

# The SHORT WAVE Magazine

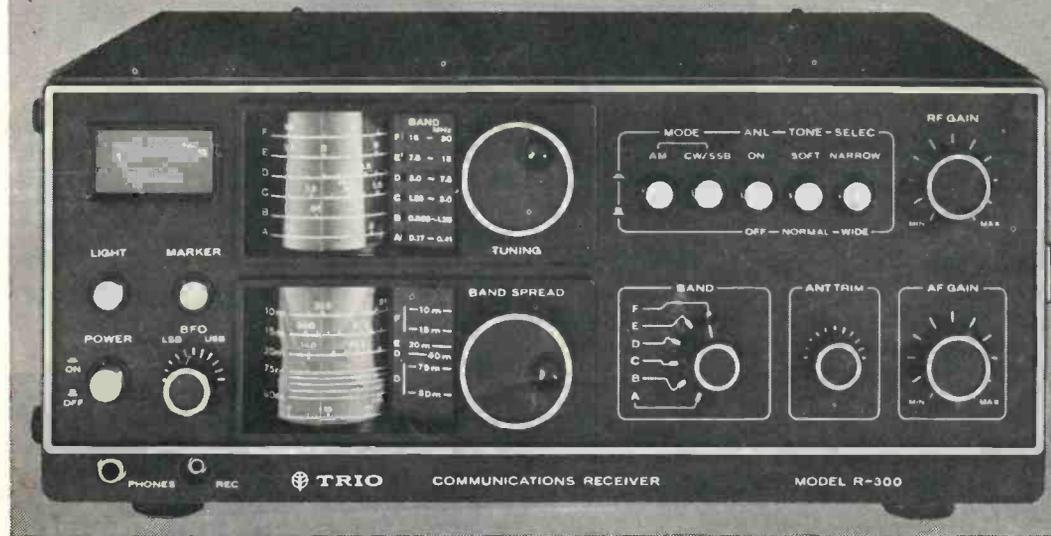
VOL. XXXV

OCTOBER 1977

NUMBER 8

## TRIO R-300

Eavesdrop on the world



### LISTEN TO THE WORLD

Short wave radio is by far the fastest and most convenient type of communications for spreading the news about what is going on in the world. And for this reason TRIO's R300 is the right rig for those who'd like to listen to a live report of the Indianapolis Grand Prix, to Radio Peking or to follow the progress of a Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for many journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO's new R-300.

Six Wavebands—LW (710-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1.25-30 MHz with separate calibration for the commercial (75-11m.) and radio amateur bands (80-10m.) of the large drum-type main tuning and bandspread dials.

Outstanding Input Sensitivity—The dual-gate MOSFET front end assures excellent cross-modulation and spurious characteristics, as well as high input sensitivity. Between 18 and 30 MHz the R-300 operates as a double superhet, giving sensitivity of 1  $\mu$ V for AM and 0.5  $\mu$ V for SSB. For full details, contact the sole importers of the exciting TRIO range.



NEW. CL22 Antenna Coupler  
for the SWL.

Only £14 inc. VAT and postage

FULL CATALOGUE 50p from

LOWE ELECTRONICS  
Cavendish Road,  
Matlock,  
Derbyshire



## YAESU proudly announces a new Synthesized 2 metre FM transceiver FT-227R



The world famous Yaesu state of the arts technique has brought computer theory into VHF communications.

**What** are the frequency splits for repeaters? Don't worry! Yaesu has computerised it. In addition to a conventional  $\pm 600$  kHz split, any transmitter offset frequency is memorised with a touch of a push-button.

**What** was my last frequency channel? Don't check! A touch of a push-button will bring you back to the memorised channel instantly.

**Why** one knob to select a channel out of 800 channels? Yaesu utilises an "OPTICAL COUPLING" system to select each channel in 10 kHz steps and the channel may be offset

5 kHz higher with a touch of a push-button. Thus 800 fully synthesised channels are provided with one-knob and no rotary switches to get oxidised and noisy.

**When** will the FT-227R be available? October, 1977.

Many, many other features such as automatic encoder-decoder for tone guarded squelch (TGS) (optional). Tone burst accessed repeater operation, automatic final protection, busy channel indicator, high-low output selection, diecast front panel, and famous Yaesu quality throughout!

See your dealer today for an informative catalogue, at a most attractive price.

Amateur Electronics,  
508-514 Alum Rock Road  
Alum Rock,  
Birmingham B8 3HX

South Midlands Communications Ltd.  
S.M. House, Osborne Road,  
Totton, Near Southampton,  
Hampshire SO4 4DN

Western Electronics (UK) Ltd.,  
Fairfield Estate,  
Louth,  
Lincolnshire LN11 0JH

# FOR 144 MHz SSB...

## THE QUALITY TRANSVERTER FROM THE PEOPLE WHO KNOW!

As you may already know, we are now manufacturing a 144 MHz all mode solid-state linear transverter, MMT144/28, as pictured below.

This 144 MHz unit is fully compatible with any 28 MHz drive source, and provides 10 watts continuous power output from power transistors capable of withstanding severe mismatch.

An internal aerial changeover relay of the PIN diode type is incorporated which has a through-loss of less than 0.2 dB. The combination of a low distortion balanced transmit mixer incorporating protected dual gate MOSFETS, to produce a spurious-free linear signal, and a low noise receive converter, makes the unit ideal for all modes of transmission at 144 MHz, particularly where a high degree of stability, linearity and sensitivity are of prime importance.

The use of high Q circuitry throughout ensures an extremely good spurious rejection and selectivity.

The unit is housed in a highly durable black diecast case, and all circuitry is constructed on high quality glass-fibre printed circuit board. The high power linear amplifier stages are housed in a separate internal compartment, thus ensuring excellent electrical and thermal stability.



### SPECIFICATION

Frequency range : 144-146 MHz  
 Input modes : SSB, FM, AM or CW  
 Input frequency range : 28-30 MHz  
 DC power requirements : 12 Volts nominal  
 Current consumption : 2.2 Amps peak

Power output : 10 watts continuous rating  
 Drive requirements at 28 MHz: 500 mW or 5 mW  
 Relative 116 MHz output : -65 dB  
 Other spurious outputs : -65 dB  
 Receive converter gain : 30 dB

Price : £88.88 inc. VAT

Receive converter noise figure: Better than 2.5 dB  
 Power connector : 5 pin DIN  
 RF input/output connectors : 50 ohm BNC  
 Size : 187 x 120 x 53 mm  
 Weight : 800 g

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

Incidentally, we are now on telex, should you require any information urgently, our number appears below.

**MICROWAVE MODULES LIMITED**  
**BROOKFIELD DRIVE, AINTREE, LIVERPOOL**  
**L9 7AN TELEPHONE: 051 523 4011**  
**TELEX: 628608 MICRO G**



# WATERS & STANTON

TELEPHONE HOCKLEY (03 704) 6835 (2 LINES)

VISIT OUR SHOP  
OR USE OUR FAST  
MAIL ORDER  
SERVICE

## STOP PRESS!

### MOSLEY SUPER TA33

High power beams in stock  
complete with balun  
10-15-20M.

£110 DELIVERED FREE

## QUARTZ-16



This is the 2 metre FM transceiver for the man who wants a functional transceiver without any frills. The Quartz 16 has 25 channel capability, tone burst and all accessories no other transceiver can match its price.



10 channels fitted £169

### IF YOU MUST SPEND ANOTHER £30 OR SO . . .

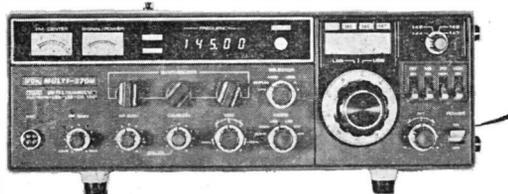
then we think you have a right to expect a few additional features. Compare the Multi-11 with any other model. Does it have :—23 channels plus 4 auto-scan; receiver incremental tuning; tx monitor switch for audio and frequency checking; built-in rf pre-amp for 20 dB quieting at -3uv; 12 watts output minimum, remote vfo socket; centre-zero and S-meter; channels fitted indicator light? If it does then it must be another M-11 . . .

If it doesn't, perhaps you'd better buy a Quartz-16 and save £30!

### MULTI-2700 Mk. II



A complete station inc. vox, toneburst, OSCAR rx., variable power control, speech processor, 900 kHz and 1.6 MHz repeater shift, dual vfo, 15 watts output. SAE for leaflet.



£489 inc. carriage

**REMEMBER!** We have our own full-time service engineers on the premises. So, when you purchase from us you have the comfort of knowing that you will be looked after should any fault develop.

## UHF FM?

### MULTI-U11

12 Watts output.

23 channels (9 fitted).

4 Autoscan channels.

Receiver incremental tuning

Automatic tone-burst.

+ mic., brackets, power cord, etc. .

£249 inc. VAT and delivery.

### THE NUMBER ONE CHOICE!

NOTE Receiver incremental tuning is an absolute must on 70 Cms.—Some transmitters are not quite as stable as the U-11!



FOR 70cms. FM

MULTI-U11



9 channels fitted £249

## QUARTZ-16 SAVE £30!

Never before has such value in 2m. FM been offered at such a low price. Exactly the same power output (perhaps a little more in some cases!) receiver sensitivity and size as its competitors but £30 cheaper. What's more it is supplied with 20 xtls giving you complete absence of spurious tx and rx responses while giving you the ability to add any channel frequency at a later date whether it be 25 MHz or 12½ spacing. You also get a microphone, mounting bracket, power cord, etc.! Beat that for value.



FOR 2M FM

THE MULTI-11



7 channels fitted £209

### YOU DON'T HAVE TO SPEND £489 FOR M2700 PERFORMANCE!

Although we sell many Multi 2700 transceivers we have to admit that you can buy other 2 metre all-mode rigs at less than £489. In fact for around £380 we can sell you other models having all-modes and complete coverage of 2 metres. Of course you'll have to buy one or two extras to match the Multi 2700 performance. The vox unit may be extra—not a lot—perhaps £20 or so; the speech processor is a must at about £50; you'll have to purchase the synthesizer unit to really appreciate the benefits of its clear digital readout and instant QSY facility—lets be conservative and say £90 to £100 should cover this item; for low power you can modify the rig (be careful or not do it until the guarantee has run out) fairly simply; the OSCAR converter works out quite reasonably at £20 and a simple switch mounted on the front panel plus a relay is all that is needed for instant selection; finally you will find that the receive pre-amp at £10 will make a World of difference. So for £380 plus about £200 you can match the performance of the Multi-2700.

For £100 less you can have the real thing!

# ELECTRONICS

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MAIL ORDER  
SERVICE**



**TELEX 897406**

## HAM RADIO'S LARGEST STOCKS IN THE SOUTH LARGEST MAIL ORDER SERVICE IN THE UK

### TO ORDER:—

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Simply write, giving details of your requirements and including a cheque, postal order or credit card no. for instant despatch.

#### BY 'PHONE

Dial 03 704 (Hockley) 6835 giving your requirements and quoting your credit card number. No fuss! Your goods will be on the way the same day!

#### PERSONAL CALLERS

Why not take a trip by rail (2 mins. from station), by car (our own 50 car carpark) by air (10 mins. from Southend Airport) and browse over our stocks.

#### OVERSEAS CUSTOMERS' ORDERS WELCOME

Wir nehmen gern Ihre export Anfragen entgegen und werden für alle unsere gängige Geräte ein Sonderpreis machen.



A SMALL CORNER OF OUR SHOWROOM AT HOCKLEY SOUTH EAST YAESU STOCKISTS

## JUST PART OF OUR EXTENSIVE STOCKS

ASK ABOUT OUR INSTANT CREDIT SCHEME

#### JAYBEAM VHF/UHF ANTENNAS

- 4M ANTENNAS
- 4Y/4M 4 el. yagi ... £11.45 (£1.75)
- PMH2/4M 2 way harness ...

#### 2M ANTENNAS :

- CS/2M 5dB colinear ... £6.96 (£1.00)
- 5Y/2M 5 el. yagi ... £9.10 (£1.00)
- 8Y/2M 8 el. yagi ... £19.35 (£1.50)
- 10Y/2M 10 el. yagi ... £23.00 (£1.50)
- PBM10/2M parabeam ... £28.35 (£1.75)
- PBM14/2M parabeam ... £14.50 (£1.25)
- 5XY/2M 5 el. x/d yagi ... £18.10 (£1.50)
- 8XY/2M 8 el. x/d yagi ... £23.95 (£1.75)
- 10XY/2M 8 el. x/d yagi ...

#### PMH/2C Circular harness

- Q4/2M 4 el. quad ... £14.85 (£1.50)
- Q6/2M 6 el. quad ... £19.80 (£1.75)
- Q8/2M 8 el. quad ... £12.35 (£1.25)
- DS/2M el slot ... £16.55 (£1.50)
- DB/2M el slot ... £3.45 (75p)
- SVMK/2M vertical slot kit ... £6.40 (£1.00)
- XD/2M x/d yagis ... £3.09 (50p)
- UGP/2M ground plane ... £3.55 (75p)
- HO/2M halo head ... £6.15 (75p)
- HM/2M halo + mast ... £14.85 (£1.00)
- PMH2/2M 2-way harness ...
- PHH4/2M 4-way harness ...

#### 70cm. ANTENNAS

- D8/70cm. 8 el. slot ... £14.05 (£1.25)
- PBM 18/70cm. Parabeam ... £16.95 (£1.50)
- MBM48/70cm. Multibeam ... £19.55 (£1.50)
- MBM88/70cm. Multibeam ... £26.30 (£1.75)
- 12XY/70cm. 12 el. x/d yagi ... £27.00 (£1.50)
- PMH4/70cm. harness ... £5.30 (75p)
- PHH4/70cm. harness ... £11.10 (£1.00)
- C8/70cm. 8dB colinear ... £36.55 (£1.50)

#### 1296 MHz ANTENNAS

- D15/1296 Yagi ... £20.92 (£1.00)

#### CHIMNEY KIT

- DL lashing kit (Heavy duty) ... £8.58 (£1.25)

#### WALL BRACKETS

- W6 6" wall bracket ... £2.50 (75p)
- W21" wall bracket ... £9.90 (£1.50)
- W24HD 21" wall bracket ... £14.10 (£1.50)

#### MASTS

- SPM 16ft. Portable mast ... £9.45 (£1.25)
- PME 4ft. mast extension ... £1.37 (75p)
- A4 4ft. 6in. x 1 1/2" ... £2.37 (75p)
- A5 5ft. x 1in. ... £1.79 (75p)
- A9 9ft. x 1 1/2in. ... carr. £4.86 (£1.50)
- A10 10ft. x 2in. ... any £8.42 (£1.50)
- A12 12ft. x 2in. ... quantity £10.15 (£1.50)

#### BRACKETS, etc.

full range stocked send S.A.E. for catalogue.

#### HF BEAMS

- Hy-gain TH3 Mk. 3 10-20 ... £154.00 (£3.00)
- Hy-gain TH3 JR 10-20 ... £108.00 (£3.00)
- Mosley TA33 High power 10-20 ... £110.00 (£3.00)

#### HF VERTICALS

- Hy-gain 12 AVQ 10-20 ... £38.80 (£1.50)
- Hy-gain 14 AVQ 10-40 ... £53.43 (£1.50)
- Hy-gain 18 AVT/WB 10-80 ... £72.50 (£2.00)

#### ROTATORS

- CDE AR30 ... £44.43 (£1.25)
- CDE AR40 ... £51.75 (£1.25)
- CDE CD44 ... £106.87 (£1.50)
- CDE HAM-2 ... £145.12 (£2.00)
- STOLLE 2010 ... £46.40 (£1.25)
- STOLLE 2030 ... £51.18 (£1.25)

#### H.F. MOBILE ANTENNAS

- G Whip tribander helical ... £18.11 (£1.00)
- G Whip multimobile ... £21.37 (£1.00)
- LF coils for above whips ... £5.48 (55p)
- Resonator whips ... £2.08 (55p)
- Basemounts ... £2.47 (55p)

#### VHF MOBILE ANTENNAS

- Jaybeam TAS 5/8th 2m. ... £11.81 (£1.00)
- Jaybeam US 70cm. ... £18.90 (£1.00)
- Bantex 1/2 wave 2m. ... £3.93 (50p)
- Bantex 5/8th wave 2m. ... £7.14 (£1.00)
- Bantex 5/8th wave 70cm. ... £5.62 (50p)

#### COMPACT HF ANTENNAS

- HQ-1 Mini-beam 10-20 ... £86.35 (£2.00)
- C4 vertical 10-20 ... £38.25 (£1.50)
- EL40X dipole 80-40 ... £27.00 (£1.00)

#### MICROWAVE MODULES

- MMT432/28 Transverter ... £109.10 (n.c.)
- MMT432/114 Transverter ... £149.60 (n.c.)
- MMT144/28 Transverter ... £88.87 (n.c.)
- MMCI44/2 or 4 or 28-30IP conv. ... £20.25 (n.c.)
- MMCI44/28 conv. LO ... £22.50 (n.c.)
- MMC70/28-30 1F conv. ... £20.25 (n.c.)
- MMC432/28-30 or 144 conv. ... £24.75 (n.c.)
- MMC1296/28-30 or 144 conv. ... £28.10 (n.c.)
- MMD050 50 MHz counter ... £66.96 (n.c.)
- MMD050/500 MHz counter ... £85.32 (n.c.)
- MMA144 2m. pre-amp ... £14.62 (n.c.)
- MMD500P Pre-scaler ... £27.00 (n.c.)
- MMV1296 70-23cm. tripler ... £33.75 (n.c.)

#### VHF MONITOR RECEIVERS

- BELCOM AMR1048 ch's. ... £106.87 (n.c.)
- NR56 vfo and 11 ch's. ... £54.00 (70p)
- TR56B 230v./12v. D.C. ... £85.00 (£1.00)
- Xtals for above ... £2.40 (15p)

#### SHORT WAVE RECEIVERS

- Trio R300 5-30MHz ... £184.50 (£3.00)
- Drake SSR-1 5-30MHz ... £149.50 (£3.00)
- Yaesu FRG7 5-30MHz ... £163.00 (£3.00)

#### NEW! MM-202G

#### MOBILE SAFETY MICROPHONE

Comprises tiny condenser microphone and boom weighing a mere 5 grams that will clip onto your lapel or car sun-visor. The output from the microphone feeds into a T/R control box that clips onto the gear lever. The MM-202G is beautifully engineered and matches any transceiver 600 ohms to 50k ohms.

£600.00  
available October

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

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G3OQT Bradhurst Electronics, Willowbrook, School Lane, Bunbury.

Cheshire. Tel.: (Bunbury) 0829 260708

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### ◀ WHAT IS THIS? A DIGITAL FRG7! FROM S M C!

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mix, drift cancelling loop for continuous, spin-tuned inclusive coverage of 0.5 to 30 MHz.

The receiver is sensitive (0.5µV for 10dB, S + N/N(SSB)) and stable with A.M., SSB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required, 8 dry cells are automatically switched in.



FRG7 ANALOGUE £145 + VAT FRG7 DIGITAL RECEIVER £199 + VAT

### The FT101E complete HF station—Ex stock.

The FT101E a complete mains or 12v. DC station contained in a compact 30 lb. package, 260W. P.I.P. of SSB (with in-built R.F. speech processor) 180W., CW and 80W. of AM 10 to 160m. (incl. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100 kHz calibrator, ± 5k clarifier (with separate on/off switch), etc.

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



FT101E



### New service manual for the '101 series £12.00

### The FT221, complete 2m. station—Ex Stock

The FT221. The multimode USB, LSB, AM, FM, CW (with semi-break in and side tone), 2m. transceiver offering the choice of phase locked VFO or 44 crystal channels, simplex or repeater (600Hz up and down shifts), with unique "double push" auto tone burst, mains or 12v. (3A) operation, excellent selectivity SSB 2.4 kHz (1.7 : S.F.) or FM 12 kHz. Front panel adjustable VOX and mic gain, a calibrator (1 MHz ± 10), 1 kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero tuning meter, noise blanker, serviceable plug in boards all contained in 11½" (14") x 5" x 11½", 22 lb. rigid package.

600 kHz and 1.6 MHz shifts over 4 MHz.

YC221 digital readout unit—Ex Stock £72.50 (+8% VAT)

### FT200B 80-10m. Transceiver

The FT200B. The "Best Buy"—260W. PIP (A3i, A1) 75W (A3), 80 to 10m. (28.5-29 MHz, 3 other crystals optional) Sensitive and selective 2.3 kHz at 6 dB (1.75 : ISF). Solid state, stable, linear (readout to 1 kHz), gear driven VFO, 100 kHz calibrator. VOX/PPT, clarifier (± 5 kHz). Semi break in CW with sidetone, etc., etc. The pre mix oscillator system used, yields: low spurious outputs on transmit, and the good signal handling and low noise capability of a single conversion superhet (whilst retaining a 9 MHz IF with high image rejection) and single range VFO stability.

DC200 12v. p.s.u. Ex stock £110 + VAT)



FRI01DD



FP200

FT200

### The FRI01 series of de-luxe Receivers

The FRI01D (de luxe) wide coverage (23 (from 1.5 MHz) 500 kHz bands + 4 and 2 metres) receiver. Analysis of the signal path shows: 0-20dB switchable attenuator, two section permeability tuned input filter, Mosfet R.F. stage and mixer (crystal controlled), 3 section top coupled bandpass filter, no gain at first I.F., IC balanced mixer, 20 kHz wide crystal filter, shunt diode noise blanker, single FET buffer stage. AM, CW or SSB (RTTY) filter, appropriate detector and audio stage. Add to this, two excellent VHF converters, squelch, FM detector, 1 kHz readout, excellent stability, Tx monitor control, crystal control facility, switchable AGC transceive capability (FT or FL 101) and that digital readout options are available of this (de luxe) or the standard (less the plug-in options of converters, broadcast band crystals, filters, etc.) version truly an "apparatus communications sine fills" extraordinary.

SMC SPECIALS—350Hz CW and 12 kHz FM Filters

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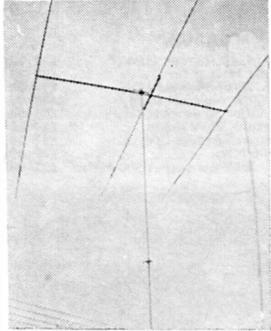
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GM8DOX B. of Allan (078683) 3223 Ian McKechnie  
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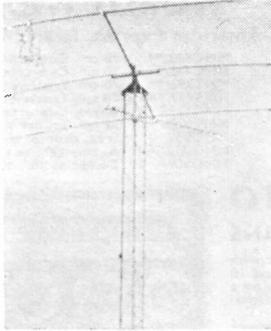


### TELOMAST WITH T433 TELESCOPIC GALVANISED



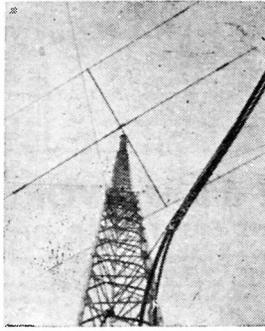
10' telescopic heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging kit. Carriage £2-47 ex-stock VAT 8%  
 30' £25.00 or £43.85 c/w rigging  
 40' £32.50 or £56.85 c/w rigging  
 50' £42.00 or £74.50 c/w rigging

### HAMTOWER with TH3 Jnr. SELF SUPPORTING



Galvanised lattice 10' sections. Free standing with climbing steps. Carriage £3-£20 ex stock 8% VAT  
 30' c/w base grillage £192.35  
 40' c/w base grillage. ... P.O.A

### TELETOWER with TH3 Mk. III TELESCOPIC GALVANISED



Carriage and rigging (RK) extra  
 42' ... £121.00 (RK £28)  
 57' ... £174.00 (RK £28)  
 79' ... £224.50 (RK £49)  
 101' ... £303.50 (RK £76)

### VERSATOWERS TELESCOPIC SEE FAR TILTING RIGHT

THE MAJORITY OF DELIVERIES ARE NOW MADE BY OUR OWN TRANSPORT

Telescopic (20' sections) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resorting to concrete. Large scale efficient production offers you a wide range of towers at minimum cost (-+VAT, EX WORKS) e.g.:

|                    |         |
|--------------------|---------|
| Standard P40 ...   | £122.00 |
| Standard P60 ...   | £252.00 |
| Heavy Duty P40 ... | £286.00 |
| Heavy Duty P60 ... | £333.00 |

### HY GAIN HFRANGE (Carr. extra) VAT 12 1/2%

|                              |         |                          |         |
|------------------------------|---------|--------------------------|---------|
| BN86 1 : 1 ferrite Balun ... | £12.50  | TH2MKIII 10-20m., 2 ele. | £104.50 |
| 103BA 10m. 3 element ...     | £48.50  | TH3JNR 10-20m. 3 ele.    | £108.00 |
| 153BA 15m. 3 element ...     | £59.75  | TH3MKIII 10-20m. 3 ele.  | £179.00 |
| 203BA 20m. 3 element ...     | £111.95 | TH6DX 10-20m. 6 ele.     | £162.00 |
| 402BA 40m. 2 element ...     | £149.50 | HY QUAD 10-20m. 2 ele.   | £162.00 |
| 18V 10-80 Load Vert. ...     | £36.50  | DB1015A 10-15m. 3 ele.   | £99.00  |
| 12AVQ 10-20, Trap Vert.      | £35.50  | 18AVT/WB 10-80m. Vert.   | £72.40  |
| 14AVQ 10-40m. Trap Vert.     | £49.95  | HY TOWER Vert.           | £162.80 |

### SMC TRAPPED DIPOLES (Post 45p) VAT 12 1/2%

|                          |        |   |        |
|--------------------------|--------|---|--------|
| S 500W P.I.P. 14 SWG ... | £19.60 | P500W P.I.P. Cu/Terylene braid c/w 75' feeder, etc. | £21.75 |
| HP IK P.I.P. 14 SWG ...  | £21.75 |   |        |

### MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 12 1/2%

|                         |         |                       |        |
|-------------------------|---------|-----------------------|--------|
| TA33 3 ele. 200W R.M.S. | £85.00  | TA32 2 ele. 300W A.M. | £58.00 |
| MUSTANG 3 ele.          | £108.00 | MUSTANG 2 ele. 1kW    | £87.00 |

### GEM QUAD FIBREGLASS (Carriage £2-£9) VAT 12 1/2%

|                    |         |                           |         |
|--------------------|---------|---------------------------|---------|
| GQ2E 2 element ... | £119.00 | GQ4E 4 element ...        | £238.00 |
| GQ3E 3 element ... | £178.00 | CKIQ 1 ele. Conv. kit ... | £66.00  |

### G WHIP HF MOBILE (Carriage 90p) VAT 12 1/2%

|                           |        |                             |       |
|---------------------------|--------|-----------------------------|-------|
| Tribander 10-20m. (+LF)   | £17.50 | LF40, 80 or 160 ...         | £5.25 |
| Multimobile 10/20 + MM    | £20.52 | MM40, 80 or 160 ...         | £5.25 |
| Flexiwhip 10m. (+FF)      | £10.00 | FF15, 20, 40, 80 or 160 ... | £5.25 |
| Basemount 1/2" hole mount | £3.00  | Telescopic whip for coils   | £2.00 |

### TAVASU HF MOBILE (Carriage 90p) VAT 12 1/2%

|                             |       |                         |        |
|-----------------------------|-------|-------------------------|--------|
| Whip Chrome 2 sect. 60'     | £3.88 | Base heavy duty ...     | £5.18  |
| Base section chrome 16"     | £1.94 | Complete monobander ... | £14.95 |
| Resonators 160-15m.         | £3.88 | Complete 5 bander ...   | £25.92 |
| Adaptor 24 to 20 thread ... | 55p   |                         |        |

### ROPES (Carriage Extra) VAT 8%

|                   |         |                          |        |
|-------------------|---------|--------------------------|--------|
| 3mm. HT steel ... | yd. 15p | X150 Rustproof 150m.     | £10.85 |
| 5mm. HT steel ... | yd. 22p | 7 x 18g. Galvanised 100' | £2.90  |

### AERIAL WIRE (Carriage Extra) VAT 8%

|                     |         |                       |            |
|---------------------|---------|-----------------------|------------|
| 14SWG hard drawn Cu | yd. 11p | 7/036 cad cu standard | ...yd. 14p |
| Cu terylene braid   | yd. 13p | 7/044 cad cu standard | ...yd. 20p |

### AERIAL INSULATORS (Post Extra) VAT 12 1/2%

|                        |     |                          |       |
|------------------------|-----|--------------------------|-------|
| N4 polyprop ribbed ... | 17p | SMCPI 8" carbon polyprop | £1.15 |
| 2 1/2 polyprop ribbed  | 45p | 3" porcelain ribbed      | 38p   |

### COAX PLUGS (Post and Packing extra) VAT 8%

|                          |       |                         |       |
|--------------------------|-------|-------------------------|-------|
| PL259 Standard UHF plug  | £0.48 | SO239 4 hole socket     | £0.40 |
| UG175 Reducer UR43/76    | £0.12 | 258 Back to back female | £0.80 |
| UG176 Reducer UR70       | £0.12 | Back to back male       | £1.20 |
| PL259R Fix reducer plug  | £0.56 | "T" Adapt (2F1M)        | £1.20 |
| PL259S "Solderless" UR76 | £0.51 | "T" Adapt (3F)          | £1.48 |
| PL259S "Solderless" UR67 | £0.51 | Angle 90°(1M + 1F)      | £0.90 |
| PL259P Push fit UHF      | £0.69 | 239 Socket to Phone/car | £0.60 |

### SMC-HS VHF Antennas

(VAT 12 1/2% Carr. 95p)

|   |        |
|---|--------|
| 250 29 or 145 MHz ... only  | £11.75 |
| 1/4, effective DC short snap mount matching transformer shock spring, tapered whip, c/w 12ft. cable and PL259 plug. |        |
| 260 70 or 145 MHz ...   | £17.15 |
| High gain, gutter mount. Tapered coil and whip, 90° spring fold over joint.   |        |
| GDX1 80 to 480 MHz ...  | £37.50 |
| Omnidirectional discone 3dB±  |        |
| 25 Trunk lip mount for snap bases ...   | £2.95  |
| 265 Gutter clip adj. angle ...  | £3.95  |
| 111 Gutter clip base c/w shock spring, 10ft. cable, PL259, etc. ...   | £4.95  |



### CUSHCRAFT VHF OMNI (Carriage 95p) VAT 12 1/2%

|  |        |
|--|--------|
| RINGO RANGER ARX 6dB gain (over 1/4) ultra low angle radiation, excellent 50 ohm match uses 3 x 1/4 in phase and 1/4 stub. 145 MHz version approx. 9' 6" (& 1 1/4 lbs.) 432 MHz approx. 3' 6" (illustrated). |        |
| ARX2 Ringo Ranger ARX450 Ringo Ranger  | £21.50 |
| 145MHz ...   | £21.50 |
| AR2 3 dB Ringo Vert. ...   | £12.75 |
| AR25 QRO AR2 ...   | £15.00 |
| CX1000 29 MHz Ringo ...  | £25.75 |
| 432 MHz ...  | £21.50 |
| ABW144 2m. Big Wheel ...   | £27.30 |
| ABW125 ABW harness ...   | £4.00  |
| ASQ22m. Squalo ...   | £11.75 |

### JAYBEAM 70 (4m), 144 (2m), 432 (70) (Carr. £1) VAT 12 1/2%

|                            |        |                           |        |
|----------------------------|--------|---------------------------|--------|
| D5/2m. 5 over 5 slot feed  | £11.00 | PBM10/2m 10 ele. Para ... | £20.50 |
| D8/2m over 8 slot feed ... | £14.75 | PBM14/2m 14 ele. Para ... | £25.20 |
| 5Y/2m 5 ele. crossed ...   | £12.90 | DB/70 8 over 8 slot feed  | £12.50 |
| 5XY/2m 8 element crossed   | £16.10 | PBM18/70 18 ele. Para ... | £15.00 |
| 10XY/2m 10 ele. crossed    | £21.50 | MBM48/70 46 ele. Multi    | £17.50 |
| 5Y/2m 5 ele. yagi          | £6.20  | MBM88/70 88 ele. Multi    | £23.00 |
| 8Y/2m 8 ele. yagi          | £8.10  | 12XY/70 12 ele. crossed   | £24.00 |
| 10Y/2m 10 ele. long yagi   | £17.20 | 4Y/4m element yagi ...    | £10.20 |
| 14Y/2m 14 ele. long yagi   | £22.00 | PMH/70 2 way harness ...  | £4.75  |
| Q4/2m 4 ele. yagi          | £13.20 | PMH2/C Circ. phasing ...  | £4.10  |
| Q6/2m 6 ele. quad          | £17.60 | PMH2/2m 2 way harness     | £5.50  |

### BANTEX VHF WHIPS (Carriage 90p) VAT 12 1/2%

|                             |       |                         |       |
|-----------------------------|-------|-------------------------|-------|
| BGA FG 2m. fibreglass ...   | £8.75 | BSU 432 MHz ...         | £5.00 |
| 70± 70 MHz fibreglass       | £4.00 | UCL Mid loaded ...      | £8.00 |
| 144± 145 FG or 55           | £3.00 | TLM Trunk lip mount ... | £5.75 |
| 85± 145 MHz FG              | £6.35 | MB Magnetic base ...    | £8.50 |
| BGA SS 2m. s/less steel ... | £8.50 | Unwanted base deduct    | £0.50 |

### CABLES RF FEEDERS (Carriage Extra) VAT 8%

|                       |         |                          |         |
|-----------------------|---------|--------------------------|---------|
| UR67 50 ohm Heavy ... | yd. 36p | UR39 75 ohm Medium ...   | yd. 24  |
| UR57 75 ohm Heavy ... | yd. 42p | T3278 ohm Distribution   | yd. 20  |
| 75 ohm Flat twin ...  | yd. 10p | UR43 50 ohm Solid Cent.  | yd. 16p |
| 300 ohm Ribbon ...    | yd. 12p | UR76 50 ohm Strand Cent. | yd. 16p |

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### SCANNER AND CRYSTAL T.B. OPTIONS

The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 40, 25 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 7 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

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DIGITAL II £235; CRYSTAL T.B. £10-00; SCANNER £49-50

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The NAG 144XL-2200 is the finest 2m. Linear Amplifier of its type we have yet seen. Identical in size to the FT-221, it produces about 250W RMS of clean stable output from a grounded grid 4CX 350F at a nominal 10W drive. The mains PSU under a large cut-core power transformer is built in and provides a 12V 3 amp fully protected and stabilised output for 12V only exciters.

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EX-STOCK £355 + VAT

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2 metre, SSB/CW/FM, RF sensing with manual override "microstripline", 12v, D.C. 10W drive. 2" x 6-5" x 10" (11") (Over 15 different models—S.A.E. details) (+VAT 12½%).

PA10/160/BL 145 MHz 160W. out. £160-00



2 or 70. Superb RF sensing and DC bias arrangements for all modes. C/w mounting bracket 12v, D.C. 10W, drive 2.5" x 5.2" x 7.5" (8.5") (+ VAT at 12½%).

APB82A 145 MHz 80W out. ... £102-15  
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144 MHz, FM, 2W of RF and ½W of audio. Immunity to image and IF breakthrough and performance to rival all walkie-talkies and many a mobile set.

C/w F plug, leather handle/whip case and telescopic whip.

Fitted 6 channels S20 & S21 + choice o S (21, 23, 24, 0) R (3, 4, 5, 6, 7) ... £109-50

R channel only crystal tone burst ... £10-00

Flexible stubby ant. £5-80 Case £4-90

F to UHF adaptor £1-65 N Cads £8-50

Base charger KCP2 ... £11-75

(ALL + VAT)

## VHF Monitor Receiver

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Ideal for the SWL, the YL or even the XYL as the monitor receiver to keep you in touch. Tiny (2½" x 1½" x 4½") and light (8 ozs.) slip into your pocket or onto your belt with the optional case. Sensitive double conversion superhet with 12 kHz band width, auto squelch, and generous audio output c/w Nicads, Mains Charger, Earpiece, Antenna.

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**Brief Specification**  
**Power requirement** : 115/230v. 45-65 Hz. A.C. ±20%  
**Input/Output impedance**: 50-75 ohms using two SO239 UHF type connectors.  
**RF Power Capability**: 10-2000 watts PEP  
**Sweep Speed**: 20-200 Hz  
**Tone Oscillators**: Nominally 1.3 kHz and 2.3 kHz  
**Tone Level Output**: 0-50mV rms per Tone at 50K ohm  
**Max. E.H.T.** on C.R. Tube: 1500v. D.C.  
**Panel Controls**:  
 Intensity/Power on-off Switch Focus  
 Audio Tone (Single or 2-Tone) Vertical Gain  
 Tone Level Horizontal Shift  
 Sweep Speed Horizontal Gain  
 Rear Controls : Astigmatism, Tone Balance, "Y" Shift (pre-set)

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 DUPLEX R (0-9) and IR (0-9) T & R.

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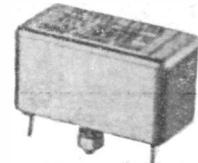
TR2200(GX), CI46A, C826MB, MS2, MR2 (12 MHz Tx and inc. 44 MHz Rx).

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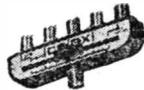
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|-----------|--------|---------|---------|--------|
| YF30F350  | 350Hz  | F*101   | CW6pl   | £18.00 |
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| YF90I600  | 600Hz  | 9MHz    | CW8pl   | £16.00 |
| YF90F2-4  | 2-4kHz | 9MHz    | SSB 6pl | £16.00 |
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| YF107H2-4 | 2-4kHz | 10-7MHz | SSB 8pl | £16.00 |
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Carrier crystals USB, LSB or FM 9 or 10-7MHz in Hc 6/u each £2.00



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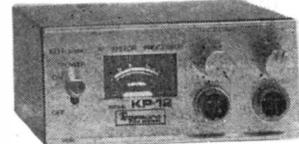


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| AR22 VHF Light HF       | ... £43.00  |
| AR40 VHF Light HF       | ... £47.50  |
| AR33 Deluxe control '40 | ... £59.00  |
| BT1 Medium duty         | ... £79.50  |
| CD44 Medium duty        | ... £95.00  |
| HAM II Heavy duty       | ... £129.00 |

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|--------------------|------------|
| 2010/220 Automatic | ... £43.50 |
| 2030 Memomatic     | ... £48.00 |

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|                              |            |
|------------------------------|------------|
| CD562 CDE (up to 2" and 1½") | ... £4.50  |
| RZ100 Stolle (ballrace)...   | ... £10.00 |

### MOUNTING KIT

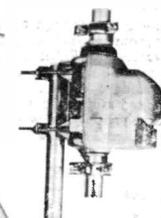
|                         |           |
|-------------------------|-----------|
| AK121 CDE to Versatower | ... £3.60 |
|-------------------------|-----------|

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|                        |               |
|------------------------|---------------|
| 5 core AR30/40/33/2010 | per yd. £0.22 |
| 8 core CD44/Ham II     | per yd. £0.35 |



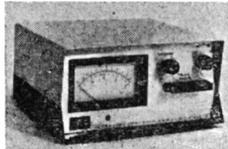
### STOLLE ROTOR



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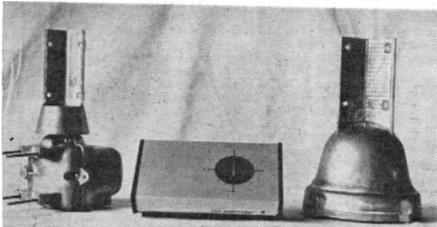
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XCR-30 FM Receiver with FM band 87-5 to 101 MHz.  
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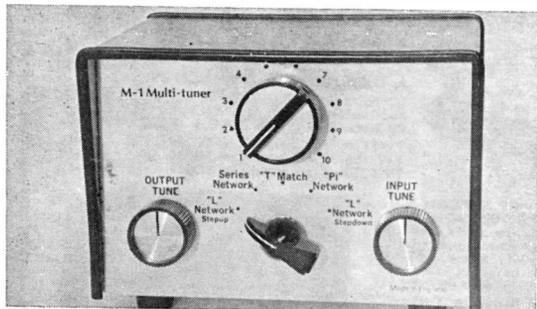
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**COMTEK 2m. Linear Amplifier.** Modes: SSB - CW - FM - AM  
Input: Up to 15 watts SSB  
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Power output: 100 watts PEP SSB  
60 watts FM

Receiver Pre-Amp 12-18dB. **QQV06-40A.** RF switching for easy control.

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5/8" Standard mobile base mount £12.00  
Base station ground plane 4 radials £13.59  
Professional antennas at an Amateur Price

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Omega TE-701 Antenna Noise Bridge (post 25p) £21.00  
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UR43 Co-ax 18p metre: UR76 45p metre, post 2p metre; 75 and 300 ohm twin feeder 10p metre, post 1p metre; Heavy duty 75 ohm twin feeder 26p metre. PL269 50p  
SO239 46p, Cable reducers 16p

We carry a substantial stock of equipment and probably a larger variety of models than most dealers. Having established ourselves as the North Wests leading supplier of Amateur Radio equipment for over 11 years. We are a totally independent company and have no retail outlets through any agents or any other establishment in the North West. We can supply and mostly from stock, equipment from the worlds leading manufacturers. We import some items direct, and we export and manufacture equipment of our own design.

DRAKE-YAESU-UNIDEN-S.T.E.-CALLETTI-JAYBEAM - MICROWAVE MODULES - G-WHIPS - TECHNICAL ASSOCIATES - SWAN - ATLAS - BARLOW WADLEY - C.D.E. - BELCOM - SPACEMARK - DECCA

Send us a large S.A.E. or 20p in stamps and we will forward you all the latest details and prices. All our prices include VAT at the current rate at the time of going to Press.

S.A.E. with all general enquiries please. H.P. and Credit facilities. Barclaycard and Access facilities. Trade-ins always welcome. We would be pleased to sell your unwanted equipment on a commission basis.

**WANTED—GOOD CLEAN EQUIPMENT**  
SPOT CASH PAID

For the caller we have wide range of cabinets (up to 200 sizes available) chassis, valves, plugs, sockets, cable, test equipment, etc.

### SECONDHAND EQUIPMENT

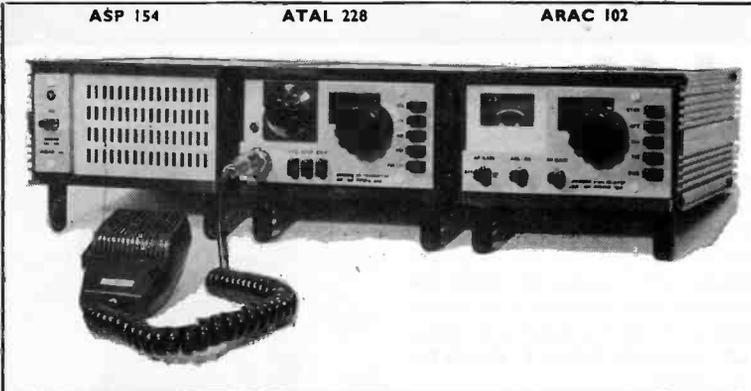
(in stock—going to press)

|  |         |
|--|---------|
| Telford TC10 Transmitter ...                 | £45.00  |
| Liner 2 Transceiver ...                      | £125.00 |
| Icom IC21 VHF FM Transceiver & Rx VFO        | £140.00 |
| STE AK20 VHF FM Transceiver ...              | £140.00 |
| Uniden 2030 VHF FM Transceiver ...           | £130.00 |
| STE ATAL 228 AM-FM VHF Transmitter & PSU ... | £115.00 |
| Yaesu YC355 Frequency Counter ...            | £80.00  |
| Yaesu YC355D Frequency Counter ...           | £110.00 |
| Yaesu YO-100 Monitorscope ...                | £100.00 |
| Drake R4C with additional crystals ...       | £400.00 |
| Drake MS4 Speaker ...                        | £15.00  |
| Drake T4X with AC Pcu ...                    | £450.00 |
| Drake W4 Wavemeter ...                       | £35.00  |
| KW Speaker ...                               | £15.00  |
| FDK Multi 270 VHF Tranceiver ...             | £425.00 |
| Yaesu FT200 Transceiver ...                  | £225.00 |
| Yaesu FT221 Transceiver ...                  | £275.00 |
| M/Modules 050 Frequency Counter ...          | £35.00  |
| QM70 50 watt Amplifier ...                   | £40.00  |
| Sentinel VHF Pre-Amp ...                     | £12.00  |
| M/Modules 1296/28 Converter ...              | £20.00  |
| Technical Associates Audio Compressor        | £20.00  |
| KW2000 Transceiver ...                       | £110.00 |
| ARAC 102 Receiver ...                        | £80.00  |

As you can see we have a substantial turn over in secondhand equipment. If you require a specific model let us know and we will inform you when we have it available.

# S.T.E. MILAN VHF EQUIPMENT

SEE THE ENTIRE S.T.E. RANGE AT THE AMATEUR RADIO RETAILERS' ASSOCIATION EXHIBITION, GRANBY HALLS, LEICESTER, OCTOBER 27-28-29th, (1977) 10 a.m. to 6 p.m. daily.



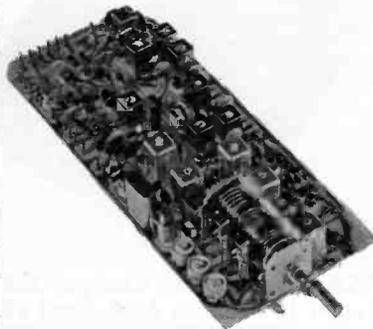
**Price List (including postage)**

|                              |        |         |
|------------------------------|--------|---------|
| AK20 FM Transceiver          | ... .. | £170-00 |
| ARAC 102 Receiver            | ... .. | £100-00 |
| Atal 228 Transmitter         | ... .. | £124-00 |
| ASAP 154 AC PSU with speaker | ... .. | £35-00  |
| AR10 Receiver Module         | ... .. | £37-50  |
| AA1 Audio Amplifier          | ... .. | £4-10   |
| AD4 FM Discriminator         | ... .. | £5-00   |
| AL8 Linear Amplifier         | ... .. | £27-00  |
| AT222 Transmitter            | ... .. | £50-00  |
| AR20 C.C. Receiver           | ... .. | £45-00  |
| AT23 C.C. Transmitter        | ... .. | £50-00  |
| AS 15 Stabilised psu D.C.    | ... .. | £10-00  |
| AG 10 Tone Generator         | ... .. | £4-50   |
| AC2A Converter 28-30 MHz     | ... .. | £20-00  |
| AK20 Transceiver Kit         | ... .. | £110-00 |

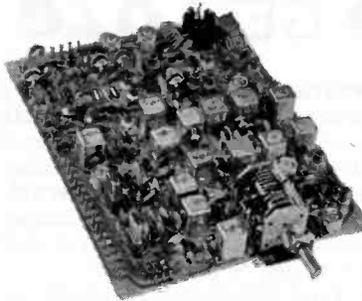
**SPEAKER AC POWER SUPPLY UNIT**

**144 - 146 MHz AM FM TRANSMITTER with Microphone**

**28-30 MHz 144-146 MHz AM-FM-SSB RECEIVER**



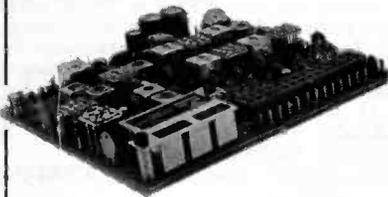
**ARI0** Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.



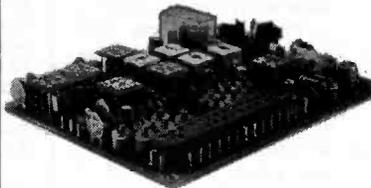
**AT 222.** A complete transmitter exciter unit for 144-146 MHz on AM or FM, VFO controlled or fixed channel operation. Complete with microphone pre-amp., speech processor including active audio filter. 1 watt output. FM. .25 watt AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.



**AK20, STE.** Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 3 watts output. Sensitivity 0.2 uv R.I.T. tone burst. Complete with microphone and mobile bracket. **Price £170-00**



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



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



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



**NEW MODEL ELECTRONIC KEYSER** Jambic operation—Weighted transmission—Three memory lengths up to 1024 bits. Internal monitor. Transmitter keyed through internal relay. Silver plated contacts. 220v. AC operation. **Price £106.00**

**STEPHENS-JAMES LTD.**  
**47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA**  
 Please note new telephone number **0942 - 676790**



# Western

★99 GETS 146 →

**YES!** Back in stock again is the well-known **STANDARD C146A** hand-portable transceiver for 2 metres; and price is only **£99** inclusive of VAT (carriage free). Supplied complete with leather case, crystals on S20 and S22 and automatic tone-burst unit. Base charger unit available for nicads (see illustration right) and crystals for extra channels at £5.29 inc. post and VAT (per channel) or £5.06 if ordered with Transceiver. **UNBEATABLE VALUE—DON'T DELAY—** as this offer cannot last for ever!

★165 GETS 828

Yet another super **WESTERN** offer on **STANDARD's C828M** 10 watt 12-channel mobile transceiver. Only **£165** including VAT (carriage free) for this pint-sized, lion-hearted rig. Price includes quick-release mobile mounting bracket, speaker/microphone, automatic tone-burst and **10 CHANNELS FITTED** (S0, S20 to S23 inclusive, R3 to R7 inclusive). S24 and S32 crystals available at **£3.04** inc. post and VAT (per channel) or **£2.81** if ordered with transceiver.

— **FEW ONLY AT THIS RIDICULOUS PRICE** —



**CSA Base Master/Charger £28.13**  
**Set of 10 NiCads (AA size) £9.00**

★165 GETS 223

If you prefer **YAESU MUSEN** for **VHF**, why not sample the new **FT223** at **WESTERN's** special price of **£165** including VAT (carriage free). Yes—as little as this for a brand-new, full-specification 23-channel 2-metre FM transceiver. 10 watts or 1 watt output, automatic tone-burst and **11 CHANNELS FITTED!** **YOUR CHANCE TO GET ON 2M. FM AT BARGAIN RATES.**

**ALSO—FROM YAESU'S ACCESSORY LIST...**

**QTR24** World Clock, batt. operated **£15.75**  
**YH55** Communications headphones **£9.56**  
**PRICES INCLUDE CARRIAGE AND VAT**



828 in FCB01J with CAT17

**ALSO . . .**

The **FCB-01J** carrying case for the **C828** is now in stock. Complete with **CAT-17** flexible quarter-wave whip antenna, battery carrier and earphone. Not a soft PVC case, but one with thick, stiff walls for maximum protection of your 828 (or C430) and ease of portability. Takes C-size nicads (10) or HP-11 dry-cells (8).

**Price: £27.56 inc. VAT**

**336.37 STILL GETS 221 R**

**PRICE UNCHANGED FOR THE MULTIMODE 2M. RIG**

# Electronics (UK) Ltd

**NEW!** POWER and SWR MEASUREMENT TO 450 MHz!  
WITH THE

## OSKER SWR-300



All the facilities of the long-established and well-known Osker SWR-200, but now with optional add-on couplers for accurate (10%) power and SWR measurements in the 2 metre and 70 centimetre bands. Basic instrument for HF—add couplers for VHF and/or UHF.

**SPECIFICATIONS**

|                   | SWR-300             | SPC-2B        | SPC-07A      |
|-------------------|---------------------|---------------|--------------|
| Freq. range (MHz) | 3-5-30              | 144-148       | 420-450      |
| Power ranges (W)  | 0-20; 0-200; 0-2000 | 0-20; 0-200   | 0-2; 0-20    |
| Accuracy          | ±15% FS             | ±10% FS       | ±10% FS      |
| Impedance (Ω)     | 50                  | 50            | 50           |
| Connectors        | SO-239              | SO-239        | Type N       |
| Dimensions (mm)   | 95 x 220 x 115      | 40 x 110 x 66 | 50 x 85 x 70 |

**PRICES**

(Inc. VAT, carriage free)

|         |            |                  |
|---------|------------|------------------|
| SWR 300 | ... £43.20 | OR ... ALL THREE |
| SPC-2B  | ... £15.12 | FOR              |
| SPC-07A | ... £19.98 | £75.00           |

★ ★ ★ STILL AVAILABLE — THE OLD FAVOURITE — SWR200 at £38.88 ★ ★ ★

★ OCTOBER SPECIALS ★  
... AT BARGAIN PRICES ...

**VHF/UHF Equipment**

|                        |        |         |
|------------------------|--------|---------|
| BRAUN SE 600 (2m.)     | ... .. | £673.87 |
| FDK Multi U-11 (70cm.) | ... .. | £223.87 |
| Standard C430 (70cm.)  | ... .. | £156.37 |

**ANTENNAS**

5% OFF — all Newtronics "Hustler" mobile antennas (HF and VHF)

Newtronics 4BTV and RM80S (10-80m. base station vertical) ... .. £63.00

**SUNDRIES**

|                                     |        |         |
|-------------------------------------|--------|---------|
| SP400/401 speakers (for FT401 etc.) | ... .. | £11.25  |
| SS303M SSTV Monitor                 | ... .. | £199.00 |
| Unica UR1A gen. coverage receiver   | ... .. | £66.00  |
| Unica UR2A gen. coverage receiver   | ... .. | £99.00  |

— ALL PRICES INCLUDE CARRIAGE AND VAT —

**DON'T FORGET YOUR JAYBEAMS**

**2 Metres :**

|   |        |        |
|---|--------|--------|
| C5/2M, glass-fibre colinear                 | ... .. | £30.78 |
| 5Y/2M, 5-ele. yagi                          | ... .. | £9.23  |
| 8Y/2M, 8-el. yagi                           | ... .. | £11.36 |
| 10Y/2M, 10-el. yagi                         | ... .. | £21.60 |
| PBM10/2M, 10-el. parabeam                   | ... .. | £25.31 |
| PBM14/2M, 14-el. parabeam                   | ... .. | £30.60 |
| 5XY/2M, 5-el. crossed yagi                  | ... .. | £16.76 |
| 8XY/2M, 8-el. crossed yagi                  | ... .. | £20.36 |
| 10XY/2M, 10-el. crossed yagi                | ... .. | £26.21 |
| PMH/2C—circular polarisation harness for XY | ... .. | £5.17  |
| Q4/2M, 4-el. quad                           | ... .. | £17.10 |
| Q6/2M, 6-el. quad                           | ... .. | £22.05 |

**70 Centimetres :**

|   |        |        |
|---|--------|--------|
| C8/70, colinear                                       | ... .. | £38.81 |
| U5/70, mobile colinear with coax                      | ... .. | £21.15 |
| PBM18/70CM, 18-el. parabeam                           | ... .. | £19.13 |
| MBM88/70CM, 88-el. Multibeam                          | ... .. | £28.58 |
| 12XY/70CM, 12-el. crossed yagi (with phasing harness) | ... .. | £29.25 |

**23 Centimetres :**

|                                   |        |        |
|-----------------------------------|--------|--------|
| D15/1296, double-15 slot-fed yagi | ... .. | £23.18 |
|-----------------------------------|--------|--------|

★ PRICES INCLUDE CARRIAGE (ROADLINE) and VAT (12½%)—CALLERS deduct £2.25 (except PMH/2C —deduct 56p) ★

**PAYMENT :** Cash or cheque, ACCESS (Mastercharge), VISA (Barclaycard) GIRO TRANSFER (A/c. 288 6154) HP and Credit Sale arranged.

SEE YOU AT THE LEICESTER SHOW — STAND NUMBER 14

**Western Electronics (UK) Ltd**  
HEAD OFFICE (All Mail/Enquiries)  
FAIRFIELD ESTATE  
LOUTH, LINCOS, LN11 0JH  
Tel. Louth (0507) 4955/6)

Our Agents :  
Southern : Alan Paxton, G4BIZ, Chandlers Ford (04215) 65015  
Scotland : Alan Cameron, GM3OGJ, Alloa (0259) 214653  
N. Ireland : Les Lyske, G13CDF, Newtownards (0247) 812449  
Opening Hours :  
LOUTH : 9-12; 1-5 p.m. Mon.-Fri. By appointment Sat. 9-12  
LEICESTER : May's HiFi, Churchgate (Tel.: 0533-58662)  
Mon.-Sat. 9-6 p.m. Closed Thurs.  
SOUTHAMPTON : Closed.



## ELECTRONIC DEVELOPMENTS

### Professional Quality for the Amateur

NEW PRODUCT



#### VHF/UHF SWR BRIDGE SWR BRIDGE SPECIFICATION

This VHF/UHF Standing Wave Radio Indicator is intended for use with high power transmitters in the 144 MHz and 432 MHz Amateur Bands.

It features a state of the art micro-stripline technique to produce an accurate forward and reflected power indication. Unlike many cheaper versions it does not give misleading reading when used at high power levels.

Each bridge is calibrated and tested at 500 watts on 432 MHz to ensure accuracy.

If you run high power then you need this S.W.R. Bridge.

Using this instrument you can make S.W.R. measurements at high power when strange things can happen to coaxial cable and aerial systems.

This VHF/UHF S.W.R. Bridge makes a perfect companion to our range of high power VHF and UHF transverters and linears.

- IMPEDENCE : 50  $\Omega$
- FREQUENCY RANGE : 50-500 MHz
- POWER HANDLING : 144 MHz — 1000 watts  
432 MHz — 500 watts
- SENSITIVITY : 144 MHz — 15 watts  
432 MHz — 5 watts
- INSERTION LOSS : Less than 0.5dB
- CONNECTORS : "N" Type UG 58 a/u
- SIZE : 6" x 3" x 3" (15.2cm. x 7.6cm. x 7.6cm.)

**PRICE : £44.95 inc. VAT**

70CM LINEAR EDL 432



This 432 MHz Linear is operated in grounded grid configuration and exhibits a gain of typically 10dB. With a drive input of 5 watts its output power is in the order of 50 watts which is more than adequate for OSCAR 7. Power requirements are 6.3v. AC and H.T. 400-1000v. DC. Fitted with BNC connectors. **PRICE : £56.25 (inc. VAT)**

THE MAGNUM LINEAR/PREAMP EDL 144



This Linear Amplifier has been developed by us to fill the need for a high power add-on unit for use mainly with low power SSB transceivers. The unit also contains a low-noise receiver preamplifier which is equipped with an RF gain control. Mains operated. Drive requirement : 5-20 watts. CW and SSB, 5 watts maximum AM & FM. P.A. 50% efficient. R.F. switched so no modification to transceiver is necessary. **PRICE : £151.90 (inc. VAT)**

THE MAGNUM TRANSVERTER  
EDT 144/28 : EDT 70/28 : EDT 50/28



Our Transverter is fully YAESU compatible and may be operated with most other HF transceivers. Drive required at 28 MHz up to 500mW. Power input up to 200 watts (50% efficient). Each Transverter is aligned using our SPECTRUM ANALYSER to obtain an extremely clear output spectrum. Microwave Modules receive Converters are fitted to all our transverters. **PRICE : £151.90 (inc. VAT)**



This new unit utilizes the same P.A. as the EDL 432 and is complete with mains power supply, blower, aerial change over relays and full metering. **PRICE : £151.90 (inc. VAT)**

Specification : TYPICAL EFFICIENCY 50% at 50w.  
INPUT DRIVE 5-10 watts. OUTPUT POWER 50 watts RMS.  
Input connector BNC 50 ohm.  
Output connector "N" Type 50 ohm.  
Size : 10½ x 6½ x 10½" (26cm. x 16cm. x 27½cm.).  
Weight : 22lbs. (9.9 kgs.).

**WAVEMETER 65 - 230 MHz**

General coverage VHF Absorption Wavemeter. Its high sensitivity makes it ideal for checking spurious outputs as well as the transmitted frequency. **PRICE : £19.90 (inc. VAT)**

Your orders, enquiries and technical queries will be dealt with both personally and quickly.

**POLAR ELECTRONIC DEVELOPMENTS LTD.**

DOMVILLE ROAD, LIVERPOOL, L13 4AT Telephone No. 051-220 6666

# AMATEUR ELECTRONICS UK

MAIN AGENT  **ATLAS** SOLE AGENT  **SWAN PLUS-**  
RADIO INC. ELECTRONICS

**YOUR BEST BUY FOR YAESU MUSEN!**

**FROM THE DIRECT IMPORTER  
COMES . . .**

**THE LEICESTER SHOW STOPPERS!**



LOOK FOR OUR NEW LOWER SPECIAL SHOW PRICES

at this point it would be appropriate to hum or whistle a few bars from the Entry of the Gladiators!

NOT the bearded lady BUT :—  
THE RECEIVER WITH A 26ft. DIAL!

NOT the Siamese twins BUT  
THE H.F. BANDS TRANSCEIVER THAT MAKES EVEN 40 MTRS. SOUND QUIET  
—That is until you find the station that YOU want.

NOT the two headed donkey BUT  
THE TWO METER TRANSCEIVER WITH NO XTALS! — NO SWITCH!! —  
NO DIAL . . . Did you say, "What has it got then?"  
EIGHT HUNDRED SYNTHESISED, PHOTOELECTRICALLY SELECTED  
CHANNELS, COMPUTERISED MEMORY, FITTED TONE BURST, 600 kHz shift  
PLUS ANY OTHER required up/down SHIFT — (you can now transvert to 70 cms.  
and use the repeaters!) ALL FOR AROUND £200 + V.A.T.

WHAT ARE THEY? . . .

. . . SEE THESE AND MANY OTHERS ON OUR STAND AT THE A.R.R.A.  
EXHIBITION, GRANBY HALLS, LEICESTER . . . 27th, 28th, 29th OCTOBER

If you can't make it to the show then call in to Alum Rock, or your LOCAL man.  
Directions etc. as per our previous advertisements where you will receive prompt,  
courteous attention and full demonstration facilities . . . away from the  
hustle and bustle.

STOP PRESS: New models now in from Swan!

**508-514 ALUM ROCK ROAD** **021-327 1497**  
**BIRMINGHAM 8** **Telex 337045** **6313**





## \*\* A NEW 240?? AND STILL £198 inc. VAT

The IC-240 from Thanet has had a bit of a face change. Gone is the tone button, which doesn't do anything anyway, and in its place is a crafty little switch which gives simplex in the centre position, normal duplex at DUP A and reverse repeat (on Rx AND Tx) at duplex B. With the IC-240 it is the RECEIVER which is shifted when working Duplex and not the TRANSMITTER as with some other rigs we could mention. This means that you can listen on the input channel, or work reverse repeat, merely at the flick of a switch—you don't have to re-tune the channel knob as you would otherwise.

The function of the LH switch has also altered as it now gives high power in the up position and LOW in the down, the centre being OFF. This, together, with the facility of easy channel change, clear channel indication and sheer rugged construction still puts the IC-240 at the top of the list.

Now that we have sold several hundred 240's we can tell you that these little sets are extremely reliable. The number we have had back for repair under warranty is really very small and the initial teething problems have been ironed out long ago. By the way, should you be feeling a little upset that your nearly new IC-240 has been made out of date have no fear. Unlike a model change in cars, we can sell you a conversion kit for £3 to bring your set right up to date so that you can't tell the difference. Please don't all rush at once though as initial stocks of these are limited. There will be plenty available later.

Check off these points against that competitive rig:—

|   | YES                      | NO                       |
|---|--------------------------|--------------------------|
| Can it cover the whole 2m. band 144-146 ? ...   | <input type="checkbox"/> | <input type="checkbox"/> |
| Is it easy to qsy from say R7 to S20 without too much knob winding ? ... ..                     | <input type="checkbox"/> | <input type="checkbox"/> |
| Is low power available ? .. .. .  | <input type="checkbox"/> | <input type="checkbox"/> |
| Can you add extra channels, in the order you want them, without having to buy crystals ? ... .. | <input type="checkbox"/> | <input type="checkbox"/> |
| Is the tone burst automatic ? ... .. .  | <input type="checkbox"/> | <input type="checkbox"/> |
| Is a scanner available ? ... .. .   | <input type="checkbox"/> | <input type="checkbox"/> |
| Is it relatively easy to add periferal bits and pieces ?  | <input type="checkbox"/> | <input type="checkbox"/> |

If the answer is YES to all these and its cheaper than an IC-240 it may well be worth buying.

### SEE ONE AT LEICESTER — STAND 9

\*\* At the moment this is a THANET mod. Until this is done in Japan you may not find it on all sets bought from other dealers, but we understand that some intend to fit it.

PLEASE NOTE THAT ALL MAIL ORDERS MUST BE SENT TO HERNE BAY AND NOT TO AGENTS.

All warranty and other repairs for sets bought from Thanet Agents and Shops must be referred to our Service Dept. in Herne Bay where we have a good range of test equipment and the technical skill to use it. Sets from other dealers MUST be referred to that dealer.



# ICOM

## IC215 HANDY FM PORTABLE 15 channels 3 watts

Fitted with 7 channels (S20, S22, R3, R4, R5, R6, R7)  
£162.00 INC. VAT

ICOM are pleased to introduce their first FM portable and a careful look at the features will soon show how popular it's going to be. You can use it ANYWHERE. Change vehicles, use it in the shack or take it for a walk to the local high spot and you have the high quality FM communication, for which ICOM are so famous, available all the time. The batteries are larger than those of its competitors, thus giving considerably longer life. The 3 watt output and high sensitivity receiver makes it a useful main station set, where it can be operated from an external power supply and a good antenna system. Thus the IC-215 can be a good starting point for the man who has just obtained his licence and wants to get on the air without having to spend too much money.

### LOOK AT THE MAIN FEATURES :

**Aluminium Die-cast Frame** The IC-215 chassis and main frame are integrated into an aluminium die-casting rendering it light but resistant to vibration or shock when carried.

**15 Channels** The unit incorporates 15 channels to select from : 12 by the main channel selector and a further 3 by the function switch. All crystals are plug-in-type HC-25/U and are the same as the crystals used in the popular IC-22A. Being fundamental crystals, they are tunable over a reasonably wide range and a separate trimmer is supplied for each crystal making accurate frequency adjustment possible. This is very important for optimum results with minimum interference.

**Dual Power Mode** The output power can be switched to 3W on HI for long distance work or 0.5W on LOW for short distance contacts or working a nearby repeater. Battery consumption is minimised in the LOW power mode.

**Dial Illumination** The dial can be illuminated to facilitate night operation. This is controlled by a selector switch on the front panel.

**Power Pilot Lamp** If the power voltage falls below the required value a red LED power indicator goes out as an indication that the batteries are almost exhausted or the external power is inadequate.

**External Power and Antenna Sockets** Sockets for external power and antenna are provided on the rear. The antenna socket takes a standard PL259 plug.

**Whip Antenna** A fully collapsible antenna is built into the top of the rig. This can be unscrewed and removed to provide a screw socket for a flexible helical antenna. We have had an Antenna Specialist flexible antenna specially made and tuned to suit the IC-215.

**Meter** The meter indicates receive signal strength during reception and relative output level during transmission.

**Squelch** A sensitive squelch control is fitted rendering the set silent when no signal is being received.

**External Speaker Jack** An external jack is fitted to the front panel for a larger speaker or an earpiece. The internal speaker is muted when this is used.

**Discriminator Meter Jack** By removing a rubber grommet on the side of the transceiver a jack socket is available for connection of a 50 microamp centre-zero meter. This is very useful when tuning extra receive crystals.

**Tone Burst** A 1750Hz tone burst is fitted for opening UK repeaters.

**Shoulder Belt** A shoulder belt is supplied and is fixed to clips on the top of the rig. There is also a microphone hook. The side panels of the set itself are covered in leather simulated vinyl.

**Excellent FM Audio Tailoring and Clipping** This feature, already well known from the excellent quality produced by the IC-22A, ensures clear optimum talk power without over deviation. This makes the IC-215 a far better rig for use with repeaters and gives an optimum range, for the power used, on simplex contacts.

### ACCESSORIES INCLUDED :

Dynamic microphone  
Microphone Case  
Shoulder strap  
Power supply plug  
Comprehensive English handbook

External Speaker plug  
Discriminator socket plug  
Earphone  
9 x Dry cells type C (U11)

### OPTIONAL EXTRAS :

IC-3PS Power supply which doubles as a holder for the IC-20L linear and supplies power for both the 215 and the linear.  
IC-20L 10 watt linear amplifier.  
IC-SM2 Desk type condenser microphone with built-in amplifier.  
Ni-Cad Batteries.  
Charger for charging the Ni-Cads in situ  
Helical stub antenna.

### HIRE PURCHASE TERMS AVAILABLE

See ICOM at your nearest agents by telephoned appointments —

LONDON—Terry, G8BAH  
01 556 9366

WALES—Tony, GW3FKO  
0222 702982

MIDLANDS—Tony, G8AVH  
021 329 2305

CHESHIRE—Gordon, G3LEG  
Knutsford 0565 4040

SCOTLAND—Ian, GM3DOX  
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# SHORT WAVE MAGAZINE

(GB3SWM)

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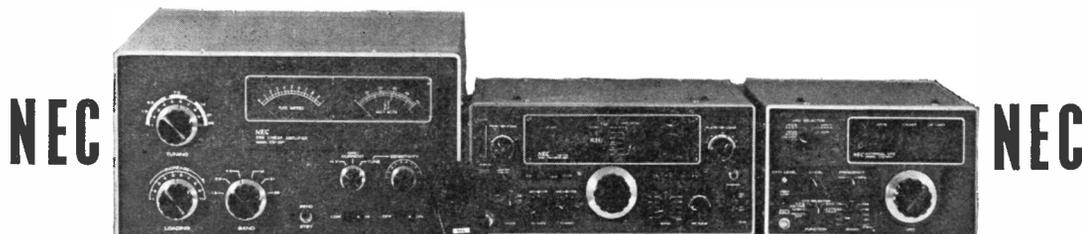
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# The SHORT-WAVE Magazine

## EDITORIAL

### ***Pollution again***

Back in July, we mentioned the May 11 issue of the "Southern Evening Echo" and its paragraph on our hobby. Surprisingly we have only had a reaction from one reader, apart from the chaps most involved in the effort to sort out the underlying problem. In fact Mrs. Pockley had latched on to the very important fact that if the Post Office or the licensee cannot cure the problem and the equipment-maker can't be bothered, there isn't a solution, short of a miracle. In this particular case, the miracle occurred, in that G3GVM and G3PLX tackled the problem; the magnitude of the undertaking being that at one time the Post Office had a file of *fifty* outstanding cases! G3PLX and G3GVM, by a rare combination of social nous and engineering know-how have managed to get to the position where the station concerned has no unacceptable TVI. Were that in itself not enough, they have enlisted the aid of Mrs. Pockley, with the result that Fareham council have referred the problem to their national organisation, with a view to legislation; and the RSGB have also circulated the members of this organisation with the relevant facts.

Mrs. Pockley is seen in a far better, and the newspaper reportage in a far worse, light than at first seemed to be the case; but above all, the efforts of G3GVM and G3PLX are beyond all praise.

*[Handwritten signature]*  
G3KFE.

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

AGAIN the word is that there hasn't been anything to really get the old adrenalin going; but the odd behaviour of the sunspots has been diverting much attention. There has been some *Spor-E* about and some very odd times when, with apparently all in favour, the bands haven't been as well as they should have been—the reason no doubt being geomagnetic.

We commented last time that at long last the invisible wire had been detected, and that it would doubtless have to come down; it didn't get *taken* down, but for the first time in daylight a bird flew into it. It was a rather big bird which did a sort of ground-loop in mid-air and was quite definitely a bit puzzled by these involuntary aerobatics. When we had stopped laughing and wiped our eyes, we noted we hadn't got an aerial any more!

As for the bands, there have been many good reasons why the writer hasn't been quite as active an SWL as usual, let alone getting on the air himself; but when he has had a turn round the bands everything from summer static on Top Band through charged rain on Twenty (the biggest snag with a vertical aerial, one feels) has been noticed, right through to good DX conditions. So—there will have been something of interest for all but the hyper-critical.

## Contests

We have a letter from Illinois advising us of an activity called "Hunting Lions in the Air," which, it would appear is being sponsored by the Lions Club of Rio de Janeiro (Arpodor), Brazil, which takes place on January 14, 1978 starting at noon GMT for twenty-four hours. Details from the above address, and logs also, postmarked not later than thirty days after the Contest.

October should be pretty active for the contesters, with the RSGB 21/28 MHz Phone contest on October 9, the ARCI QRP Contest the same weekend (even if they do call 100 watts input QRP!); for this

one the CW contesters should be looking at 40 kHz up from the LF band-edge, save for Twenty where they will be around 14065 kHz; SSB frequencies 3855, 7260, 14260, 21300 and 28600 kHz, and the Novices will be on 3720, 7120, 21120 and 28040 kHz. Logs to W5TVW.

If you want to play in a real one, the CQ WW DX Contest has its Phone section October 29-30, and the CW leg November 26-27. The time is the usual 48 hours, 0001 GMT Saturday to 2359 Sunday. Single operator stations can be entered as all-band or single band, and it is to be noted that the use of a DX net, or any form of "alerting" assistance puts you straight into the multi-operator class. The multi-operator entries divide as usual into single transmitter and multi-transmitter sections. Exchange RS(T) plus two digits indicating your CQ Zone. Contacts with stations on different continents rate three points each, ones with stations outside your own country but on the same continent rate one point a throw. Your own country may be worked for a multiplier but does not rate any QSO points. The multiplier will be one for each CQ Zone contacted, and one for each country contacted on each band; a station may contact its own country and Zone for multiplier credit. Add the Zone multiplier to the country multiplier, and use the number so found to multiply the total QSO points. To be eligible for an award a single-operator entry must have completed twelve hours of operation as a minimum, while the multi-operator categories require 24 hours of operation at least to rate for an award. If a log contains entries for more than one band it will be counted as an all-band entry unless otherwise notified; and there are no less than 38 trophies at stake. For the logs, all times are to be GMT, and indicate each zone or country multiplier the first time it is worked. Logs to be checked for duplicate contacts, and for each one found by the contest committee three points

will be deducted. Use cross-check (dupe) sheets for each band on which 200 or more contacts are made; and preferably do so with smaller entries. Forty contacts to the page on 8½ x 11 inch paper. For Phone the postmark deadline is December 1, 1977, and for CW January 15, 1978. Address as ever CQ WW Contest Committee, 14 Vander-venter Avenue, Port Washington, L.I., N.Y. USA 11050.

Another one to recall is the RSGB 7 MHz contest—Phone on October 15-16, CW November 5-6—both this and the previously mentioned 21/28 MHz efforts will all help to keep the bands in use, and so discourage both the intruders and those who would like to pinch our space.

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

November issue—October 6th  
December issue—

November 3rd

January issue—December 1st

*Please be sure to note these dates!*

## The Bands

Perhaps the best place to make a start is *Ten*. G2BJY (Walsall) mentions a QSO with PY1AZE on 28035 kHz and adds that this brings up 26 countries worked on the band in the past couple of months.

G3NOF (Yeovil) doesn't seem to have picked the right times; he heard lots of Europeans, but reckons that a lot of listening is required to work DX on Ten at the present state of the sunspot cycle.

G2ADZ (Chessington) missed reporting his July results and was on holiday for half of August. July was not so exciting as June, but was nevertheless quite good. Every day produced short-skip to Europe, with a surprising variation from first thing in the morning to late at night; 11 days produced real DX, and on July 6 there was an opening to the States. July's CW contacts included KV4KE, ZP5EC, KV4CI, FG7AM, UA9SEQ, LU8AHW,

PY7AZQ, 9H3MIF, UW9WR, 4Z4RJ, UA9XDB, YV5CEP, and KP4DJE. As for August, it was 14th to 31st; Europeans every day except August 29 which was bad, but DX on nine out of 17 days: EA9EO, C5AAD, FC6CLD, LU8DQ, EP2SV, LU3HAZ, CT3BQ, UA9CIT, PT6KZ, ZP5AO, EA9EW, PY1ZAE, and the solitary SSB contact with 9Y4NP. Perhaps the most interesting of the Europeans was YO5AMH, coming at 579 with one watt to a dipole.

## 21 MHz

Our first reporter this time is G4CCQ (Lamberhurst) who is more occupied with packing up the gear and tossing out the junk than in operating, as he is getting ready for a move from a tied house, to heaven-knows-where and heaven-knows-when. CW was used to work UK9SAY and EA9EO, plus a single SSB contact with JA1PIG/PZ.

G4DJY (St. Annes-on-Sea) has been plagued with a chirpy note on the one hand and an excess of work on the other—we know the feeling! Thus the 21 MHz score was JA8UI/PZ, ZP5NW, and some *W/VE* stuff, in between switching off for periods to let the transmitter cool down when the chirp crept in.

Now to G4EVO (Broadstairs), with his five watts input maximum to a Joystick; there was a half-contact with HA3KMK which seems to have caused G4EVO a bit of puzzlement, then DL7CY, DK2QE, YU1FD, HA7KLL, UA3BF, SM4HOD, G4FDO, DK9NH, YU1NOM, HA7KPD, YU2GIJ, OH2PA, UP2CY, YU2CEJ, HB9BOY, YU2KY, F6EWW, YU4FRS, EA1JG, I1XWI, YU2KDE, YU3FS.

G2HKU (Sheppey) tried out his HW-8 on 21 MHz, and hooked up with HA9RI just to prove the beast worked properly.

## Twenty

Business on this band has been quite brisk at times, as the reports all indicate. However there has been quite a lot of one-hop European and genuine short-skip conditions—handy if you want to work *G's* on Twenty!

It seems reasonable to make a start by mentioning two new boys in every sense. G4GIE (Gt. Moulton) has been a member of the G-QRP

Club for a while and in due course got his licence. He has 420 milliwatts out on Forty and 240 milliwatts out on Twenty; and at the time of his letter he had just about completed one week on the air. His very first QSO on 14 MHz with this QRP and a Joystick was with UA1ACE in Leningrad—a distance of over 1200 miles which must have been very heartening indeed, and it has been this sort of report that has filled the log on both 7 and 14 MHz. And, praise be, John says that if they don't come back to his QRP, he puts this down to his own inexperience, which is making him learn all about how to do it properly.

G4FUP (Horsham) got his ticket in February, but took a month to get on the air, the start being 3.5 MHz CW with a 62 Set picked up from the Club Junk sale for £1.60. This had a bit of a rough note so a week later a Panda Cub was added to transmit while the 62 Set remained in use for reception, and so a start was made on 7 MHz. This set-up still had some shortcomings when tried on Twenty, but is still in use after three months. On 14 MHz reception was improved by the use of a 1946 Pye domestic receiver, the output of which was passed to a Ferguson domestic receiver for a little extra audio gain; BFO injection is at the front-end by courtesy of a BC-221; and more recently the shack has had a TCS-12 receiver added to enable Top Band to be looked at. Now, to results on 14 MHz: all *W* call areas with the exception of *W7* and *WØ*, umpteen *UA9's* UL7IBD, KV4AA, IE9DMK, EA8BF and CY3AKG—the *CY* is a special from VE-land. This is the real stuff of amateur radio—perhaps Neil will give us a photograph to demonstrate to these people who complain about how expensive the hobby is just how simply one can achieve world-wide communication.

GM4CXM (Glasgow) now has added a director to his dipole, so it now becomes a two-element fixed beam aimed at the Caribbean, resulting, of course in the stations worked being mainly in a westerly direction. 14 MHz CW thus yielded HI8MOG, HK3HY, KP4AWM who had just five watts, KV4AA, N6VE, N7RM (Oregon), U6ØA, UH8BAX, UJ8JCA,

WA4ZVP who had two watts, W7WN (Arizona), W7DPW (Washington), YS10, and 4J4A. On the SSB front, Ray has been going great guns and has offered quite the longest list for one band that we have ever received, so we'll have to summarise: *CE's*, *CP's*, CT3/4LI, CX5, EA8GN and EI8AU, FG7's, GU2FZC, *HPI's*, HI8's, HR3JJR, IJ7EX, JY3ZH, K6OYE, *LU's*, OA6CV, OF1AJ/OJØ, *PY*, *PZ*, *SV*, *TF's*, TI2CAP, various Russians-in-Asia, VE8CF, VP2SN, VP8HZ, VP8JB, other *VP8's*, VP9A/M, *W's*, XP1AB in OX-land, XO1FG, *YV's*, ZB2FX, *ZL*, *ZP5's*, *6Y5's*, *8P6's*, 8R1Q, 8RI, and a crop of 9Y4's.

G3RCA (Wigan) is a Twenty-metre addict, sticking to SSB most of the time, and he again has a list as long as your arm from which we must select—and we could comment that the mere fact that we are having to pick and choose from the correspondents lists is the surest indication of improved conditions that one can imagine—it is all of three years since conditions were good enough for us to have long lists coming in. To revert to G3RCA, his operating times have been afternoon and evening in the main, with the odd early-morning session. In the mornings we notice OF1AJ/OJØ, KM6FF, FK8CR, plus A51RG snapped up around 1130. At or just after lunch-time we see P29JS, YB6ACV, VS5DM and VS5MS, with KA6HF for "afters", as it were. Mid-afternoon showed with K9PNT/DU2, VK8GU, 9V1SN, YBØAR; later on there are QSO's on record with such as J28AN, 9M2DW, 9Q5FL, VP2EQ, A2CZV, 5H3KS, K4YT/8R1, VP1VS, VP1CYL, K5CO/5A, WA6ICQ/9Q5, CEØAE, HZ1BS, HZ1TC, VP2MH and SUIJA.

G3NOF's morning sessions of late have given him the impression that the morning *VK/ZL/Pacific* opening has been generally a bit later than in past years. On the other hand the East Coast *W's* are often in as early as 0900 and staying in until the small hours—up to 18 hours a day at G3KFE. Don found 1500 was a time when there were openings for quite strong signals from South East Asia. SSB contacts were noted with A51RG, AP2MQ, AP5HQ, C31JR, C31MJ, EP2SV, EP2TY, FM7WS, FPØCG,

HS0SEA, IL7DMK, IM0RYC, K5CO/5A, K5HCI, K6ND, K7FF/6, K7NN, K9PNT/DU, KH6JCW, KL7IAK, KL7IVO, KL7IWM, KL7IYL, KM6FF, OF1AJ/OJ0, TJ1BB, VE4CN, VE6BEF, VP2MB, VS5DM, VU2LQA, WBN6JW, WB7ANH, XPIAB, YB2SV, YB0RS, ZP5YW, 9M2AP, 9M2DW, 9M2EE, 9M2FK, 9M2MT, 9V1RD and 9V1SW.

G2HKU dragged out his trusty old KW-2000 with which to work CW to H18MOG, K5BGB, PY2FFA and UJ8JC.

For G4EVO, his five watts of CW managed to take him all round Europe, a VK, and then lots more Europeans.

G4DJY is a strictly CW man, and his 100 watts is put into a Joystick. This last month Peter has been rather busier than he would like, so instead of a log he has just picked out the best; PY4CZ, KV4CI/MM near VP7, PY1NEW, 4M4CET from YV-land, PY2FFA, C5AAD (Gambia), JA1PIG/PZ, VP2MBC, W7IR, H18MOG, PJ2VD, OX3OA, CT3BQ, LU8DQ, plus the usual crop of W/VE/USSR stuff.

It was CW also at G4CCQ, where 4J4A, UW0AF, C31GL, HB0BLC, OH6NO/SU, EP2YK, and VK3MR, plus a lone SSB contact with OF1AJ/OJ0.

### Here and There

One knows not the reason, but there seems to be less chit-chat and witty comment this month—maybe it's the weather getting everyone down!

Anyone who worked IIDFS/IAS can QSL to IIFNX, Luca Fontana, Pizza S. Domenico 49, 19100 La Spezia, Italy, says our old friend W4WFL, who seems to be making a good show with CQ Magazine if our other friend on that side, WIWY, is anything to go by. One guesses that Morgan sent it across not just as an item of news but for its savour—the station concerned was an expedition to *Formica* Island! So now we know where all that stuff the XYL's demand should be put on their kitchen furniture comes from!

If you are only SSB, you won't find much activity from Outer Mongolia—according to UK9AAN there are only two SSB stations operating from there, the calls being JT1AN and JT1KAA; on

the CW side if you hang about at 14020 kHz you might just find a crop of JT's. UK9AAN himself will be, as usual, well away in the CQ WW contest in October, with a full-scale multi-op and multi-Tx arrangement and in there to win.

By the time this comes to be read, the chances are pretty good that you will have latched on to the Galapagos Is. DX-pedition, which is on Santa Cruz island, where HC8FN owns the Hotel Galapagos. Although they will have a multitude of individual calls the group call will be HD8CD, the suffix being in commemoration of Charles Darwin. It seems that it was around the area of the Galapagos Is. that he first got the glimmer of the idea of Evolution. Talking of evolution reminds us that among other things the group are going to dish out a special award for the first QSO with them by way of Oscar 7; and the plans therefore cover from 1.8 MHz right through to 144 MHz. In among the various gear, we notice that the group use a KW-2000B and the linears on the other bands are from the same stable—the other rigs are Trio, Collins, Drake, Heath, and Atlas, while on the aerials side there will be a brace of tri-band beams, plus a five-element Yagi and KLM Multi-2700 for the Oscar activity.

Last time round someone was querying 5T4AKL—G3NOF points out that this one was OA4AKL with a "special" call. This is also, Don says, the case with VC9UM who would normally be VE9UM but that VE9's haven't been issued for experimental purposes for some time, which makes it rather more likely that the operator was either VE6UM or VE8UM.

### Forty

There was this bloke, you see . . . said he could never find any DX on Forty Phone . . . after a bit we could stand it no longer and just had to find out why. That old saw about "if you can't hear 'em you can't work 'em" is as true at his QTH as at G3KFE's. So, we ended up teaching him how to drive his receiver and what the use of an attenuator was, not to mention whipping out his pre-selector box! But, seriously, there are many who come to this hobby of ours straight from R.A.E., and it is up to us old hands to teach

these chaps how careful handling can make such an enormous difference. We could also add, maybe, that if the receiver was vintage late nineteen-fifties he would stand a better chance than with some of the more modern boxes, even though it might take a sight longer, up to an hour, before it settled down in frequency.

Talking of those old times brings us to our first reporter, G6TC, who last wrote in to this piece some twenty years ago (when it was in the capable hands of G6QB, Howard Thomas); Ted still keeps up his interest in DX, and is still mainly CW. Indeed, the writer seems to recall, back around the days when he first started into the hobby, seeing a picture of G6TC with a BC348 receiver and a CW rig. Ted usually spends about 3/4 hour on the band before he goes to work in the morning, giving him 0615 to 0700z. Since early May this has led him to some 100 QSO's with 41 different VK's, they being led of course by the redoubtable Snow VK3MR, not to mention VK3VJ, Alf, VK3XB, Ivor, and VK2BFJ Fred. There are also ZL's, notably ZL4IE and ZL2UV, while there have in addition been WC, YV, PY, LU, and so on. G6TC reckons he is "just one of the small fry" on Forty in the mornings, as he hears faintly other G's doing their stuff of working the DX.

Some time now since we last heard of G3PKS (Wells) who has been away on holiday; since returning the rig has been fired up between 0630 and 0730z and a number of VK's worked, a ZL who was smothered under the horde of Eastern European calls, ZL1UV, UB0NKW, N4WW, K2NN and PJ2KD. A number of VK's were heard on the band but not called because they were on SSB.

We have already remarked on QRP enthusiast G4GIE, and his first 14 MHz QSO; he seems to have been having rather similar results on 7 MHz, all round Europe and through the evening QRM.

G4FUP and his simple rig also have been mentioned elsewhere, but he also used the Thing on 7 MHz, to work all round Europe and have lots of nice ragchews.

Forty for G4CCQ was quite a good band, with such as J4JA, YV1NX, DL2RL/YV6, 4M5AMT,

| Call      | Starting date, January 1, 1977 |    |     |            |       |    |    |     |           |       |
|-----------|--------------------------------|----|-----|------------|-------|----|----|-----|-----------|-------|
|           | TOP BAND                       |    |     | TEN METRES |       |    |    |     |           |       |
|           | AM                             | CW | SSB | Countries  | Total | AM | CW | SSB | Countries | Total |
| G4FJU ... | 33                             | 74 | 70  | 13         | 179   | —  | —  | —   | —         | —     |
| GM3YOR... | —                              | 74 | —   | 14         | 88    | —  | —  | —   | 10        | 10    |
| G4AEJ ... | 50                             | 30 | 12  | 6          | 98    | —  | —  | —   | —         | —     |

Scoring is on the following basis: one point per county worked on SSB, two per county on CW, three per county worked on AM; two points for county AM/SSB QSO's, each end to score two points in the appropriate column for the mode used. No other cross-mode working permissible. Countries score one point each regardless of mode.

and PY2BW—the 4M5 chappie was not hanging around passing out information, but the prefix list would place him as being in Venezuela.

At G2HKU there was the interesting contrast between the QRP rig and the KW-2000; QRP worked through to DJ1PK, DK7JI, DK6EZ, DM5VH, K3EST who gave him 599, and UA2FCZ. This can be compared against the big rig which came up with KV4AA, UJ8AQ, UI8LAG, UL7VAI and UV9AX.

At G4EVO it is always QRP of course, and it managed to get him all round Europe, although by the proportion of his QSO's on 7 MHz to the total it is quite clear that Forty is not a favoured band at G4EVO.

### Eighty

What can one say? Most of the band is covered with ragchews, and yet there is SSB and CW DX there for the taking by those with the nous to do so; and Eighty among the non-DX types is quite the most ill-mannered band below 144 MHz.

The QRP chaps like this band, and many of them come on around the noon period; and it's quite surprising what they can do, with such simple gear and low power. G2HKU for instance, trying out his HW-8, worked DJ5GW and GW5TW on CW.

For a change G2NJ (Peterborough) finds he has been working the "oblique stroke" callsigns assortment; picking out at random from the log one finds DL1GK/HB "in the mountains," G3SET/M using CW from Brighton, G2CAS/P a couple of miles from Snowdon, and also worked from Ilkley, GW4ETS/A near Monmouth, and LA9ZL/MM in the Bay of Biscay.

Eight watts of CW are still getting round well enough on 3.5 MHz CW, says G4FJU—and your conductor recalls that this figure used to be almost *de rigueur* in the days when he started, by way of a basically Top Band rig made to double on to Eighty as one's first station.

For Ben there were plenty of U.K. QSO's plus EA7XQ, UK5WBT, SP5BLI, F6BQF, PAOCYW, UA4PU, to give a dash of variety.

What a pity people can't send us details of events in good time! We hear that at the time of writing, GI8EWM, GI4FVM, GI3UHL, GI4DOM and GI4EIZ are on their way to *Rathlin Island* (weather of course permitting), which lies some seven miles from Ballycastle in a northerly direction, covering all bands from 3.5 MHz right through to VHF, which should give quite a lot of G's something new to snap up. Apart from its Marconi connection, *Rathlin* is noted as the site of the cave in which Robert the Bruce saw the proverbial spider. One would guess that they would have doubled their "customers" had the word gone round a little earlier so that it could appear in last month's column; still, one has to remember that expeditions which depend on a small boat are—and can only be—finalised when they know the weather and the tides will serve.

To get on Eighty and Top Band, G4EDG uses his 7 MHz vertical; the system is to mount a 7 MHz trap at the top of the existing vertical, to take a horizontal wire some thirty feet to a 3.5 MHz trap, from which again there is another 45 feet of wire which in its turn brings the system to resonance at 1.825 MHz. Steve doesn't say whether he worked much on Eighty, but if his Top Band results are anything to go by, it should perform quite well.

G3PKS used the band with his little crystal-controlled rig in the car on his holiday tour, along with its homodyne receiver; the whip is a home-brew one on the roof, and Jack reckons an e.r.p. of around 0.1 watts allowing for the losses in the aerial. This power, used from Bala Lake worked G3YLL, G3EIW and G8LN; the last two were worked again from a lay-by some forty miles north-west of Aberdeen. Near

Stranraer there was a Gotaway when PA0JSS called Jack, but no complete QSO followed. G3OTK/A was at the G3PKS home QTH, and G3FRN were both worked from Wigton area, and another quite successful effort was from near Kenilworth.

Elsewhere we have mentioned G4GIE; he has tried Eighty but at the time of writing he hadn't made a QSO, although the RF appeared to be getting out and the signals were certainly coming in.

Another one who seems largely to have deserted Eighty is G4EVO—his log contains the odd QSO but nothing very much and it is clear he prefers to work on Twenty and Fifteen.

### Top Band

Doesn't get a lot of mention anyway at this time of year; G4FJU has updated his Table entry after a chat with G4AEJ as to what was needed, while G4EDG has been, as mentioned elsewhere, trying out the multi-banding of a 7 MHz ground plane. The matter of "how well does it work?" was very quickly solved by an idle tune across the band; PY1RO was calling CQ, and QSX 28; a quick calibration and a call brought Rolf back with RST 359. Other calls were made, one of which brought back PT2CW, and on a different date VE1ZZ was being worked, while PY, LU, and K2ONC were all heard. We guess Steve is waiting for the "season" to start!

Finally, what about some more entries for the Ladder? If we go on like this, about all we shall have left after WARC 79 will be the memory!

### Finale

As normally of late, the deadlines for the next few months will be found in a "box" in the body of the piece, the current one being October 6 to arrive, addressed CDXN, 34 High Street, Welwyn, Herts. AL6 9EQ.

## A FOUR-BAND VERSATILE VERTICAL

BECOMING THE SIX BAND "RHAPSODIC  
RADIATOR"

B. A. M. HERBERT, G2WI

THE writer's QTH is such that whilst two 30-ft. masts could be erected to raise the aerial they were only 67 feet apart and the consequent aerial orientation NNE-SSW.

The initial set-up in these circumstances was, and still is, a K.W. trapped dipole; the end sections have to be folded down close to the masts, the whole configuration being a variety of inverted "U."

This arrangement functions admirably on all bands but on 21 and 28 MHz there are respectively five and seven half-waves in the "top" which gives mainly "end-fire" radiation on these frequencies; bearing the antenna orientation in mind it will be seen that the RF radiated on 21 and 28 MHz largely just contributes to the warming-up of the Polar wastes!

Despite the fact that Ten will be of little account for sometime to come, it was desired to evolve an efficient radiator that would put out a good omni-directional signal on this band and on fifteen metres—hence, much thinking! The fact that an arrangement appears to have been arrived at which radiates equally well on four bands (and later, six!) with an inherently low SWR may be considered as a bonus for the Industry!

Of course, it would have been quite simple to go out and buy an "XYZ Vertical" and have done with it, but it has always been axiomatic with the writer that "if you can't build it you shouldn't buy it." In any case it was necessary to determine whether a Vertical antenna would provide the results desired and that this should be achieved inexpensively.

A study of commercial verticals speedily revealed complicated traps and mechanical details which were deemed to be beyond the writer's constructional capabilities—so other means had to be sought. Vague memories of suggestions for using "stubs" in place of traps as the isolating elements in multiband antennas drifted through the memory, and eventually pencil and paper produced a layout for which logical voltage and current distributions could be projected.

As will be seen from Fig. 1, the antenna starts as a 7 MHz "quarter-wave over ground" vertical, fed at the base with 75-ohm co-ax, the outer of which is grounded (a good solid earth spike, please!); prune from the original 33ft. 9in. to get the minimum SWR—it comes quite easily to 1:1 at the chosen frequency of 7050 kHz. The choice of 75 ohms was a compromise between the base impedance at  $\frac{3}{4}$ -wave and  $\frac{1}{4}$ -wave, and does seem to work.

Once this is achieved join 16ft. 9in. of wire to the top end of the antenna and run it down parallel to the main wire, 2-in. spacers will be needed and these were made up from  $\frac{3}{8}$ -in. Perspex rod and applied every two feet (holes

were drilled through the rod and the requisite spacers threaded on—also as for the first eight feet or so there was to be another parallel wire on the *other* side of the main wire, these spacers were made 4in. long and drilled in readiness). These spacers are simply secured in place by crimping the wire above and below them. This method gives a very light assembly which is strong.

When the 16ft. 9in. wire is in place (forming the 14 MHz "stub") erect and energise the antenna with 14 MHz RF; choose your own optimum frequency—mine was 14.2 MHz. Trim the stub wire an *inch or less* at a time until the SWR is minimal—about 1.2:1.

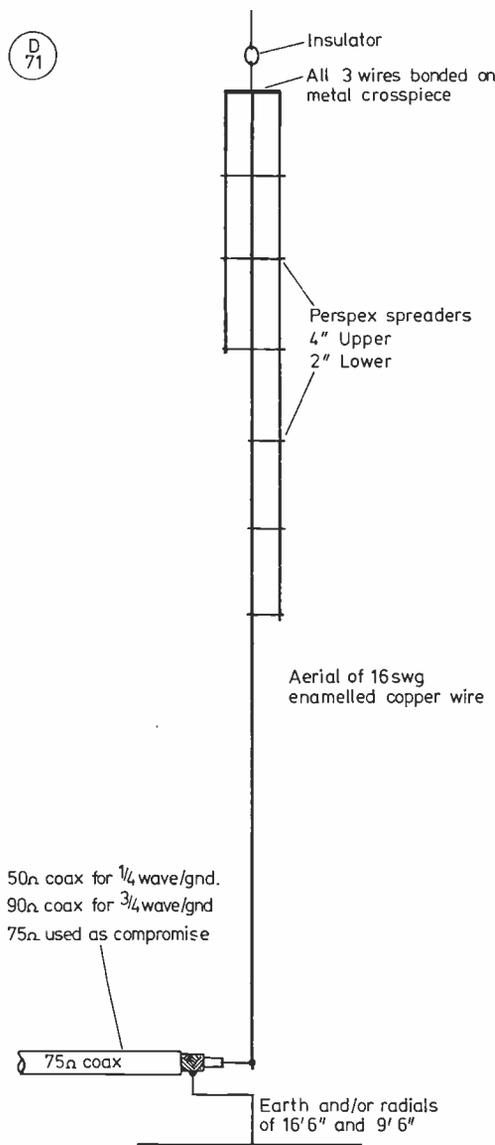


Fig 1. Physical details of the 'Wigwam Vertical'

The other stub wire (8ft. 6in.) is now attached and passed through its spacers and the antenna energised with 28 MHz RF. The stub wire must be trimmed very carefully to achieve the best SWR (use a nail file); choose your own optimum frequency—mine was 28.55 and the SWR 1:1:1. It will be appreciated that 21 MHz will be a function of the full 7 MHz wire and as such has no adjustment of its own, the SWR proved to be 1:1:1 at 21.25 MHz.

Having assembled and adjusted the antenna and stubs it should be hoisted into position and the SWR checked again. It may be necessary to do a little more "pruning"—as to which way (*i.e.* longer or shorter) can be determined by tuning the Tx for best SWR and observing

| SWR Readings |     |        | SWR Readings, |                        |
|--------------|-----|--------|---------------|------------------------|
| 7.0          | MHz | 1:05:1 | 160-          | and 80-Metre Additions |
| 7.1          | "   | 1:1:1  | 3.6           | MHz 1:8:1              |
| 14.1         | "   | 1:5:1  | 3.7           | " 1:2:1                |
| 14.2         | "   | 1:35:1 | 3.8           | " 1:6:1                |
| 14.3         | "   | 1:2:1  | 1.8           | " 1:4:1                |
| 14.25        | "   | 1:25:1 | 1.9           | " 1:3:1                |
| 21.0         | "   | 1:01:1 | 2.0           | " 1:5:1                |
| 21.15        | "   | 1:1    |               |                        |
| 21.3         | "   | 1:1:1  |               |                        |
| 21.45        | "   | 1:2:1  |               |                        |
| 28.2         | "   | 1:5:1  |               |                        |
| 28.4         | "   | 1:2:1  |               |                        |
| 28.6         | "   | 1:1:1  |               |                        |
| 28.8         | "   | 1:1:1  |               |                        |
| 29.0         | "   | 1:23:1 |               |                        |

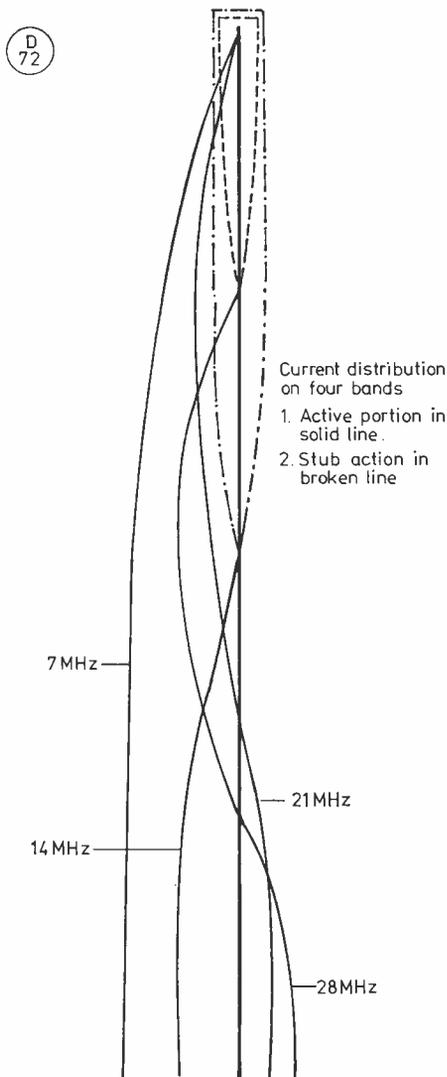


Fig. 2 The G2WI Versatile Vertical—a component of the six-band "Rhapsodic Radiator"

whether high or low of the chosen frequency, once this is known a little thought will indicate the appropriate action.

Although the original intention was for a direct earth on the outer of the co-axial cable this, in fact, could not be achieved immediately as the antenna was erected between buildings and over a concrete backyard. To simulate the ground connection two radials were utilised; they were *not* insulated and were nailed to the fence!

One was 16ft. 6in. long and the other 9ft. 6in.—if these are used they may need a little pruning to achieve the minimum SWR. A direct earth was soon achieved and the investigation continued.

The assumed current distributions are shown in Fig. 2; it will be seen that the antenna functions as a  $\frac{1}{4}$ -wave against ground on 7 MHz, ditto on 14 MHz—the upper half being cancelled out by the 16ft. 9in. stub wire. On 21 MHz it works as a  $\frac{3}{4}$ -wave over ground and on 28 MHz the 8ft. 6in. stub reduces the effective length to a  $\frac{3}{4}$ -wave for this band. In use the antenna needs no ATU, but plugs direct into the SWR meter; there is no TVI on domestic TV's.

The SWR figures (measured by two "homebrew" meters and on a professional example) are given in the Table.

Results to date are highly satisfactory: using 200 watts p.e.p. SSB on 7 MHz all Europe etc. is covered at S9, on 14 and 21 MHz JA, VK, ZL1, and KL7 have all been contacted with good reports. On 28 MHz a solitary ground-wave over a 30-mile path gave a solemn S1 both ways.

Obviously a rotary beam or quad could be better, but for those set about with space and location problems this antenna is an easy answer at low cost, which can be hung up almost anywhere—it's not even fussy about being perfectly vertical.

#### Transformation Scene: "Versatile Vertical" to "Rhapsodic Radiator"

Having established the "Versatile Vertical" as an efficient, all-round four-band radiator, the promptings of other interested amateurs, amongst whom G2BSQ was prominent, caused the writer to consider extending the performance to cover *six* Bands. This presented certain problems since no mast or other "sky-hook" 132 feet high offered itself.

The matter was resolved by keeping to the original "Versatile Vertical" and adding to it extensions to cover 160 and 80 metres. These additions to be horizontal, thus giving an inverted "L" outline. The open wire construction as used in the original was thought to be cumbersome

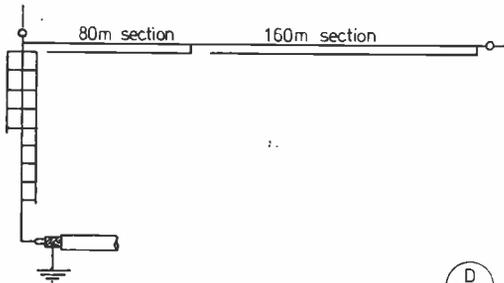


Fig. 3 General arrangement of 6-Band aerial.

for these extensions, rather too obvious (to the neighbours) and also somewhat heavy.

Consideration was given to using flat-twin ribbon feeder and work proceeded with this material. At first it was thought that, with a little rearrangement of the stub sections the whole Vertical might be fabricated in the "ribbon" material; this was in fact achieved but then the snag appeared. The ribbon Vertical worked well enough—until it rained! Then everything went "wider-shins"—the SWR soared up and it became sadly clear that the ribbon was too affected to be suitable in that place. So, back to the original "V.V." which is virtually unaffected by weather.

It was surmised that at the lower frequencies, and hung up in the clear where it would drain well, the ribbon might not be so unusable; accordingly a 34ft. length of ribbon was cut and one wire soldered to the top of the Vertical, this is referred to as the "main" wire, the other being the "stub" wire. The antenna was now energised with RF at 3.7 MHz and the far end of the "main" wire trimmed back until the SWR was 1.2:1; the "stub" wire was trimmed to match but only to keep things looking tidy.

The SWR on the 7 and 21 MHz bands was now wildly adrift, as might have been expected! The "stub" wire in the 80-metre extension now had to be brought into use to form the stub which would restore the Vertical to its correct operation. This is where the Velocity Factor of the flat twin wire comes into the picture: if we joined the free wire to the "main" wire at its far end then the stub would resonate at too low a frequency.

If the Velocity Factor of the ribbon is known or can be determined, then as a starting point one multiplies the length of the 80-metre extension (after trimming) by the VF, this gives the length of the required stub *measured from the top of the Vertical towards the free end*. Having determined this point a sharp awl is used to pierce the plastic of both wires and a stout safety pin used to short them together (checking on the 7, 14, 21, and 28 MHz SWR will show if this is correct—if not, trial and error each side of the initial spot will eventually find the exact position at which main and stub wires need to be shorted. This is achieved by soldering. The remaining stub wire need not be removed from the ribbon but six inches or so should be cut off from the extreme end where the 160-

metre extension is about to be added.

The 160-metre extension is formed in exactly the same way as the one for 80 metres; a 66ft. length of ribbon is cut and one wire soldered onto the "main" wire, the overall length trimmed for a low SWR at, say, 1.9 MHz. A ratio of 1.3:1 is acceptable, though quite a substantial length (2 or 3 feet or more) may have to be removed to get this result. Calculate, as before the length of stub required to cancel out the 160-metre addition, and measuring from the junction of the 80- and 160-metre extensions find the approximate point for shorting up. Locate the exact spot as before and effect the short.

Your antenna is now a six-band "Rhapsodic Radiator" using no ATU, allowing instant QSY from band to band, with low SWR—all factors calculated to induce Rhapsody in the average operator! Fig. 3 gives general aspect.

### Some Practical Details

1. As surmised, it was found that the 160/80-metre additions were very little affected by rain and damp.
2. Some ribbon feeder is of very light construction and was thought likely to stretch when about 90ft. of it was hung up in the horizontal mode. To obviate this the web of plastic was punched every 8-10 inches, when this was completed a nylon string was threaded through and attached securely to the ends of the ribbon; the nylon string does not stretch but carries the weight and the ribbon lies along it. Fig. 4 shows the idea. No detectable change in results or figures have been found to be caused by this modification to the ribbon.

3. If all the 160-metre extension cannot be hung-up it has been found that it can be brought down to fence level and laid out with no impairment of operation.

The "Versatile Vertical" has now become the "Rhapsodic Radiator," operating over six bands, and retaining all the original advantages.

Its Cost? Minimal! Mainly in time and patience in adjustment.

Its Results? Excellent—at least equal to any random length of wire using an ATU and on the higher frequencies very superior!

One last thought: plan and site the Vertical portion first—if you change the physical position of the Vertical *after* the horizontal section has been trimmed and raised you may find that due to different interactions all the SWR's have gone astray. You have been warned!

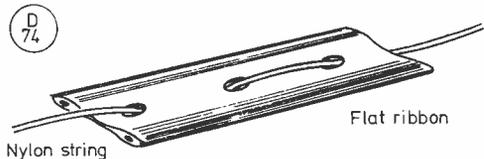


Fig. 4. Nylon string threaded along feeder for support.

## THE POLDHU STORY— FACT OR FICTION?

G. R. M. GARRATT, G5CS

**M**ANY people disbelieve Marconi's claim to have heard those "S"s from Poldhu on the 12th December 1901. Claiming that the whole thing was a technical impossibility, the story has been described by many competent to judge as a "hoary old myth" and, certainly, when one examines the undoubted facts, Marconi's claim does seem to be quite incredible. A spark transmitter with an output of perhaps 2-3kW, a non-resonant non-directional aerial, a wavelength of between 600 and 1,000 metres, daylight all the way from Cornwall to Newfoundland, an untuned receiver with no amplification whatever and a detector which, at best, could only be regarded as a very inefficient diode. Come off it—the whole thing was quite impossible!

And yet, in spite of the apparent impossibility, many have continued for many years to believe that Marconi *did* hear those signals as he always claimed to have done. Marconi's integrity is indisputable, he had nothing whatever to gain by deceit and the utter consistency with which he adhered to his claim throughout his life seems to carry conviction. He never wavered in his account and he refused completely to admit of the possibility that he might have been mistaken.

I have always believed that Marconi *did* hear those "S"s but, some years ago, I found myself challenged to justify my belief by explaining *how* the feat might have been accomplished with the equipment Marconi is known to have used. Fair enough—so, for what it is worth, here is the theory I put forward. It divides broadly into three headings, Waveform, Power and Frequency, though all three are inter-related.

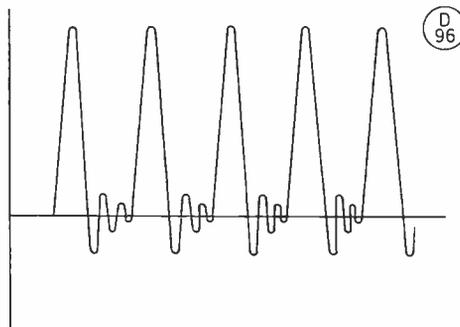
Dealing firstly with the question of waveform, it is possible that we are far too conditioned by our knowledge and experience with ordinary CW transmitters to realise sufficiently that a spark transmitter was a very different "kettle of fish." Whereas a CW transmitter, as its name implies, radiates a continuous succession of waves of constant amplitude, a spark transmitter radiates only a very brief burst of oscillations which die away exceedingly rapidly and which are followed by a long period of silence until the next discharge initiates a further brief train of oscillations.

That much is common knowledge but we need to look at the spark transmitter rather more closely and ask the questions—"how brief is the 'brief train of oscillations' and how long is the interval between successive trains?". The answers to these questions—and the consequences which flow from them—provide some truly staggering figures.

In the highly damped conditions of a spark transmitter, each burst of oscillation dies away completely in only three or four cycles. The first half-cycle is of tremendous amplitude, the second is much smaller and by the time we reach the fourth or fifth cycle the amplitude has become negligible. Suppose that we are dealing with a fundamental wavelength of 500 metres (0.6 MHz), each complete cycle occupies just over 1½ microseconds, the

whole brief train only about five microseconds and since it is only the first two cycles which are of any significance we can see that, effectively, nearly all the energy is packed into 2½ or three microseconds.

Now let us consider the interval between successive spark discharges. Obviously this depends upon the type and adjustment of the interruptor or its equivalent but if we assume the not unreasonable figure of 20 sparks per second we have a time interval between spark discharges of 1/20th second—or 50,000 microseconds. We thus have the extraordinary situation where we have nearly all the energy being radiated within a brief time of 2½ microseconds to be followed by a "waiting period" of 50,000 microseconds before the arrival of the next "pulse." This leads one to the even more surprising situation where the average power radiated in each "pulse" is 20,000 times the mean power output of the transmitter so that, if the mean power output is, say, 2kW, the peak power output of the pulses is of the order of 40,000kW—40 megawatts!



POLDHU TX (1901) PROBABLE WAVEFORM

Probable waveform of the Poldhu transmitter. Assuming a wavelength of 450 metres (0.66 MHz) each complete cycle lasts 1½ micro-seconds; with 20 sparks per second, the next "train" of oscillations, if represented on the same scale, would be a quarter of a mile away!

Turning now to the wavelength—or frequency—of the Poldhu transmitter, we are immediately confronted with the difficulty that nobody really knows what wavelength was used! The fact is that in 1901 the pioneers, and even Marconi himself, did not appreciate the significance of wavelength and, even had they done so, they had no means of measuring it. Even Marconi's co-designer, Professor J. A. Fleming, did not know the answer when he wrote in 1921—"the wavelength was never measured but it may have been about 1,000 metres". G. S. Kemp, Marconi's original assistant, was accustomed in later years to say that the wavelength used was about 2,000 metres but W. S. Entwistle, another of Marconi's contemporary engineers, wrote in 1922 that the wavelength "was probably about 700 or 800 metres." Pay your money and take your pick!—we just don't know the answer but recent calculations based on such facts

as we know of the tuning circuits at Poldhu leads us to believe that the fundamental wavelength was rather shorter than has previously been supposed and it is now thought more likely that it was between 350 and 400 metres—say between 0.75 and 0.85 MHz. This would in fact check up with Marconi's statement in 1908 that the wavelength of Poldhu "was about 1,200 feet" but, quite frankly, he didn't know and perhaps it doesn't really matter because we can be quite certain that, whether it was 350 metres of 1,000—or anywhere in between—such waves would not have been capable of propagation across the Atlantic in daylight.

While the nominal wavelength of the Poldhu transmitter must remain an unsolved problem we can be quite certain that the radiated waveform was such as to be very rich indeed in high-frequency harmonics. With its very high decrement, Poldhu's waveform was anything but a pure sine wave and, as was shown by the French mathematician Fourier, any such waveform can be analysed into pure sine waves having frequencies which are multiples of the fundamental. Without going into the complicated processes of mathematical analysis, it can be said with certainty that the waveform of any spark transmitter—even that of a motorcar ignition system!—is crammed full of higher harmonics. Indeed, a large part of the energy involved will be radiated in the form of harmonics.

As we saw earlier, the peak power of the Poldhu pulses may well have been of the order of 25-50 megawatts and it is not at all unreasonable to suppose that there would have been many hundreds of kilowatts distributed among the higher harmonics—say between 2 and 12 MHz, a proportion of which might have been capable of propagation across the Atlantic in daylight. It is probable—indeed it is certain—that the energy radiated on these higher frequencies would not have been confined to sharply defined frequencies in strict harmonic relation to the fundamental, whatever that may have been in theory. On the contrary, the HF energy would have been radiated over a very wide band and, far from being a handicap, the fact that Marconi's receiver in Newfoundland was completely untuned was almost certainly its salvation! It would have been responsive to the energy in a very wide band of frequencies, whereas had it been sharply tuned much of the energy would have been eliminated and, in all probability, nothing whatever would have been received.

There, for what it is worth, is my theory. I believe that if you take into account the waveform of the Poldhu transmitter and the very long time-interval between successive "pulses," it becomes evident that the power in the "pulses" was enormous; we cannot be sure, because so many relevant details are unknown, but it could have been anything between 10 and 100 megawatts. Allow for the high-power harmonics which must inevitably have been generated by a transmitter such as Marconi used at Poldhu and I believe you have a possible explanation of how those "S"s got across to Newfoundland.

There can be no proof and I fear that no one will be able to write "Q.E.D." after my theory—for if there is one thing which *is* certain, it is that no one will ever be able to undertake a full-scale repeat of Marconi's experiment. Think of the TVI! If anyone can think of a better explanation I'd like to hear of it.

## TREES AS RADIATORS

### SOME PRELIMINARY EXPERIMENTS

A. D. TAYLOR, G8PG/GW8PG

**I**N December, 1973, the American journal "Electronic Design" published a brief report about some experiments carried out by the U.S. Army Electronics Command at Fort Monmouth, N.J., the object being to improve military communication in jungle environments. There were no circuit details given, but the gist of the story was that by using a so-called "hybrid electromagnetic coupler" (HEMAC), made in the shape of a flexible toroid coil, trees and metal structures such as lamp standards could be used as efficient antennas. The method was to wrap the toroid around the tree or lamp post and excite it by means of a transmitter connected *via* a matching unit. It was claimed that in rain forests signal improvement of over 20 dB had been obtained compared to a carefully tuned loaded whip aerial. The report included a photograph showing a toroid, made from either thick wire or co-axial cable, strapped around a tree, its ends being connected to a metal box (presumably the matching unit) which was in turn connected to a military HF pack set.

#### Experiments

This report was noted for future investigation, but it was not possible to begin work until the autumn of 1975. The bulk of the experiments were carried out from the GW8PG QTH, a few miles from Wrexham. This site is badly screened by hills and trees. The "laboratory equipment" used for all tests consisted of a transistor transmitter/receiver running 2 watts of CW, suitable toroids, a variable capacitor and a diode radiation meter.

The first approach was to set up the circuit shown in Fig. 1a. Coil L1 is the toroid, tied closely in place around a tree trunk at a height of 6 feet; the tree used initially was a plum tree about 12 feet high. This circuit configuration proved to be useless: the settings of C1 required to peak the transmitter and receiver inputs varied widely, and only a few very weak signals could be heard when the receiver was peaked. After further experiments the circuit shown in Fig. 1b was tried, tap T1 being placed a few turns up from the "earthy" end of the toroid (note that at no time during the tests was an actual physical earth connected to the equipment). The new circuit produced greatly improved results. The transmitter and receiver could be peaked at approximately the same setting of C1 and lots of signals could be heard on 14 MHz and within a few minutes an RST 459 report had been received from Yugoslavia. Later the same day, using a 25 foot high beech tree from an "impossible" location (heavily wooded at the bottom of a small valley) two further contacts were made with Europe. Various other European stations have been worked since on 14 MHz, one of them giving a 589 report; the 2 watt power was used throughout. Despite a number of hours of experimenting it has not yet proved possible to make any contacts on 7 or 3.5 MHz using a

tree as a radiator, even though good reception is achieved on these bands. This is interesting, as the original American experiments were in the 4 to 10 MHz frequency range. On the other hand, they were pre-arranged schedules rather than an attempt to attract attention with 2 watts on a busy amateur band.

Experiments have also been carried out on energising a metal pipe, namely an elderly cast iron downspout at the G8PG QTH on Merseyside. The overall length is about 18 feet (vertical) but a joint near the centre is suspect and the effective length is probably about 10 feet. Exciting this pipe *via* a toroid produced 7 MHz contacts at up to 200 miles and a local contact on 3.5 MHz, despite the fact that the pipe is only two inches from the wall of the house. This approach certainly looks promising as no metallic connection is required, coupling being entirely by means of the toroid. Possibilities such as tall cranes on building sites, lightning conductors on tall steeples, and even the Forth Bridge, spring to mind!

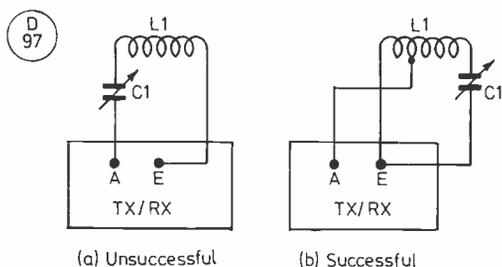


Fig 1

### Table of Values — Fig. 1

|                       |   |                     |
|-----------------------|---|---------------------|
| C1                    | = | 200 pF              |
| L1 (14 MHz)           | = | 8 turns, tap at 2t  |
| L1 (7 MHz)            | = | 18 turns, tap at 4t |
| L1 (3.5 MHz)          | = | 35 turns, tap at 6t |
| All approx. 3in. dia. |   |                     |

#### Practical details

The toroid coils were wound with 20 s.w.g. plastic covered wire, although the wire size is not critical provided it is sufficiently rigid. After winding, each coil was slid off its former and a two-foot length of nylon cord was passed through it and attached to the first turn; during transit the cord is tied round the coil to hold it flat. In use it is used to tie the coil around the trunk of the tree with the turns evenly spaced. Capacitor C1 was mounted on a paxolin panel fitted with connecting terminals and having a webbing strap bolted onto it. The strap is used to attach the assembly to the tree trunk a few inches below the toroid. Plastic flex is used for the two connections to the transmitter/receiver: lead lengths used during the tests were between 3 and 7 feet. The tuning procedure used was to adjust C1 for maximum

received signal strength, then switch to transmit and adjust the transmitter output controls and C1 to give maximum RF in the toroid.

#### Suggested further experiments

Owing to the writer having no suitable tree close to the shack all the above experiments had to be done at very low power in the open air and this proved to be a considerable handicap. Anyone who has a tree outside the shack window is in a position to do some really useful work by coupling (say) 50 watts into the tree *via* a toroid and conducting regular experiments over a period of at least a year. This time period is necessary because the tree is a living organism with characteristics which vary with the seasons. In the simplest terms, during spring and early summer the tree is storing energy by extracting mineral salts from moisture drawn up through the root system: excess moisture is shed *via* the leaves. In late summer and winter these processes are shut down and the tree becomes much drier internally. This means that radiating efficiency, assuming that the tree is playing a major part, could vary considerably during a 12 month period. Incidentally the root fibre system of a large, mature tree would extend for tens of miles if the fibres were laid end-to-end, so the ground plane prospects are interesting! Another possibility which seems worth investigating is that of exciting trees at VHF, possibly *via* a small toroid tied around a low branch. Should it prove possible to use a tree as a vertical VHF radiator many wavelengths high the applications in areas such as search-and-rescue missions could be very important.

So, as can be seen, much more investigation is required in this field, but at least as far as can be ascertained the first amateur transmissions ever in this field can now be claimed by the U.K. Should any reader decide to take the work further the writer of this article will be delighted to hear from him.

### R.A.E. COURSES

THESE notices were received too late for inclusion in the September issue. The main Lists appeared on p.351 of the August issue, and p.412 of the September issue.

**Aldridge:** At the Adult Education Centre, Tynings Lane, Aldridge, Staffs., Tuesday evenings 7.30 p.m. Course tutor B. Price, G4DDF.

**Langley:** At the Langley College of Further Education, Station Road, Langley, Slough, Berks., Monday evenings (theory, Morse, also post-R.A.E. course). Full details from E. C. Palmer, G3FVC (Senior Lecturer) at the above address.

**London (Islington):** At De Beauvoir G.L.C. Evening Institute, Tottenham Road, Balls Pond Road, Islington N.1, Tuesday and Thursday evenings at 7.30 p.m. Senior tutor Fred Barns, G3AGP, from whom details may be obtained at the above address.

**Sheffield:** At the King Edward VII Lower School, Darwin Lane, Sheffield 10, Wednesdays at 7.00 p.m. Details from G3JON, QTHR.

## UNUSUAL DX

G. F. PAINTER, G3CFO

THE author has been interested for many years in frequency standard stations on most of the normal frequencies (2.5, 5.0, 10.0, 15.0, 20.0 and 25.0 MHz) especially WWV. These were used as background "music" to other activities in much the same way as some people use BBC Radio 2. Well, WWV has now moved from Maryland to Boulder Dam, some three thousand miles farther away and we are almost at the lowest level in the eleven year cycle so that when heard, this station almost ranks as DX. Activity is now confined more or less to 2.5 and 5.0 MHz.

Some while back the author noticed a peculiar double tick on the signals of a local frequency standard station and after some thought came up with the following idea. The ticks appeared to be separated very roughly by about 0.1 second; radio waves travel at 186,000 miles a second so  $186,000 \div 0.1 = 1,860,000$  miles, so the local and unknown stations were, again very roughly, 18,600 miles apart. In other words the unknown station must be round the other side of the globe. This sparked off a period of concentrated listening at odd hours of the day and night which eventually resulted in hearing and identifying JJY, the Japanese frequency standard station in Tokyo. Continued intensive listening produced the stations listed as follows, these have been heard and identified on 5.0 MHz.

|                              |                           |
|------------------------------|---------------------------|
| ATA New Delhi India          | JJY Tokyo Japan           |
| BPV Peking China             | MSF Rugby England         |
| FFH Paris France             | OMA Prague Czechoslovakia |
| IAM Rome Italy               | RWM Moscow U.S.S.R.       |
| IBF Turin Italy              | WVW Boulder Dam U.S.A.    |
| ZUO Olifontfontein S. Africa |                           |

LOL Buenos Aires, Argentina, offered itself gratuitously while the writer was engaged on something completely non-radio and came up long enough for positive identification: the one and only time it has been heard. Some of the nearer, geographically speaking, stations can be heard quite frequently during normal listening hours.

HBN Neuchatel Switzerland, ZLFS Lower Hutt New Zealand, and Uccie Belgium may have been heard but not so far identified. In addition FFN OMJ RJA

RAT and RAS have also been heard but apart from identifying the country by the first letter nothing is known of the location of these stations. Any information would be appreciated.

The author is now concentrating on a little known form of DX hunting. This consists of identifying marine and aeronautical beacons on frequencies between 250.0 and 400.0 kHz (yes kilo-hertz). This is the higher frequency end of the long wave band on my communications receiver.

*Reeds Nautical Almanac*, starting on page 370, provides full details of frequencies and geographical location in degrees longitude and latitude; but the accompanying maps, on page 376 and onwards, make it much easier for a landlubber to find the location of any beacon. Each beacon listed, in addition to frequency, transmission times, range in nautical miles, and callsign, is identifiable by its list number which also appears on the related map. Around U.K. coasts the beacons are numbered roughly in sequence starting on the Irish west coast, through the Channel (English and French coasts included) up the East coast to the Faroes and Shetlands, then down the West coast of Scotland and through the Irish Sea back to the Atlantic coast. Other groups will be found to run more or less numerically. Thus, callsign NR, 303.4 kHz is number 45 and is located at the N. Ronaldsay light house in the Orkney Islands, or GX, 303.4 kHz is number 107 and is the Isle de Groix light house on the French Atlantic coast in the Bay of Biscay. The range of NR is given as 100 nautical miles and that of GX 50 nautical miles but both have been clearly heard at the author's QTH in N. Oxfordshire.

Do not expect R9 signals. With the BFO to on and centred RF gain to full and LF gain well up, the majority are about R2 to 3, with some at R4 to 5. The Table is a sample of what can be collected in a short period of listening.

The total at the moment, with more being heard frequently, is 99 marine beacons and 12 aeronautical beacons. An interesting exercise is to obtain a map of Europe and draw lines from the QTH to each beacon heard; distance rings drawn at 50, 100, 200 miles and so on, provide a handy reference.

It will be seen that while a great deal of interest lies in just general listening on these frequencies, it is much more interesting with the *Almanac* to hand and copies can probably be obtained at public libraries.

| No. | Callsign | Station                   | Location          | Range (miles) | Type         |
|-----|----------|---------------------------|-------------------|---------------|--------------|
| 1   | GF       | Eagle Isle Light House    | W. Coast Ireland  | 30            | Marine       |
| 22  | OTW      | W. Hinder Light Vessel    | Off Ostend        | 10            | "            |
| 25  | GU       | Tongue Light Vessel       | English Channel   | 30            | "            |
| 52a | AB       | Akraberg Light Vessel     | Faroes            | 100           | "            |
| 61  | LG       | Eillean Glas Light Vessel | Scots W. Coast    | 30            | "            |
| 71  | BR       | Bar Light Vessel          | Liverpool Bay     | 30            | "            |
| 108 | GX       | Bell Isle Light House     | Bay of Biscay     | 50            | "            |
| 143 | OF       | Kattegat S. Light Vessel  | W. Baltic         | 100           | "            |
| 326 | GV       | Genova Lantern            | S.E. French Coast | 70            | "            |
| A27 | BNY      | Bunraty                   | Shannon           | 100           | Aeronautical |
| E30 | NIC      | Nicosia                   | Cyprus            | 250           | "            |
| D50 | LAT      | Latina                    | Italy             | 50            | "            |
| E40 | GN       | Gamal Nasser              | Tobruk            | —             | "            |

# LOWE ELECTRONICS

present

## Your guide to the best stand at LEICESTER 1977.

In this brief guide, we are pleased to present a small selection of the new equipment from TRIO. As it is clearly impossible to show all the good things which will be on our stand at the exhibition, why not come along and see it all. The Leicester ARRA exhibition is the premier event in the amateur radio calendar and is not to be missed.

**REMEMBER THE DATES. 27th, 28th and 29th OCTOBER. Opening times 10 a.m. to 6 p.m.**

This will be an outstanding year for TRIO and Lowe Electronics because we shall be introducing at Leicester a host of new and exciting products designed to offer you the very best in amateur radio equipment. Over the three years since we were appointed TRIO distributors, the TRIO reputation for top quality, sensible design and real reliability has converted many amateurs and listeners into proud TRIO owners. Progress over the next three years should be, even more marked now that we are seeing the second generation of TRIO equipment.



### NEW TS700S. 2 metre all mode transceiver

The TS700S is intended to be top of the line in 2 metre multi mode stations. Building on the solid foundation of the TS700S with its outstanding signal quality and unbeatable receiver dynamic range, TRIO have now incorporated all the facilities which customers have expressed a wish to see in the 700 series. Main new features are:

#### Digital readout

Built into the rig and using the same easy on the eye blue/green readout tube as the TS820. The counter is a complete frequency measuring system and incorporates the VFO and carrier oscillator frequencies to measure the CW transmit/receive shift as well as USB/LSB shift. The display reads to 100 Hz on SSB and CW but is automatically rounded off to the nearest 1 kHz on FM—However—if you insist on reading to 100Hz, the touch of a switch restores this facility on FM also.

#### Smooth accurate tuning

Using the new dual ratio gearbox with flywheel action for fast band scanning. It is true to say that nothing compares with a real VFO backed up by first class mechanical engineering, when it comes to pin point accurate tuning of SSB and CW.

#### Receiver pre amplifier

The TS700S is fitted with a low noise receiver pre amplifier with carefully calculated gain figures to give that extra performance when digging into the noise for real DX. When signal levels are high, simply remove the pre amplifier at the touch of a front panel switch.

#### Vox operation

And break in CW using the built in VOX system. Front panel gain and delay controls allow instant adjustment to suit every situation.

#### High/low power

A front panel button allows instant selection of high power or a nominal 1 watt low power transmitter output.

#### Split frequency working

Using the new external VFO unit VFO700S. The frequency of the external VFO is checked by the digital readout on the TS700S. A press switch on the VFO allows instant frequency checking at any time and any frequency split or full transceiver operation can be carried out using the external VFO. A unique accessory for the VHF operator.

#### New standards of performance

On the samples which we have checked, the 10dB S/N ratio sensitivity is around 0.15  $\mu$ V on SSB and the 20dB quieting level is less than 0.2  $\mu$ V on FM. This gives the TS700S a real lead over any other rig around.

Plus of course all the features which make the 700 series so outstanding. Remember the signal quality resulting from the use of a high supply voltage on the PA and driver giving unbeaten linearity (TRIO patent). Remember the rugged, go anywhere construction which makes the 700 series so popular on expeditions and field days. Remember the all mode (AM, FM, USB, LSB, CW) operation—not all rigs have them. Remember the Simplex/Repeater/Reverse repeater operation available at the turn of a switch.

Finally, remember the combined reputations of TRIO and Lowe Electronics and you will agree with us that for the ultimate 2 metre all mode station is has to be the TS700S.

TS700S £542 inc. VAT. VFO700S £83 inc. VAT

# LOWE in London

Communications House, 20 Wallington Square, Surrey. Tel. 01-669 6700

## TR7500

The TR7500 will delight the 2 metre FM user with its combination of performance, reliability and unique features. It represents another step forward in the Trio product line and is designed to give its owner the very best rig available in its class.

Whatever you own now, a change to the TR7500 will be a change for the better.

### Features

**PLL** No crystals to buy—ever, since the operating frequencies are generated by an advanced PLL system which gives 80 channels from 144—146 MHz in 25 kHz steps, all 10 repeater channels and all 10 reverse repeater channels. **No programming is required by the user**—just unpack the rig, connect 12 volts dc and you are on the air.

**Unique display**  
Trio attention to detail at its best is shown in the easy to read LED channel number display which is arranged to show the correct channel number at all times. If you want S24, just turn the knob until the display shows 24—simple isn't it? Need R7? Turn the knob until the display shows 7. There's no need to wonder "did I programme R7 into channel 15 or channel 20?"

### Repeater operation

Available at the turn of a front panel knob, as is full reverse repeater operation and simplex. Automatic tone burst of course with spot on accuracy thanks to the exclusive Trio tuning fork oscillator at 1750 Hz.

### Performance plus

As the TR7200G set new standards in receiver dynamic range and sheer good performance, the TR7500 will continue and improve on this by setting new, even higher standards. A combination of multi-stage helical filtering at signal frequency, two stages of 10.7 MHz monolithic filtering and finally tailoring at 455 kHz allows the TR7500 to keep on working under strong signal conditions when other, lower quality rigs will die.

The transmitter is true FM, generated at 10.7 MHz and translated to two metres in a single fully balanced mixer system. This

## The new leader. TR 7500



ensures a superbly clean signal with no unwanted multiplier products, and an all new PA system with specially developed transistors gives output powers well in excess of normal specifications.

Trio introduced the much copied variable power SWR protection system and it is of course fitted to the TR7500 with an improved high gain dc amplifier for tighter control. Thanks to new standards of mechanical design, the TR7500 with all its potent performance is packaged in a case not much bigger than the TR2200GX!

### Accessories

The TR7500 is supplied complete and ready to use with mobile mount, microphone, power leads, comprehensive manual, etc., etc. Nothing more to buy to own the best new FM mobile rig on the market.

### See it soon!

A new matching power supply the PS-6 is available for operation from 100-240v, ac mains. Output voltage 13.8 at 3.5 amps and including a built in speaker to take advantage of the well known high quality TRIO audio.

TR7500 £225 inc. VAT PS6 £57 inc. VAT

## The new TS520S

The TS520S is the logical development of the TS520, the rig which has earned high praise from amateurs the world over. The TS520S keeps the main design features which made the TS520 a success but has an updated specification which includes full 160 metre coverage, 15 MHz WWV and an auxiliary uncommitted band for possible future amateur frequency changes.

**Outstanding receiver performance**  
Due to the use of a 3SK35 dual gate MOSFET RF amplifier which gives excellent cross modulation performance. The 3SK35 has a low noise figure (typically 3.5 dB) and high gain (typically 18dB). The result is that the TS520S has a receiver sensitivity better than 0.2  $\mu$ V for 10 dB S+N/N ratio on all bands.

### New speech processor

The TS520S incorporates a new audio compression system for extra punch in the pile ups and when the path is fading—and it does it without the distortion of clipping.

### Vernier PA tuning

Slow motion tuning drive to the PA anode tuning control guarantees easy, accurate tuning at all times.

### Effective noise blanker

The TS520S is fitted with an advanced noise blanker system for elimination of impulse and ignition interference. Just one of the de luxe features fitted as a standard item to the TS520S. The transceiver is also fitted with a 20dB attenuator selected by a convenient front panel push button.

### AC power supply

The TS520S is completely self contained with a built in top quality AC power supply 100-240v, ac. The TS520S also has the optional DS1 a DC-DC converter allows mobile operation from any 12v, dc supply.

### One thing has not changed

Trio excellent speech quality due to the use of a pair of rugged 6146B PA tubes. When we asked the Trio designers if they were considering a solid state HF transceiver, their reply was "when anyone can produce a solid state PA which can match the low intermod performance of proper transmitting tubes, we

## TS520S



shall then produce a solid state rig. Until then, we prefer to keep our signals clean." They are only stating the facts that existing TRIO owners know—that TRIO signals sound outstandingly good on the air.

All the other features which made the TS520 so popular are retained—RIT control, 8 pole SSB filter, 25 kHz calibrator, separate carrier and mic gain controls, semi break in CW with keyed sidetone, VOX/PIT/MOX operation, low power tune up for long PA life, built in speaker, built in low noise cooling fan, fixed channel operation, etc., etc.

### DG-5

A new digital readout unit, the DG-5 is

available as an option, and in the TRIO tradition of doing the job correctly, the DG-5 mixes the carrier oscillator, VFO, and heterodyne oscillator frequencies so as to display the true operating frequency at all times.

The DG-5 sits on top of your rig and shows the frequency in six large easy to read digits. A unique feature is that the DG-5 can be used as a normal frequency counter from 100 Hz to 40 MHz at the touch of a switch.

### TS520 owners

The DG-5 will also work with your rig using the DK 520 adaptor kit.

TS520S £489 inc. VAT. DG-5 £132 inc. VAT

## LOWE in Birmingham

Soho House, 362-4 Soho Road, Handsworth, Birmingham.  
Tel. 021 554-0708

## LOWE in Leeds 27 Cookridge Street, Leeds. Tel. 0532 452657

### TS820

The ultimate transceiver... TRIO's TS-820. No matter what you own now, a move to the TS-820 is your best move. It offers a degree of quality and dependability second to none, and as the owner of this superb unit, you will have at your fingertips the combination of controls and features that, even under the toughest operating conditions, make the TS-820 the leader that it is. Unprecedented demand plus the painstaking care TRIO lavishes on each TS820 treated an initial backlog of orders but happily we can now supply the TS820 from stock. Once you have operated the TS820, you will not be satisfied with anything else.

**Features**  
**SPEECH PROCESSOR** ● An HF circuit provides quick time constant compression using a true RF compressor as opposed to an IF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control.  
**IF SHIFT** ● The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820 the pacesetter that it is.  
**PLL** ● The TS-820 employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

**Specifications**  
**FREQUENCY RANGE:** 1.8-30 MHz (160-10 metres)  
**MODES:** USB, LSB, CW, FSK  
**INPUT POWER:** 200W PEP on SSB  
 160W DC on CW  
 100W DC on FSK  
**ANTENNA IMPEDANCE:** 50-75 ohms, unbalanced.  
**CARRIER SUPPRESSION:** Better than 40dB.



**SIDE BAND SUPPRESSION:** Better than 50dB.  
**SPURIOUS RADIATION:** Greater than -60dB (Harmonics more than -40dB)  
**RECEIVER SENSITIVITY:** Better than 0.25µV.  
**RECEIVER SELECTIVITY:**  
 SSB 2.4 kHz (-6dB)  
 4.4 kHz (-60dB)  
 CW \*0.5 kHz (-6dB)  
 1.8 kHz (-60dB)  
 \*With optional CW filter installed.  
**IMAGE RATIO:**  
 160-15 metres: Better than 60dB.

10 metres: Better than 50dB.  
**IF REJECTION:** Better than 80dB.  
**POWER REQUIREMENTS:** 120/220 v. AC, 50/60Hz. 13.8v. DC (with optional DS-1A DC-DC converter).  
**POWER CONSUMPTION:**  
 Transmit: 280W.  
 Receive: 26W. (heaters off).  
**DIMENSIONS:** 13½" w. x 6" h. x 13 3/8" d.  
**WEIGHT:** 35.2lb. (16kg.)  
**DG-1, digital readout optional.**  
**TS820 £645 inc. VAT DG-1 £127 inc. VAT**

### The Portables

**TR2200GX.** Represents the very best of TRIO design. It is the latest in the line of continuous progress from the first TR2200 and maintains the TRIO tradition of top quality at a reasonable price. The TR2200GX has all the features that you could want—high power output; sensitive receiver; flexible use from internal batteries or external supplies using the power lead supplied; built in removable telescopic antenna with flexible whip available; built in metering of signal strength, transmit output and battery condition; fitted with twelve channels at low, low prices; in short, all that you could want.

All operator controls are placed for maximum convenience on the top face of the rig and a protective carrying case is included in the price.

**VB2200GX.** This is the matching 10 Watt mobile amplifier for the TR2200GX (and all previous models). It is self contained and of very small size but produces well in excess of 10 Watts for 2 Watts of drive. It contains a regulated power supply for the TR2200GX and has positive SWR protection for the PA transistor. The amplifier may be switched out of circuit if required, but still supplies power for the TR2200GX.

**TR3200.** Not content with having the lead in 2 metre handy portables, TRIO have gone a step forward and produced the best 70 cm. portable rig to match.

The TR3200 is really terrific; over 2W output with switched reduction to 40 mW for local contacts; tailored speech response with a new limiting amplifier and new microphone give you crisp speech quality.

Excellent receiver performance with double IF filtering at 10.7 MHz and 455 kHz with no less than five limiters to guarantee noise free performance on even the weakest signals.



12 channel capability with three channels factory fitted with crystals for SUB, 18 and 20. Supplied with all accessories as the TR2200GX and including a new high gain 5/8 wave antenna.

Don't forget, the following accessories are provided with the TR2200GX and TR3200 —

Removable antenna Free  
 Carrying case Free  
 Shoulder strap Free

Battery charger Free  
 External power lead Free  
 Prices including 12½% VAT

TR2200GX £139 (3 channels)  
 £169 (12 channels)  
 £45  
 VB2200GX £182 (3 channels)  
 MB1a £9.70  
 NiCad pack £9.72

## LOWE in Glasgow 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

# LOWE in Wales

35 Pen-Y-Waun, Efail-Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809

## TR8300

### NEW TR8300 70cm FM mobile

The TR8300 is a matching rig to the well established TR7200G and offers top mobile/ fixed station FM performance in the 70cm. band. Capable of taking up to 23 channels, the TR8300 is supplied with four fitted. The crystals are identical to those used in the already popular 3200 70cm. portable so changing between rigs is easy.

#### Features

The TR8300 is housed in the standard Trio rugged splash proof case and fits the Trio quick release mobile mount (supplied with set). All the top quality Trio design refinements are incorporated, including the LED indicators to automatically show which channels are fitted with crystals, high/low power switching, automatic tone burst and a new monitor facility for checking your own modulation.

#### Top performance

The receiver section utilises a 5 section helical filter as signal frequency followed by crystal filtering at 10.7 MHz and final selectivity determined by a 455 kHz multiple section ladder filter. The receiver sensitivity is better than 0.4  $\mu$ V for 20dB quieting and the adjacent channel selectivity is very good indeed. Squelch sensitivity is better than 0.3  $\mu$ V so you will not miss any weak signals at all.

The transmitter employs a rugged Motorola transistor in the PA stage which guarantees output power in excess of 10 watts. The Trio variable power SWR protection system is included of course, and high/low power switching is by front panel push button. A top quality coaxial antenna change over relay is used so as to minimise losses both on transmit and receive.



A total of 40 transistors, 26 diodes and two integrated circuits are employed in the TR8300 to give top performance and unparalleled reliability.

#### Complete and ready to go

All the normal Trio accessories are provided with the TR8300 including the patented quick release mobile mount, microphone, power leads, comprehensive manual and the special stand used when operating from home.

The TR7200G set the standard for 2 metres and the TR8300 establishes new standards for the up and coming activity band—70cm. See it soon at Leicester.

**TR8300 £227 inc. VAT**

## Don't forget . . .

We also stock for the radio amateur every conceivable piece of equipment and station accessory. From the incomparable TRIO range of products—the TS820 HF transmitter, hailed by all users as the best available today at any price; the TS700S all mode digital 2 metre transmitter which is setting new standards; the TR2200GX and TR3200 2 metre and 70 cm. hand portable transmitters, unique in their field and in ever increasing demand; the all new range of mobile VHF/UHF FM and SSB equipment featuring up to the minute techniques with TRIO design expertise. The entire TRIO range will be on show at Leicester and must be seen. From our wide range of station accessories, we recommend the DAIWA in line power meters and top quality antenna couplers, the Hansen range of SWR meters, the complete range of RAK antennas from simple systems for the short wave listener to full size five band dipole arrays. Microphones, communications speakers, headsets, station clocks, morse keys, both hand and fully automatic electronic; the wide range of SHINWA filters for HF and VHF user; all HY-GAIN antennas and CDE rotators from the U.S.A.; the complete range of Microwave Modules VHF and UHF converters and transverters; and of course the unique TD224 video display system which allows direct viewing of RTTY copy on the



# TRIO



## ANNOUNCEMENT

We are pleased to announce that in addition to the normal Lowe Electronics retail outlets, the complete range of Trio products is now available from the following well established, full time, specialist dealers who will be pleased to demonstrate and advise you on any item from the range.

For North London and area  
**Radio Shack Ltd.**  
 188 Broadhurst Gardens  
 London NW6 3AY  
 Telephone : 01 624 7174

For Lancashire and the North West  
**Stephens James Ltd.**  
 47 Warrington Road  
 Leigh, Lancs., WN7 3EA  
 Telephone : 0942 676790

screen of a normal TV set in complete silence. We are stockists and suppliers of most of the top quality products in the amateur field and we pride ourselves on speed of service together with the finest technical advice and workshop facilities. We have

branches in most areas where all our products are on display and where you can obtain courteous assistance.

For full details of our range and price lists, simply send 55p in stamps to our Matlock address.

## HEAD OFFICE

119 Cavendish Road, Matlock, Derbyshire. Tel. 0629, 2817 or 2430

# A SIMPLE HF/VHF/UHF GATE DIP OSCILLATOR AND WAVEMETER

C. W. HARLOW, G8BTK

**T**HIS instrument, which covers frequencies to an excess of 450 MHz, whilst not claiming in any way to be original, has not, as far as the writer is aware, been published before in this form nor have the higher range of frequencies capable with this unit been covered.

The circuit is shown in Fig. 1 and a components list is given. Apart from the UHF FET, the components, all of which come from the writer's junk box, are not critical and  $\pm 10\%$  or so should make very little difference.

sections of VC1/2. For UHF use only, the "strip" line coil may be permanently soldered in place. All components should be rigidly mounted to aid stability and reliability. It will be seen that this GDO has facilities for use as a modulated signal generator and an absorption wavemeter, all for the price of one unit.

When used as a signal generator, an AM/FM signal is produced; that is to say, the modulation is amplitude and part frequency modulated. The GDO also can provide a CW signal. If phones are plugged in at the socket indicated and with the unit used as an absorption wavemeter, it may be used as a station monitor.

The unit should be constructed in a rigid metal box and calibration can be made *via* a communications receiver with the addition of a 2-metre and 70 cm. converter. The home TV may also be used for the higher frequencies.

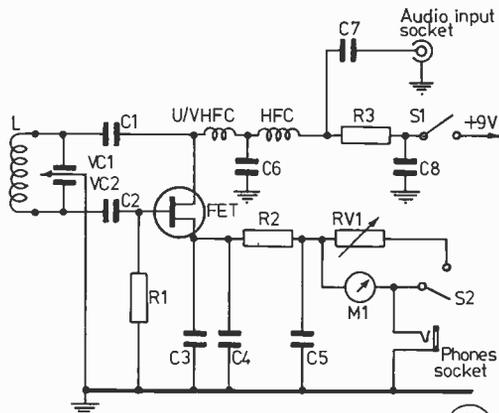


Fig. 1

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### Components List

- |   |                                     |
|---|-------------------------------------|
| VC1, VC2 = 2-gang, 75 or 100 pF         | R1 = 120K                           |
| C1, C2 = 100 pF                         | R2 = 2.2K                           |
| C3, C6 = 680 pF miniature ceramic plate | R3 = 1K                             |
| C4, C5 = 0.001 $\mu$ F, small disc      | VR1 = 100 ohm                       |
| C7, C8 = 0.1 $\mu$ F, small tubular     | L1—to suit range or ranges required |
|   | M = 500 micro-amp.                  |
|   | FET = BF256S or BF256               |

Switches S1 and S2 are ganged, and in the OFF position give use as an absorption wavemeter and station monitor. When in the ON position, the instrument may be used as a GDO, a CW signal generator and—when an audio source is connected to the socket—a modulated signal generator giving a partially FM modulated AM signal.

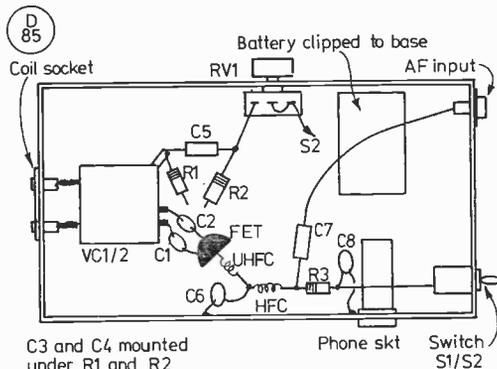


Fig. 2

Amongst the uses for a GDO which are perhaps less known are:

1. Aerial resonance which may be determined by connecting a coupling coil to the end of the feeder and finding the "dip" point which indicates resonance.
2. Band setting a newly constructed or badly misaligned receiver, this being helped considerably by the audio modulation facility provided in the unit here described.
3. Determining the resonance of toroidal inductors. The method is to link the GDO to the toroid by a coupling loop as shown in Fig. 3 and *via* a further coupling loop at the other end of the co-axial cable to the GDO.

Many more uses are possible for this type of instrument, most of which will come to the mind of the experimenter as and when the need arises.

The lay-out, Fig. 2, with particular reference to the coil socket, VC1/2, C1, C2 and the FET, which is a BF256S or equivalent, is very critical if the highest frequencies are to be achieved, otherwise it is quite straightforward. The components should be mounted with the shortest practical lead lengths and the coil socket should be "braided" connected with the shortest lengths possible, the braids being obtained from an old piece of co-axial cable and slipped over the two pins of the coil socket and taken directly to each of the fixed

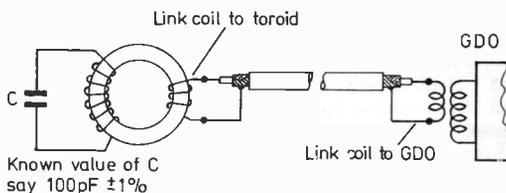


Fig. 3

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# VHF BANDS

NORMAN FITCH, G3FPK

## VHFCC Awards

TWO readers have been awarded their VHF Century Club certificates this month, both for 2m. operation. No. 286 goes to Leonard Kenyon, G8KNR, from Great Bardfield in Essex. He only took up amateur radio at the age of 63 studying for the R.A.E. at the Mid Essex Technical College in Chelmsford. Leonard passed at the first attempt. First licensed in August, 1975, the first station comprised a Trio TS-520 transceiver with transverter running 10 watts to a 5-over-5 aerial at 35ft. In December, 1975, a *Versatower* was installed and the aerial is now at 70ft. A year ago, a Trio TS-700G was acquired for 2m. operation whilst the TS-520 awaits an airing on the LF/HF bands when the CW test is passed.

Paul Melbourne, G8GML, from Cambridge receives award no. 287. He was first licensed in August, 1972 and had to use a series of simple aerials due to "local difficulties." Paul's first rig was a *Yaesu* FT2F-B to an indoor 2-ele. Quad and later to a 6-ele. vertical colinear. Having decided that FM was a dead loss, he progressed to a *Belcom* Liner-2 to a 6-ele. Yagi at 25ft.

A 40ft. tilt-over pole was built at Easter in 1975 and the aerial changed to a 10-ele. long Yagi but the current station now comprises an *Icom* IC-202 and 30 watts linear amplifier to a 5-over-5 aerial. The QTH is only 40ft. *a.s.l.* the only clear take-off being between north and east. Paul is now active on 23cm. and 70cm. and is doing well in our tables.

Some readers have asked about the rules for the VHFCC so to re-cap, they are available for 4m., 2m. and 70cm. All QSO's must have been made from the same QTH by direct

means; *i.e.* no repeater or satellite QSO's. When you have accumulated 100 confirmations from different stations just send a list to your scribe who will choose six at random to be submitted for verification. When sending in a claim, please include a brief history of your amateur radio career and details of past and present equipment. We do not issue any claim forms by the way.

## Beacons

Alec Allan, GM3ZBE, and Graham Knight, GM8FFX, installed the new Lerwick beacon at the Magnetic Observatory site on August 28. The QTH locator is ZU65F and the frequency is 144.965 MHz. The transmitter runs 10 watts into two 8-ele. Yagis one firing south, the other to the north-east for auroral warnings. So far, conditions have not been good enough for it to be received in the south of England but Derrick Dance, GM4CXP (Borders) reports hearing it first on August 30, the QRB being 530 km. The callsign is GB3LER.

The comments about the GB3NEE beacon in the September column brought a long telephone call from its keeper Roger Jones, G3YMK, who stated that the transmitter has only been off the air recently when the tower was being painted. He discovered that part of the coaxial cable feeder is ordinary TV downlead of unknown age and condition so it is uncertain what losses occur between the 18 watts at the output of the Tx and the aerials. Both the beacon and the Tyne-Wear repeater installations were due for maintenance checks on September 11.

Roger was rather upset that the remarks were made without reference to him. He says he checks both GB3TW and GB3NEE each day and, if there is anything unusual it is reported to the RSGB in accordance with licence requirements. However, your scribe was merely trying to put over the opinions of many readers that the signal from GB3NEE is nothing like as consistent and reliable as it used to be when on 145.975 MHz as GB3DM in past years. Then it was most unusual *not* to hear it at G3FPK whereas now it is undetectable for about 50% of the time.

It must be appreciated that there are dozens of VHF/UHF beacons of

interest to readers and it is quite impractical for "VHF Bands" to contact every keeper on a regular basis. G3COJ keeps us informed about the U.K. situation as far as he himself is kept in the picture by the numerous beacon keepers.

A new UHF beacon is now operating from France in the 70 cm. band. Its call is FX4UHF and the QRG is 432.870 MHz. The QTH locator is ZD52c in the Pyrénées-Atlantiques, Dept. 64, at La Rhune, right on the Spanish border and the *a.s.l.* is 904 metres. The power output is 10 watts to two 10-ele. Yagis beamed towards Paris, *i.e.* at 23° bearing. Reception reports to F1FG. From G3DME via G3USF, news of a beacon on 50.146 MHz in Cyprus, callsign 5B4CY. More details later.

## The Satellite Programme

For the scientifically minded, some rather precise information concerning the launch of *A-O-D* scheduled still for Feb. 23 next, along with a further LANDSAT satellite. *A-O-D* would be released 4381 seconds after launch and after another 739.29 secs. it would be at 78.964°N and 22.270°W at an inclination of 99.00491°. If successful, this vehicle will become *Oscar* 8.

*Oscar* 7 seems to be continuing to provide reliable communication on both modes but it is worth reminding casual users that every Monday is a QRP day with a maximum *e.r.p.* of 10 watts. The idea of QRP operation is to allow stations running the many low power transceivers to communicate through 0-7, something they are less likely to be able to do if the QRO vandals monopolise the satellite. At other times, 100 watts *e.r.p.* is the maximum desirable power; say 10 watts to a 10-ele. beam.

Some stations reported worked on Mode "A" include EA8IZ (29.488 MHz), PJ2CW (29.495), VE7IO (29.470/485), 5T5CJ (29.440) and C5AAP in The Gambia. An interesting one worked from G3FPK on August 7 was TF4F, an Icelandic operation from one of those new islands which appeared during a huge volcanic eruption of a few years ago. KV4FZ was another new one for your conductor on Aug. 23 on 29.475 MHz down link.

For a long time there has been

much cursing at G3FPK due to a strong signal on 29-476 MHz at certain times of the day which has often masked the weaker *Oscar* signals. A bit of detective work by listening to the programme content and noting times has pinpointed the transmitter responsible and, at the time of writing, it is being investigated.

Hugh Rylands, TU2EF, wrote about his *Oscar* activities from the Ivory Coast and complained bitterly about the selfish QRO types whose big signals depress the satellite receiver's AVC so much that they push the weak DX signals they are presumably anxious to work into the noise level. He cites the case of the signals on Mode "B" from his *Echo-70 (Liner-430)* whose 10 watts invariably goes unheard in Europe. Hugh also makes the sensible suggestion that those who have already worked a DX station do not call him on many subsequent occasions so that others may have a chance. He has 62 countries worked now *via* satellites with five continents confirmed.

TU2EF reports that ZS6BNT has worked into Italy and ZS1BI into Malta. 5Z4JJ is back in Europe, as is 9J2PH. 5X5FS and 9X5SP "... seem to have disappeared now." ZE7JX is active on Mode "A" on descending node.

### Contests

**Results:** There were three sections in the RSGB Region 1 VHF Contest on August 14. The Multi-operator part was won by the Wulfrun Contest Grp. (Nth.) with 5133 points, the Bury Radio Society second with 3602 pts. and the Isle of Man ARS in third spot with 3487 pts. The winner of the Single Operator section was G4CZP who scored 2240 pts. ahead of GD2HDZ with 1369 and G8GHO/P with 557. The section for operators outside of Region 1 was won by G3FJE/P with 411 pts. followed by G3JZP/P with 259 and G8JTP/P with 203.

**Coming Events:** Publications week-end sees the UHF Contests, the RSGB and IARU Region 1 coinciding events, on October 1/2 from 1600-1600 GMT. The bands are 432 MHz to 2.3 GHz. The 1977 series of 70 cm. *Cumulatives* begin on October 8, then further sessions on the 16th and 24th, plus Nov. 9, 17

and 25, all 2000-2230 GMT. The 70 MHz Fixed Contest is scheduled for Oct. 23, presumably 0900-1500 GMT.

### The 144 MHz Open Contest

Your conductor tends to avoid contests mainly because it is quite impractical to devote more than a few hours to them. However, short periods of listening prove quite interesting and reveal enough about conditions to enable a report to be compiled.

At the start of the event, conditions seemed rather flat with much weaker than usual signals from the Welsh portables. Propagation to the north, a good direction from G3FPK, was below par with only S4 reports being exchanged with GM4BWT/P in YP44h at 2209 GMT.

### QTH LOCATOR SQUARES TABLE

| Station | 23 cm. | 70 cm. | 2 m. | Total |
|---------|--------|--------|------|-------|
| G3JXN   | 25     | 61     | 82   | 168   |
| G3COJ   | 16     | 52     | 68   | 136   |
| GD2HDZ  | 10     | 25     | 53   | 88    |
| G8GML   | 8      | 46     | 85   | 139   |
| G8EOP   | 8      | 36     | 38   | 82    |
| G8IFT   | 7      | 18     | 45   | 70    |
| G4DKX   | 5      | 30     | 68   | 103   |
| G3OHC   | 4      | 30     | 98   | 132   |
| G8LEF   | 4      | 37     | 79   | 120   |
| G4AEZ   | 2      | 22     | 57   | 81    |
| G8FUF   | 1      | 79     | 199  | 279   |
| G2AXI   | 1      | 43     | 71   | 115   |
| G8BKR   | 1      | 12     | 89   | 102   |
| G3POI   | —      | —      | 202  | 202   |
| GM4CXP  | —      | 25     | 122  | 147   |
| G3CHN   | —      | —      | 143  | 143   |
| G3FPK   | —      | —      | 139  | 139   |
| G4BWG   | —      | 25     | 110  | 135   |
| 9H1CD   | —      | 6      | 120  | 126   |
| G8HVY   | —      | 33     | 93   | 126   |
| G4BAH   | —      | 32     | 92   | 124   |
| G3XCS   | —      | 19     | 100  | 119   |
| G4FCD   | —      | 22     | 85   | 107   |
| G8HHI   | —      | 21     | 78   | 99    |
| 9H1BT   | —      | —      | 94   | 94    |
| G8IWA   | —      | 17     | 74   | 91    |
| G3FIJ   | —      | 25     | 62   | 87    |
| G8GII   | —      | 22     | 63   | 85    |

|        |   |    |    |    |
|--------|---|----|----|----|
| G6UW   | — | —  | 85 | 85 |
| 9H1C   | — | —  | 83 | 83 |
| G4DEZ  | — | —  | 79 | 79 |
| G4FBK  | — | 5  | 72 | 77 |
| G4AWU  | — | —  | 77 | 77 |
| G8JHX  | — | —  | 74 | 74 |
| GJ8AAZ | — | 15 | 56 | 71 |
| G8JJR  | — | —  | 71 | 71 |
| G4GET  | — | —  | 69 | 69 |
| G3BW   | — | 21 | 47 | 68 |
| GD3YEO | — | 8  | 59 | 67 |
| G8KUC  | — | 7  | 60 | 67 |
| G8KLN  | — | 1  | 62 | 63 |
| G4ERX  | — | 10 | 52 | 62 |
| G4CIK  | — | —  | 62 | 62 |
| G8LHT  | — | 1  | 60 | 61 |
| G3KPU  | — | —  | 60 | 60 |
| G4GCQ  | — | —  | 60 | 60 |
| G8KSP  | — | —  | 60 | 60 |
| G8ITS  | — | 9  | 49 | 58 |
| G8JEF  | — | —  | 58 | 58 |
| GW4FJK | — | —  | 57 | 57 |
| OZ9IY  | — | —  | 53 | 53 |
| G8KSS  | — | —  | 47 | 47 |
| G4EYL  | — | —  | 41 | 41 |
| G8LLG  | — | 1  | 38 | 39 |
| G8JAH  | — | 1  | 35 | 36 |
| G8JGK  | — | —  | 34 | 34 |
| GM8NCM | — | —  | 34 | 34 |
| G8JAJ  | — | —  | 24 | 24 |
| G8JKA  | — | —  | 21 | 21 |

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

Only one QSO was made on the Sunday with DF5FG/LX/P in CJ19j. Overall impressions were of lower than usual activity for this kind of contest. On the Sunday morning, signals from the westerly direction were very much louder and it would seem that Sunday would have been more profitable for points-piling.

G3USF (Staffs.) did a lot of listening and mentioned that the team at GW8IZS/P thought conditions "mediocre." They gave serial number 562 at 1521. Martin got no. 566 from G4BEM/P at 1511 and reckons that GW3OXD/P finished up with about 602 QSO's. Mark Deutsch, G3VJG, did 4½

hours of -/P from the Midlands achieving 60 contacts, best DX being YP square. He heard GD3FLH but reckons that conditions were very much up-and-down.

Bob Nash, G4GEE, wrote on behalf of the Coventry Technical College ARS who made their first -/P effort in the contest using the call G3UVW/P. They operated from ZM72h making just over 320 contacts with the TS-700 and 8-over-8 Yagis. Notable contacts included G3OUR/P (WJ09j), GM4BWT/P (YP44h), ON4YZ (CK63a), F1DPX (ZH02a), DC8RAA (DJ26a), DF5FG/LX/P and G18KIA (XO21b). Bob asked, "We wonder if there is need for all the power being run."

Richard Diamond, G4CVI, and John Regnault, G8FQO, operated -/P from near Cromer in Norfolk (AM07f) and managed 382 QSO's worth about 4,600 points. They lost 3½ hours and found conditions rather poor even having a struggle to work GM8FFX in Aberdeen over an "easy" sea path. The contest gave Bryn Llewellyn, G4DEZ (Oxon.) an opportunity to try out his newly acquired NAG 144XL amplifier, albeit with a 4CX250B valve as the 4CX350F did not arrive in time. Ian White, G3SEK, operated from Bryn's for a while and 329 QSO's resulted, 61 of which were non-G. The elimination of the QTH-swopping information was much appreciated.

John Tindle, G3JXN, operated from London W5 for 12 hours and made 327 contacts, originally intending not to participate at all seriously. Ian Gordon, G8IFT, and Martin Fulda, G8IQL, operated the University of Kent ARC call, G8KUC from Canterbury and made 411 QSO's, 203 of which were non-UK. They wondered if many of the G stations were working in the SSB Field Day. Best DX came at the end with DM2GPL/P in GL square.

### Expeditions

The Oxford University group operated from the Scillies as planned but do not appear to have enjoyed other than average conditions. It is hoped to have an authentic report from them for the next issue but your scribe was told that the 70 cm. K2RIW linear had misbehaved initially due to a fault with one of

the 4CX250B valves. On 2m., they were not particularly loud in the London area whenever G3FPK was QRV.

### Meteor Scatter

The *Perseids* shower around Aug. 10 to 13 was very good with some incredibly long bursts. S.w.I. Mike Allmark, Leeds, noted some up to 50 seconds and he added three new countries to his score, viz; CT1, OH and OHØ, but missed out on C3 and OY. Best DX was on the 12th and 13th and included OH5NW (NU), SM2HDF (JY34a), I4XCC (GD03d), SM3COL (IW16f), SM3FGL (IW53g), IW6MBK (HC42g), CT1WW (WB63b) and DB5NA/OHØ. Mike reports that Dennis Boniface, G4DSC, worked CT1WW and OH5NW, the latter also worked by G4CMV and G8HDR.

Clive Penna, G3POI (Kent) submits a mouth-watering list:—I3LGP (GF24), I6CXD/6, IW6MBK, LA3WU (DU61a), OE5UAL, OH3AZW (LV39e), DB5NA/OHØ (KU61f), OK1BMW/P (HK52b), SK6JF/OY (WU77e), SM3BIU (HX18j), SM3COL (IW06f), SM3AZV (IX79d), UA1WW (OR12b) and UK2BAB (MO19a). C3IOX in AC square was another new MS country bringing Clive's total to 40. Dave Price, GW4CQT, also worked UK2BAB on random and UP2BBC (LP07j).

Keith Naylor, G8FUF (Essex) a very experienced MS practitioner, reckons this year's *Perseids* to have been one of the best displays he has seen. At the peak around 1100 GMT on the 12th, he had continuous bursts for over a minute and exchanged RS 59 reports with DB5NA/OHØ during an E's type 44 second burst.

John Nelson (G4FRX) brought his TS-700 and home built 400 watts amplifier to G3FPK's QTH during the *Perseids* and was astounded at the SSB DX heard. Unfortunately several SSB skeds set up by letter with FICYB in Corsica produced not one ping so we assumed Edouard did not get the note about QRG's in time.

It is obvious that in future major showers, the calling procedure for random SSB MS working can be revised to enable QSO's to be concluded very quickly during a longish burst. To this end, Ian White,

G3SEK, and Clive Penna, G3POI, are thrashing out a suitable proposal for discussion at the next IARU meeting in Hungary.

The next notable shower will be the *Orionids*, peaking around Oct. 20/21.

### The Gigahertz Bands

Don Hayter went to Alderney for the Aug. 21 leg of the 10 GHz *Cumulatives* operating as GU3JHM/P. He worked G4CNV/P and G3VPF/P, 8 km. south of Dorchester and G8BCO/P and G8ALO/P 7 km. north of Chichester and G3KSU/P on the Isle of Wight. On the 28th, he worked F5ZA over a short 16 km. path for the first GU/F 3 cm. QSO. Glen Ross, G8MWR (Coventry) reports that G8AIM is building gear for 10 GHz and also for 2.3 GHz.

Bill Jarvis, G8APX, writes that he will shortly have some spare *Microwave Associates Inc.* varactor tuned "Gunnplexer" transceivers complete with the horn antenna with 17 dB gain. Anyone interested should contact Bill at Salewheel House, Salisbury Hall Road, Ribchester, Preston, PR3 3XU. For an s.a.e. he will send you a "Xerox" of the full gen.

### Two Metres

G2AXI (Hants.) found conditions very average over the month. Syd added GJ8EZA and GU3JHM/P (Alderney) to his 1977 tally plus G3OUR/P (Scillies) on Sept. 3. Gerry Ilbury, G3MMW, (Hants.) writing on Aug. 13 complains of the sad lack of CW activity generally as typified by his seven QSO's over the preceding thirty days! Although his site is not ideal, he notes that both GB3CTC and FX3THF are always audible with GB3NEE popping in and out of the noise. Even so, numerous CQ calls fall on deaf ears with perhaps just a few regulars to be heard.

G4ERX reckons it was a poor month for him. At Sept. 6, Ray has not managed to work G3OUR/P but did have a QSO with G8APZ/P in Devon. "Gremlins" in the transverter during the "Open" precluded his working DF5FG/LX/P at 0300 GMT. John Woodham, G8BKR (Bristol) had a brief contact with EI7BA in Co. Limerick in VM square. He quite often hears EI9BG

(Co. Clare) in VM square on Sunday mornings working EI9Q. Con Hunter, EI9V, was operating from WL square on Aug. 12 and was worked by G8LQM/P near Newquay but nothing copied at G8BKR.

Chris Baker, G8JGK (Essex) was

another who worked DF5FG/LX/P in the Open Contest and he thinks the 6-ele. Quad at 50ft. on the new tower is paying off. Martin Green, G8MKW (Warks.) has worked GM at last thanks to GM8LHT/P in YP76h, and on the E's front, I4EAT

(FE60) was contacted on Aug. 6.

Alister Simpson, GM8NCM (Fife) records generally poor conditions except for Aug. 17 and 18 when propagation to LA was good with LA6HL worked each day and the Bergen repeater accessible. The new rig, a Yaesu FT-221R with the 8-over-8 aerial is working well.

At G3FPK on Aug. 9, G4JZ (Glos.) was heard working some GI's and a QSO with GI8KIA ensued. Shortly after, GI8FLQ in Co. Down (XO32b) was worked. 24 hours later, a long awaited QSO with Shetland was concluded thanks to John Aitken, GM8NFG (YS07g) who was a very steady signal with his FT-221R and 8-ele. Yagi. Propagation to the far north was extremely good late on the 10th and into the early hours of the 11th. On Sept. 4, F1EKU/P in Dept. 63 (BF29c) was a tremendous signal all evening; with 5 kW *e.r.p.* from a site 5,000ft. *a.s.l.* hardly surprising!

For once, a major spell of good tropo. conditions occurred at a weekend. September 10/11 saw excellent propagation into northern Spain and the Pyrénées, plus lots of stations from central France and later from Switzerland, Luxembourg and the low countries. At least, the southern stations "scored" but those only a few miles north of London seemed to miss out. EA1CR, one of many stations in Gijon (XD32) was inundated with callers as he was the only SSB station heard. EA1CP was worked on CW on the 10th and EA1AB, another Santander station in YD41b, at 1450 GMT on the 11th. A missing square was provided by F6CHT/P in Dept. 56 on the Ile de Groix (YH23e) and several new departments were also worked, way down in the south of France. As these notes are being completed, the barometric pressure is 1038 millibars in London, so hopefully there should be another good spell of tropo. as the high pressure declines.

#### Deadlines

All your notes, claims, etc. for the next issue by October 6, and for the December column by November 3, to:—"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

### THREE BAND ANNUAL VHF TABLE

January to December 1977

| Station | FOUR METRES |           | TWO METRES |           | 70 CENTIMETRES |           | TOTAL Points |
|---------|-------------|-----------|------------|-----------|----------------|-----------|--------------|
|         | Counties    | Countries | Counties   | Countries | Counties       | Countries |              |
| G2AXI   | 47          | 7         | 53         | 20        | 36             | 7         | 170          |
| G3OHC   | 50          | 7         | 60         | 15        | 29             | 8         | 169          |
| GD2HDZ  | 41          | 5         | 52         | 13        | 39             | 9         | 159          |
| G8GML   | —           | —         | 65         | 14        | 51             | 12        | 142          |
| G3XCS   | 44          | 6         | 53         | 17        | 10             | 4         | 134          |
| G4BYP   | 25          | 5         | 53         | 12        | 28             | 9         | 132          |
| G8LEF   | —           | —         | 66         | 17        | 36             | 11        | 130          |
| G4ECQ   | 44          | 4         | 65         | 15        | —              | —         | 128          |
| G3FIJ   | 37          | 5         | 50         | 11        | 20             | 4         | 127          |
| G4FCD   | 35          | 2         | 67         | 18        | 3              | 1         | 126          |
| G8BKR   | —           | —         | 69         | 16        | 28             | 4         | 117          |
| G8HHI   | —           | —         | 56         | 14        | 36             | 10        | 116          |
| G4DWZ   | 26          | 3         | 52         | 13        | 17             | 4         | 115          |
| GM4CXP  | 18          | 2         | 53         | 21        | 13             | 7         | 114          |
| G8HQJ   | —           | —         | 58         | 17        | 28             | 10        | 113          |
| G8IFT   | —           | —         | 61         | 13        | 31             | 5         | 110          |
| G4AEZ   | 29          | 6         | 37         | 12        | 17             | 4         | 105          |
| G3BW    | —           | —         | 49         | 12        | 30             | 7         | 98           |
| G3FPK   | —           | —         | 72         | 22        | —              | —         | 94           |
| G4CMV   | —           | —         | 69         | 15        | 7              | 2         | 93           |
| G4FOR   | —           | —         | 62         | 16        | 7              | 2         | 87           |
| G4FBK   | —           | —         | 58         | 14        | 12             | 1         | 85           |
| G4DKX   | 7           | 1         | 37         | 11        | 19             | 6         | 81           |
| G4ERX   | —           | —         | 50         | 13        | 15             | 3         | 81           |
| G4DEZ   | —           | —         | 61         | 18        | —              | —         | 80           |
| G8ITS   | —           | —         | 46         | 10        | 21             | 2         | 79           |
| G8JHX   | —           | —         | 61         | 18        | —              | —         | 79           |
| G8LHT   | —           | —         | 58         | 14        | 1              | 1         | 74           |
| G8GII   | —           | —         | 31         | 5         | 28             | 6         | 70           |
| G8KSS   | —           | —         | 54         | 16        | —              | —         | 70           |
| G8MKW   | —           | —         | 50         | 12        | —              | —         | 62           |
| G8JJR   | —           | —         | 51         | 10        | —              | —         | 61           |
| G8JGK   | —           | —         | 46         | 12        | —              | —         | 58           |
| G4GCQ   | —           | —         | 45         | 9         | —              | —         | 54           |
| G4GET   | —           | —         | 40         | 7         | —              | —         | 47           |
| G8IZY   | —           | —         | 38         | 7         | —              | —         | 45           |
| G4FKI   | —           | —         | 21         | 5         | 4              | 1         | 31           |

## THE MONTH WITH THE CLUBS

### By "Club Secretary"

BY the time this issue gets to you, the club will be well into its winter programme; so now is the time to give you the Rules for MCC—the thirty-second MCC, and the first one in which there will be no G6FO among the monitor stations.

You will have plenty of time between now and November 5 to organise something; don't forget the value of such contests in training for bigger and better efforts; which could be taken to mean that if a chap is interested in contest operating, he could well ask his committee to let him enter on their behalf. Certainly the invigilators have never had cause to complain when we hear a station operating slowly but steadily, and one can as well use MCC for "self-training in communication by Wireless Telegraphy," as the licence has it, as go in there with the hell-for-leather win or bust outlook. Either way, it's been traditionally a good clean effort with anywhere up to 100 Clubs, not to mention the other chaps who come on to add to the fun.

And for the SWL's—we would be only too pleased to have your check log, to help the invigilators keep tabs on all that goes on. If there are enough of them we will make a separate list of their names, but if not, we will certainly make our acknowledgement in the piece for the help.

#### The Mail

And, with so many club scribes on holiday, and the piece being written on Bank Holiday weekend, it will be a thin clip, and no chance to "write in" the odd late arrival—but, as always, such late stuff is held on file for use the following month.

Our first stop is at **South Birmingham**, mourning the death of two of their founder members G3OMG and G3PDS. Both had served the club well, taking office and responsibility, and taking part in the Top Band net regularly. G3OMG in addition was ever ready to help the SWL or newly licensed chap with that vital bit of encouragement at the right time.

As for the club, they foregather at Hamstead House, Fairfax Road, West Heath, Birmingham 31, this being the West Heath Community Association establishment.

This is probably the last time that **Cheltenham RSGB** will be writing in, as they are in the throes of an amalgamation with the Cheltenham Radio Society; the subtle change in name will be that the new group will call itself Cheltenham Radio Club. It appears as if the new group will be based on the RSGB group venue, the Old Bakery, Chester Walk, behind the library. October 6 is the date, and it rather looks as though November 3 is going to be the first gathering of the new formation.

At **Peterborough Radio and Electronics Society** (there is another group in the district) we have it that the Hq. address is the Scout Hut, Occupation Road, and the date October 21. The subject is "to be arranged"—and we guess that it will have been settled by the time this reaches you.

On we go to **Chiltern** who have their place at 42 Castle Street, High Wycombe. Their date is October 26, and for further details we have to refer you to the Hon. Sec. His name and address, as ever, will be found in the Hon. Sec's. Panel on p.490.

If you know of anyone, blind or invalid, who is not yet a member, get them into RAIBC by way of the Hon. Sec. at the address in the Panel . . . and, while you're at it, you might consider joining as a "supporter" or a "rep."—either of which activities will be found to be very rewarding indeed.

It's the AGM to kick off October at **Wolverhampton**, where they foregather each week at Neachells Cottage, Stockwell End, Tettenhall. October 3 is AGM, and on 17th there will be a members slide evening; Natternites occur on 10th and 31st, while October 24 is given as a committee meeting.

Just too late for inclusion in the list, we have a note that there will be an *R.A.E. class* in the Burgess Hill area, the venue being Marle Place, Leylands Road, Burgess Hill—which is the Hq. of **Mid-Sussex**. G6YJ is the R.A.E. class man, but for the details of the club itself we turn to the Newsletter. In this we see October 6 as down to G3RXJ to talk about the Hardware of Microwaves, and on 20th there will be "Mid-Sussex Discs" based on the radio programme *Desert Island Discs*. Anyone with tape or disc for the occasion is asked to get in touch with G8KMP.

The **Melton Mowbray** group had their AGM last month; they have Hq. at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, and we believe that the "third Friday" routine applies. However, the Hon. Sec. will no doubt be pleased to fill you in should get in touch—see Panel for his address.

Another AGM falls to be mentioned, this one being at **Horndean**, on October 13, at the usual Merchistoun Hall Hq.

For **Cray Valley**, their normal home is Eltham United Reformed Church Hall, 1 Court Road, London SE9. As the Newsletter we have to hand is not the current edition, we don't have the full list of dates, but on October 20 there is the Annual Construction Competition.

Nice to hear again from Arthur, G3MDW, writing in on behalf of **Northern Heights**; he has noticed an absence of the group's news of late, and this of course is because (as we have said before) we find it impossible to carry "block bookings" without some quite serious mistakes creeping in for which, inevitably, we get blamed! Thus, our rule is quite simple, that when we receive a letter (or a news-sheet) from a club, we mention them in this piece at the first opportunity, and then file. In this case, sure, we get the Newsletter once in a while, but not every month. Anyway, it's certainly *not* G3MDW's fault. The gang are still at the Peat Pitts Inn, Ogdon on each Wednesday. October 5 is set aside for G4ECM to talk about Ceefax and Oracle, the Teletext services available on TV, and on October 19 there will be a Slide Show.

Down West now, to **Saltash**, where they get together at Burraton Toc H Hall, which lies at the junction of Warraton Road, and Oaklands Drive, on the first and third Fridays of each month. Thus October 7 is for G3WKC to give a semi-technical film show to the

members while October 21 is a "home" quiz engagement against the members of Plymouth club.

Back up North now, to a fairly young group, Ormskirck who at the moment have to get together at each others' homes on Wednesday evenings, which immediately says that if you want to make a first contact with them it is but common courtesy to get in touch first—see the Panel for the name and address of the Hon. Sec. There is as yet no firm programme, but we guess that they are working on it. Having seen many clubs in the same situation, we know just how difficult it is to fix up anything definite.

Hereford send us in a Newsletter each month, and from the one we have to hand we read that the building in which they have Hq. is being renovated, so we can sympathise with the disruption and dirt; however it'll soon be over and the benefits felt. They seem to gather at the County Control, Civil Defence Hq., Gaol Street, Hereford, on the first and third Fridays.

It is the first Wednesday in the month as a rule for Surrey, but there doesn't seem to be a forward programme in the Newsletter issue to hand, although we do know that the Hq. is at TS *Terra Nova*, 34 The Waldrons. The one we just mentioned is normally the prime meeting, with a less formal "do" at the same address on the third Wednesday.

We were indeed sorry to read the Editorial in the Wirral Newsletter, in which the Editor bewails the low number of attenders and then says that this is the reason why they can't ask "foreign" speakers to give a talk. We felt sad, not just because we can recall when Wirral were one of the biggest and liveliest clubs in the country, but also because the Editor has got it backwards, having turned cause into effect and effect into cause. However, why not go along on the first and third Wednesday in each month, to the Sports Centre, Grange Road West, Birkenhead, and see for yourself—we're sure they would be glad to meet you.

Stowmarket are next in the pile, and the letter from the Hon. Sec. there shows no sign of defeatism—a talk by Decca last month, and this time a talk on TVI by G3YWM; the first Monday in the month it is, in the Red Cross Building near Stowmarket Station.

At Echelford they are a bit cross because the turnout for VHF NFD was so good they could have afforded to have a station on 23 centimetres to further boost the score—which is the right sort of thing to be cross about! They also nearly scrapped off the 70 MHz station, but that was probably something they would not have done had a certain member been able to attend the planning meeting. Hard luck, but just one of those things. The group get together at the Hall, St. Martins Court, Kingston Crescent, Ashford, Middlesex, on the second Monday and the last Thursday of each month. Doubtless by now the Hon. Sec. will have something organised—if you want to find out before going, his address is in the Panel.

The Market Hall, St. Albans is the place for the formal meetings of Verulam, while the winter informals are based on the R.A.F. Association Hq. in Victoria Street. For October, the formal would be on October 27; nothing given in the way of programme but as there is something down for November and December, doubtless there'll be something fixed up. The pattern is to have the

## MCC—THIRTY-SECOND

## TOP BAND CLUB TRANSMITTING CONTEST

## RULES

1. **Object:** Clubs to work one another.
2. **Dates:** Saturday and Sunday, November 5 and 6, 1700-2100z (8 hours in all).
3. **Band, Power and Mode:** 1·8-2·0 MHz, ten watts DC Input, CW only.
4. **Call sign and Identification:** Clubs are to use their own call sign, or that of a paid-up member, and to identify themselves as a Club, e.g. "G3ASR Club" in all QSO's. Counties in which a station is located are to be indicated by a three-letter abbreviation, e.g. HMB for Humberside, WMD for West Midlands, etc.
5. **Scoring:** Count three points for each Club worked in your own country, six points for a Club in another country, one point for a non-Club station. (Countries include G, GC, GI, etc.).
6. **Multiplier:** One multiplier point for each U.K. or Eire county worked, one multiplier point for each country worked, once only during the whole contest. A non-Club contact can be claimed as a multiplier, if it meets these conditions.
7. **Logs:** To include (a) Date; (b) Time, GMT; (c) RST sent; (d) RST received; (e) County abbreviation received, plus "Club" or "non-Club." (f) QSO Points claimed. Each contact claimed for multiplier credit under Rule 6 to be underlined. At foot of each page, note total QSO points claimed on that page. Each page to be legibly set out as above, using one side of the sheet only. At head of each sheet, clearly indicate Club name and sheet number. Pre-printed log sheets will be accepted, provided they meet the above requirements; alternatively, A4 size sheets suitably ruled may be used.
8. **Disqualification:** A bad note, over-driving of a transceiver resulting in a wide spread of *spurii*, use of excessive power, key-clicks, deliberate interference with another station, or operation judged by the invigilators as being not in the spirit of the Contest, may result in disqualification, at the sole discretion of the invigilators.
9. **Contest Call:** "CQ MCC," Use of call signs during a QSO must be within the terms of the licence.
10. **Final Tabulation:** On the last sheet indicate total QSO points claimed, total multiplier claimed, and final score, being QSO points times Multiplier. On a separate sheet, include a declaration that the station has been operated within the rules of the Contest and of the licence; in addition, details of equipment and aeriels used. A general statement of the reaction to the Contest—experiences, comments, criticisms, anecdotes, suggestions.
11. **Entries:** Address MCC, "Club Secretary," SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS. AL6 9EQ, and to be posted to arrive not later than November 22. Results in full will appear in the January 1978 issue of the SHORT WAVE MAGAZINE. The Editor's decision is final on all matters affecting the Contest.

informals on the second Thursday in each month, followed by the main meeting on the fourth Thursday.

We know of two clubs serving the Derby area; it is the **Nunsfield House** lot we mention here, they being based on Nunsfield House Community Association, Boulton Lane, Alvaston, where they can be found in Room 7 every Friday evening. October 7 is down for G3LOV to give a talk about the hobby as it is in U.S.A., and on 14th there is a technical film Show. G8MAZ has October 21, and his theme will be the selection of components and aerials for mobile use—a topic which, despite its importance, the writer cannot recall ever having been mentioned as a topic for a lecture. Finally, on October 28, Bob Lewin will be talking about lasers and their application.

Oddly enough the same dates apply for **South Manchester**, although the topics are a little different. They have a planned RTTY talk on October 7, while on 14th G2AKR will recount some more reminiscences—memories which have clearly interested the gang in the past. G2JT has October 21, and his theme is "Radio Noises" while the month is rounded off by a discussion on the future of our hobby. In addition to all this, of course, there are still the Monday evening sessions each week in the club shack, for the address of which we refer you to the Hon. Sec.—see Panel.

It's the Annual General Meeting for **Midland** on October 18, the venue being the University of Aston; it's a bit of luck we received this particular notice, as it was addressed to 55 Victoria Street which we left a long, long time ago!

Discussions seem to be popular with the members of **Acton, Brentford & Chiswick**; they have one set down for October 18, the topic being "144 MHz aerials." The Hq. address is at Chiswick Trades and Social Club,

#### Deadlines for "Clubs" for the next three months—

(For November issue—September 30th)

For December issue—October 28th

For January issue—November 28th

For February issue—January 6th

Please be sure to note these dates!

66 High Road, Chiswick, London W4.

An important point for **Torbay** members and anyone who intends a visit to the October 29 meeting: it will be at the Ambulance Hall, East Street, Newton Abbot, which is at the back of Woolworths shop in Courtenay Street, and G4BZE will be talking about RF and AF speech processing.

At **West Kent** the Hon. Sec. confines himself to saying that the programme submitted last time round still holds. This being the case, we have to refer you to him for the details; we can't even give you the venue, because while we printed the name of the place, we didn't mention the town in which it lies last time!

An odd name crops up in the next letter; the Hq. of the **Walsall** group is at the Hamemaker Inn. They are having some difficulty with the programme as G3JFI has had to give up the Programme Secretary task owing to ill-health. However, there are Morse classes every Tuesday, and on alternate weeks they try and set up something formal.

To visit **Swindon** group you have to go out of town; the Hq. address is at the Coldharbour pub (they have a clubroom there) which is situated some five miles north of Swindon on the A419. On October 5, G8JHC will be talking about Satellites and Things, while on October 19 there will be a Junk Sale.

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

**ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, G4GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.

**BOURNEMOUTH (Wessex A.R.G.):** G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth (20027) BH2 6PD.

**CHELTENHAM (RSGB):** G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.

**CHILTERN:** N. C. Ambridge, G4FRL, 53 The Avenue, Chinnor, Oxon. OX9 4PE.

**CORNISH:** H. F. Adcock, 1 Bowglas Close, Castle Road, Ludgvan, Penzance TR20 8HD. (Cookwells 562.)

**CRAY VALLEY:** J. M. B. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.

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

**DARTFORD HEATH D/F:** Miss J. Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.

**DERBY (Nunsfield House):** I. Cage, G4CTZ, 25 Petersham Drive, Alvaston, Derby DE2 0JU.

**ECHELFORD:** R. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.

**HEREFORD:** S. Jesson, G4CNY, 181 Kings Acre Road, Hereford.

**HORNDLEAN:** S. Jenkins, G4CHO, 31 Briar Close, Horndean, Hants.

**MAIDSTONE YMCA:** M. Baynham, G3VCW, Le Perquage, Copperfield Drive, Leeds, Maidstone, Kent.

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

**MIDLAND:** A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham B29 5UJ. (021-427 3088.)

**MID-SUSSEX:** E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.

**NORTHERN HEIGHTS:** A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (244329), HX2 8XG.

**ORMSKIRK:** P. J. Kay, G4GCB, 24 Laurel Avenue, Burscough. (892416), Ormskirk, Lancs.

**PETERBOROUGH:** L. Crichtley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

**R.A.I.B.C.:** H. Boutle, G2CLP, 14 Queens Drive, Bedford, MK14 9BQ.

**REIGATE:** F. H. Munday, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.

**SALTASH:** J. Reynolds, G8LLR, 47 Lulworth Drive, Roborough, Plymouth (771135).

**SOUTH BIRMINGHAM:** Mrs. G. Apperley, 35 Denise Drive, Harborne, Birmingham 7.

**SOUTHDOWN:** B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.

**SOUTH MANCHESTER:** W. L. Seddon, G3VIW, 12 Barwell Road, Sale, Cheshire M33 5FF. (061-973 3355.)

**STOWMARKET:** P. J. Keeble, G4ETO, Meadowbrook, 37 Coombs Lane, Stowmarket, Suffolk.

**SURREY:** S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon CR2 8PB. (01-457 3258.)

**SUSSEX REPEATER GROUP:** C. Goadby, G8HVV, "Twin Firs," Hophurst Lane, Crawley Down, West Sussex RH10 4LJ.

**SWINDON:** A. D. Bettley, G8KWC, 17 Centurion Way, Stratton-St.-Margaret (2860), Swindon, Wilts SN3 4BT.

**TORBAY:** M. Yates, G3UIQ, Top Flat, 23 Waverly Road, Newton Abbot (3025), Devon.

**VERULAM:** B. Pickford, G4DUS, "Netherwood" 130 The Drive, Rickmansworth, Herts.

**WALSALL:** K. Boucher, G8KML, 22 Emery Close, Walsall.

**WEST KENT:** B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks (56708), Kent.

**WIRRAL:** H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey. (051-638 2515.)

**WOLVERHAMPTON:** J. Cook, G8EDG 75 Windmill Lane, Castlecroft, Wolverhampton WV3 8HN.



Mike Rhys, G8KTC, a member of the Torbay A.R.S. turned up at their Mobile Rally, at Haldon racecourse on August 28th, with this unusual 2m. mobile rig. With 5 watts FM, he can operate on the move as he has a mic. and phones built into his helmet and a send/receive switch on the handlebars.

On to Dartford Heath D/F who seem to have lost their "only D/F club in the country" tag now that there is one formed for the Mid-Thames area—this should build up some friendly rivalry. The club Hq. is at The Scout House, Broomhill Road, Dartford, Kent, October 23 is the date, and it is down for a D/F Hunt on two metres—details from the Hon. Sec., at the address in the Panel.

The Reigate programme is quite crowded for October, but if we extract just the meetings, we find October 4 for a Natter Nite at the Marquis of Granby, while on 18th there will be a Members Evening at the upstairs room of the Constitutional Centre; both these venues being in Redhill rather than Reigate.

On the first Monday in each month, at the Chaseley Home, South Cliff, Eastbourne, the Southdown group are in session. This gives up October 3, and the event is one of their famous Junk Sales at which, it is claimed over £200 changes hands.

For Crystal Palace we can't give you any current details, as their short Newsletter is entirely given over to August and September data and a temporary change of date, at the expense of their usual little note of all the doings at the bottom of the sheet; so, we must ask you to contact the Hon. Sec.—see Panel—for all the latest information.

Bournemouth (Wessex ARG) are now an active and large group with over eighty members, and Hq. to suit at the Dolphin Hotel, Holdenhurst Road, Bournemouth. October 7 sees the Annual General Meeting, and on October 21, we see that they will be having a report on VHF NFD results, plus a report on the RSGB meeting in Bournemouth the previous evening.

Just as its name implies, Sussex Repeater Group is an organisation devoted to the idea of a repeater on VHF in the county—this is a return to the original idea after their combined effort with the Sussex Coast group to get UHF repeaters going. For more details on either group, we suggest that you contact the Hon. Sec.—see Panel.

Now we go on to Maidstone YMCA where the club scribe is complaining about our deadlines: so do we, chum—we make it so late that most of the weekend after the deadline is spent in writing the piece ready for Monday! To revert to the club, they have probably one of the best equipped places in the country, where they are to be found on all the Fridays in each month; this paragon of a place is the Y Sportscentre, Melrose Close, Cripple Street, Loose, Maidstone, with a programme to match in full swing by the time you receive this. In essence, they set aside the first and third Fridays in each month especially for beginners, and something is usually organised for everyone on the other dates.

October 6 is the date for Cornish and the venue as usual at the SWEB Clubroom, Pool, Camborne. The subject will be the new 70 centimetre-band repeater, and the speaker G3TDJ.

### Finale

Once again we have reached the bottom of the pile, and it is time to ask you to send in your news in time for the dates shown in the box. For any given issue you should send us the dates following the publication day of that issue; if you stick to this simple rule as regards the dates, the deadlines can be noted and met without confusion. The letters or whatever should have a note of dates, venue(s), and the Hon. Sec. name, address and telephone number, and be sent to arrive by first post on the deadline day, addressed to "Club Secretary," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

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## NEW QTH's

This space is for the publication of the addresses of holders of new call signs, 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.

EI8DE, Dr. J. B. Kearns, 126 Glenegeary Avenue, Dun Laoghaire, Co. Dublin. (Tel. Dublin 854247.)

EI9DC, P. M. D. Cronin, "Derhil," Church Road, Killiney, Co. Dublin. (Tel. 01-852420.)

G2BLU, A. H. Bird (ex-G8JGX), 32 Downs Road, Maidstone, Kent ME14 2JN (re-issue) (Tel. Maidstone 58426.)

G4FVD, J. A. Newport, 10 Poolmans Road, Windsor, Berks. SL4 4PA.

G4FWD, R. C. Fraser Milner, 26 Bayham Road, Mitcheldean, Glos. GL17 0JR.

G4FWE, Mrs. M. E. Fraser Milner, 26 Bayham Road, Mitcheldean, Glos. GL17 0JR.

G4FXD, I. D. Hawkins, "Brookside House," 38 Thornhill Gardens, Sunderland, Tyne and Wear SR2 7LE.

G4GBK, C. D. Appleton (ex-G8GYD), 249 Devonshire Road, Atherton, Greater Manchester M29 9QB.

G4GBR, Dr. P. B. Parnaby, "Fern Bank," Wetheral Pasture, Carlisle, Cumbria CA4 8HR.

G4GCK, K. Morrison, 7 Braeside, Sunderland, Tyne and Wear SR2 7QH.

G4GCQ, R. H. Thomas (ex-G8KKK), 7 Sandringham Close, Rushden, Northants NN10 9ER. (Tel. Rushden 55645.)

G4GCT, North Bristol Amateur Radio Club, Lockleaze Community Association, Romney Avenue, Bristol 7.

G4GCU, Z. Kowalczyk, 20 Chapel Street, Laxenby, Middlesbrough, Cleveland.

G4GDL, M. Ellis, 17 Turnberry Grove, Alwoodley, Leeds 17.

G4GDM, J. S. Owens (ex-G8LPE), "Norbury," 51 Borrowdale Road, Bebington, Wirral, Merseyside L63 3AP. (Tel. 051-334 1819.)

G4GDQ, R. H. E. Found, 54 Lincoln Road, North Hykeham, Lincoln LN6 8HB. (Tel. 0522-63456.)

G4GDR, A. Heath (ex-G8KDV), 39 Barra Close, Highworth, Swindon, Wilts.

G4GFF, R. Johnston (ex-G8MJL), 13 Byron Close, Knottingley, West Yorkshire WF11 8QG.

GW4GFS, H. R. Jones, Hafod-Y-Grug, Mynytho, Pwllheli, Gwynedd LL53 7RH.

G4GGD, Royal Corps of Transport Amateur Radio Society, Signals Division, Army School of Mechanical Transport, Normandy Barracks, Leconfield, N. Humber-side.

G4GGP, J. H. Saynor (ex-G8GHM), 28 Lune Road, Norton, Stockton-on-Tees, Cleveland.

G4GHG, L. Barrett, 9 Henbury Close, Bronshill Road, Torquay, Devon. (Tel. 0803-37050.)

G5CAX, M. A. Carlson (ex-KL7ISQ), 15 Baker Avenue, Potton, Sandy, Beds. SG19 2PJ.

G8MUP, W. Bailey, 6 Girton Close, Northolt, Middlesex UB5 4SY. (Tel. 01-422 7018.)

G8MXY, G. Franklin, F.R.C., "Mosfet House," 51 St. Marks Road, Canvey Island, Essex.

G8NLL, T. J. Perrin, Flat No. 2, 201 Honor Oak Road, Forest Hill, London SE23 3RP.

G8NLW, L. C. Culling, 22 Allen Road, Oulton Broad, Lowestoft, Suffolk NR32 3PD.

## CHANGE OF ADDRESS

EIIDE, M. O'Rourke (G3WTX), Kiltanna, Knockaderry, Newcastle West, Co. Limerick.

EI4BB, B. Daly, 28 Templeogue Wood, Templeogue, Dublin 12.

G2AUD, H. H. Oak-Rhind, "South View," The Green, Brinkworth, Chippenham, Wilts. SN15 5AA. (Tel. Brinkworth 497.)

G2BZQ, R. Q. Marris (ex-G2BZQ/W0), 27 Prince Andrew Way, North Ascot, Berks.

G3AHE, G. James (ex-ZLIAGM), 56 Overhill Road, Stratton, Cirencester, Glos. GL7 2LP.

G3FVU, Wessex Amateur Radio Group, c/o G. D. Cole, 4EMN, 6 St. Anthony's Road, Bournemouth BH2 6PD.

G3HBU, F. A. Hall, "Pines Fell," 78 Reading Road, Finchampstead, Berks. RG11 4RA.

G3HQU, J. G. Jackson, 243 Rawlinson Street, Barrow-in-Furness, Cumbria LA14 1DW.

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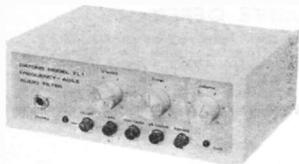
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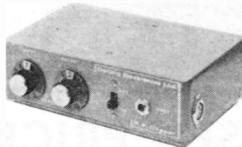
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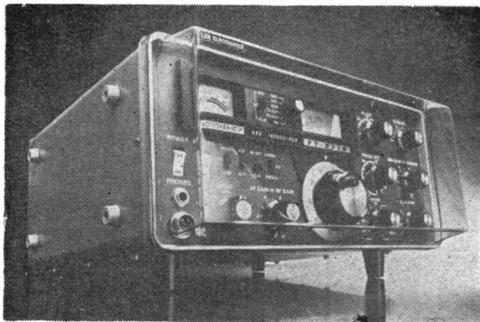


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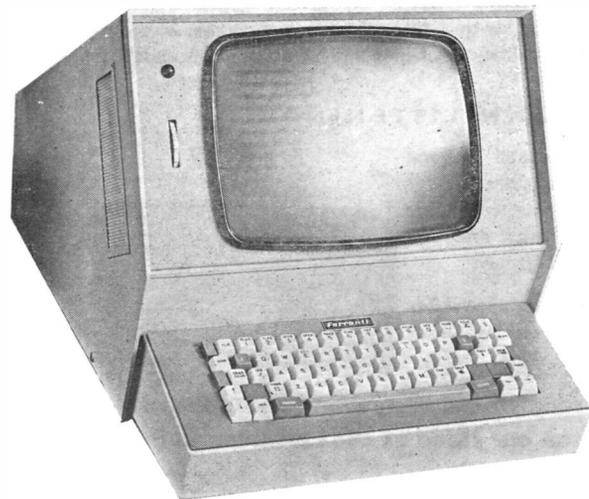
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| 144-850 ...                                       | a   | b               | b              | b               | b               | b                | b                | b                | b                    | b               | b                | b                | b                |
| 145-000/SO ...                                    | 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 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-350/S14 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-400/S16 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-500/S20 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-525/S21 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-550/S22 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-575/S23 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |
| 145-600/S24 ...                                   | 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                |
| 145-950/S38 ...                                   | a   | a               | a              | a               | a               | a                | a                | a                | a                    | a               | a                | a                | a                |

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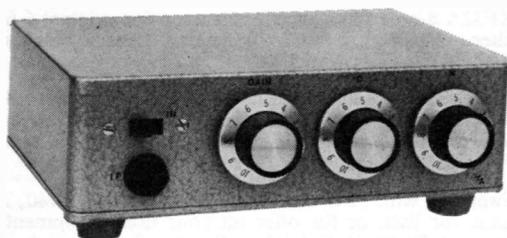
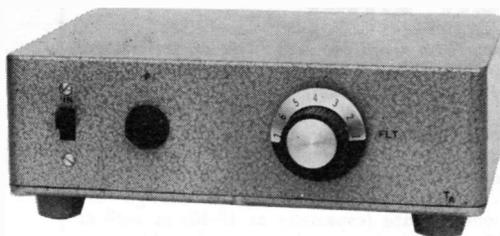
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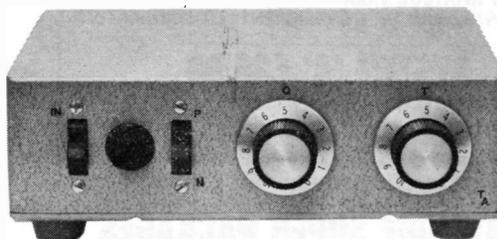
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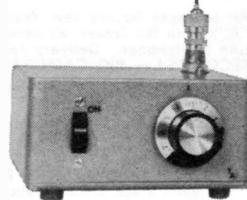
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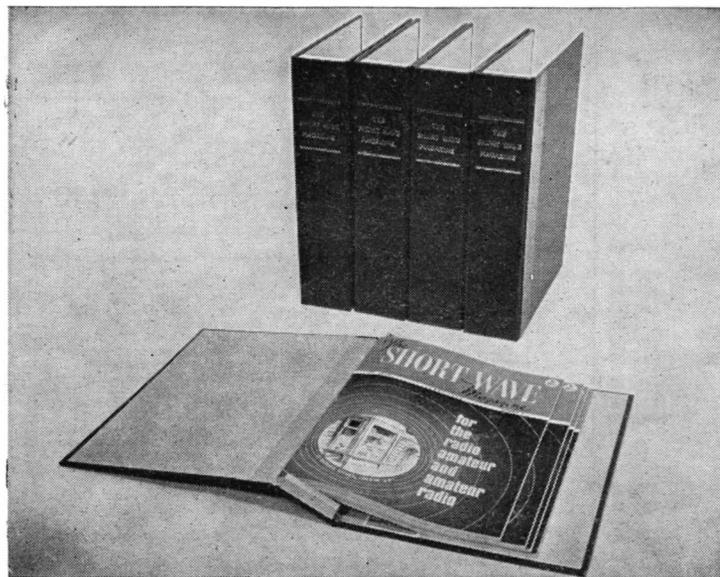
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