequency swept, for CT-381 equipment. Buyers collect.—Clyne, G8LIU, QTHR. (Tel: Uxbridge 30006 after 7 p.m.)

**Wanted:** Electroniques IF transformer Type DIF/1/1-6 Series 2.—Adalian, G2ACG, Herons End, The Drove-way, St. Margarets, Dover, Kent.

**Selling:** FR-101S, SP-101, YO-100, TR-2200GX, TR-3200, FT-221R and SP-120 speaker, all in excellent condition. Also Philips N.1500 VCR.—Morris, G4ENS, QTHR. (Tel: Luton 414179.)

**Wanted:** Preselector (Codar, etc.). **Sale:** Codar RQ-10X, £5.—Thompson, 16 Coniston Road, Reddish, Stockport, Cheshire.

**For sale:** Mustang Mk. II, £85. CDE TR-44 rotator, £70. Drake MN-4, £70. Hy-Gain BN-86 balun, £10. All as new.—Barry, 10A Hensbury Close, Torquay. (Tel: 0803-312879.)

**Wanted:** LF converter (up to 1 MHz) for RA-117E. (N. Ireland).—Box No. 5670, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

**For sale:** FT-221, £300 or near offer. Ampere 2m. 80w. linear, £85 or near offer. Buyers collect.—Gullis, G8MFI, QTHR.

**Sale:** FR-50B Rx, amateur bands 80-10m., good condition, £45.—Ring Carling, Lymington (0590) 73269 after 6 p.m.

**Selling:** FRG-7 receiver, as new, with Western Electronics antenna switch, £130.—Ring Tomlinson, Padgate 814394.

**Sale:** VFO-700S, mint, £65. Eddystone EC-10 Mk. II with mains PSU, £95. S.M.C. monitor 'scope, £55. Trio 700S, £450. **Wanted:** IC-211E.—Ring Moscrop, G4EMG, 01-534 3460 evenings, 01-471 1762 daytime. Shack clearance: R.308 Rx, 19-140 MHz, AM/FM/CW, £60 buyer collects. Sharp RD712D stereo tape deck, requires slight attention, £30. BSR TD10 tape deck, £10. Rank Precision Instruments 25kV. 6mA. power supply, no data, £15. Best Products 12kV. power supply, £12. 'Scope, 5in., converted to Varicap VHF panoramic monitor, £30.—Dykes, 162 Crofton Lane, Petts Wood, Kent.

**Sale:** FRG-7, under 6 months old, as new, boxed with manual, £150.—Renshaw, Tonbridge 355692.

**For sale:** Avo VR-378A signal generator, 2-250 MHz, £25. Avo Mk. IV electronic testmeter, £10. Triplet Type 1632 signal generator, £2. Advance square wave generator, less knobs, £5. Partridge LOZ-500 Joymatch, £5. Waveforms high-voltage tester, 30kV., £5. Leak TL10 mono amp., pre-amp. and tuner, tatty but working, £10. Telefonken mono reel-to-reel tape recorder, £5. Home-brew transmitter, Geloso VFO, useful for spares, £5.—Barratt, G4GHG, QTHR. (Tel: Torquay 37050.)

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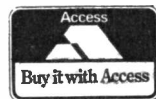
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Wanted: Page printer (commercial and met. copy), with or without keyboard. Must be working.—Box No. 5663, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

For sale: Receivers: Nems-Clarke VHF, £75; Trio, £65; Ex-WD set, £10. HP-524C electronic counter, £65. TS-382A/U audio oscillator, £35.—Ring Wright, Wigan 55948.

For sale: IC-201 with manual etc., also fitting PA-3 40673 pre-amp., £240. (Essex).—Box No. 5659, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Sale: Microwave Modules 432/285 transverter, latest model, new, £115. Icom IC-201 2-metre multimode, £235. Large home-built colour TV, 25in., £40.—Ring Blake, G3MWV, 0263-512872 evenings.

Sale: KW-160 ATU, £10. PM-2000 power meter, £30. Datong clipper, £20. Shure 444 microphone, £15. TV3300LP filter, £10. K.W. dummy load, £10. Class-D wavemeter, £5. SB-610 monitorscope, £20. Hustler GC144T 2m. collinear, £30. K.W. trap dipole, £10. Prefer buyers collect, otherwise carriage extra.—Baker, G3WTV, 16 Woodfield Road, Radlett Herts. (Tel: 01-739 3464 ext. 7752, daytime only).

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Selling: Collins 75A4 Rx, £250. Collins 32 2m. Tx, £60. Vanguard Tx, 160-10m., £25. BC-221, £18. Yaesu YC-355 counter, £60. Teletype 19 tape puncher, £10. Creed 7B/RP page printer, with perforator, £15.—Ring Coulman, 0482-653630 after 6 p.m.

Selling: Yaesu FT-620B Tx/Rx converted to 4m., 9w. output on SSB/CW, 3w. on AM, fitted with AM filter, £250. Buyer interests and collects.—Ring Gall, Downland 55342 early evenings (Surrey).

Sale: Heathkit GR-78 portable commercial Rx, as new, £80 or near offer. Kokusai mechanical filter Type MF-455-10CK, new, £10.—Hibberd, G3PYP, QTHR. (Tel: Melksham 708816, Wilts.)

For sale: Heathkit 'Mohican' with 14AVQ antenna. Or will swop for beam rotator.—Ring French, G3LGL, Kinver 2461 (Midlands).

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**Sale:** DX-160 realistic solid-state receiver, 150 kHz to 30 MHz SSB/CW, 5 bands, little used, with preselector and artificial earth, £75 or near offer.—Ring Penarth 709456 after 6 p.m.

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**For sale:** Trio TS-700S 2-metre multimode transceiver with external VFO-700S, digital readout, full duplex operation, absolutely as new (going QRT on 2m.), £525 or near offer.—Ring Elsdon, 01-686 6479 evenings.

**Selling:** Liner-2, spectrum analyser checked, fitted pre-amp., £105. Jaybeam 4-ele. 2m. quad, indoor use only, £12. Hamgear Oscar-amp., £10.—Ring Williams, G3RSJ, High Wycombe 446228.

**For sale:** Racal RA-17L communication receiver in cabinet, with handbook, excellent condition, £225.—Hanson, 6 Woodhall Place, Parkside Estate, Newcastle-under-Lyme, Staffs.

**Wanted:** Medium-wave valve receiver, such as BC-433G compass Rx, Marconi Mercury, or BC-344.—Ring Moseley, Aberystwyth 4511 (Aberystwyth College of Further Education).

**Wanted:** FRG-7 receiver, or would consider Trio R-300.—Ackers, 35 Ravens Close, Normoss, Blackpool (35388), Lancs.

**Wanted Urgently:** Loan of manual, or any information on Ultra MR4A61 'Valiant' low-band AM mobile (for A.T.C. Sqdn.). Any expense refunded.—Brain, 26 Woodburn Avenue, Newcastle-upon-Tyne (742157), Tyne and Wear.

**Wanted:** These receivers: Hammarlund SP-600J, or R.274 by Hammarlund or Hallicrafters; B.40D; R.216; R.206. Also Type USM-140 oscilloscope, or equivalent.—Werba, 51 Windsor Road, Cambridge. (Tel: 0223-68959.)

**For sale:** Trio R-300; Partridge Joystick ATU, with supports, phones, cables and manual; Trio NR-56 with 8 crystals and PSU; Jaybeam GPU/2 with supports, new condition, little used. The lot, £150 or near offer (moving).—Ring Quick, 01-764 9090 anytime.

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Wanted: CR-300 and AR88LF receivers required urgently for group of disabled enthusiasts; no gifts please, but fair price willingly paid. Also spares wanted for AR88 and R.107. Details and prices please. (S. Wales.)—Box No. 5666, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

For sale: Admiralty receiver Type AP-100335, coverage 60 kHz to 30 MHz, £45. Creed 7B printer, £15.—Ring Twigg, Burnham 64689 (Berks.).

Moving QTH: Forces sale of: KW-2000 with AC/PSU, mint, £160. Green and Davies LA-600 linear, £60. Lincor-2, £100. Home-brew 160/80m. Tx, £15. SSM medium frequency 2-metre converter, £10. B.44 Mk. III, £5. Pye Ranger, transistor, £5. Class-D wavemeter, £5. Hartley 13A dual-beam 'scope, £25. Inverter PSU, £5. Two 25w. loudspeakers, £10. Roller coaster, £2. Carriage extra. s.a.e. for details.—Grainger, G4FTN, QTHR. (Tel: Brierley Hill 71782.)

Selling: Eddystone EC-10 Mk. I receiver with mains unit, nearest £95 secures.—Ring Fenney, 01-500 5395 evenings (Essex).

Wanted: No. 19 Wireless Sets and all associated equipment. Other ex-WD Sets also considered.—Baber, 27 Carden Crescent, Patcham, Brighton (S08573), Sussex. Selling: Grundig 'Satelit' 2100 receiver, with SSB unit and case, Joystick VFA and 28-30 MHz 2m. converter, all in excellent condition, £180 the lot.—Ring Taylor, Doncaster (0302) 20610 evenings.

December issue: Due to appear November 24th. Single copies at 50p post paid will be sent by first class mail for orders received by Wednesday, November 22nd, as available.—Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Wanted: Sattelit 2000 or 2100 receiver, must have instruction book and be immaculate, preferably with SSB and mains lead (but not essential).—Tate, 42 Callender, Ouston, Chester-le-Street, Co. Durham. (Tel: Birtley 403738.)

For sale: Trio R-300 amateur bands communications receiver, with manual and DC power lead etc., excellent condition, original carton, offers around £155.—Ring Calvert, G4HKJ, Wylam 3325 weekends.

Sale: AM-10B Cambridge, modified for FM, with 10-amp. PSU, £40. AM-10D tunable Rx, £30. Both on two-metres.—Ring Donohue, 051-428 8371 (Merseyside). Sale: CD-44 rotator with 20 metres of control cable, £60. Prefer buyer collects.—Woffenden, G3UGB, QTHR.

Wanted: Two-metre FM portable transceiver in very good condition.—Templeton, G3ZCO, QTHR. (Tel: 0262-78066.)

Selling: Eddystone 770R, 19-165 MHz, recent overhaul, excellent condition, with matching speaker, £90 cash. Buyer to arrange collection.—Cooper, 15 Hoston Close, Barrow-on-Soar, Loughborough, Leics.

Wanted: HRO coil packs 14-30 MHz and 2.5/4 MHz, plus bandspreads if possible.—Judge, 106 Bicknor Road, Maidstone (S0709), Kent.

Selling: Heathkit SB-102 Tx/Rx, HM-102 power pack, SB-200 linear amp., SB-610 monitor 'scope, home-built ATU, Shure 444 mic., £550. Buyer collects. R.C.A. AR8516L maritime receiver, modified with 6-3 valves and power pack, £150. R.C.A. AR88D receiver with manual, £50.—Box No. 5665, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

For sale: FDK Multi-2000 with 2 VFO's, analogue and synthesised, all modes, speech processor, calibrator, 16 watts, built-in Oscar converter, £400.—Ring East, G8PKD, 01-486 8286.

Selling: Atlas 180, 160-20m., £220. Kokusai CW filter/transformers, MF.455 O3AZ, £10 (or exchange for telescopic aerial, ATU or W-H-Y?).—Grieveson, 6 Spinney Bank, King's Sutton, Banbury, Oxon.



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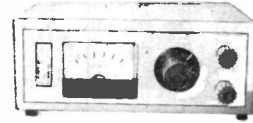
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