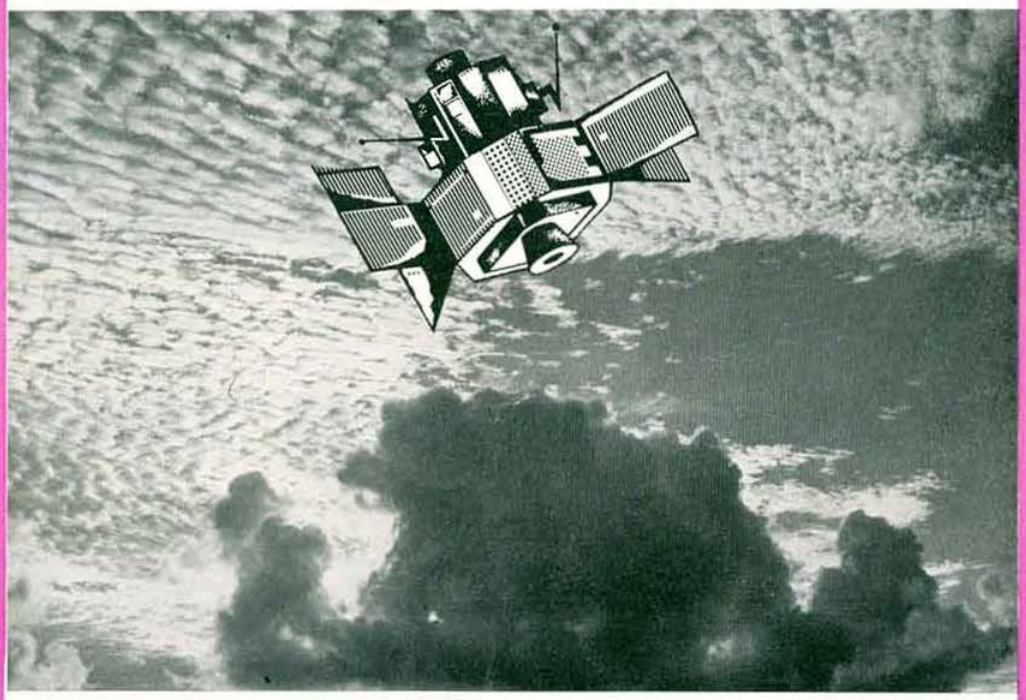
# radio communication

SPECIAL ISSUE
INTERFERENCE

May 1975

## 7th World Telecommunication Day
## 17 MAY 1975

*"Meteorology and telecommunications"*

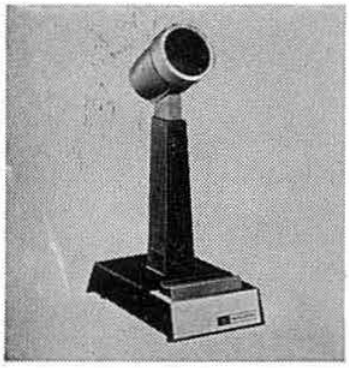


International Telecommunication Union

journal of the Radio Society of Great Britain

SSB-ers:

# increase talk power, cut "splatter"



Our *444 base station microphone* not only gives you increased talk power, but cuts "splatter" (and QRM complaints) to an absolute minimum! It has superbly tailored response, with sharp cutoffs below 300 and above 3,000 Hz and a rising response characteristic for maximum intelligibility. The 444's rugged, reliable Controlled Magnetic element has been proved in safety communications, and other tough professional communications applications. It delivers a clean signal to the transmitter at levels as high as crystal units! (And, unlike crystal and ceramic units, the element is totally immune to the effects of temperature and humidity.) The 444 also features an adjustable height stand that makes for comfortable "ragchewing" sessions, an optional-locking bar for push-to-talk or VOX operation, and a practically indestructible Armo-Dur® case. Write:

**Shure Electronics Limited**
**Eccleston Road, Maidstone ME15 6AU**
**Telephone: Maidstone (0622) 59881**

SHURE

# radio communication

Volume 51 No 5 **May 1975** Price 40p

**EDITOR**
A. W. Hutchinson

**ASSISTANT EDITOR**
R. J. Eckersley

**DRAUGHTSMAN**
D. E. Cole

**EDITORIAL PANEL**
J. P. Hawker, G3VA
G. R. Jessop, G6JP
R. F. Stevens, G2BVN

**ADVERTISING REPRESENTATIVE**
C. C. Lindsay

## CONTENTS



*Radio Communication* **is published by The Radio Society of Great Britain as its official journal on the first Tuesday of each month and is sent free and post paid to all members of the Society**

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

**17,816 copies per issue average circulation in 1974**

**© RADIO SOCIETY OF GREAT BRITAIN 1975**

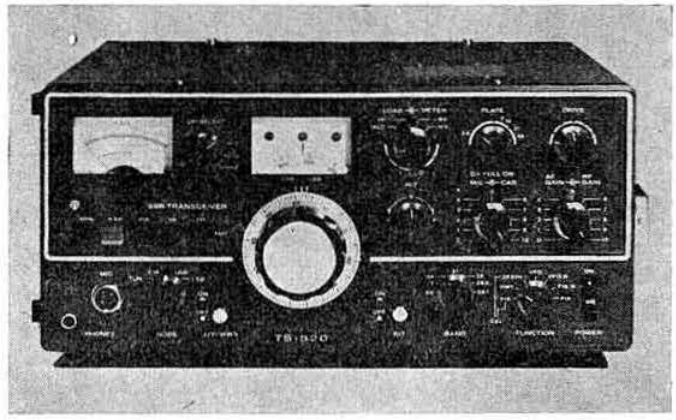
Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE. Tel 01-837 8688. (**Circulation** queries should be addressed to: The Subscriptions Manager, RSGB.)

Closing date for contributions unless otherwise notified: 4th of month preceding month of publication.

**Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-837 8688 (or 01-686 5839, advertising only).**

# LOWE ELECTRONICS

## TRIO
## TS520



The TS520—latest in the new TRIO line of superior amateur radio equipment. Its styling and finish put all other rigs in the shade; and it is not just pretty—the front panel is a die casting giving unheard of strength and stability.

All semiconductor except for driver and PA, the TS520 is at home mobile, portable or fixed station thanks to built-in AC power supply and 12V inverter. Blower cooled 6146's for long life and exceptional linearity.

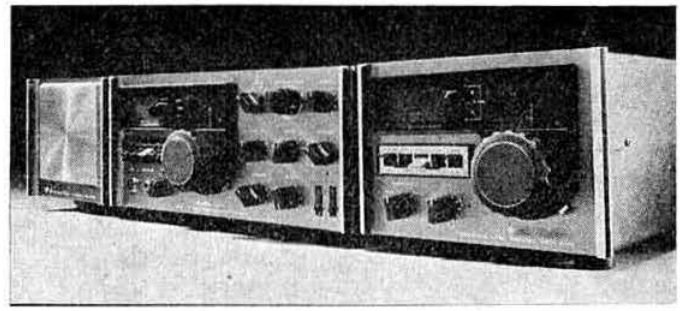
*TRIO exclusive. Built-in speech compression for that extra DX punch—without distortion, due to amplified ALC system.

### FEATURES

*R.I.T. ★ NOISE BLANKER ★ AMPLIFIED 2 SPEED AGC ★ 25kHz CALIBRATOR ★ BLOWER COOLED PA ★ FIXED CHANNEL OPERATION ★ 4 FUNCTION METERING ★ AMPLIFIED ALC ★ BUILT IN SPEECH COMPRESSION ★ LED INDICATORS FOR FIX, VFO, RIT ★ LOW POWER TUNE UP FOR LONG PA LIFE ★ TRANSVERTER OUTPUTS (MATCHING TRANSVERTER IN STOCK) ★ 12V dc/240V ac OPERATION ★ MATCHING SPEAKER AND VFO AVAILABLE ★*

OBTAINABLE ONLY FROM LOWE ELECTRONICS **PRICE £290 (VAT EXCL)**

## TRIO
## TS900



This is probably the finest amateur transceiver ever made. Professional design and construction make the TS900 a joy to own and use.

As QST (July 1973) said "This device has to be the pace-setter for the 1970's".

Full coverage 80-10; superb stability and selectivity; all mode operations including RTTY (crystal controlled RTTY shift built-in); all solid state except driver and PA; DC power supply and external VFO both available.

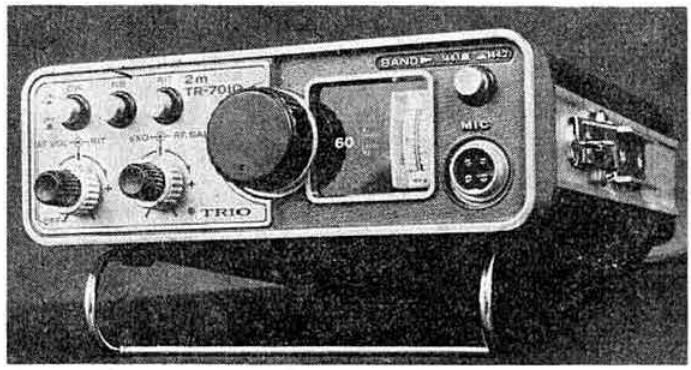
*300W pep ★ All Modes ★ Separate USB/LSB Filters ★ 500Hz cw Filter Option ★ Four Function Metering ★ Two speed AGC ★ Noise Blanker ★ 0·1 Micro Volt Sensitivity (ARRL Measurements) ★ Blower cooled pa ★ Crystal controlled rtty generation ★ VOX ★ Break in cw ★ ac psu ★ dc psu ★*

Write or phone for full specification and the reasons why the TS900 is the ultimate transceiver.

OBTAINABLE ONLY FROM LOWE ELECTRONICS **PRICE £480 (VAT EXCL).**

# LOWE ELECTRONICS

## TRIO
## TR7010




Following the worldwide success of the TS700, Trio have taken the TS700 basic design and packaged it for 2 metre SSB mobile use.

The TR7010 sets new standards in receiver sensitivity and low spurious emission on transmit. Operating CW and SSB from 144·1-144·3MHz, the TR7010 covers all CW, SSB and beacon activity. 40 5kHz channels plus VXO and RIT provide continuous coverage. 8 extra channels can be used, without retuning, in the range 144-145MHz by fitting auxiliary crystals.

Single conversion using an IF of 10·7MHz with a superb crystal filter provides outstanding selectivity. Wide range amplified AGC and newly developed FET devices in RF amplifier and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals.

Single conversion transmitter with new fully balanced mixer system generates a beautifully clean signal with crisp audio quality.

The first lucky owners are on two metres right now. Listen to the signal and make up your own mind. Why not send for full details of the all new TR7010 right now.

**Price £165 (VAT excl)**

## TRIO
## TR2200G

The world's most popular 2 metre handy transceiver now comes complete with tuning fork controlled repeater access tone and facilities for 12 channels. With the advent of repeater operation in this country, it is now possible to work long distances with low power equipment and the sudden popularity of portable 2 metre equipment testifies to this fact. The TRIO TR2200G is a high performance transceiver with features not found in other rigs. Supplied with 3 channels fitted:—

145·50 Simplex
145·55 Simplex
145·175/775 Duplex

Most other I.A.R.U. channels available. **PRICE £80 (VAT excl)**

**SPECIFICATION**

*TRANSMITTER*

| | |
|---|---|
| *Frequency range* | 144–146MHz |
| *Emission* | *F3* |
| *Output power* | *1W* |
| *Freq mult* | *X12* |
| *Antenna impedance* | *50Ω* |

*RECEIVER*

*Sensitivity* Less than 1μV for 20dB S/N

*Intermediate frequencies* 10·7MHz and 455kHz

*AF output* 0·5W

*Power source* 10·4–15·2Vdc negative earth (8 × UM3 batteries or optional NiCad pack)

*Power consumption* 450mA TX 55mA RX

*Supplied complete with 3 channels, charger for NiCads, external dc lead, carrying case, shoulder strap, microphone, two battery carriers.*

**HEAD OFFICE** **119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m to 9 p.m.**

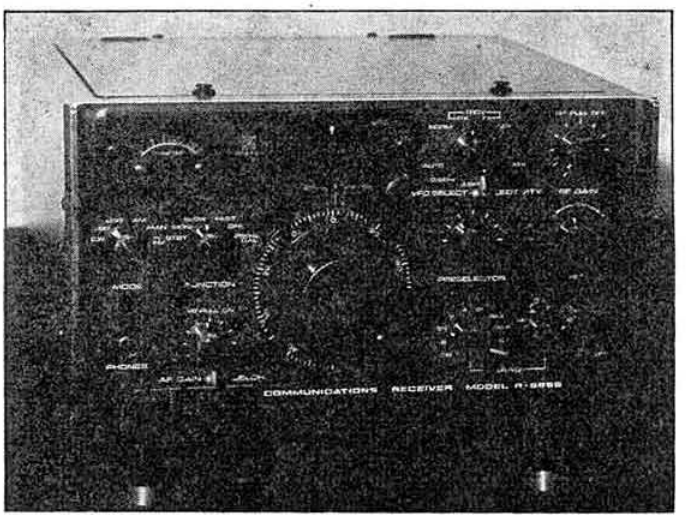
**BRANCH OFFICES** Goring Road, Steyning, Sussex. Tel. Steyning 814466
Soho House, 362-4 Soho Road, Handsworth, Birmingham Tel. 021-554 0708

**AGENTS** Alan GW3YSA. 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809
John G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
Sim GM3SAN. 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

**OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE**

**73 from BILL G3UBO/VE8DP, ALAN G3MME, JOHN G3PCY/5N2AAC, IAN G3ZYC**

# LOWE ELECTRONICS



TRIO

R.599S

**PRICE £275 (VAT EXCL.)**

## 10-Band Amateur Receiver R-599S

Trio's new solid-state R-599S includes all the fine features made famous by the former 599 series along with several innovations, additions and improvements which make this receiver top value. It not only covers all amateur radio bands from 160m (1,8MHz) to 10m (28,0MHz), but also the 11m CB (26·8–27·4MHz), the WWV range (10MHz) and the 2m-band between 144MHz and 146MHz due to built-in special converter circuits

**All-Mode Operation**—Another "full house" feature of the R-599S: three separate demodulator circuits permit ssb reception in upper and lower sideband, AM reception with or without Auto Noise Limiter (ANL) as well as FM reception.

**Ultra-sensitive RF Stage**—Due to extensive use of the latest FETs and RF semiconductor devices the R-599S offers optimum sensitivity, spurious suppression, large-signal selectivity with virtually no cross modulation. Input sensitivity in ssb mode is better than 0,3μV on all bands between 160m and 10m, better than 2μV in AM mode on 2m for 10dB S + N:N.

**Interference-free Reception**—The Automatic Gain Control (AGC) can be switched to FAST or SLOW in accordance with respective receiving mode and guarantees clearly legible Rx signals. The Noise Blanker circuit effectively eliminates pulse-type noises such as car ignition system interference, etc. without affecting the input sensitivity. The additional Squelch circuit is continuously adjustable and suppresses background noise during FM reception.

**Highly advanced VFO**—equipped with latest dual-gate MOSFETs provides stable undistorted output signals. In conjunction with the FET mixer circuit and the diode switch-selected crystal filters the new VFO assures utmost frequency stability with less than ± 100Hz drift after 60min warmup time.

**Precision two-speed Dial Drive Mechanism**—employing a multi-stage reduction gear permits velvet-smooth tuning. Only precision milled solid brass gears with miniature ball-bearings are used for this gear train which drives the main and sub tuning dials without mechanical backlash. The sub tuning dial covers a range of 600kHz with 25kHz calibration, whereas the main tuning dial covers a 100kHz band section with 1kHz calibration. A built-in 25kHz crystal marker oscillator assures fast and accurate dial calibration.

**Versatile Operating Modes**—In conjunction with the matching ssb/a.m./cw-Transmitter T-599S, the so-called "cross-over" switching of both units permits either independent Tx and Rx or combined transceive operation, using either the receiver's or transmitter's built-in VFO for master tuning plus RIT (Receiver Incremental Tuning) for transceive operation with offset Rx frequency, but without affecting initial transmitter tuning. Moreover the R-599S/T-599S combination offers fixed channel operation on five crystal frequencies—ideal for frequent local and district QSOs.

**Packed with Extras:** automatic and manual bandwidth control, coupled with the MODE switch selects the appropriate bandwidth for each operating mode; built-in 8-element crystal filters for usb, lsb, cw and a.m.; large S-meter with illuminated dial and fluorescent-lighted dial pointer; VFO indicator lamp shows whether the receiver or transmitter VFO is in operation; connections for External Speaker S-599, Transmitter T-599S. The built-in 25kHz crystal marker oscillator is also used for transmitter dial calibration.

**Dual Power Supply**—The R-599S is equipped with two independent power supply units, one working from 120–240V, 50–60Hz AC power lines, the other from 12 to 15V DC batteries. Due to its extremely low power consumption of 15 watts the R-599S is ideally suitable for field use.

## FM NEWS

*The proposed Matlock repeater will be in operation by the end of nineteen canteen. Operating on channel R6¾, it will incorporate new advanced features designed to ensure that no one will be able to use it. The access tone will be a coded pair of audio frequencies which will be changed according to the phase of the moon. Information on the code for the day will be published in the "Exchange and Mart" too late for it to be of any use.*

*Since it is likely that holders of Class B licences will wish to use the repeater, it is suggested that the use of Morse code for repeater replies is downright unfriendly. These will, therefore, be replaced by pre-recorded voice replies as follows:*

*When accessed, the repeater will send back the immortal words "Hello Sailor" and promptly close down to avoid arrest.*

*The repeater will from time to time interrogate users with the message "what is your deviation?" to which the user should reply "Black leather and high heels", or whatever may be his particular thing.*

*Once accessed, the repeater will allow 3½ seconds of usable time after which it will announce "Time gentlemen please" and close down with peals of maniac laughter.*

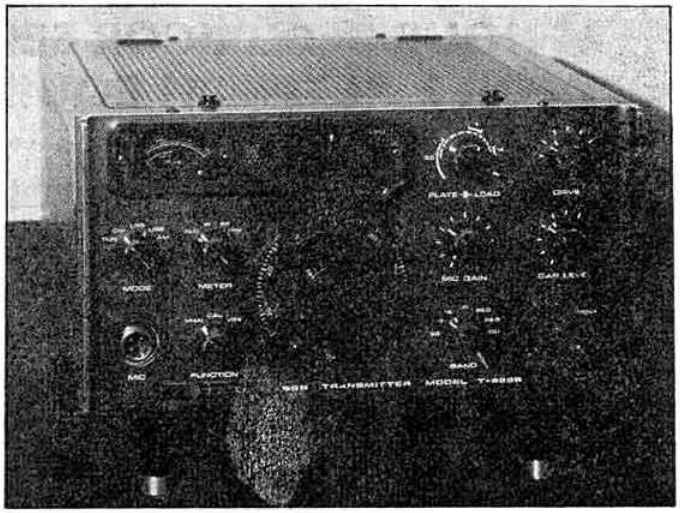
*Overall control of the equipment will be entrusted to comrade Ivan Offalsignal, a senior member of the KGB. Anyone found guilty of over deviation will be expelled from his fm group and be sentenced to five years hard labour in the Southampton salt mines.*

*Suitable mobile equipment for use with this exciting new repeater will be imported from Inner Mongolia and sold through appointed agents. Anyone can be added to the growing list of sole exclusive agents on payment of £5. 9s. 8d. to the Matlock home for rapidly ageing radio dealers.*

# LOWE ELECTRONICS

# TRIO

## T.599S



**PRICE £265 (VAT EXCL.)**

## SSB/AM/CW Transmitter T-599S

Like all modern Trio amateur transceivers and transmitters, the new T-599S features highly reliable and stable hybrid circuitry. With the exception of the two final amplifier tubes of type 6146B and the 12BY7A driver tube, the entire transmitter is of latest solid-state design, employing 4 fets, 1ic, 30 transistors, 3 zener diodes and 30 diodes. The basic circuit was adopted from Trio's world-famous "599" series, with considerable improvements made in the input and oscillator circuits.

**SSB, cw and a.m. Operation**—on all radio amateur bands between 80m and 10m (3,5 thru 29,7MHz). To facilitate tuning, the 10m-band has been subdivided into three ranges of 600kHz bandwidth each.

**Advanced Signal Generators**—using a push-pull balanced modulator for double-sideband generation with lsb and usb filter in ssb mode, and a low-power signal generator for a.m., featuring a signal quality that is superior to that of conventional carrier injection type circuits.

**Ultra-stable VFO**—identical to that used in the 10 band Amateur Receiver R-599S. By means of the built-in "cross-over" circuit, the transmitter VFO can be used for transceive operations in conjunction with the receiver VFO or separately for individual Rx/Tx operation. All necessary connections and terminals are available. Just connect the special jumper cable supplied to the respective outlets of the R-599S and T-599S and you are in business for perfect QSOs.

**Newly designed Dial Drive Mechanism**—also identical to that of the R-599S receiver. Due to split dials for main and sub tuning scales with 600kHz and 100kHz dial calibration, respectively, dial accuracy is better than ± 1kHz after 30min warm-up time. Dial calibration is easily accomplished by means of 25kHz marker signals, produced by the crystal marker generator of the R-599S.

**High Transmitter Power**—With an input of 200 watts p.e.p. in ssb mode and 80 watts in a.m. mode, the T-599S will produce rf output of 120 watts in ssb and 40 watts in a.m. mode into a 50 ohms antenna load. Due to the exceptionaly stable VFO, frequency shift within the first hour of operation will be below ± 100Hz.

**Clean and undistorted Tx Signals**—Because of the built-in alc circuit, overloading of the driver and final stage is vitrually impossible, thus assuring splatter-free, clearly legible output signals. The ALC circuit is also effective in cw mode (A1).

**"Real" Transmitter Final Tubes**—The T-599S uses two final amplifier type S2001 which are equivalent to the well-known 6146B. These tubes have been developed exclusively for radio amateur use and yield a considerably higher and more stable output than tv horizontal amplifier tubes, found in a lot of transmitters. A silent 4-blade blower reduces operating temperatures to safe levels, increases stability and prolongs tube life.

The pa stage is accomodated in a well-ventilated hv safety cage, which assures adequate tvi and bci protection.

**Versatile operation**—due to the "cross-over" circuit which allows true transceive operation in connection with the 10 band Amateur Receiver R-599S, plus fixed channel operation on five crystal frequencies of own choice. A special transverter terminal extends operating possibilities to include the 2m vhf range.

**Numerous Extras:** Multi-function instrument, serving as alc voltage-, plate voltage, plate current and rf output meter; semi-break in keying; cw sidetone generator (output signal can be monitored thru R-599S receiver); TUNE position mode switch, disabling final amplifier tubes during transmitter tuning; two-stage microphone amplifier with level control; microphone impedance switch; built-in VOX control with continuously adjustable delay, sensitivity and anti-VOX circuits; alc feedback; connections for conventional, semi-automatic and electronic cw keys; fully stabilized operating voltages; VFO function indicator, etc.

The T-599S is designed for AC line operation with 110-120V AC and 220-240V AC, 50-60Hz. The beautifully styled cabinet with "cockpit-look" front panel is designed to match that of the R-599S receiver, so that both team up as a professional looking station.

## Optional Accessories:

### Speaker Console S-599

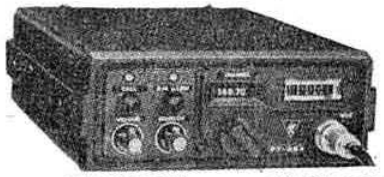
Designed to match the R-599S/T-599S receiver/transmitter combination. 8 ohm speaker; nominal load 2 watts; frequency range 300 to 3500Hz.

**FULL RANGE OF ACCESSORIES ALWAYS IN STOCK**
**SEE PREVIOUS ADVERTISING FOR FILTERS, CLOCKS, MICROPHONES, ETC.**

# SMC South Midlands

## 24 HOUR SECURICOR SERVICE FROM SMC FOR 2 METRE FM EQUIPMENT

**ORDER 'PHONE SERVICE:** Just quote your Access or Barclaycard number and we will despatch the same day.
**FREE:** Labour, collection and delivery on all warranty work. 24 HOUR SECURICOR DELIVERY (remote parts and Scotland 48 hours).
**SERVICE:** By experienced staff, WE AT TOTTON have been supplying, testing and servicing Yaesu since we first started direct imports from Yaesu Musen in 1971.

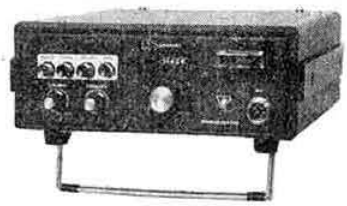


**FT 224 £130**

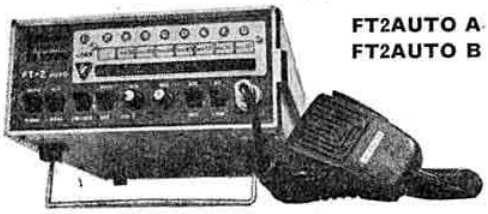
**The FT224** solid state transceiver is the advanced replacement for the FT-2FB and features 1 or 10W output with a 24 channel flexibility (including a priority channel) all in one small package. Built-in tone burst (for repeater actuation) automatic high VSWR and reverse power line protection, centre zero or "S" meter on receive, power output indicator on transmit and of course, squelch. The wireless comes complete with built-in speaker, mobile mounting bracket and P.T.T. dynamic microphone.

SMC models (as with our new Autos) come fitted with 145·00, 145·5 and 145·55MHz.

**The Sigmasizer** series offers either 200 or 80 (10 or 25kHz increments channels on 2 metres, 600kHz offset on two preset channels, (Sig 200) or an offset oscillator (sig R) give ready access to repeaters when used in conjunction with the built-in tone burst. A further channel may be programmed for instant selection of local Net or RAEN frequencies. Automatic final protection, 10W of R.F. and a generous 2 Watts of audio (for mobile use) draining only 2·2A from 12V D.C. on transmit. The unit may be run as a base station with the FP2AC regulated power supply (and battery charger).



**SIGMASIZER 200R**
**SIGMASIZER 80R**



**FT2AUTO A**
**FT2AUTO B**

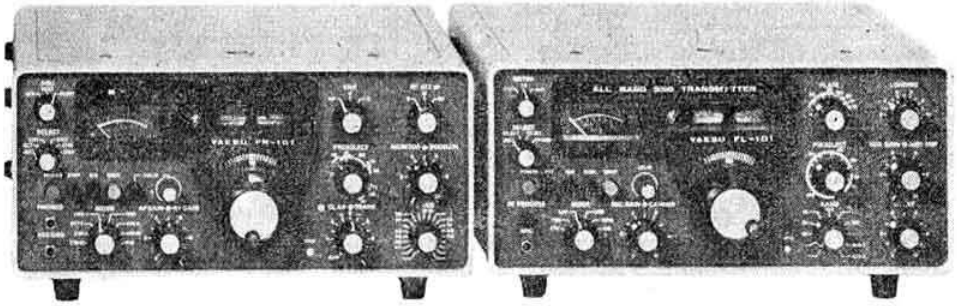
**The FT2AUTO** is a unique concept in 2 metres FM transceiver. The "Auto scan" circuit monitors in turn each of the 8 channels every third of a second and automatically locks upon receipt of a signal. Push buttons enable elimination of undesired or occupied channels, on Auto mode, or selection of that frequency on manual mode. A priority circuit may be activated to check your local net or RAEN frequency every two seconds. To transmit on a channel being received a momentary pressing of the P.T.T. locks the transmitter to the receiver.

Separate TX and RX crystals allows duplex operation, switchable tone burst, squelch, built-in mains and 12V P.S.U. and microphone provided.

**FL101 £265**
**RFP101 £22**

**FR101S £245**
**FR101SD £330**

**FR101D £330**
**FR101DD £430**



The FR101 is an advanced receiver offering in the deluxe version, coverage from 1·5MHz including all SW broadcast and HF amateur bands (23 in all) to 144MHz. AM, FM, SSB CW are catered for, each with a separate crystal filter. Transceive operation with the FL or FT101. Now with 70MHz coverage.

The FL101 is the ideal companion to the FR101 thus forming a superb base station. Operation on 160 through 10m using SSB, AM, CW or FSK is offered, with the added bonus of an option inbuilt RF speech processor being available at moderate cost.

**STOCK/PRICE AND SECONDHAND LIST BACK IN PRINT — SEND SAE**

Buy it with Access

**PLEASE NOTE — THESE PRICES *DO NOT* INCLUDE VAT (25%)**

**Terms:** Cash with order or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £150.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

BARCLAYCARD welcome here

# Communications Ltd

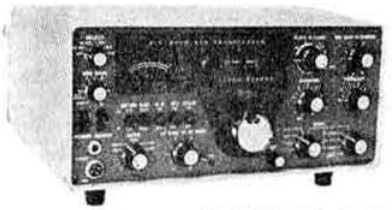
YAESU

## YAESU MUSEN UK LARGEST DISTRIBUTOR FOR FIXED OR MOBILE SSB EQUIPMENTS

**With active Amateur Agents now in Scotland, Wales, North and Midlands—and, of course, from our H.Q. in the South to:**

answer your queries, demonstrate equipment, arrange H.P., facilities for credit cards, advice on equipment, antennas, masts, accessories to complete installations.

See these four pages for some of our comprehensive range. Write in for FREE Stock/Price List.



**BASIC 201, £290**
**DC 201, £20**

The newest of the Yaesu transceiver on offer the FT201. The FT201 features 80-10m operation and the ability to run from the mains or a 12V supply. It is constructed using plug-in modules as made famous in the FT-101. Of special interest to those contemplating using the 201 as a prime mover for VHF use, is the use of 9MHz as the IF frequency and that full AM operation is possible (the optional AM filter being available). For the CW enthusiasts a 600Hz filter is available with AGC characteristics to suit the mode. Write for full specifications.

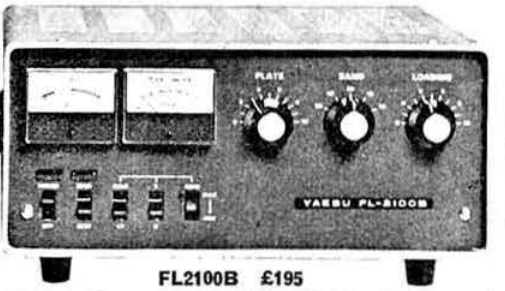
The FT75B is a higher power replacement (120W P.I.P) of the FT75, the unit which along with the 101 has been responsible for the upsurge in HF mobile operation around the world. On bands 80 through to 10 there are 3 VXO controlled crystal channels as well as provision for external VFO operation. The FT75B is all solid state except the final and driver stages. Included is an excellent noise blanker and squelch circuit for quiet channel monitoring.

Accessories include the FV50C VFO at **£35.00**, the VC75 microphone compressor and VOX at **£18** and the FT75B AC power supply at **£35**, and the DC75B at **£40** *illustrated right.*

**£140 (+ PSU)**

**FT101B £330**

The FT101B is except for driver and PA, fully solid state using reliable and serviceable "computer type" plug-in modules. All that is needed for instant "on the air" operation from 160 through 10m is either 12V DC or 234V AC and, of course, an antenna.



**FL2100B £195**

The FL2100B features operation 80 through to 10m using two rugged 572B carbon plate tubes in class "B" grounded grid circuits with individually tuned input coils for each band, and Bifilar wound ferrite filament chokes.

**FT101B £330**
**FL2100B £195**
**FV101B £48**
**SP101B £13**

**SEE OVERLEAF FOR A SELECTION OF MASTS, ANTENNAS AND ACCESSORIES**

## SOUTH MIDLANDS COMMUNICATIONS LTD

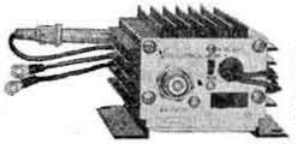
**OSBORNE ROAD, TOTTON**
**SOUTHAMPTON SO4 4DN**

SMC
A MEMBER OF THE ARRA
Hours of business:
9-5.30 9-12.30 Saturday

**Cable: Aerial Southampton**
**Telex: Chamcom 47388**
**Tel: (04216) 4930 & 2785**

**Agents (evenings) (ALL Q.T.H.R.)**
**Brian Kennedy G3ZUL** Droitwich (09057) 4510
**Peter Avill G3TPX,** Darton (022 678) 2517
**Ian McKechnie GM8DOX** Bridge of Allan (078683) 3223
**Howarth Jones GW3TMP,** Pontybodkin (035 287) 846

# SMC South Midlands



**144MHz LINEARS RFL**

RF sensing, switchable drop out time SSB, AM, FM, CW, 12VDC. 10W drive. 801 100W, 901 150W. Available late June: 801, **£70**; 901, **£95.**

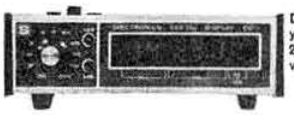
**RF SPEECH PROCESSOR KP12**

Audio to audio, via 107MHz, mains powered. Illuminated meter, FT-101, FT2 plugs suitable all phone modes superb on FM.

**EX STOCK IN TOTTON.**

**£44** p & p 40p

**READOUT UNIT FOR FT-101 ETC. DD1**



Digital readout to ± 100Hz for your FT-101 (B), FT-401 (B), etc. 21 IC's 76 diodes provide a most worthwhile accessory.

**£110** Carriage paid

**9MHz SSB FILTERS YF90/F/S EX STOCK IN TOTTON.**

2·4kHz, 6 pole, each individually supplied with ± 6dB, 25dB, 60dB bandwidths, ripple factor and insertion loss.

Filter only **£11.00**
Filter, USB Crystal, **£12.50**
Filter, USB and LSB, **£14.00**
p & p 37p

## VERSATOWERS

Carriage paid, England & Wales

*Illustrated right.* Tiltover Telescopic post mounted ex-stock. The tilting action allows ease of maintenance and changes of antennas. The relatively low weight eases installation problems. From: **£172.25**

## ALIMASTS

Carriage paid, England & Wales

A/Alloy Telescopic 1·5, 2, 3 metre sections, 6-21 metres from **£11.60** for 6m to **£38.00** for 21m.

## TELOMASTS

(England & Wales, carriage £1.50)

Galvanized steel Telescopic 10ft. section with or without rigging.

30ft.—**£15.00** 40ft.—**£20.00** 50ft.—**£25.00**

With rigging kits:

30ft.—**£29.00** 40ft.—**£39.00** 50ft.—**£49.00**

## HAMTOWERS

(Carriage extra)

Galvanized lattice 10ft. sections 30ft. height with climbing steps on one face. From: **£90.50**

## THE KP12 2 METRE WALKIE-TALKIE FROM SMC EX STOCK IN TOTTON

**ONLY £75 FITTED WITH SIX CHANNELS!—SO, S20 AND YOUR CHOICE FROM R21, S22, R5, R6 & R7**

KP202, **£75.00** KCP2 base master, **£8.80** NI-Cads (set 10), **£8.50** Stubby Antenna, **£4.25** Case, **£3.75** Burst unit, **£5.50** F to UHF adaptor 95p

## CRYSTALS—LOW PRICES FROM STOCK (INSURED POST AND PACKING 37P)

**FT2FB** (14MHz Rx, 18MHz Tx)

144 { ·15, ·20, ·30R, ·36, ·50, ·60
145 { ·05, ·09R, ·32, ·40, ·44R, ·51R, ·80, ·84, ·90

**All £3.30 pair; £1.80 single**

**Simplex** 145 { ·500, ·525, ·550, ·575, ·600

**Duplex** 145 { ·075/675, ·100/700, ·125/725, ·150/750, ·175/775

**Inverse** 145 (·125R, ·150R, ·175R)

**All £3.50 pair; £2.00 single**

**FT2F** (52MHz Rx, 6MHz Tx)

144 { ·15, ·25, ·36R, ·40R, ·60R, ·70R, ·80, ·96
145 { ·08, ·09T, ·20, ·36, ·40, ·68, ·80

**All £3.30 pair, £1.80 single crystal**

**Simplex** 145 { ·000, ·500, ·525, ·550, ·570, ·600

**Duplex** 145 { ·075/675, ·100/700, ·125/725, ·150/750, ·175/775

**Inverse** 145 { ·100R, ·150R, ·125R, ·175R ·750T

**All £3.50 pair, £2.00 single**

**Standard** C826MB and C146A

145 { ·500R, ·525, ·550R, ·575, ·600, ·75R

**All £3.50 pair,** marked singles only **£1.80**

**MULTI 7/8 TR2200** 44MHz Rx, 12MHz Tx 145·150/750 **£3.50 pair**

**PYE POCKETPHONES.** 84·5MHz, 12MHz Tx 433·2 **£4.00 pair**

**8MHz HC25/U** **£2.00**
144·480 145·00 145·150
145 (·500, ·525, ·550, ·575, ·600)

**52MHz HC6/U** **£2.25**
145·750 145·775

**CRYSTAL SUB STANDARDS** 100kHz HC13/U **£2.50** 100KHz HC6/U **£3.00** 1MHz HC6/U **£4.50**

**SPARE YAESU CRYSTALS** *COMPLETE* RANGE STOCKED **£2.20** each CRYSTALS TO ORDER 6/8 weeks delivery

Phone 04216 4930 for best price

**SHURE** (p & p 30p)
444—Desk Mic. .. .. **£15.30** 444T—444 with Amp .. **£17.20** 401B—Hand-Low Z .. **£7.20** 201—Hand-Hi Z .. .. **£6.00**

**MICROWAVE MODULES** (all 28-30MHz i.f., others to order) p & p 30p
70MHz converter .. .. .. **£15.20** 144MHz converter + L.O. output .. **£16.30** 432MHz converter .. .. .. **£18.10**
144MHz converter .. .. .. **£15.20** 144MHz pre amp 2 output .. .. **£9.00** 1,296MHz converter .. .. .. **£24.00**

### SECONDHAND PRICE LIST—PHONE FOR LATEST

**YAESU**
FT501 and FP501, **£335.00**
FT101 Mk II Fan and CW filter, **£285.00**
FT101 Mk I, **£220.00**

**EDDYSTONE**
EP14 (pan adaptor), **£75.00**

**HEATHFIT**
SB102, **£250.00**

**TRIO**
JR310, **£75.00**

**KW**
KW2000E (1 year KW guarantee), **£300.00**
Viceroy, **£60.00**
KW105, **£45.00**

**SSM**
Sentinel X 28-30, **£12.00**

**BURNS**
Tone Burst, **£2.50**

**INOUE**
VFO for IC21, **£30.00**

**EX WD**
R216, **£85.00**

**RACAL**
RA17, RA218, RA117E, RA218 pre-selector
RAC417 ISB unit
MA150 ± PA16290 ± MA10SG
Synthesizer PSU
Units costing over **£40.00.** Weight permitting delivery free of charge (usually by Securicor). Guarantee 3 months (labour)

**VAT EXTRA**

Buy it with Access

**PLEASE NOTE — THESE PRICES *DO NOT* INCLUDE VAT (25%)**

**Terms:** Cash with order, or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £150.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

BARCLAYCARD

# Communications Ltd

YAESU

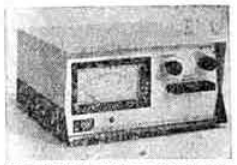
**HY GAIN · JAYBEAM · K.W. · MOSLEY · BANTEX · G. WHIPS · C.D.E.**
**VERSATOWERS · TELOMASTS · HAMTOWERS · ALIMASTS · S.M.C. PRODUCTS**

## HY GAIN, THE BEST RANGE, FROM THE USA (Carriage paid)

| | | | | | |
|---|---|---|---|---|---|
| Hy Tower, 10–80m, Self supporting tower | £133.00 | TH2 Mk. 3 10–20m. 3 element 600W .. | £69.00 | 103BA 10m. 3 element beam .. | £35.00 |
| 18V, 10–80m. Vertical self supporting | £18.00 | Hy Quad 10–20m. 2 element 40m. .. | £99.80 | LA 1 Lightning arrestor .. .. | £17.50 |
| 12AVQ, 10–20m. Vertical self supporting | £25.50 | DB10-15A 10 and 15m. 3 element beam | £76.00 | LA 2 Lightning arrestor .. .. | £3.00 |
| 14AVQ, 10–40m. Vertical self supporting | £36.00 | DB24B, 3 element 20m. 2 element 40m. | £142.00 | 12RMQ Roof mounting kit .. | N.A. |
| LC80Q Loading coil for AVQ, 80m. .. | N.A. | 402BA, 40m. 2 element .. .. .. | £121.00 | 14RMQ, Roof mounting kit .. | N.A. |
| 18AVT/WB 10–80m. Vertical .. .. | £52.00 | 204BA 20m. 4 element beam .. .. | £96.00 | 400 Rotor .. .. .. .. | £139.00 |
| TH6DXX 10–20m. 6 element beam .. | £119.00 | 203BA 20m. 3 element beam .. .. | £80.00 | BN86 Balun .. .. .. .. | £9.50 |
| TH3 MK3 10–20m 3 element beam .. | £99.90 | 153BA 15m. 3 element beam .. .. | £44.00 | TH3 Jnr 10–20m. 3 element 600W | £74.00 |

**S.M.C. TRAP DIPOLES** (Carriage paid)
Trap dipole 10-80m .. .. .. £16.85 Type HP (1kW pep) .. .. .. £18.75 Type P Portable .. .. .. .. £19.50

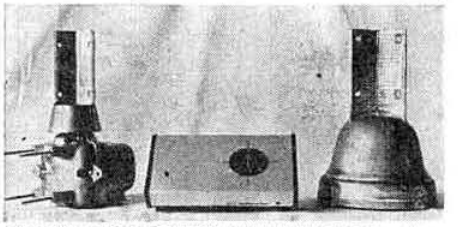
## CDE ROTATORS EX STOCK (IN TOTTON) FOR FAST DELIVERY



THE NEW CONTROL UNIT FOR THE CD44 AND HAM 2

Carriage (B.R.S.) Free. Securicor delivery 60p extra
ALL ROTATORS SUPPLIED COMPLETE WITH APPROPRIATE CONTROL BOX AND INSTRUCTIONS

| | |
|---|---|
| AR30 for Stereo and small VHF beams | £25.00 |
| AR40 for Medium VHF Small HF beams | £30.00 |
| CD44 Arrays up to 2½ sq. ft. of wind area | £60.00 |
| Ham II Arrays up to 7½ sq. ft. of wind area | £90.00 |
| Control Cable 5 core for AR30/AR40 | at 18p/m |
| Control Cable 8 core for CD44/HAM II | at 26p/m |



THE NEW SILENT CONTROL UNIT WITH AN AR30 and 40

## JAYBEAM COMPLETE RANGE OF (AND MORE!) (Carriage extra) FOR 70, 144 or 432MHz

**OMNI-DIRECTIONAL 2 metres**

| | | |
|---|---|---|
| HO/2M | Halo head only | £1.85 |
| HM/2M | Halo with mast | £2.20 |
| UGP/2M | Ground plane | £4.15 |
| XD/2M | Crossed dipoles | £5.75 |

**CIRCULAR 2 metres**

| | | |
|---|---|---|
| XD/2M | Crossed dipoles | £5.75 |
| 5XY/2M | 5 element crossed | £8.20 |
| 8XY/2M | 8 element crossed | £10.20 |
| 10XY/2M | 10 element crossed | £14.10 |

**YAGIS 2 metres**

| | | |
|---|---|---|
| 5Y/2M | 5 element Yagi | £4.30 |
| 8Y/2M | 8 element Yagi | £5.60 |
| 10Y/2M | 10 element long Yagi | £11.00 |
| 14Y/2M | 14 element long Yagi | £14.00 |

**SLOT FED 2 metres**

| | | |
|---|---|---|
| D5/2M | 5 over 5 | £7.92 |
| D8/2M | 8 over 8 | £10.50 |

**PARABEAM 2 metres**

| | | |
|---|---|---|
| PBM14/2M | 14 element parabeam | £16.90 |

**PHASING HARNESS 2 metres**

| | | |
|---|---|---|
| PMH/2C | Circular harness | £2.85 |
| PMH2/2M | 2 way harness | £3.95 |
| PMH4/2M | 4 way harness | £9.15 |

**YAGIS 4 metres**

| | | |
|---|---|---|
| 4Y/4M | 4 element | £6.80 |

**PHASING HARNESS 4 metres**

| | | |
|---|---|---|
| PMH2/4M | 2 way harness | £5.30 |

**70 CENTIMETRES**

| | | |
|---|---|---|
| D8/70 | 8 over 8 | £9.00 |
| PBM18/70 | 18 element parabeam | £10.50 |
| MBM46/70 | 46 element multibeam | £12.10 |
| MBM68/70 | 68 element multibeam | £16.10 |
| 12XY/70 | 12 element crossed | £16.70 |

**PHASING HARNESS 70cms**

| | | |
|---|---|---|
| PMH2/70 | 2 way harness | £3.30 |
| PMH4/70 | 4 way harness | £3.85 |

**BEARINGS**

| | | |
|---|---|---|
| RZ100 | Alignment Bearing | £7.60 |

**COUPLERS**

| | | |
|---|---|---|
| JBL 15/59. 2" jointing sleeve | | £1.85 |

**SWR 10 & 50**
Freq. 3·5-144MHz.
SWR only 432MHz.
Power up to 1kW.
Reduction for VHF.

SWR 50

SWR 10

**NEW LOW PRICE SWR/POWER METERS** (p & p 37p)

| | | |
|---|---|---|
| SWR10 | Reflectometer, single meter, accuracy quoted ±5% .. .. .. .. | £6.30 |
| SWR50 | Calibrated for 50 and 75 ohm line, power meter (±15%) and SWR (±5%) .. .. .. .. .. | £11.20 |

**K.W. EQUIPMENT** (carriage extra)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| KW103 SWR/PWR meter | £16.00 | Dummy Load 75/50 ohm | £12.00 | KW160 Topband ATU.. | £18.00 | KW108 Monitorscope | £85.00 |
| KW107 SUPERMATCH | £63.00 | Antenna switch, 3 way | £6.00 | KW EZ match 10/80m ATU | £22.00 | KW109 QRO ATU | £78.00 |

**MOSLEY TRI BAND (10-15-20m) BEAMS (carriage £1.75)**

| | | | | | |
|---|---|---|---|---|---|
| TA33 Jnr E 3 ele 200W RMS | £45.00 | TA32 Jnr E 2 ele 300W AM | £32.00 | Mustang 3 ele 2kW PIP | £60.00 | Mustang 2 ele 1kW AM | £48.00 |

**BANTEX** FIBREGLASS, STAINLESS STEEL VHF/UHF MOBILE ANTENNAS (Carriage 75p)

| | | | | | | |
|---|---|---|---|---|---|---|
| B5 ¼Wave 144MHz, | £5.00 | B5U ¼Wave 432MHz | £5.00 | Magnetic Base Mount, | £7.50 | Note: deduct 50p from price of |
| BGA ¼Wave 144MHz | £6.60 | 70½ ¼Wave 70MHz | £3.00 | Trunk Lip Mount | £5.10 | aerial if standard base not required |

**GWHIPS, The British Mobile HF Antenna Range** (Carriage 75p)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tribander 10, 15, 20 | £13.53 | LF40, 80 or 160m | £4.51 | Flexiwhip, 13m with base | £10.45 | F15, 20, 40, or 160 | £4.67 |
| Multimobile 10, 15, 20 | £15.73 | MM40, 80 or 160m | £4.10 | Basemounts | £1.81 | Telescopic whips for coils | £1.22 |

**R.F. CABLES** (Carriage up to 20m, 40p; over, 50p; less for lighter cables)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50 ohm RG8U/UR67 .. | 33p/m | 75 ohm UR39 .. .. | 25p/m | 75 ohm Flat twin .. | 6p/m | 75 ohm BICC 2378 .. | 22p/m |
| 75 ohm UR57 .. .. | 33p/m | 75 ohm Economy .. | 10p/m | 300 ohm Ribbon .. .. | 6p/m | 50 ohm UR43/UR76 .. | 15p/m |

**COAX PLUGS** (p and p extra)
PL259 **42p**; Reducers **12p**; PL259A **54p**; UHF Angle **90p**; S0239 **33p**; VHF back to back **66p**; BNC plugs **42p**; N plugs **82p**

## SOUTH MIDLANDS COMMUNICATIONS LTD

**OSBORNE ROAD, TOTTON**
**SOUTHAMPTON SO4 4DN**

SMC
A MEMBER OF THE ARRA
Hours of business:
9-5.30 9-12.30 Saturday.

Cable: Aerial Southampton
Telex: Chamcom 47388
Tel: (04216) 4930 & 2785

**Agents (evenings) (ALL QTHR)**
**Brian Kennedy G3ZUL** Droitwich (09057) 4510
**Peter Avill G3TPX,** Darton (022 678) 2517
**Ian McKechnie GM8DOX** Bridge of Allan (078683) 3223
**Howarth Jones GW3TMP,** Pontybodkin (035 287) 846

# AMATEUR ELECTRONICS UK

**OFFICIALLY APPOINTED DISTRIBUTOR** *for* **THE YAESU MUSEN CO. LTD.**

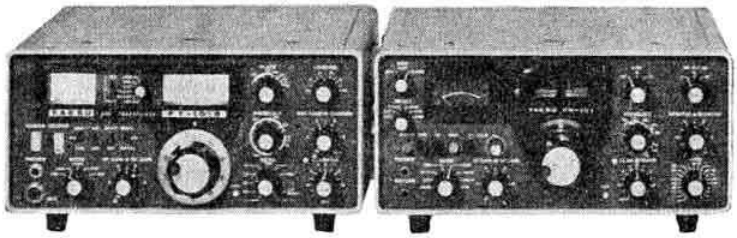
## FR-101 Receiver

FOUR MODELS NOW AVAILABLE

| | |
|---|---|
| **FR-101S** | STANDARD |
| **FR-101DL** | DE LUXE |
| **FR101SD** | STANDARD WITH DIGITAL DISPLAY |
| **FR-101DDL** | DE LUXE WITH DIGITAL DISPLAY |

- **Solid State Receiver with Total Spectrum Coverage 160 thru 2 Meter plus provision for Major Short Wave Broadcast Bands — THIS SET IS A MUST FOR THE DEDICATED SWL**

**AND FOR THE LICENSED OPERATOR THE NEW FR-101 ALSO GIVES SUPERB TRANSCEIVE OPERATION WITH THE FT-101B ▶**



***THE FULL YAESU RANGE IS ALSO AVAILABLE FROM OUR SELECTED ACCREDITED STOCKISTS AS SHOWN HERE***

**RADIO SHACK LTD.**
188 Broadhurst Gardens
LONDON, NW6 3AY
01-624 7174

**STEPHENS-JAMES Ltd.**
70 Priory Road
Anfield
LIVERPOOL, L4 2RZ
051-263 7829

**J. & A. TWEEDY LTD.**
79 Chatsworth Road
Chesterfield
DERBYSHIRE
0246 34982
and WOODHALL SPA
(LINCS) 52793

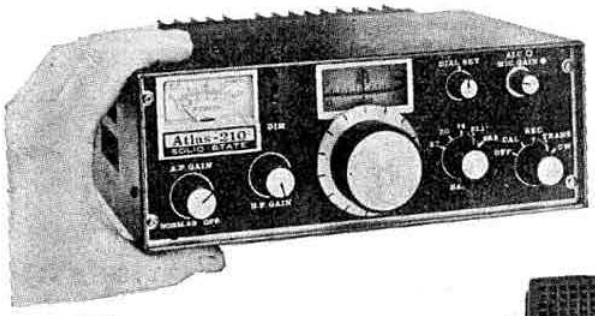
**TAURUS ELECTRICAL SERVICES**
26-28 Nottingham Road
LOUGHBOROUGH
05093 5131

**THE AMATEUR RADIO SHOP, G4MH**
13 Chapel Hill
HUDDERSFIELD
0484 20774

# 508-514 ALUM ROCK ROAD
# BIRMINGHAM 8

021-327 1497
6313

G3FIK




## NEW MODELS!

**ATLAS-210** 80 THRU 10
**ATLAS-215** 160 THRU 15

SWAN ELECTRONICS


**£29.90**
(PLUS VAT OF £2.39 AND P/P 75p)

**PLANET** 808 SUPERB NEW SPEECH PROCESSOR!

THE 700 CX SWAN'S 700 WATTER — OTHER MODELS FROM STOCK

**AMATEUR ELECTRONICS UK** ARE DIRECT IMPORTERS OF **YAESU, SWAN & ATLAS** EQUIPMENT AND MANUFACTURERS OF **PLANET** PRODUCTS

**NEW LINES— AND THE RETURN OF SOME OLD FAVOURITES!**

| | | |
|---|---|---|
| STANDARD RADIO | — | FULL RANGE |
| MICROWAVE MODULES | — | FULL RANGE |
| OSKER SWR200 POWER METER | - | **£22.68** INC. VAT |
| ARAC 102 MOSFET RECEIVER | - | **£87.30** INC. VAT |
| BARLOW WADLEY XCR-30 | - | **£125.00** INC. VAT |

**USED EQUIPMENT** — MANY CHOICE ITEMS
**COLLINS — DRAKE — RACAL, Etc.**
PLUS SPECIAL OFFERS ON DISCONTINUED SOMMERKAMP AND TRIO MODELS

AERIALS — ROTATORS — ANCILLARY EQUIPMENT, Etc. —
ASK FOR OUR ACCESSORY BROADSHEET—PLEASE SEE BELOW

A COUPLE OF STAMPS (WE'LL PROVIDE THE ENVELOPE) WILL BRING YOU OUR LATEST USED EQUIPMENT LIST OR INDIVIDUAL INFORMATION ON SPECIFIC ITEMS—21 PENCE BRINGS THE LATEST GLOSSY SWAN OR YAESU CATALOGUE (FULLY REFUNDABLE AGAINST EVENTUAL PURCHASE).

**Northern Agent**—JOHN ROWLEY, G3KAE, Scarborough. Tel: West Ayton 3039
**Scottish Agent**—RON TURNER, GM8HXQ, Wishaw. Tel: Wishaw 72172

# Western

**UNITED KINGDOM DISTRIBUTOR OF THE WORLD'S FINEST RANGE OF AMATEUR RADIO EQUIPMENT BY**

# YAESU MUSEN

YAESU

## YOU'LL REGRET NOT WAITING FOR "IT"!

### . . . "it" has a PHASE LOOP LOCKED VFO FOR 144-6MHz
### . . . "it" has AM as well as SSB-FM and CW
### . . . "it" is YAESU's NEW FT-221

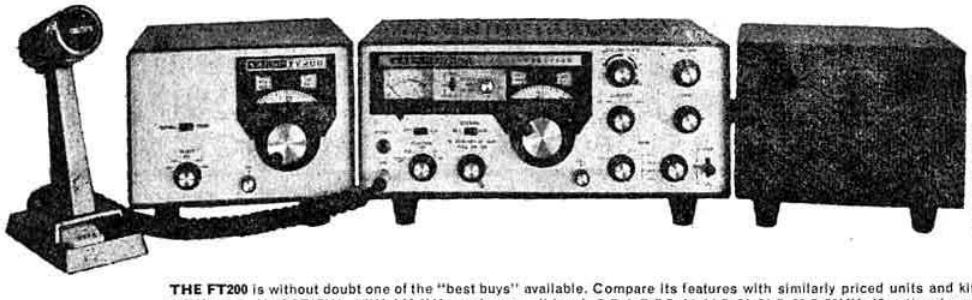
We regret that there's one thing wrong with "it" however! The FT-221 will not be available until about July. However, as a bona-fide Yaesu distributor we have that inside information which gets our orders for shipment of FT-221's in on Yaesu's desk first so we hope you will favour us with your order. Price? Not yet known but circa £300 no doubt.

It's worth remembering that when you deal with WESTERN ELECTRONICS you have the best after-sales service in the country. We have the best equipped service department in the country in our trade and provide free collection and re-delivery on all warranty work. It's all part of our service!

**YAESU PRICES—WE REGRET THAT DUE TO INCREASED COSTS NEW PRICES WILL APPLY TO NEW STOCK, PROBABLY IN MAY**

## IT'S REALLY RELIABLE AND THE BEST BUY IN BRITAIN . . . THE FT200

**YD844** **FV200** **FT200 (£183.60)** + **FP200 (£48.60)** **PRICES inc. VAT**



FOR
260w. p.e.p.
10-80m.
SSB-CW-AM
1KHz READOUT
CLARIFIER
100KHz
CALIBRATOR

**THE FT200** is without doubt one of the "best buys" available. Compare its features with similarly priced units and kits. SPECIFICATION: 260W p.e.p., i/p SSB/CW. 75W AM 1kHz readout on all bands 3·5–4, 7–7·5, 14–14·5, 21–21·5, 28·5–29MHz (3 optional crystals available for 28–28·5, 29–29·5 and 29·5–30MHz. Stability: 100Hz 30mins after warm-up. Sensitivity: 0·5µV 10dBS/S + N. Selectivity: 2·3kHz (6dB), 4kHz (60dB). Clarifier ±5kHz. Break-in CW keying. You will pay more for a kit with less power, only 5kHz readout and no receiver incremental tuning (Clarifier control). These prices only apply whilst current stocks last. Three extra crystals fitted for full 10m coverage COST **£8.10** inc VAT.

*REMEMBER!:* We have the experience and first introduced the "Yaesu" brand name to you in August 1970 by "Western Electronics", started by our managing director, Hal Perkins, G3NMH.

**VALVES** (p & p 30p) Minimum order **£2.** Most valves are of first grade Toshiba manufacture. **VAT EXTRA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 572B (Cetron) .. | £11.20 | 6AW8 .. .. | £0.60 | 6CB6 .. .. | £0.49 | 6GK6 .. .. | £0.55 | 12AU7 .. .. | £0.50 |
| 5763 .. .. | £1.55 | 6BA6 .. .. | £0.35 | 6CH6 .. .. | £0.86 | 6GW8 .. .. | £0.72 | 12AX7 .. .. | £0.45 |
| 6146 .. .. | £4.50 | 6BE6 .. .. | £0.40 | 6CL6 .. .. | £0.75 | 6JS6C .. .. | £1.75 | 12AT7 .. .. | £0.52 |
| 6146B .. .. | £4.85 | 6BM6 .. .. | £0.50 | 6EA8 .. .. | £0.50 | 6KD6 .. .. | £1.75 | 12BY7A .. .. | £0.50 |
| 6AH6 .. .. | £1.05 | 6BM8 .. .. | £0.80 | 6EH7 .. .. | £0.50 | 6LQ6 .. .. | £1.75 | 12DQ6 .. .. | £2.25 |
| 6AM6 .. .. | £0.55 | 6BN8 .. .. | £0.45 | 6EJ7 .. .. | £0.50 | 6U8 .. .. | £0.55 | OA2 .. .. | £0.96 |
| 6AN8 .. .. | £0.55 | 6BQ5 .. .. | £0.45 | 6EW6 .. .. | £0.40 | 7360 .. .. | £5.00 | O2B .. .. | £0.60 |
| 6AV6 .. .. | £0.33 | 6BZ6 .. .. | £0.40 | | | | | | |

**CATALOGUE.** We will be pleased to send you a copy of our COMMUNICATIONS EQUIPMENT catalogue (20p) or TOWERS, ANTENNAS and ROTORS catalogue (20p). No SAE required.

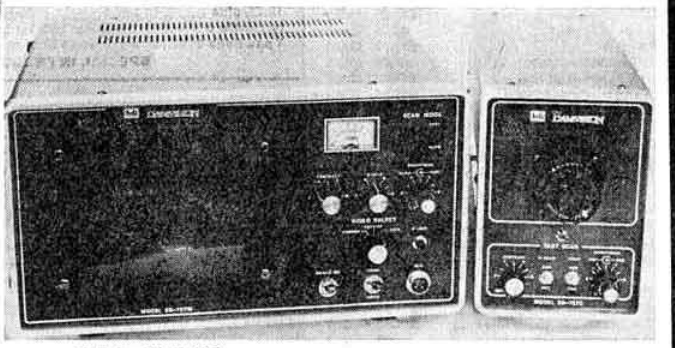
# Electronics (UK) ltd

## NEW! FOR THE SERIOUS FM REPEATER OPERATOR
## THE STANDARD C828! There's no other choice!

We're so fascinated by this little beauty that we think it makes everything else "obsolete" (or expensive!). The Price? . . . **£125** + VAT. ★ 10 watts(HI), 1 watt (LO)output ★ 12 channels SIMPLEX or REPEATER ★ Single crystal control of REPEATER means you only have to buy one CRYSTAL PER REPEATER ★ Fitted S20, S22, R5, R6, and R7. ★ LED (BUSY) indicates whether you have accessed the repeater or not ★ LED's to indicate EXTERNAL VFO, TRANSMITTER ON, REPEATER OPERATION ★ SPEAKER/MICROPHONE gives PRIVATE LISTENING AND HAS SWITCH TO OVER-RIDE THE CHANNEL SELECTOR ENABLING A CHANGE-OVER TO BE MADE TO AN EXTERNAL VFC. ★ Size? Only 84mm (W) × 58mm (H) × 235mm (D). ★ TONEBURST IS BUILT-IN.

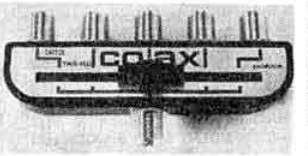
## NEW! Here is the latest in SSTV from HAMVISION

This advanced system is packed full of features and beautifully styled. The SS-727M (monitor) and SS-727C (camera lens) is **£485** + VAT.

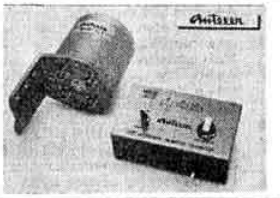


## NEW!
### REX DG-100 10-160m DIGITAL TRANSCEIVER £399 + VAT

## NEW! CO-AX SWITCH DC-1500MHz, 1kW




This is a superb commercial quality co-axial switch. It is NOT a rotary wafer switch but a gold-plated micro-stripline constant impedance device. Power handling capability—1kW, AM. Connectors—UHF standard (gold flashed), BNC, N, C & F available to order.



## NEW! AC-3
### remotely operated antenna switch. No extra cables required.

The AC-3 enables one of 3 antennas to be remotely selected using a single co-axial feeder. No multi-cored cable is required. Handles 500W p.e.p. up to 150MHz.

**Western Electronics (UK) ltd**

Agents: Ian Partridge, G3PRR CHESHAM, BUCKS (02405) 4143
Alan Cameron, GM3OGJ, Alloa (02592) 4653
David Lacey, G8IYP, Solihull Warks., 021-744 4438
Hours of business: *9.15-5.15; 9-12.30 (Saturday)*

**NOTE: CLOSED SAT. MAY 24.**
1-3, WEST PARK ROAD, SOUTHAMPTON
TELEPHONE: SOUTHAMPTON 27464
CABLE: WESTRONICS, SOUTHAMPTON
TELEX: 47388 WESTRONICS

# FAST AND FRIENDLY MAIL ORDER

**Your South Eastern Yaesu Stockist**

**BY 'PHONE** *Simply telephone your Barclaycard or Access No. for immediate despatch* **Tel. 03 704 6835**

**BY POST** *State clearly your requirements enclosing cheque or postal order*

**CALLERS** *You are always welcome to come and inspect the equipment in our showroom*

**FOR ALL ENQUIRIES** *PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE*

**YAESU EQUIPMENT (ex VAT)**

| | | |
|---|---|---|
| FT101B 160-10m tcvr. 240V/12V | £330.00 | (n/c) |
| FR101D 160-2m rx 240V/12V | £330.00 | (n/c) |
| SP101 matching speaker | £13.00 | (1.00) |
| FV101 remote vfo | £48.00 | (1.00) |
| FT401B | | (n/c) |
| SP401 matching speaker | | (1.00) |
| FT200 80-10m transceiver | £170.00 | (n/c) |
| FP200 matching spkr./AC supply | £45.00 | (1.00) |
| FT220 2m SSB/FM tcvr. 240/12V | £264.00 | (n/c) |
| FT224 2m FM tcvr. 24ch. toneburst | £130.00 | (n/c) |
| FP2 matching AC/charger supply | £38.00 | (1.00) |
| YC355D 200MHz counter 240/12V | £125.00 | (n/c) |
| YO100 monitor scope (superb)! | £93.00 | (1.00) |
| FT2 Auto | tba | (n/c) |
| Sigmasizer (80 channel) | tba | (n/c) |

**JAYBEAM VHF ANTENNAS**

| | | |
|---|---|---|
| 4 element yagi | £7.34 | (£1) |
| 5Y/2m yagi 5 element | £4.64 | (75p) |
| 8Y/2m yagi 8 element | £6.05 | (1.00) |
| 10Y/2m yagi 10 element | £11.88 | (1.00) |
| PBM14/2m parabeam | £18.25 | (1.25) |
| D5/2m slot fed yagi | £8.56 | (1.00) |
| D8/2m slot fed yagi | £11.24 | (1.00) |
| 5XY/2m 5 el. crossed yagi | £8.86 | (1.00) |
| 8XY/2m 8 el. crossed yagi | £11.03 | (1.00) |
| 10XY/2m 10 el. crossed yagi | £15.23 | (1.25) |
| XD/2m crossed dipole | £6.21 | (75p) |
| UGP/2m ground plane | £4.48 | (75p) |
| HM/2m Halo with mast | £2.38 | (75p) |
| D8/70cm slot fed yagi | £9.72 | (1.00) |
| PBM18/70cm parabeam | £11.77 | (1.00) |
| MBM46/70cm 46 el. yagi | £13.07 | (1.25) |
| MBM68/70cm 68 el. yagi | £17.39 | (1.50) |
| 12XY/70cm 12 el. crossed yagi | £18.04 | (1.00) |

Full range of phasing harnesses and Jaybeam brackets in stock. SAE for catalogue.

**MFJ PRODUCTS (USA)**

| | | |
|---|---|---|
| CWF-2BX boxed cw audio filter | £13.95 | (25p) |
| SBF-2BX boxed ssb audio filter | £14.58 | (25p) |
| CWF-2 unboxed sw filter | £9 | (25p) |
| CWF-3 unboxed cw filter | £5 | (25p) |
| 100BX 100/50/25kHz boxed calib. | £11.50 | (25p) |
| MFJ-100 calibrator unboxed | £9.35 | (25p) |
| MFJ-100 calibrator less xtal | £11.50 | (25p) |
| CMOS Electronic keyer with monitor | £21.06 | (25p) |

**MINI-PRODUCTS "MINI-BEAMS" (USA)**

| | | |
|---|---|---|
| HQ-1 hybrid quad10-15-20m | £54.00 | (1.50) |
| B24 2 element yagi 10-15-20m | £42.12 | (1.50) |
| RK3 reflector element for B24 | £27.00 | (1.50) |
| C4 vertical dipole 10-15-20m | £24.30 | (1.30) |

**HY-GAIN ANTENNAS**

| | | |
|---|---|---|
| 12AVQ 10-20m self supporting | £20.00 | (1.50) |
| 14AVQ 10-40m self supporting | £30.00 | (1.50) |
| 18AVT/WB 10-80m self supporting | £44.00 | (2.00) |
| TH3 beam | £97.74 | |

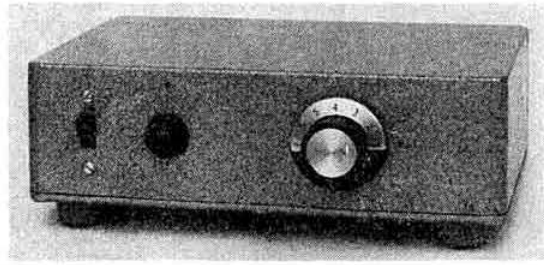
**ROTATORS**

CDE:
AR30 **£27.00** (75p) AR40 **£32.00** (75p) CDE 44 **£64.80** (1.00)

STOLLE:
2010 **£33.48** (75p) 2030 **£37.80** (75p)

CABLE
5 core round **18p** yd (1p) 5 core flat **15p** yd (1p)

## THE TECHNICAL ASSOCIATES COMPLETE CW/SSB RECEIVER FILTERING SYSTEM



This unit combines our famous cw and ssb audio filter modules into one package (see SWM revue, April 1975), plus a built-in audio amplifier to fully drive a loudspeaker. Simply plug into headphone or speaker terminals and connect receiver speaker to the output of the unit (headphone socket also provided). The 7 positions of selectivity down to 80Hz ensures QRM free copy.

**SPECIAL INTRODUCTORY PRICE £26.00 + VAT. P & p 50p**

**MICROPHONES**

| | | |
|---|---|---|
| Shure 201 | £6.00 | (25p) |
| Shure 444 | £13.95 | (45p) |
| Yaesu YD844 | £16.12 | (30p) |

**ANTENNA FEEDERS**

| | | |
|---|---|---|
| 50 ohm UR43 | 18p yd | (1p) |
| 50 ohm RG8U/UR67 | 36p yd | (2p) |
| 75 ohm standard | 10p yd | (1p) |
| 75 ohm UHF low loss | 14p yd | (1p) |
| 300 ohm feeder | 8p yd | (1p) |

**COAX FITTINGS**

| | | |
|---|---|---|
| PL259 coax plugs | 42p | (5p) |
| Reducers | 15p | (1p) |
| Belling male coax plug | 12p | (1p) |
| Belling female plug | 18p | (1p) |
| Belling coax joiner | 20p | (1p) |

**MICROWAVE MODULES**

| | | |
|---|---|---|
| NEW! 70cm transverter 28/70cm | £67.00 | (50p) |
| 2m converters 2-4/4-6/28-30 | £16.42 | (25p) |
| 4m converter 28-28·7 | £16.42 | (25p) |
| 70cm converters 28-30/144-146 | £19.55 | (25p) |
| 2m pre amp | £9.72 | (25p) |
| 1296MHz converter 28-30 | £25.92 | (25p) |
| 2m converter 28-30/116 osc. o/p | £17.60 | (25p) |

**SOLID STATE MODULES**

| | | |
|---|---|---|
| 2m or 4m Europa B | £88.00 | (1.00) |
| As above less valves | £74.00 | (1.00) |
| Matching power supply | £34.00 | (1.00) |
| 2m converter 2-4/4-6/28-30 | £16.20 | (25p) |
| 70cm converter 144-146 | £16.20 | (25p) |
| 2m pre amp | £9.72 | (25p) |
| PA3 pre amp | £5.94 | (25p) |
| 70cm pre amp | £9.72 | (25p) |

**TESTED TRADE-INS**

| | | |
|---|---|---|
| FT501 plus psu 6 months old, mint | £359.00 | (n/c) |
| Europa 4m transverter with valves | £60.00 | (1.00) |
| Pye Base station working on 2m | £35.00 | (cost) |
| Eddystone 140, excellent | £150.00 | |
| KW 202 Rx, excellent | £150.00 | |

**SPECIAL SIGNAL PUNCHING PACKAGE**

Technical Associates Advanced speech compressor with variable compression, decay time and noise gate provides the most economical way of increasing talk power WITHOUT ANY DISTORTION. Still offered at **£22.50** (30p) it's a bargain with the famous Shure 444 mic at **£35** the two units, it's unbeatable! Order yours now and save money. **VAT EXTRA**

**SWAN EQUIPMENT (ex VAT)**

| | | |
|---|---|---|
| 700cx transceiver plus psu | £395.00 | (n/c) |
| 700cx/ss16 transceiver plus psu | £435.00 | (n/c) |
| Remote vfo unit | £99.00 | (n/c) |
| Vox unit | £25.00 | (n/c) |

**BELCOM**

| | | |
|---|---|---|
| Liner 2 2m SSB tcvr 10W p.e.p. o/p | £156.00 | |

**TRIO**

| | | |
|---|---|---|
| QR666 receiver 160-10m plus general coverage 230V/12V | £140.00 | (n/c) |
| Matching xtal calibrator | £9.50 | (25p) |

**LOWE ELECTRONICS (ex-VAT)**

| | | |
|---|---|---|
| 2m FM 6ch. monitor receiver | £19.95 | (50p) |
| 'xtals 145/-5/-525/-55/repeaters | £1.50 | (5p) |

**TONEBURST MODULES**

| | | |
|---|---|---|
| Dual 1700 & 1750Hz o/p | £3.95 | (15p) |

**STATION ACCESSORIES**

| | | |
|---|---|---|
| SWR metre 160-2m | £7.50 | (35p) |
| SWR metre plus power metre 160-2m | £11.50 | (35p) |
| Baluns 1kW 75 ohm | £4.95 | (25p) |
| Baluns 1kW 50 ohm | £4.95 | (25p) |
| Insulators | 12p | (2p) |
| Dipole centre insulator SO259 | £1.75 | (20p) |
| Wightraps 1kW pair | £4.60 | (35p) |
| HP3A TVI filter | £2.16 | (5p) |
| 1¼ inch ferrite cores | 30p | (n/c) |

**NOTE: As from 1st May, VAT inclusive prices must be increased by 15%**

# WATERS & STANTON ELECTRONICS

## HOCKLEY AUDIO - SPA ROAD - HOCKLEY - ESSEX

**HIRE PURCHASE** PRICES INCLUDE VAT (unless stated) **9-5 30 pm Early closing WEDNESDAY** **Tel: 03-704 6835** **TRADE-INs**

# Complete the coupon and we'll send you our new catalogue. Completely free.


The new Heathkit catalogue is now out. Full as ever with exciting, new models. To make building a Heathkit even more interesting and satisfying.

And, naturally, being Heathkit, every kit is absolutely complete. Right down to the last nut and bolt. So you won't find yourself embarrassingly short of a vital component on a Saturday evening–when the shops are shut.

You'll also get a very easy to understand instruction manual that takes you step by step through the assembly.

Clip the coupon now and we'll send you your free copy to browse through.

With the world's largest range of electronic kits to choose from, there really is something for everyone.

Including our full range of test equipment, amateur radio gear, hi-fi equipment and many general interest kits.

So, when you receive your catalogue you should have hours of pleasant reading.

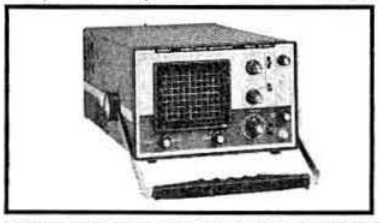
And, if you happen to be in London or Gloucester, call in and see us. The London Heathkit Centre is at 233 Tottenham Court Road. The Gloucester showroom is next to our factory in Bristol Road.

At either one you'll be able to see for yourself the one thing the catalogue can't show you.

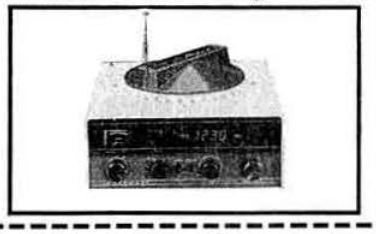
Namely, how well a completed Heathkit performs.

Heath (Gloucester) Limited, Dept. **RC55,** Bristol Road, Gloucester, GL2 6EE. Tel: Gloucester (0452) 29451.

A new oscilloscope from the Heathkit range.



Marine direction finder with digital read-out.



Solid-state grid dip meter.

## The new Heathkit catalogue. Out now. FREE.

To: Heath (Gloucester) Limited, Dept. **RC55,** Gloucester, GL2 6EE. Please send me my free Heathkit catalogue.

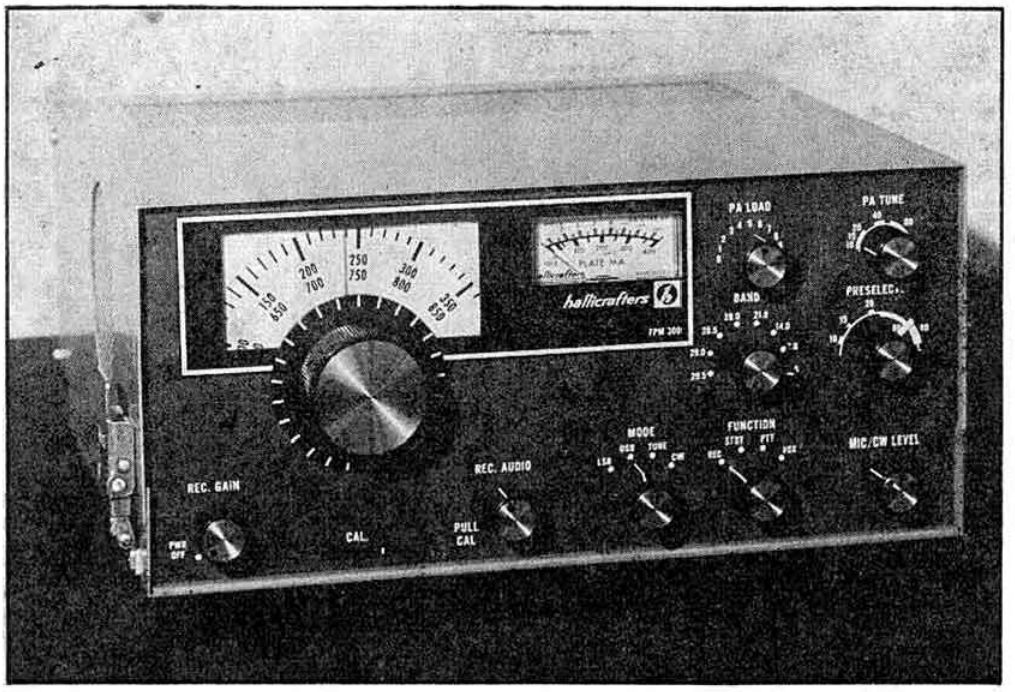
Name_____ Address_____

_____ Postcode_____

Remember easy terms are available with the Heathkit Monthly Budget Plan.

HEATH Schlumberger

# Hallicrafters' all-american made FPM-300, Mark II "Safari" SSB/CW transceiver is Q5 . . . from the Mauritania solar eclipse expeditions to a famous raft adventure in the Atlantic.




Proven design in the tradition of the HT-37 and solid-state dependability are combined in this compact transceiver featuring state-of-the-art FET's, hot carrier diodes and bi-polar transistors for peak, reliable performance.

Some of the high performance specifications:

- Designed for fixed, portable and mobile use
- Equipped with a self-contained Universal AC and DC power supply system
- Compact dimensions (HWD) 5½" × 12" × 11"
- Weight: 25 pounds
- Tuning ranges: 8–600kHz Bands, 80–10m
- Built-in speaker
- Power requirements: 117V or 234V 50/60 AC 13·4 VDC negative ground
- Modes: Selectable Upper or Lower Side-band-CW or RTTY
- Type of service: continuous operation with 2-tone SSB-CW-RTTY (50% duty cycle)
- Power Output: 125 Watts P.E.P. (Nominal) into 50 ohms
- Receiver Sensitivity: Less than 1μV for 15dB SN Ratio
- Selectivity: 2·0kHz
- Receiver IM: 60dB below 2 equal 10MV signals
- Receiver Image and I.F. Rejection: Greater than 60dB
- Internal Receiver Spurious: Less than equivalent 1 Microvolt Signal
- Transmitter IM: 30dB below P.E.P. (26dB below one of two equal tones)
- Adjacent Channel Desensitizing: 3dB with greater than 10,000 MV
- Sideband Suppression: −50dB min @ 1kHz
- AF Power Output: 2 watts
- Stability: 100Hz after warmup. Max. 100Hz with 10% line voltage change
- Frequency Readout: Within 1kHz ± 100kHz of Cal. Point not more than 3kHz across entire 500KC Band
- Break-in CW: Semi-Automatic
- CW Sidetone
- Audio Frequency Response: 500-2500Hz Nominal
- AALC: 12dB Compression
- AGC Figure of Merit: 60dB minimum
- Crystal Calibrator: Provides 25kHz Calibration Signals
- Optional Accessories: MR-300 Mobile Installation Kit; HA-60 Blower Fan Kit, works on AC or 12V DC

## You should be talking with a Hallicrafters

**SEE YOUR HAM DEALER FOR ALL DETAILS**

**UK PRICE £290 plus VAT**

# STOP! Are you interested in buying top performance VHF or UHF equipment? Then look no further!...

## 144MHz Mosfet Converters

We offer you the only professionally specified converter for use with modern highly accurate 28-30MHz receivers. We have now standardised the design of our 28-30MHz converter using a zener-stabilised 116MHz crystal oscillator, giving a typical read-out error of better than 1kHz. The converter is now available in the two versions, with and without the local oscillator output facility.

**MMC144/28** Price **£16.42** inc VAT
**MMC144/28 LO** (with 116MHz output) Price **£17.60** inc VAT

**SPECIFICATION**
Noise figure: 2·8dB max. Gain: 27dB typ.
Image rejection: 65dB typ.
Crystal oscillator: 116MHz (zenered)
Frequency error at 144MHz: 3kHz max.
Power supply: 35mA at 12 volts.
116MHz o/p power: 5mW min (LO o/p version)

We have extended our popular range of single conversion converters to include the following I.F.s.:
9-11, 12-14, 14-16, 18-20, 24-26, 28-30MHz
Price **£16.42** inc VAT

**70MHz MOSFET CONVERTER**
I.F.s available: 4-4·7, 14-14·7, 18-18·7, 28-28·7MHz.
Price **£16.42** inc VAT

**70MHz CONVERTER FOR SSB—MMC70/28 LO**
SSB is now widely used on the 70MHz band, and we are now manufacturing our 70MHz converter with the local oscillator output facility provided at 42MHz. Specification and price are as above for the 144MHz version.

**144MHz DOUBLE CONVERSION MOSFET CONVERTER**
I.F.s available ex-stock: 2-4, 4-6MHz. Price inc VAT **£16.42**
This unit was developed to meet the heavy demand for a converter suitable for use with receivers having better performance at lower frequencies. It uses two dual-gate mosfet mixers, both fed from the output of a 70 or 71MHz crystal oscillator. Selectivity is obtained at the first IF in the 74MHz range, thereby over-coming the usual problems associated with low-I.F. single conversion converters.

**136MHz SATELLITE BAND CONVERTER**
I.F.s available: 28-30MHz and others Price inc VAT **£16.42**

**432MHz MOSFET CONVERTER**
I.F.s available ex-stock: 14-16, 18-20, 24-26, 28-30, 144-146MHz. Price inc VAT **£19.55**
This unit uses a dual-gate mosfet mixer for excellent strong-signal performance preceded by two BFY90 transistor RF stages for high sensitivity. All UHF tuned circuits are printed using Microstrip technology, and a crystal in the 100MHz region is used in the oscillator chain to overcome unwanted beats in the tuning range.

**1296MHz CONVERTER**
This converter has been developed using an extension of the microstrip techniques that have been well proven in our 70cm converter design. Two versions of the design are available using either a 96MHz or 105·666MHz crystal to produce I.F.s of 144-146MHz or 28-30MHz respectively, corresponding to the 1296-1298MHz band. We are using crystals of a very tight tolerance to minimize the offset that would otherwise be very noticeable when using a high performance 28-30MHz tunable receiver. The multiplier chain uses three BFY 90 transistors and the mixer is fabricated using a pair of MA 4882 Schottky diodes in a balanced hybrid ring configuration. The I.F. head amplifier uses a selected low noise dual-gate mosfet to give an overall noise figure which is typically better than 8·5dB, and a gain of 25dB. Microstrip UHF circuitry ensures repeatability of this high performance design. The unit is housed in the same small die-cast box as the rest of our range of converters and is fitted with 50 ohm BNC connectors for optimum UHF performance. The converter operates from a nominal 12V supply and is available in negative earth version only.
Price inc VAT **£25.92**

**VARACTOR TRIPLERS**
We manufacture varactor triplers for 432 and 1296MHz. Both are highly stable, with low level harmonic output, and capable of AM operation at the 50% power level. These units are aligned using swept-frequency and swept-power drive sources, the output of each unit being monitored on one of our spectrum analysers. Great attention is paid to harmonic suppression and linearity. All harmonics are greater than 40dB down on the wanted output.

**432MHz VARACTOR TRIPLER**
Maximum input power at 144MHz: 20 watts. Typical output power (at maximum input): 14 watts. Price inc VAT **£18.90**

**1296MHz VARACTOR TRIPLER**
Maximum input power at 432MHz: 24 watts. Typical output power (at maximum input): 14 watts. Price inc VAT **£27.00**

**144MHz DUAL OUTPUT PREAMPLIFIER**
Gain 18dB, N.F. 2·8dB. Ex-stock. Price inc VAT **£9.72**

---

All our converter and varactor units are housed in durable alloy diecast boxes, well-finished in matt-black stove-enamel. Each unit measures 110 × 60 × 31mm, and weighs approximately 200gms. With the exception of the 1296MHz units, Belling-Lee 75ohm sockets are used for RF input and output connections. Units can be supplied from stock fitted with 50ohm BNC sockets at an additional charge of 40p per socket. PTFE feedthrough insulated terminals are used for DC power connection.

Terms: Cash or cheque with order, or by Giro Transfer to our account, no. 683 4159.

Delivery: Ex-stock by return of post.

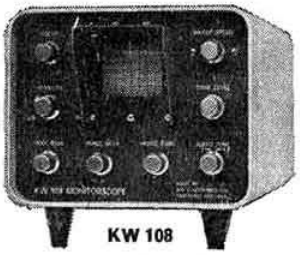
# MICROWAVE MODULES LIMITED

**11 CRANMORE AVENUE, CROSBY, LIVERPOOL L23 0QD TEL: 051-928 1610 9 a.m.-8 p.m.**

# PROFESSIONAL PERFORMANCE with KW

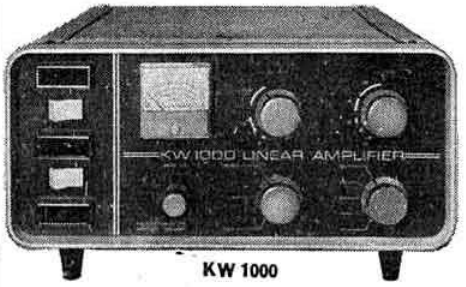

KW 2000E & Power Supply

**KW 2000E Transceiver** Covers all HF Bands 10–160 metres (10 metres in 4 Bands), 500kHz vfo. SSB/CW. Outstanding Tx audio quality. Excellent Receiver signal-noise figures. Includes VOX, break-in CW, 100kHz and WWV calibrator. Reliable 6146's in pa.



KW 108

**KW 108 Monitor Scope** Monitor your transmissions 10–160m. two-tone test generator incorporated to ensure optimum linearity for ssb.

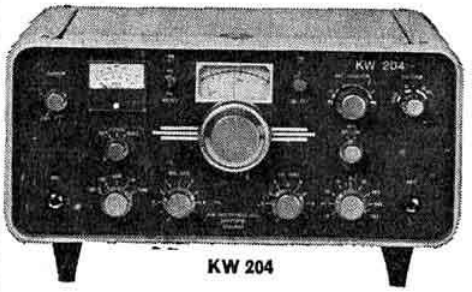



KW 1000

**KW 1000 Linear Amplifier** 10–80 metres. 1200 watts p.e.p. input max. Designed to be "driven" by KW 2000A/B/E or other Unit of similar power rating. In-built 2·5kV psu. PA tubes pair T160L. Very quiet in operation.

KW 107

**KW 107 Antenna Tuning System** Incorporates E-Z match, SWR/RF Power meter, dummy load, Antenna switch. A high power version KW 109 is also available.




KW 204

**KW 204 Transmitter** Well known for really good audio quality (ssb) and a favourite with cw enthusiasts. 10–160 metres. Reliable PA Tubes (2 × 6146).

**Stockists for Hy-Gain beams and verticals. CDR rotators, Shure microphones etc.**

KW spares are normally carried for a minimum of five years after date of manufacture of equipment.

**Other KW Favourites.** KW 1000 Linear Amplifier KW E-Z match ATU; KW 160 ATU; KW 103 SWR/RF Power meter; KW Dummy Load; KW Traps (The original and best); KW Trap Dipoles; KW 109 Supermatch (High Power Version); KW Low pass Filter; KW Balun; KW Antenna Switch.

## KW Communications Products (DECCA COMMUNICATIONS LTD)

Write or phone for catalogue to:
**1 Heath Street, Dartford, Kent.**
**Tel: Dartford 25574/219191**

Easyterms available over 12, 18 or 24 months

# RADIO SOCIETY OF GREAT BRITAIN

## 35 DOUGHTY STREET, LONDON WC1N 2AE

FOUNDED 1913
INCORPORATED 1926

MEMBER SOCIETY
INTERNATIONAL AMATEUR RADIO UNION

### PATRON: HRH THE PRINCE PHILIP, DUKE OF EDINBURGH, KG

### COUNCIL 1975

| | |
|---|---|
| **PRESIDENT** | C. H. Parsons, GW8NP |
| **EXECUTIVE VICE-PRESIDENT** | E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM |
| **HONORARY TREASURER** | J. O. Brown, LLB, FCA, G3DVV |
| **TELECOMMS LIAISON OFFICER** | R. F. Stevens, G2BVN |

**MEMBERS**

R. J. Baker, G3USB; P. Balestrini, TEng(CEI), MITE, MIAM, G3BPT; D. Byrne, G3KPO; R. W. Fisher, G3PWJ; W. J. Green, G3FBA; W. F. McGonigle, GI3GXP; L. E. Newnham, BSc, G6NZ; J. R. Petty, G4JW; D. M. Pratt, BTech, MIEE, MIERE, G3KEP; W. A. Scarr, MA, FBIS, G2WS; A. W. Smith, GM3AEL; R. F. Stevens, G2BVN; D. M. Thomas, GW3RWX; F. C. Ward, G2CVV.

---

**GENERAL MANAGER AND SECRETARY**

G. R. Jessop, CEng, MIERE, G6JP

**EDITOR**

A. W. Hutchinson

---

### REGIONAL REPRESENTATIVES

| | |
|---|---|
| Region 1 —North-Western | B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Cheshire. |
| Region 2 —North-Eastern | J. E. Agar, G8AZA, 291 Overdale, Southwold, Cayton, Scarborough, Yorks. |
| Region 3 —West Midlands | B. Kennedy, G3ZUL, 10 Pilgrim Road, Droitwich, Worcs. |
| Region 4 —East Midlands | T. Darn, G3FGY, "Sandham Lodge", Sandham Lane, Ripley, Derbyshire. |
| Region 5 —Eastern | P. J. Simpson, G3GGK, The Beagles, Caldecote Highfield, near Cambridge. |
| Region 6 —South Central | L. W. Lewis, G8ML, 34 Cleevelands Avenue, Cheltenham, Glos. |
| Region 7 —London | R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham-on-Thames, Middx. |
| Region 8 —South-Eastern | D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent |
| Region 9 —South-Western | H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Nr Dartmouth, S Devon. |
| Region 10—South Wales | R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam. |
| Region 11—North Wales | P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinlle, Llandwrog, Caernarvon. |
| Region 12—North-East Scotland | A. J. Oliphant, GM3SFH, 17 Rockwell Crescent, Thurso, Caithness. |
| Region 13—South-East Scotland | V. W. Stewart, GM3OWU, 9 Juniper Avenue, Juniper Green, Midlothian EH14 5EG. |
| Region 14—West Scotland | M. A. Comrie, GM3YRK, 57 Dungoyne Drive, Bearsden, Glasgow. |
| Region 15—Northern Ireland | J. Thompson, GI3ILV, "Albany", Newry Road, Armagh, N Ireland. |
| Region 16—East Anglia | E. T. Jacobs, BRS32513, 26 Pondfield Road, Colchester, Essex. |
| Region 17—Southern | L. N. G. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants. |

---

### HONORARY OFFICERS

| | |
|---|---|
| **Awards Manager (hf)** | C. R. Emary, G5GH, Westbury End, Finmere, Buckingham. |
| **Awards Manager (vhf)** | Jack Hum, G5UM, 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester LE7 9JJ |
| **Intruder Watch Organizer** | C. J. Thomas, G3PSM, 73 Mexborough Avenue, Leeds LS7 3ED. |
| **QSL Bureau Manager** | A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent BR2 7NH. |
| **Slow Morse Practice Transmissions Organizer** | M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex. |
| **Society Historian** | L. E. Newnham, G6NZ, 17 Washington Road, Emsworth, Hants. |
| **Taped Lecture Library Curator** | G. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford. |
| **VHF Manager** | G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23. |

---

**Membership rates: UK—£5.50, VAT included (Unlicensed members under 18 years of age—£2). Overseas—£5 (USA $12). Members are asked to notify changes of address without delay.**

# CURRENT COMMENT

In the March issue of *Radio Communication* the Honorary Treasurer drew attention to the unprecedented rise in postage costs now faced by the RSGB. A second-class letter of 2oz and under now costs 5½p instead of 3½p, a rise of 57 per cent. Similar increases apply to both first- and second-class mail in the other lower weight brackets, eg a 4oz second-class letter now costs 8p compared with 5p, a massive 60 per cent rise. An 80-page issue of *Radio Communication* coming within the 6oz weight limit previously cost 7p, now it costs 9½p, a 36 per cent increase which must be multiplied by the UK circulation of the journal. The Society has an overseas membership of about 1,500 and the despatch of the journal has hitherto cost 5½p. It now costs 8p and on 5 January 1976 this will rise again to a staggering 11p.

One does not need to be a financial wizard to appreciate the significance of these increases. But unfortunately it does not end here, for on 29 September 1975 the Post Office adopts metric weights. The lowest weight limit is 50g, which is less than 2oz. However, the PO has said that there will be a weight limit of 60g for an interim period of a year.

The various statements by the PO and the Post Office Users National Council have been studied and none mention any hint of economies for the future. Indeed the tone is that the present increases will not see the PO out of the red and that more are on the way. There was a time when the PO provided a good service at an economical cost: neither of these criteria now apply, as witness the 200+ Society journals which go astray every month.

Where does all this leave the Society? With a massive deficit unless the subscription is increased at the end of the year. By how much, however, can the subscription keep rising, due to factors outside our control, without a harmful loss in membership? This is a question affecting not only the RSGB but the many other similar organizations whose existence is threatened. It is ironic that in this so-called technological age that the cost of communication is of major concern to us all.

*G2BVN*

# QTC AMATEUR RADIO NEWS

## Senior citizens

By the terms of the Articles of Association of the Society (20 and 23) the Council has power to waive the subscriptions of members who suffer from blindness or other disability and to apply a reduced subscription to members attaining the normal retiring age. The wording of the resolution giving effect to the latter decision is:

The Council may, at its discretion, on the application of any member reduce to £3.30 the subscription payable for any year by such member if:

(a) the said member is not less than the age on which the National Retirement Pension becomes payable and has been a member of the Society continuously for at least 15 years immediately prior to such application,

(b) the said member has retired from all business activities.

## Election of Regional Representatives

**RESULTS**

**Region 12**

| | |
|---|---|
| G. M. Grant, GM3UKG | 7 votes |
| F. D. Hall, GM8BZX | 11 votes |
| G. I. Knight, GM8FFX | 6 votes |
| T. C. Wratten, GM4CAU | 6 votes |

Mr F. D. Hall is therefore elected.

**Region 16**

| | |
|---|---|
| R. E. G. Kendall, G8BNE | 13 votes |
| G. B. Packer, G3UUS | 12 votes |

Mr R. E. G. Kendall is therefore elected.

As no nominations for Regions 3, 6, 7, 11, 14, 18 and 19 were received by the closing date of 21 February, representatives for regions 3, 7, 11, 14, 18 and 19 will be appointed by Council in accordance with the conditions published on page 135 of the February issue of *Radio Communication*. In the case of Region 6, two nominations were received after 21 February and Council has decided that a ballot be held in this region. Corporate members residing in Region 6 are therefore invited to vote for one of the two candidates: Mr D. C. Andrews, G4CWB, and Mr M. I. Connell, G8HDL; in the form prescribed on page 309 of the April issue of *Radio Communication*, such votes to reach RSGB headquarters not later than 30 May 1975.

## Woburn Rally, 3 August 1975
## Return to original location

Regular visitors and friends will be pleased to learn that following negotiations between the RSGB Mobile & Exhibition Committee and the Woburn Estate, this year's rally will be held at the coach park location.

Enquiries for trade stand space should be made to Mr N. O. Miller, "Avon", Gardiners Lane, Crays Hill, Billericay, Essex.

## Interference survey

The centre four pages of this issue constitute an Interference Survey Form. Members are asked to complete this form, remove from the journal, fold it as indicated, and after affixing an appropriate postage stamp return it to the RSGB.

The co-operation of members in completing this survey will be greatly appreciated and will serve to enhance the work of the Society in the interference field.

## Attention G3OAA-G3PZZ

Over 10,000 unclaimed cards, addressed to holders of the above callsign series, are held by G3WP. As these are occupying a large storage area drastic action therefore becomes necessary, and any cards remaining unclaimed one month after the publication of this notice will be destroyed.

Cards can be collected by forwarding stamped addressed envelopes of approximate size 7in by 5in to: J. H. Brazzill, 43 Forest Drive, Chelmsford, Essex CM1 2TT.

## Western FM Repeater Group

This group has recently been formed to promote the setting up of a repeater in North Wales at Moel-y-Parc on 2m, and later on 70cm. The callsign GB3MP is being requested and it is hoped that Channel R6 will be allocated.

In conjunction with the North Western Repeater Group which is planning a repeater GB3RF to be sited at Hameldon Hill near Burnley, Lancs, it is hoped to provide repeater facilities for RSGB Regions 1 and 11.

The chairman is Mr B. Levett, G3TXH, and the secretary is Mr G. Adams, G3LEQ, QTHR, from whom further information can be obtained.

## 1975 BARTG Convention

Village Hall, Meopham, Kent

**11am to 6pm, 24 May 1975**

Attractions at the British Amateur Radio Teleprinter Group Convention this year will include

Comprehensive demonstration of many makes of teleprinter

Lectures on "Getting going on rtty", "Know your printers", "RTTY teach-in", and "Variable speed systems for rtty"

Bring and buy stand  Trade stands

Technical advice corner

Food and refreshments  Ample parking space

Further details from G3OZF, QTHR, tel 0296-74 354

### Space research

The Society recently received an invitation from the chairman of the UK CCIR main committee to nominate a member to sit on Study Group 2 (space research and radio-astronomy services). Mr A. H. B. Bower, G3COJ, has kindly agreed to accept nomination as the RSGB representative on this study group which is currently dealing with papers concerning the amateur satellite service.

### Free to newsletter editors

Editors of club newsletters may be interested to know that Plessey Semiconductors have prepared a note on the SL600 series for their use. If this experiment is a success, the company hopes to produce two or three such short notes for club newsletters each year.

The note is available free of charge from Mr J. M. Bryant, G4CLF, Linear Applications Manager, Plessey Semiconductors, Cheney Manor, Swindon, Wilts SN2 2QW.

### "HR Report"

The newsletter produced by the editors of *Ham Radio Magazine* now appears in weekly editions. The four-page *HR Report* is despatched by airmail and contains up-to-the-minute news on events in the amateur radio world. A yearly subscription for UK readers is $15 which should be sent to *HR Report*, Greenville, NH 03048, USA.

### Can you help?

A circuit diagram for the Woodsons transmitter NS120S will be welcomed by Mr P. M. Branton, G2CNN, Apartado 96, Mahon, Menorca, Spain.

### South Dorset Repeater Group

This group has recently been formed and anyone in the south Dorset area who is interested in supporting it is asked to contact Geoff Watts, G8BCH, 59 Verne Common Road, Portland, Dorset DT5 1EJ.

## 1975 Longleat Mobile Rally

Longleat House, Longleat,

near Warminster, Wiltshire

**29 June 1975**

See **Mobile Rallies Calendar** for full details

## RSGB Region 12 Amateur Radio Assembly

Robert Gordon's Institute of Technology, Schoolhill, Aberdeen

**Saturday 28 June 1975**

**Programme**

| | |
|---|---|
| **1000** | Exhibition, bookstall, etc opens |
| **1015** | Guided tour of the School of Electronic & Electrical Engineering (1st group) |
| **1100** | Morning coffee |
| **1115** | Guided tour (2nd group) |
| **1200–1300** | Lunch |
| **1310** | Opening ceremony by Dr J. C. Earls, PhD, CEng, FIEE, Dean of the Faculty of Engineering |
| **1315** | "Six circuits for success" by Mr M. C. Hately, BSc, CEng, MIEE, GM3HAT |
| **1410** | "The 127th performance of the G6CJ aerial circus", by Mr F. J. H. (Dud) Charman, MBE, G6CJ |
| **1525** | Tea and biscuits |
| **1540** | Results of building contest and grand raffle |
| **1600** | "Signal processing for cw in noise", by Mr F. J. H. (Dud) Charman, MBE, G6CJ |
| **1645** | Closing address by RSGB Council member |

**Talk-in stations**

Provided by Aberdeen ARS on 80m, Robert Gordon's Institute of Technology RC on 2m (fm), and the Can DX Club on 2m (ssb/a.m.). On 2m the calling channels will be 144·210MHz ssb, 145·500MHz fm and 145·800MHz a.m. Provision has been made to cover other frequencies commonly used on the 2m band. Similarly, on 80m, vfo facilities will be used.

**TICKETS**

Assembly (including morning and afternoon refreshments) **75p**

Assembly (including refreshments and lunch) **£2.50**

Available from T. C. Wratten, Jnr, GM4CAU, 89 Hilton Road, Aberdeen AB2 2HX, to whom remittances should be made payable. *Stamped addressed envelopes with remittance please. Please book well in advance.*

**Overnight accommodation**

Bed and breakfast available at Aberdeen College of Education, on 27 and 28 June, at £2.50 per night. If accommodation is required, please include the appropriate amount when booking for the assembly.

### Stolen property

Mr K. Corregan, G3YLG, 8 Belsize Close, Hemel Hempstead, Herts, had the following equipment stolen from his shack on 5 February: Trio TX599 Serial No 150028; Trio JR599 Serial No 130265.

Mr S. Jacobs, 2A Merlin Road, Collier Row, Romford, Essex RM5 3YA, had his Yaesu FT-2F, Serial No 604394, stolen from his Cortina No WMK 136M outside his house on 27 February. The set was equipped with the following crystals: 144·48, 144·60, 144·80, 145·00, 145·20, 145·09, 145·50, Cambridge and London repeaters.

The car of Mr C. Brown, GW3OIM, was broken into on the night of 21-22 February at Bangor, North Wales, and his mobile rig stolen. This consisted of a HW12A clearly modified for cw (with a jack at the rear) and with the vfo off-set in order to operate down to 3,575kHz, and a miniature swr bridge. Any information to GW3OIM or the police at Bangor, Gwynedd.

# Dealing with interference problems

by A. M. B. HOLLOWAY, G3VUQ*
Secretary, Interference Committee (1972-4)

**THIS article summarizes the reasons, and some simple cures, for interference. References are given to other articles dealing with the problems. Finally, information is given on seeking the advice of the RSGB Interference Committee. It is hoped that those seeking advice will read this article before contacting the committee.**

## INTERFERENCE—THE TRANSMITTING END

It is probable that the vast majority of interference occurs because of deficiencies in the affected equipment rather than in the transmitting equipment. This does not, however, absolve the amateur from the responsibility of taking a number of steps, if only to demonstrate that he is concerned to make what efforts he can to minimize the risk of complaints.

### The "clean" transmitting station

Interference may be caused by the radiation of unnecessary signals, such as harmonics of the required output frequency, or local oscillator signals in heterodyne mixer type transmitters. In vhf transmitters, unwanted harmonics of the basic low-frequency oscillator may be radiated. A further possibility is that of parasitic oscillations—these may occur on any frequency and be radiated directly, or perhaps modulate the carrier thus producing unwanted sidebands. [8, 20]

In many transmitting stations not only are unwanted signals radiated, but the wanted signal is radiated from the wrong places! The signal should be radiated from the aerial alone; not from feeders, mains leads etc, nor from the equipment itself. [6, 13, 15]

### The "correct" layout of a transmitting station

It is recommended that to avoid some of the problems outlined above, all transmitting stations should conform to the general configuration shown in Fig 1. *All* individual units should be well screened, and power supply and microphone leads etc well filtered. Interconnecting leads should be short and stout (wherever possible use soldered joints). The function of each unit is as follows:

**Aerial tuning unit**
This is needed to match the impedance of the aerial, including feeders (which may vary widely), to that of the filter. The atu may also give added rejection to unwanted signals—this depends upon the design. It may also act as a balun, converting balanced to unbalanced feed, or isolating the aerial circuits from the transmitter circuits (a useful function—see later). When the aerial/feeder impedance is similar to that of the filter the atu may be omitted, but its other benefits will be lost.

**Filters—low-pass or band-pass**
A low-pass filter which cuts off at about 30MHz is recommended for hf stations. For vhf stations a band-pass filter is preferable. These filters are intended to remove as many of the unwanted signals as possible. Because the input impedance of the aerial/feeder/atu will almost certainly not be correct for the filter on frequencies other than the transmitting frequency, the attenuation may be quite different from the published figures. These assume *correct* termination of source and load on *all* frequencies. Under unfortunate circumstances a filter could even act as a matching section to an unwanted signal giving apparent gain! [9-12, 16-19]

**SWR bridge**
This indicates when the atu has been adjusted correctly. The bridge is placed before the filter because its detector circuit contains diodes—these may generate harmonics. When the filter is perfectly terminated the bridge should indicate an swr of 1:1. Incorrect termination could damage the filter because of high voltages which are produced—for this reason transmitted power should be kept low until the atu has been correctly adjusted. Poor swr is often wrongly blamed for apparent deficiences. [27]

**Harmonic trap**
This is added to give extra attenuation to a specific frequency likely to cause trouble. It should be in a screened compartment—either inside the transmitter or as an external unit.

* 2 Burlington Drive, Stockport, Cheshire SK3 8UE. (At present /MM in the Indian Ocean).

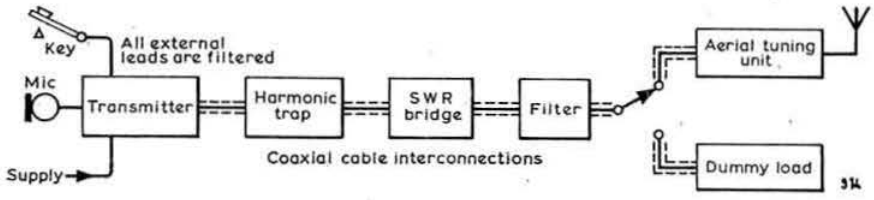



**Fig 1. Recommended transmitting station layout for minimum spurious radiation**

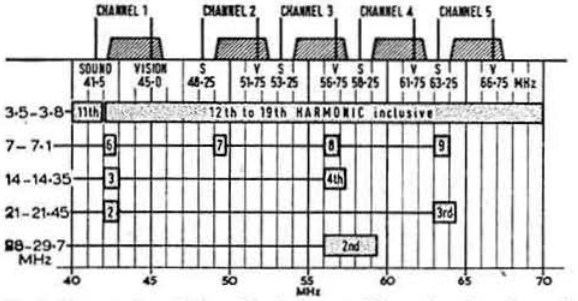



**Fig 2. Harmonic relationship between hf amateur bands and tv channels in Band 1**

Note that the trap should be tuned to the actual transmitter harmonic frequency and *not* to the frequency likely to be interfered with (eg 3 × 14MHz = 42MHz, so the trap must be tuned to this frequency and *not* 45MHz (tv Channel 1 vision carrier frequency)). Fig 2 indicates the harmonic relationships between the hf amateur bands and Band 1 tv frequencies. Similar charts can be drawn up for other amateur bands and tv channels.

Note that if interference occurs to tv because of *harmonic* generation this will normally affect only *one* tv channel. The tv picture will take on a "herring-bone" appearance and tuning the tv will not produce any apparent change. Altering the transmitter frequency, however, will alter the pattern.

A great deal has been written in *Radio Communication* (and other publications) on the subject of harmonic generation and radiation. With the change to uhf tv this topic is largely irrelevant to British amateurs' problems, so it is only necessary here to refer those interested to [1, 8, 10, 12, 15, 17 19, 22]

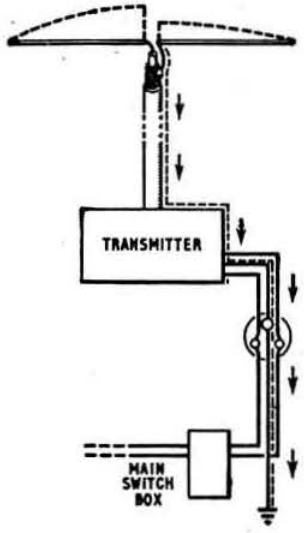



**Fig 3. Due to the unbalance of aerial currents, a proportion of the current on the leg connected to the braiding flows down the feeder, through the equipment casing to earth. Should there not be a separate earth, these currents will flow via the power wiring to the house main earthing system. It is usual practice for the mains neutral to be connected to earth at the sub-station and this can result in considerable radiation on the mains distribution**

## Radiation of the wanted signal

Signals are often radiated from the wrong places in a transmitting station, but the amateur can do a great deal to ensure that his signals are radiated from the aerial alone. Radiation from other parts of the station (aerial feeders, mains leads etc) can cause unnecessarily high field strengths in the immediate vicinity of the equipment, hence surrounding the neighbours' tv, radio and hi-fi equipment. For this reason alone it is advantageous to mount aerials as far away from neighbours and as high as possible to "clear" surrounding objects.


**Fig 4. Bifilar mains choke wound on a transistor radio ferrite rod. About 30 double turns of adequately-rated pvc-covered wire closewound on a ¼in diameter rod should suffice (dimensions and turns not critical)**

The use of balanced aerials fed by balanced feeders (or via a balun) is recommended. Careful attention should be paid to the method of earthing the equipment—use of the mains earth should be avoided if possible. A separate good-quality earth is to be preferred—this should *not* be connected to the mains earth. Fig 3 shows the path which unbalanced rf currents may take in a carelessly designed system. Note that the use of a balun (at either end of the coaxial feeder) would prevent this current flow. For greater detail see [2, 6, 13]. It is advisable to use a mains filter to prevent rf energy from flowing into the mains wiring; the simplest type is the ferrite ring filter (described later), or see Fig 4.

It should also be noted that a horizontal aerial is less likely to produce strong fields around neighbouring equipment than a vertical aerial. There are two main reasons for this: many vertical aerials rely on a ground connection to form the second half of the dipole—this can induce currents in nearby conductors; and vertically-polarized signals are more likely to be picked up on nearby tv aerial downleads. In either case strong fields may be carried into the house by these conductors.

## INTERFERENCE—THE RECEIVING END

If all the above steps have been taken it is reasonable to assume that the amateur station is "clean", and the field strength surrounding the station is as low as possible. It is therefore highly probable that interference is due to inadequacies in the design (or operation) of the affected equipment

There are two distinct classifications:

(*a*) Interference to tv or radio—tvi or bci;

(*b*) Interference to audio-only equipment—afi.

In the first case these services are "protected"—the equipment is designed for rf reception and the services of the Post Office Interference Branch may be called upon in cases of interference to *authorized* broadcast transmissions. This

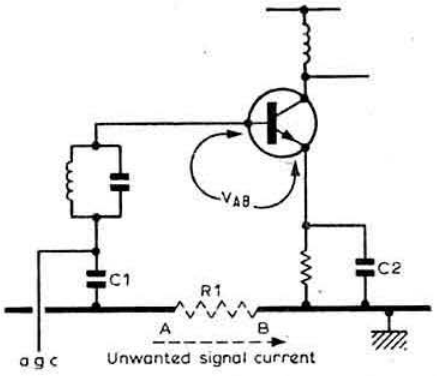



**Fig 5. Simple example of how "braid current" can enter any stage of a piece of electronic equipment. Current flowing through the resistive earth path (R1) causes an interfering voltage $V_{AB}$ to be fed to the base-emitter junction via C1 and C2**

applies only to those transmissions which are intended to be received in a particular area—ie where the receiver is within the official service area of the transmitter.

In the second case the audio equipment is "by definition" at fault since it is neither designed nor licensed to act as a radio receiver. It is therefore not "protected" against interference.

## TVI and bci

In the majority of cases of tvi or bci which occur nowadays, it is unlikely that harmonic production from amateur signals is taking place. Interference usually affects all tv channels (particularly on uhf sets), and is not affected significantly by the frequency of the interfering signal. This type of interference is caused either by direct reproduction of the signals on vision, by detection on either vision or sound, or by cross-modulation which may occur in any stage of the affected equipment. It is, incidentally, probably true to say that the least likely place for the interference to occur is in the tuner itself, since this is the one stage of a set which still possesses a modicum of screening and a stout earth path. Providing a "better" signal to the receiver is unlikely to have any beneficial effect in such cases. [24]

The most common method by which the interfering rf energy enters the equipment is in the production of "braid currents" in the aerial downlead. These currents flow through the earthy part of the set, causing rf voltages to be developed across points which should be at equal potential. Colour decoder circuits are particularly susceptible to transmissions on the 3·5 and 7MHz bands (colour sub-carrier is on 4·43MHz). Fig 5 shows a simple representation of this interference mechanism. Braid current mechanisms are dealt with in more detail in [21].

## Braid-breaker filters

Fortunately the cure for braid current induced problems is usually simple and cheap (it is a source of amazement to the Interference Committee that the manufacturers of tv sets seem so unwilling to take action). Fig 6 shows a combined uhf high-pass filter and braid-breaker circuit. This circuit, slightly modified, could be used in place of existing uhf tv aerial isolator panels (but should only be used by the amateur as an add-on unit). This gives useful attenuation up to about 200MHz and, due to the low-value coupling capacitors, effectively breaks the feeder from the tv at hf amateur frequencies. Construction of this filter can be left to the ingenuity of the reader—provided the leads are kept short the attenuation to uhf signals is negligible. [21, 25]

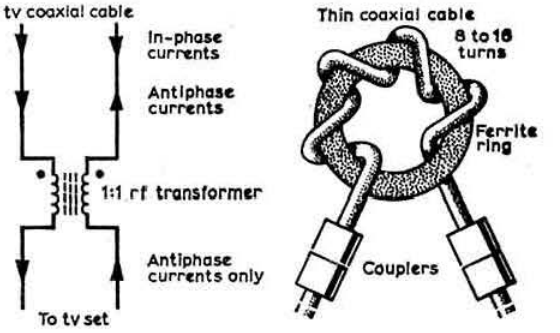
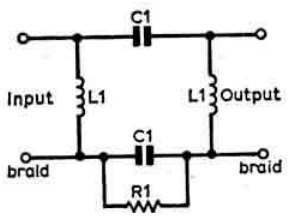



**Fig 7. Ferrite ring filter (suitable for all frequencies, radio, tv, and hi-fi, mains etc). The tv feeder is made into a coaxial rf choke. In-phase currents are blocked while anti-phase currents pass unhindered**

Where vhf tv and radio sets are affected, the cause may well still be braid currents, but the above solution cannot be applied because it is not possible to break the braid effectively to hf amateur frequencies yet produce minimal attenuation to vhf. Consequently a different approach is necessary—some form of 1:1 rf transformer is required. This can take several forms, the most simple being the ferrite ring filter (Fig 7). This consists of a few turns of the aerial feeder round a ferrite ring (such as the Mullard FX1588). Usually about 8 or 10 turns will suffice, but it must be emphasized that neither the number of turns nor the grade of ferrite used is critical. *This device is wideband and is equally suitable for use on uhf tv, vhf tv or radio, hi-fi, mains filters etc.* Alternatively various



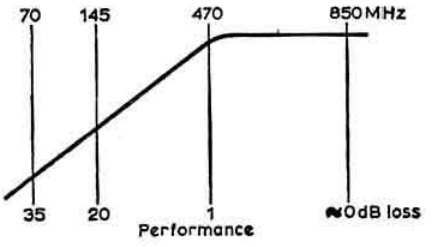




**Fig 6. (Left) Circuit of uhf tv braid-breaker. L1 is four turns 24swg ¼in inside diameter. C1 is 5·6pF small disc or tubular. R1 is about 1MΩ. Physical construction must conform to good uhf practice to minimize loss, but values are not critical. (Right) UHF tv filter performance**

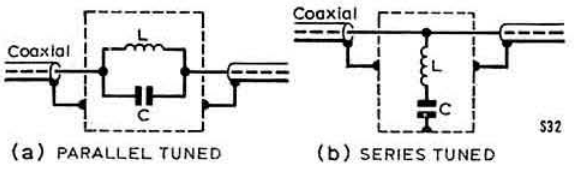



**Fig 8. Single-frequency traps. (a) Parallel tuned. A tunable trap of this type is a valuable aid to diagnosis. Suggested values are: C, 75pF variable; L, 10t 16swg ¼in dia 1in long for 25/70MHz, 22t 24swg ¼in dia 1in long for 12/35MHz. (b) Series tuned. This type of trap must be used with care—in cases where interference is picked up on the coaxial cable braiding, this type of trap may worsen the situation**

other types of transformer may be constructed using either purpose-made balun cores, or any other scraps of ferrite found in the junk box. For details see [21].

In each of the above devices the intention is to choke off, or completely break the path of, interfering rf currents in the braid of the aerial downlead. Except in the case of the filter in Fig 6 they are not frequency-dependent filters to signals being passed from the aerial itself. Where the aerial is able to pick up significant amounts of interfering signals it may be necessary to back up the braid-breaker filter with a filter designed to pass the wanted signal and stop the interfering signal(s).

It is not proposed to go into detail on the various types of receiver high-pass filters at this point—readers interested should consult [4, 7, 12].

## Traps

Where it is necessary to fit a filter to allow the wanted signals to pass and prevent the passage of unwanted signals, it will be found that as a general rule it is better to use a tuned trap (to stop the unwanted signal) than a pass filter (for the wanted signal). This rule holds, for simple filters, except when the two signals are several octaves apart, when either type will have similar effect. The reason for this is simply that a tuned stop filter will give greater attenuation to the unwanted signal than the out-of-band response of the pass filter.

This is a useful fact in practice, since it enables the filter to be set up before installation. If a filter is intended, for example, to prevent a 2m signal from entering a uhf tv receiver, then the filter is easily adjusted on the amateur's own 2m receiver to remove (or at least greatly attenuate) a beacon or other local 2m signal. Note that this method of tuning is valid only for simple trap filters of the form shown in Figs 8–12. When complex filters are used the terminations (source and load) can seriously affect filter performance—see earlier comment under **Filters**.

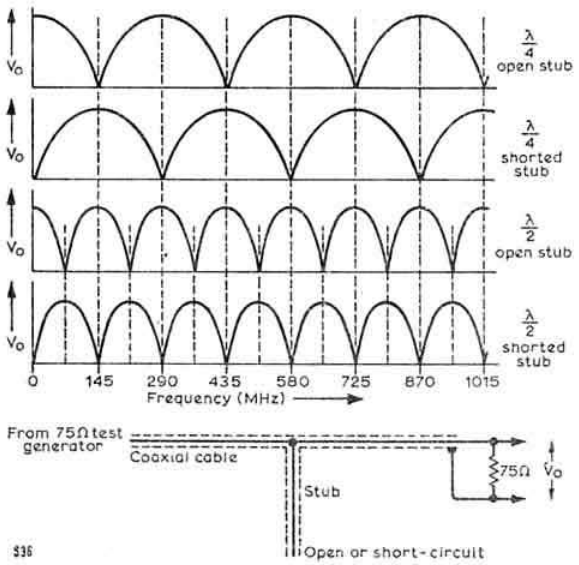



**Fig 9. Output level/frequency for various 145MHz stubs**

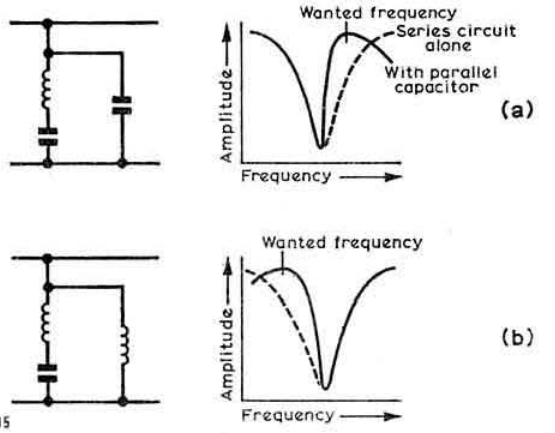



**Fig 10. (a) Use of capacitance across a trap or λ/4 stub sharpens the response on the high-frequency side. (b) Use of inductance across a trap or λ/4 stub sharpens the response on the low-frequency side.**

## Stubs

Coaxial cable stubs are a popular form of trap filter because they are simple and cheap to make, though sometimes troublesome to adjust. They do, however, have a potential shortcoming—their overtone responses. These are shown graphically in Fig 9. It will be seen that if such a stub filter were used to prevent a 2m signal from entering a uhf tv set, it is quite possible that some of the wanted uhf signals would also be attenuated. There are ways of shifting the overtone responses (by various forms of end-loading), but a simple single-tuned trap (Fig 8) will produce similar attenuation without suffering from the overtone problem. In practice the trap is also easier to adjust.

## How much attenuation?

The LC ratio of traps may be important. Parallel-tuned traps have narrowest bandwidth and least attenuation with a low LC ratio, whereas for the same performance the series-tuned trap would have a high LC ratio. Some compromise between attenuation and bandwidth may be necessary when the two signals are close together. Additional circuit elements may be used to "sharpen" the side response of a trap (or stub) as shown in Fig 10. As a general rule, a single trap or stub can be expected to give around 30dB attenuation on its

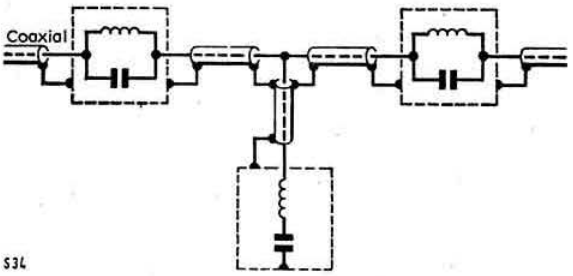



**Fig 11. Single-frequency traps cascaded to increase attenuation. These may be enclosed in one case (with each section screened)**

tuned frequency. Greater attenuation can be obtained by cascading traps or stubs as in Figs 11 and 12.

An interesting combination of these techniques is shown in Fig 13. This filter is designed to reject 432MHz signals but have little or no effect on signals from 470MHz up. The attenuation may vary between about 60dB (when the traps are tuned to the same frequency) and 40dB (when the traps are stagger-tuned to cover the 70cm band).

## Logical approach to tvi diagnosis

Fig 14 sets out a method of dealing with tvi diagnosis. This may be found helpful in difficult cases where the reason for the trouble is not immediately obvious.

## AFI

In the majority of cases of afi the interfering signal is found to be entering the audio equipment by means of its interconnecting leads—the most common route being the loudspeaker leads on a typical stereo installation. In some cases

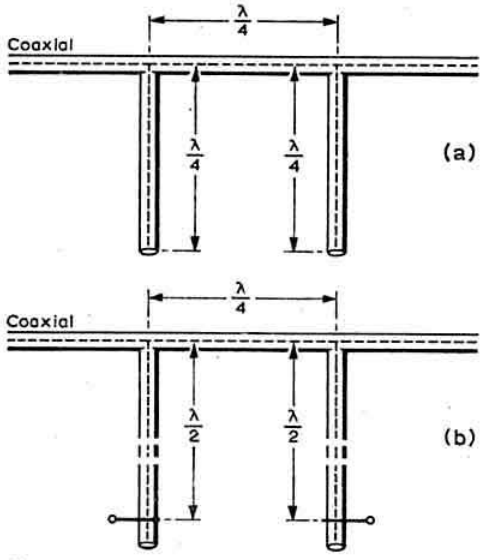



**Fig 12. Two stub filters capable of providing a notch of about 70 or 80dB at centre frequency. (a) Open-circuit quarter-wave stubs. (b) Version using short-circuit half-wave stubs with movable "pin" short-circuiting device**

the mains lead is responsible. The interference is generated by detection within the amplifier. The rf energy may be fed direct to the amplifier input (via, for example, the internal negative feedback line from the loudspeaker terminal), or it may enter any stage by the same type of mechanism as the braid current described above (Fig 5). The first type of problem could be cured by decoupling the loudspeaker or other leads with disc ceramic capacitors of suitable value (around 100 to 10,000pF). However, this would not deal with the braid-current effect. Again the ferrite ring filter provides a simple answer: the offending leads (loudspeaker, mains or interconnecting) are wrapped into a few turns round a ring core as in Fig 7. Other approaches are possible, but involve considerably more effort [23].

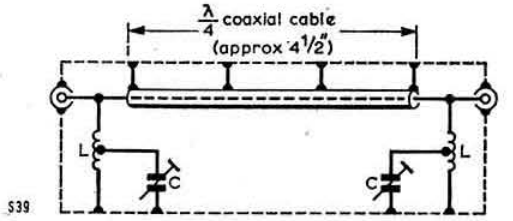



**Fig 13. 70cm trap for use with uhf tv sets. L is 8t 20swg ¼in inside diameter, stretched to 0·6in long, centre-tapped. C is 2·5–6pF low inductance trimmer. The two tuned circuits must be screened from each other or kept well apart. The braid of the cable must be soldered to the box at several points, as shown. All leads must be very short**

## The amateur's best friend

There is no doubt that the ferrite ring core is the most useful device in the amateur's anti-interference armoury. A major advantage in using such devices is that in the majority of cases the leads to be filtered do not even have to be cut and the filters are used external to the equipment only. They are easily removable, and the resale value of the equipment is unaffected. If rings are not available, ex-transistor radio aerial rods are a good second best in many cases. The grade of ferrite is unimportant and the number of turns not critical. They may be used for receiving or transmitting purposes [2, 21, 23].

## Interference to amateur reception

This is an increasing problem. Many amateurs complain of interference (especially on 160m and 80m) from tv receivers. This is largely a problem for the manufacturers to deal with, but again, in many cases, simple measures may produce a considerable improvement [14].

The comments made above with regard to radiating signals from the aerial alone (use of baluns etc) also apply in the reverse direction. If the aerial alone receives the signals, careful positioning will minimize local interference pick up. Similarly, measures taken to prevent signals on amateur frequencies from entering tv sets will reduce the likelihood of the sets *radiating* rf energy on those frequencies. The use of braid-breaker filters is recommended for this purpose. Interference from other sources, such as electric motors, thermostats and other electrical machinery can be combated by the use of mains filters, decoupling capacitors etc. Some useful types are shown in Fig 15.

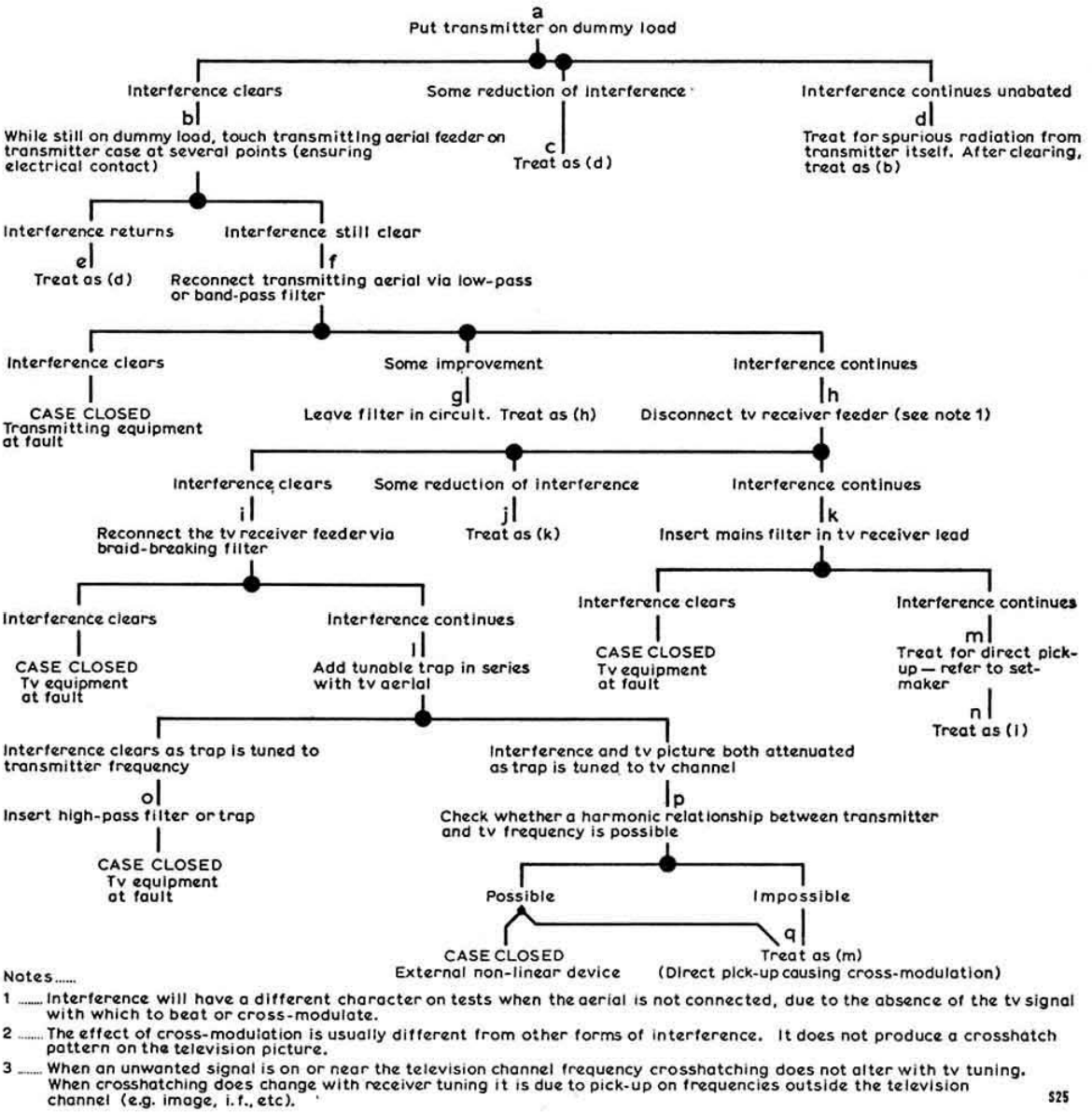



**Fig 14. Chart for the diagnosis of tvi**

## Try the obvious

Before any filters are tried, one simple test should be carried out. Operate the affected equipment with the aerial downlead *well removed* from the set. In the case of afi remove the loudspeaker leads (or suspect input leads) and use headphones or loudspeakers on *short* leads. If interference still occurs it is apparent that no amount of filtering of the leads will effect a cure. Close attention should then be paid to other routes by which the energy might be entering the equipment. Filter the mains leads and check for the presence of other conductors which may be radiating rf energy into the equipment. Electrical conduit, gas and water pipes etc should all be treated as suspect. Try earthing the braid of the aerial feeder where it enters the room.

## If a filter does not work

If removing leads effects a cure, but a filter does not appear to work, two questions should be asked:

(*a*) Is the right type of filter being used?

(*b*) Is it being used properly?

The answer to the first should be apparent if the above information has been understood. The answer to the second

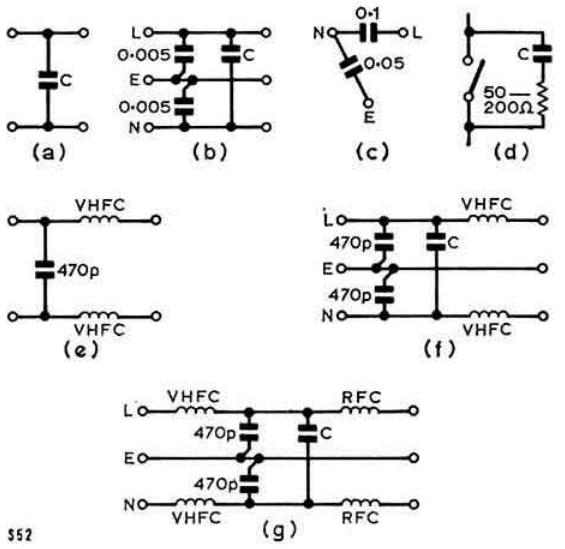



**Fig 15. Some common forms of interference-suppression filters (from *Radio Servicing Pocket Book.*) (a) For two-core cable appliances. (b) For three-core appliances. (c) For three-pin sockets. (d) For thermostats. Types (e) and (f) are vhf types intended for use at television frequencies. Type (g) is a combined mf/hf/vhf filter. The value of C may vary between 0·01 and 0·5μF. On type (c) the values given are the largest permissible. All capacitors must be rated for ac. L line, N neutral, E earth**

is a little more complicated. For many years the rule has been "put the filter as close to the object being filtered as possible". This does not always hold, especially with braid-breaker filters. Since the function of the filter is to open-circuit the braid *current*, a high braid *voltage* might result. This would produce a field surrounding the filter, and this field might break through directly into the equipment. In such a case it is well worth trying the filter some distance from the set (say, 2 or 3m), perhaps in conjunction with a separate earth to the braid. This action alone has been known to cure not only tvi on the set to which it was connected, but also bci to a portable radio in the same room.

## Warning!

The Interference Committee strongly advises against any amateur carrying out internal modifications to any equipment not his own. This will invalidate guarantees, and the amateur may well be held responsible for any faults which occur at a later date. It is the responsibility of the set owner/dealer/manufacturer to repair faulty equipment, and every effort should be made to ensure that these are the people who deal with the matter.

## THE RSGB INTERFERENCE COMMITTEE

The above information forms the basis of the *technical* cure for a high percentage of interference problems. Many problems are in fact *social* rather than technical and this is the subject of a separate article.

The committee is willing to help with problems whenever possible, but it should be remembered that it is important that all the facts are known. The appendix gives some of the questions to which answers are often needed before a case can be dealt with effectively. Anyone needing the help of the committee should write (c/o RSGB HQ) giving answers to these questions, and any other information which might be helpful, and making sure that copies of any correspondence with other interested parties is enclosed.

## What will happen

A reply will be sent by a committee member giving his appraisal of the situation and a recommended course of action; further correspondence, if necessary, should go direct to the committee member. It will greatly assist the effectiveness of advice if the final results are made known to the committee. At present, only a minority acknowledge advice, and only a small minority make results known.

## What will NOT happen

Some members writing to the committee appear to expect that within 24 hours of receiving the request for help, the RSGB will despatch expensive test equipment and highly qualified "interference men" to deal with the problem on site! Needless to say this is not so. The interference problem is, and will remain, largely a problem for the individual, or local group, to deal with. The Interference Committee can only offer advice and moral support in most cases. It is up to the *member* to deal with *his* problems—the job of the RSGB should be to attempt to prevent the troubles from arising in the first place.

## Information gathering

When a problem has been dealt with, with or without assistance from anyone, it is of interest to everyone to know this fact. Consequently, a short note to the committee giving any necessary details (information on unusual cures etc) would be greatly appreciated. It should be *clearly* stated that the letter is for "information only". This information will form an invaluable guide to the scale of the problem, the frequency with which standard cures are effective, and the degree of success (or failure) of RSGB efforts to combat the problems.

## The survey

As an "instant indicator" the committee decided to carry out a survey. This is included in this issue of *Radio Communication*, and ALL members are urged to return the completed questionnaire immediately.

## Acknowledgement

The author wishes to thank all those (far too numerous to mention) who have, during the past years, contributed articles and information on interference matters; without their efforts a compilation of this nature would not have been possible.

## BIBLIOGRAPHY

### Articles from "Radio Communication"

A list of some of the articles published in *Radio Communication* containing information, practical or theoretical, on the subject of interference follows. Close study may indicate a degree of disagreement between authors, but this is to be expected with a subject where local circumstances vary widely. It should also be noted that during the period

covered by this list television standards and amateur operating techniques have changed considerably.

Where necessary a brief explanatory note is given with each reference.


[1] Mar 1966 "The effective use of low-pass filters for reducing tvi", G. P. Anderson, G2QY. (Importance of adequate screening etc).

[2] July 1966 "The G3HZP balun", H. D. James, G3HZP. (HF transmitting balun using ferrite ring cores).

[3] Dec 1966 "QRM—the cure", B. Priestley, G3JGO. (Amateur-to-amateur interference).

[4] Apr 1967 "Three cases of tvi", D. A. Pilley, G3HLW. (VHF tv high-pass filter).

[5] May 1967 "The tvi problem on 4m", M. Gibbings, G3FDW. (General).

[6] June 1967 "Co-ax or twin?" E. M. Wagner, G3BID. *Letters to the Editor*. (Feeder radiation).

[7] Aug 1967 "High-pass filter design for tv protection against hf transmissions", W. J. M. McKinney, GI3TZB.

[8] Jan 1969 "SSB and interference", B. Priestley, G3JGO. (Transmitter design notes).

[9] Feb 1969 *Technical Topics*, J. P. Hawker, G3VA. (Filter mismatch—absorptive filter).

[10] May 1969 "How much harmonic?", Kay Priestley, G3XIW. (Filter notes).

[11] July 1969 "Simple filters for transmitters on 144 and 432MHz", G. R. Jessop, G6JP. (VHF band-pass filters—see also December 1969, [16] and [18]).

[12] July 1969 "Which filter?", Kay Priestley, G3XIW. (Low-pass and high-pass designs).

[13] Oct 1969 "Television interference—its causes and remedies", D. M. Thomas, GW3RWX. (General).

[14] Jan 1970 "Interference and the amateur", E. M. Wagner, G3BID. (Power-line interference etc).

[15] Feb 1970 "Where tvi is a problem", D. G. Pinnock, G3HVA. (General).

[16] Sept 1970 "Simplified stripline filter for 144MHz", P. T. Bellamy. (Bandpass filter).

[17] Mar 1971 "High attenuation low-pass filter for hf band use", J. W. Shelley, G3YFZ.

[18] June 1971 "A compact bandpass filter for 144MHz", G. R. Jessop, G6JP.

[19] Aug 1971 "Modern filter design for the radio amateur", W. H. Allen, G3UJ.

[20] Oct 1971 *Four metres and down*, J. Hum, G5UM. (Spurious signals from 144MHz transmitters).

[21] Nov 1972 "Practical braid-breakers using stock materials", I. Jackson, G3OHX. (Why they work and how to make them).

[22] Mar 1973 "Improved harmonic attenuation in hf transmitters", Dr A. Gschwindt, HA5WH. (Modifications to output matching networks).

[23] Apr 1973 "Audio frequency interference (afi)", P. W. Waters, G3OJV. (General).

[24] Dec 1973 "UHF television interference", I. Jackson, G3OHX. (Effects of signal strength etc).

[25] Feb 1974 *Technical Topics*, J. P. Hawker, G3VA. (Printed circuit uhf filter).

[26] Nov 1974 "A balun transformer for 50 and 75 ohm lines", Z. T. Chowaniec, G3PTN.

[27] June 1974 *Technical Topics*, J. P. Hawker, G3VA. (Effects of swr).


Useful hints may also be found in the *Technical Topics* section of the following issues: Jan and Mar 1969, Dec 1970, July 1971, July and Oct 1972, June 1974. A series of "TVI Tips" (compiled by B. Priestley, G3JGO) was run during 1970.

Interference statistics appear either as separate articles, or as part of *Technical Topics* in: Oct 1969, Oct 1970, Dec 1971, Nov 1972, Jan 1974, Sept 1974.

## Other RSGB publications


*Television Interference Manual*, B. Priestley, G3JGO. (Largely a digest of information published in *Radio Communication* up to about 1971).

*Amateur Radio Techniques*, J. P. Hawker, G3VA. (Many useful circuits, devices etc).

*Radio Communication Handbook*. (Much information, including a chapter on interference).


## Further references


*Radio Amateur's Handbook*. (ARRL) (Much information, including interference advice).

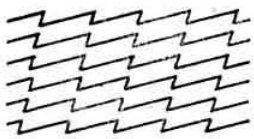

Many other publications for the radio amateur have carried articles dealing with interference problems, transmitting and receiving filters etc. Readers are advised to study the indices of all magazines carefully. A useful set of low-pass filters (one for each band, 1·8 to 28MHz) was published in *Ham Radio* Mar 1974 (with correction in Dec 1974).

## APPENDIX

**Information to be supplied when the advice of the Interference Committee is sought**

(1) Date, name, callsign, address, telephone number.
(2) Affected tv channel numbers (if tvi).
(3) Diagram showing:
  (*a*) position of transmitter and aerials;
  (*b*) position of affected equipment and aerials;
  (*c*) approximate distances involved;
  (*d*) direction from which affected tv signals are received.
(4) Description of transmitting station, aerials etc.
(5) Which frequencies cause trouble? Which transmitting modes cause trouble?
(6) Are the following used: (*a*) an atu?, (*b*) an swr bridge?, (*c*) a filter?, (give details).
(7) Has any part of the member's, or his neighbours' equipment changed recently?
(8) Make and model number of affected equipment.
(9) Has the Home Office (or other authority) become involved? Give details in chronological order.
(10) Are complainants likely to be co-operative? Describe their attitude on this and other domestic matters.
(11) Which articles or references have been studied?
(12) What action has been taken? Give full details.
(13) Supply copies of all correspondence to date—these will be returned if requested.

**Information supplied is treated in confidence.**



# Interference—the social aspect

by J. W. SWINNERTON, G2YS*
Chairman, Interference Committee

MAN is a gregarious animal—he must have companions if he is to realise his human nature to the full; as the old sage had it "One man is no man at all". But running strongly alongside this need is the opposite one—to be able to withdraw from the mainstream of life and do one's own thing while recharging mental batteries for the next bout of contacts with fellow human beings. Radio amateurs have perhaps the best of both worlds, but for many there comes a point where the harmony of peaceful co-existence is distorted or broken; where the fine boundary between liberty and licence becomes blurred—they are literally interfering with their neighbours' enjoyment of the amenities with which they choose to surround themselves.

Fortunately for us we have for long enjoyed freedom under the law, where by the acceptance of responsibilities we acquire certain rights. The order is important—it is when these two factors are transposed that trouble arises: if we all got our priorities right there would be no need to write this article.

## Cause or effect?

So, being "responsible", you study for your transmitting licence, you agree to abide by its terms and you acquire a "right", ie permission to operate. And in no time at all you receive a complaint of "interference" from a neighbour. You are at once at odds because *your* dictionary defines interference as "a clash", and his as "meddling". The snag is that you are both correct, but *your* definition implies impartial interaction, whereas *his* implies blame—on your side. As he sees it you are interfering with his fundamental right to enjoy, within the confines of his own home, the pleasure of vicarious viewing or listening which he has come to regard as a reward of technological progress.

## Cool it, man

If your reaction is "I've got a transmitting licence and my harmonics have been measured at 300dB down" or words to that effect, then you are heading for trouble. Your neighbour cannot distinguish between cause and effect, and as far as he is concerned you are the *cause* of his annoyance. So your first priority is to lower the emotional temperature, by expressing regret without admitting liability and by offering explanations and assistance. Having done this, go back and check your own equipment for faults and incorrect alignment. If you are convinced it is "clean" and will stand up to thorough investigation you must enlist your neighbour's co-operation.

Now begins the tricky part. Your neighbour has most likely little or no technical knowledge; all he knows is that he has paid good money for what the dealer and his own senses have convinced him is a good product, and he likes the end-result. If you describe it as a load of junk he will be furious, and you might as well go home. A little analogy might be opportune instead: you point out that his equipment is receiving signals it should be proof against—and if it is only an audio amplifier it should not be receiving them anyway. It is acting like an ill-fitting door letting in the draught—the cure is not to try to halt the wind but to improve the door. So follows a gentle suggestion that his dealer is the best person to undertake this responsibility under the Sale of Goods Act. Thereupon you promise to co-operate with the dealer in any tests which he wishes to carry out, and bow out gracefully. Finally, give your neighbour a fair deal. Dig the garden or take the kids out until he has had reasonable time to call in the dealer: modification kits can take some time to arrive, while your free time and the dealer's might not coincide.

## Try another tack

If the dealer is unco-operative, and the neighbour refuses to allow you to make *external* modifications, such as fitting filters, then you have to advise him to call in the Post Office Investigation Officer. If your equipment is found to be at fault it is reasonable to expect you to put it right; for his part the neighbour has 28 days' grace to modify his own equipment while you stay off the air. This is not a once-and-for-all prohibition, since both you and the neighbour will change and modify equipment from time to time.

It is to be expected that not all PO investigators will have a comparable degree of experience and expertise in dealing rationally and tactfully with a somewhat emotionally charged situation, but you should find them impartially helpful and willing to put in a lot of time to find a cure. Remember that yours is but one of the many cases that they have on hand at a given time, and their evenings at home may be rare, so bear with them. If you have grounds for thinking that the investigating officer who deals with your case has not been scrupulously fair and diligent, then report the facts to the RSGB and the matter will be taken up in the appropriate quarter. It is important to remember that the Wireless Telegraphy Acts do not extend protection to hi-fi equipment, so that any advice given by PO investigators in this sphere is on a grace-and-favour basis; nevertheless they do help whenever possible.

## Pride and prejudice

It may happen that in spite of your patient explanations and offers of help the situation will turn sour on you; you may not even be consulted, but hear only vague third-hand comments or even threats. Our experience is that "sour" cases tend to turn up more on council estates than elsewhere, and for valid sociological reasons. Council houses are smaller and closer together, while families are often bigger—they tend to get on each other's nerves more easily and to work off frustrations in irrational or unreasonable ways,

* 29 Beacon Way, Rickmansworth, Herts WD3 2PF.

petty jealousies come to the surface, and in some homes the "telly" is the centre around which the world revolves. If the man next door sees a local councillor at his place of work, pub, or union meeting then you might even find that pressure is brought to bear on you through "Town Hall" channels.

## The omnibus clause

Such a situation raises the problem of tenancy agreements. Many of these are wide open—and deliberately so framed—to give landlords the widest possible powers to cover any contingency. A typical clause might be "The tenant shall not cause a nuisance by using radio, television or musical equipment to the annoyance of his neighbours" and it is easy to see that this can be construed as applying to amateur radio.

New Town corporations, in particular, place severe limitations on the use of outside aerials, and it is often difficult to plead a special case against what appears to be an outright ban. Wired radio and tv distribution systems are often favoured, and may be contracted out to the lowest tender irrespective of the quality and technical characteristics of the system. If you break in on this you are often in real trouble—a typical case brought to the Society's notice involved an inferior tv array below roof level of a block of flats feeding a head amplifier located at the far end of the building!

The moral to this is—read the agreement form thoroughly, and raise queries immediately *in writing*. If you receive a negative or evasive reply you—and only you—can decide whether to accept the terms offered. It is of no use appealing to the Society after the event and criticising it for not achieving the impossible—some relaxation *may* be obtained, but only after long and patient negotiation.

## The height of folly?

Any permanent structure over 10ft in height requires planning permission under the Town and Country Planning Acts, and furthermore must comply with local building bye-laws. The erection of a beam tower on a 45ft pole will call for all the diplomacy you can summon in achieving success at the planning stage, and it is wise to sound out your neighbours' possible reactions *before* you embark on the project; even then you must be prepared for a change of heart. Your own conduct as a good neighbour will be a big factor: if you neglect your garden until it is overgrown with weeds, or your children scream up and down the road until midnight, do not expect much sympathy.

If they have not done so already, you would be unwise at this stage to admit that your amateur radio activities might lead to interference problems. It has been seriously suggested that the matter be broached in the form of a circular letter to neighbours, explaining briefly how the interference might arise and offering to help overcome it. This policy is not to be commended, as you will thereafter bring down wrath upon yourself for poor reception conditions, faulty sets, and similar disorders.

Remember that you are proposing to subject your neighbours to "interference" of a different kind—the impairment of their visual amenities. If your house overlooks the gasworks you can reasonably try for a 45-footer, but if you are on a brow overlooking an expensive housing estate it would be better to try for something less obtrusive. Remember that "case law" does not apply in planning—each application is considered on its merits. Be practical, not emotional.

## "Nowt as queer as folk"

Nowhere is this northern expression truer than in handling interference cases. You are dealing with laymen who most likely have no training in scientific method. Their attitude may be conditioned by their view of you in other spheres, and even be a vehicle for jealousy and petty spite. If their equipment cost a lot of money and produces superb sound and vision, why should you "interfere" with their fun? You may also discover you have neighbours who want to shut themselves off from the world by high fences and closed curtains. Such people have a marked reluctance to accept any modification to a set because they wish to remain cocooned in their own private world.

Others may have less obvious reasons for not opening up their equipment—it may have "dropped off a lorry"; maybe it is not even licensed. Be prepared for the frustration of being told that "it makes the sound distorted" after proving that an external filter cures the trouble—many hours of patient work by the PO and the amateur have been ruined by a filter being quietly removed the moment the investigator has left the house. Be prepared, too, for the dealer who "doesn't want to know" because he does not have the required technical expertise, or stands to lose his profit margin. You have to remain patient under frustration and provocation; hard words break no bones, neither do they cure interference.

## "I'll have the law on you"

Some people over-react from the start, because their defence mechanisms are taut. In spite of your playing it cool you may find that your offended neighbour is out to get you closed down right from the start. *You* are the last person he will reason with, and he might well have no time for PO investigators either.

In the first instance he may resort to social blackmail by touring his neighbours with a form of petition, or he may simply allow the idea to filter through to you that he is taking it up at high level. He might even try to intimidate you by shouting at you across the garden fence, throwing stones at your window, or cutting your guy wires at night. He may complain to the landlord or housing manager, or he may write to his MP. This action can mean a lot of unnecessary work for many people, and can strain the credibility of democracy and the true function of government. The "process programme" then becomes something like this: MP—Minister—Home Office—local investigation officer—neighbour—Home Office—Minister—MP—neighbour. And what has he got? Simply an investigation which he would have got by approaching the local PO anyway.

Alternatively he may go straight for the big-stick method and consult a solicitor; he has to pay for the privilege and he will want to see an end-product. This presents the solicitor with a problem, because investigating the law is time-consuming and it is almost certain that he will not have a copy of the licence regulations on his shelves. He may even try to discourage the would-be antagonist, but if pressed he will agree to write a "solicitor's letter", couched in general terms, and probably giving his client's intention to take action unless the "nuisance" is abated. Your course of action? Do *not* acknowledge it; do *not* cease transmitting, and send a copy of the letter immediately to the Society for advice.

The ball is now back in the complainant's court. He must

now back down or he must initiate action *on a specific point of law*. This will involve him in considerably more expense, and meanwhile the solicitor will have received an "educative" letter from the Society. This will acquaint him with the legal basis of the regulations, advise him of the procedure normally followed in making complaints of interference, and inform him that the Society has 17,000 members for whom it acts. He should then realise that the case cannot now be treated in isolation, and that if the matter is to be pursued his client must accept his advice.

### The last resort

If the complainant nevertheless decides to pursue the matter, you will probably receive notice of intention to take out an injunction restraining (ie prohibiting) you from continuing the "nuisance". Immediate action is now called for, because the onus is now on the complainant to argue his case before a judge in the High Court. This will involve briefing counsel (an expensive matter) and the calling of expert witnesses (*on both sides*) since you are entitled to enter a defence against the action. You must contact the Society *immediately* by telephone or telegram and follow it up with copies of all correspondence and your account of the dispute in date order, setting out every relevant bit of information. The Society's legal advisers will then decide how best to advise and support you. Support is not automatic and infinite; each case is considered on its merits, and the implications of success—or failure—must be fully explored.

So far no-one has resorted to this extreme action, but a successful case is of vital interest to us all.

### No man is an island

We cannot face this interference problem in isolation, and your Society's policy is to tackle it by education, consultation and co-operation. If you call for assistance and advice it will be readily given. But please remember that we have no "magic wand", and if the advice given is not to your liking remember that it is given in good faith, and do not blame the Society for failing to achieve the impossible. Most cases are not cleared up overnight—in one exceptional case it took five years to negotiate a successful outcome!

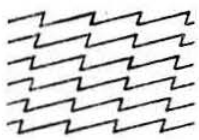
The onus of help and advice falls on a body of willing volunteers, and they are only human—they like to achieve success. Some who ask for help do not even write to say "thank you", still less to report that their problems have been solved.

Our relationship with our friends on the official side is becoming increasingly cordial; the relay and rental companies are notably co-operative, and we are trying by every possible means to get our point of view across to the "trade".

Social problems loom large in the hundred or so cases which the Interference Committee deals with each year—they are a fascinating aspect of our work, but generally far more difficult to solve than purely technical problems.

**Do ask for our advice—ask early—and help us to promote a good public image of amateur radio.** □

---



# "Going QRT"

by G. SLAUGHTER, G3PAO*
Member, Interference Committee

ANYONE reading through members' For Sale advertisements in recent issues of *Radio Communication*, and being of an analytical turn of mind, could not have failed to observe the number which offered relatively modern transceivers or even complete stations. The fact that some of the gear for sale was so up-to-date (one incorporated digital readout, and was accompanied by the ancilliary accessories needed to load an aerial) prompts the question, *why*?

Reasonably, it would seem unlikely that a hf transceiver embodying a facility such as digital readout would not normally be considered so gravely passé by the operator as to warrant replacement by something more modern. It might not be out of context to infer perhaps that no replacement was in fact being contemplated. *Why*?

Another hf rig on offer was billed as "owner going vhf". Little wrong with this, it might be argued, but seemingly another operator forsaking the mf and hf bands, perhaps going 2m nbfm. *Why*?

Some even say "Going QRT"—but *why* QRT? How many others have quietly gone QRT and only frequent the shack virtually as SWLs?

Certainly loss of interest must play a vital part in the decision to withdraw from a chosen hobby, likewise frustration could be an initiator leading to this attitude of mind. Is sheer frustration behind the sale of the commercially-built linear in mint condition and only one year old? If so, *why*? If "disturbance of the social peace", otherwise breakthrough, is a major factor in any retirement from amateur radio, then it seems that the enthusiasm, determination and in many cases the really hard work needed to qualify for the "ticket" has been completely negated.

There can be few hobbies, as does ours, that *demand* at least one official qualification through examination by a government body, and the possessor of such qualification(s) surely has good reason to be proud of his or her designation as an amateur radio operator.

Determination and enthusiasm have earned us the privilege of practising and enjoying communication by radio; and breakthrough is technically capable of being cured. Some situations may take a long time to reach a conclusion satisfactory to all the parties concerned, but such an ending can only come to pass *if you do not give up*. Bear in mind that quiet, confident, commonsense perseverance in finding a solution to a radio problem involving your neighbour can only gain respect and eventually, it is hoped, goodwill.

Perseverance should be the guideword, for by its very nature our hobby is entitled to respect. Let us therefore make every effort to ensure that it gets and, more important, keeps it. □

* 6 Leggatts Wood Avenue, Watford, Herts.

# TV masthead amplifiers and their problems to the amateur

by J. E. SWAYNE, G3BLE*

Corresponding member, Interference Committee

IN cases of weak uhf tv signals some form of pre-amplification is required to enable the tv viewer to obtain an acceptable colour or black and white picture. The best place to add pre-amplification is as close to the aerial as possible in order that the best signal to noise ratio can be obtained. This being so, the amplifier is placed in a position where it is difficult to make tests or modifications.

Although these amplifiers do a worthwhile job in improving the tv signal, they are also very prone to cross-modulation from signals in the hf and vhf bands. Such interference to these amplifiers from transmitters operating within a radius of 500 yards depends on the model of amplifier used.

The first time this type of interference came to the author's notice was when a neighbour installed a colour tv receiver within 25 yards of the end of a 40m $\frac{1}{2}\lambda$ dipole. The tv signal was only 100$\mu$V when using a 46-element aerial, so the aerial signal had to be amplified in order to give the neighbour a good colour picture. All was well until G3BLE went on the air, when a complaint was received that the picture was blotted out and strange noises were coming from the speaker.

Investigation showed that strong interference was produced only when the tv receiver was tuned to a local channel. This was diagnosed as cross-modulation taking place within the masthead amplifier, as no interference resulted when using a separate uhf aerial without an amplifier. In order to find a cure, an amplifier and power supply of the type in use by the neighbour was obtained and tests were begun.

The manufacturer's specification for the Belling Lee L4424 amplifier is:

| | |
|---|---|
| Frequency range | 40-850MHz. |
| Gain | 13dB $\pm$ 1dB over the range. |
| Max output voltage | 100mV |
| Input/output impedance | 75Ω. |

As can be seen by the frequency response graph of the amplifiers, the L4424 has a gain of +7dB at around 7MHz, rising to +13dB at 29MHz, falling to around 0dB at 3·5MHz, and showing a loss of around −12dB at 1·8MHz.

These amplifiers are used a great deal in the tv trade, as when cascaded there is a gain of something like +26dB, but with the actual frequency response shown in Graph 1 this model is particularly susceptible to cross-modulation from transmitters operating from 3·5MHz upwards.

By contrast the German Stolle VMO63 wide-band amplifier, covering Channels 21-68, has a gain of +26dB across the uhf tv band. But the loss at 29MHz is −44dB, at 7MHz −93dB and at 3·5MHz −102dB.

The Labgear CM6019/wide-band amplifier for Channels 21-68 has a typical gain of 10dB, but this amplifier has a much better cross-modulation factor as it is the only amplifier tested that has a tuned input circuit. The loss at 29MHz is −95dB and at 14MHz over −120dB.

The cure for cross-modulation must be made at the amplifier input, and as this is close to the tv aerial the necessary cure must be waterproof, available to tv dealers, and require no maintenance. The Belling Lee L1594 uhf/vhf outdoor diplexer and the SAC uhf/vhf outdoor diplexer cover all these requirements, and the only modification required is to connect a $\frac{1}{8}$W or $\frac{1}{4}$W 75Ω resistor across the vhf output. The diplexer is connected close to the amplifier input, with the aerial input connected to "C" and the output taken from "uhf" to the input of the disturbed amplifier, (Fig 1). In order to do this the tv aerial must be taken down by a tv dealer, and as in the majority of cases ladders must be used, this could be expensive, but the cure is 99 per cent certain. If the type numbers of both amplifier and diplexer are known, the loss at the unwanted frequency can be estimated very closely from Graphs 1 and 2.

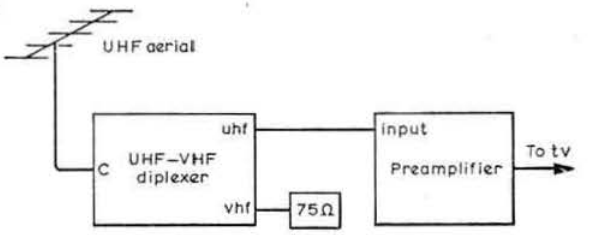



**Fig 1. Use of diplexer as input filter**

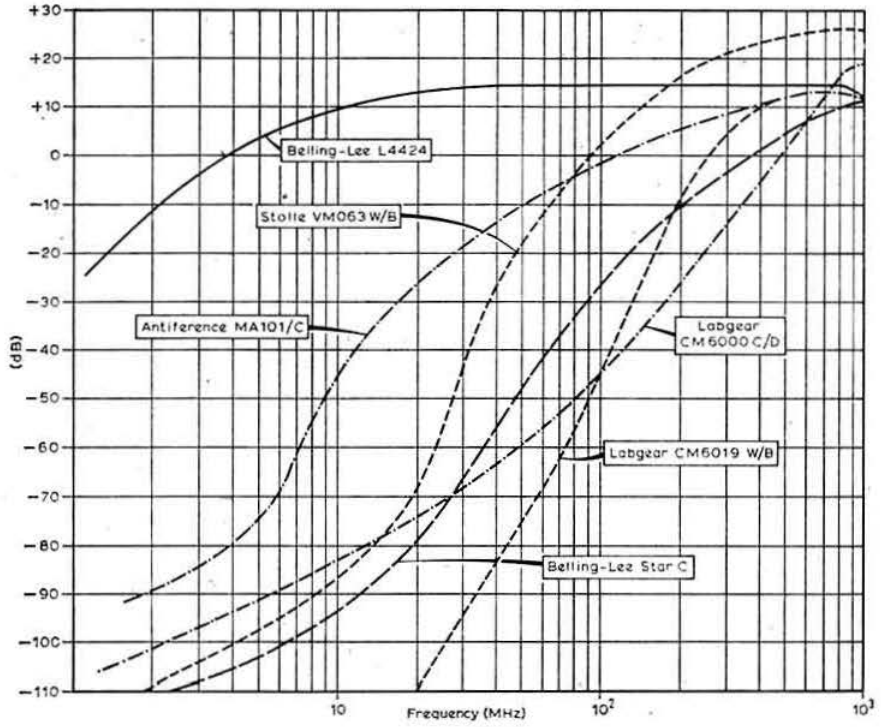
One word of warning. If operation on the 2m band is intended, the loss in the diplexers or uhf high-pass filter† may not be sufficient to protect the masthead amplifier, although there is now a modified design of uhf filter that includes a 2m trap. In this case an additional 20-25dB of attenuation can be obtained, but the uhf filter is not suitable for external use at the present time.

Attempts made to use a 2m $\frac{1}{4}\lambda$ open stub at the input to the amplifier to increase the attenuation of the 2m signals, give rise to the following problems:

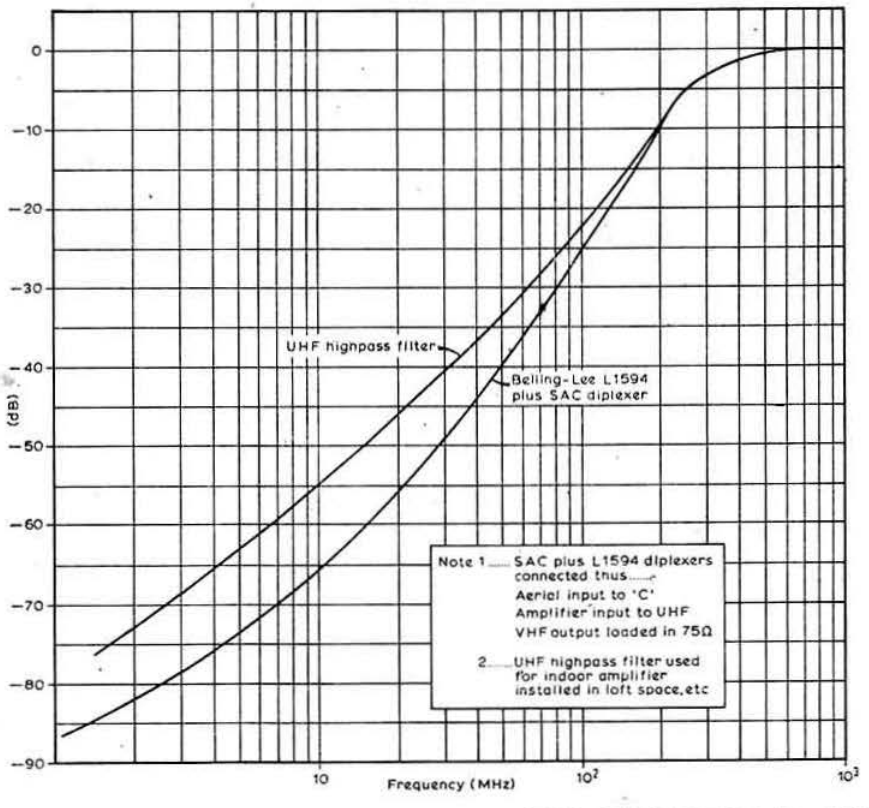
1. The stub is not stable due to the ingress of moisture when used externally.

* 12 The Haven, Beadnell, Chathill, Northumberland NE67 5AW

† The uhf high-pass filter referred to is that shown in Fig 6 on page 360.

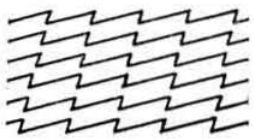



**Graph 1. TV masthead frequency response curves**




**Graph 2. Frequency response of uhf high-pass filter and B/L L1594 and SAC diplexers**

2. It may be found that the 2m stub is also acting as an odd ¼λ at the required tv frequency, thus attenuating the required signal.
3. A short-circuited stub for the uhf channels involved can be connected across the input to the mast amplifier, with some success, but the problem of moisture and movement of the stub alters the resonance point.
4. Although some success can be acquired subject to the foregoing remarks, the stub is difficult to set up while on a roof, and also requires one other person to observe the results while the amateur is test transmitting. For these reasons it is not recommended, as the cost of the operation outweighs the long-term success. A far simpler method is to fit either a modified SAC or Belling Lee L1594 diplexer for outdoor use at the input to the amplifier. □



# Who pays the price?

by I. JACKSON, G3OHX*
Member, Interference Committee

AS the sales of domestic entertainment equipment increase, the radio amateur finds no relief from the problems of interference to his neighbours. Those items which cause most trouble are traditional—tv, radio and hi-fi.

In the UK most manufacturers of this equipment believe that the best way of dealing with interference is to treat each case as it arises. It is considered that it is too uneconomic to protect their products *en masse* against the possibility of interference from nearby transmitters. As a result of this policy many amateurs and their neighbours are put to a lot of trouble and expense. To the manufacturer this may make good economic sense but to the amateur it is totally unacceptable.

## How much does it cost?

It is not possible to ensure that any piece of electronic equipment is absolutely interference-proof under all conditions; the cost would be prohibitive. However, some models of tv set feature more prominently than others in letters from members seeking assistance from the Interference Committee. Does this mean that some manufacturers actually fit the prohibitively-priced protection? Of course not!

In many cases of interference the affected set has some unfortunate layout of its circuit, positioning of wiring, choice of component values, lack of decoupling at a vital point, etc. For example, there have been cases of loudspeaker leads which happened to be about a ¼λ long causing interference from 2m transmissions. In another case an agc line resonated on 3·5MHz—an unfortunate length of wiring and values of decoupling capacitors forming a tuned circuit. These are instances where no extra cost of components would be involved in preventing interference from occurring.

## Testing

This kind of problem could be solved if the manufacturers had an awareness of the possibility of interference, and it would be relatively simple to test new products to see if they performed satisfactorily near amateur stations. After all, the closest transmitter to any domestic equipment is likely to be an amateur one. As the amateur bands embrace such a wide spectrum of frequencies, this test would also give a good indication of the likelihood of interference from other, non-amateur, transmitters.

Where tests reveal a design weakness, a cure may be found by a re-assessment of the traditional concepts of design. If so much can be achieved with no extra component cost, what could be achieved for a little bit more?

## Strange ideas

There seems to be a belief, which dies hard, that interference is due to harmonics from amateur transmitters—even when the affected equipment is audio-only. This stems from a shallow understanding of the problem, and a misreading of the many excellent articles which describe techniques for dealing with interference. As a result some manufacturers are reluctant to consider any complaint unless the amateur has been cleared officially by the Post Office. Even then, they may act only if the affected equipment is still under guarantee.

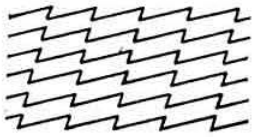
## Amateur policy

It is the policy of the Interference Committee to ensure that amateur interference problems are minimized. A special effort is being made to try to convince the domestic entertainment equipment manufacturers that improvements can be made without prohibitive costs. There is evidence to show, for example, that a slightly different design of tv aerial isolation circuit could cut tvi cases by two-thirds.

To this end approaches have been made to the British Radio Equipment Manufacturers' Association (BREMA), an organization to which most of the major British manufacturers belong. It is hoped that by co-operation at an official level, rather than by "back door" approaches to individual manufacturers, we will be able to achieve a permanent appreciation of interference problems and that this will result in appropriate action being taken. However, we must put a good case to BREMA, and the first step is to find out if we really do have a problem.

To help us to assess the true situation, please complete and return the questionnaire in this issue of *Radio Communication*. We will continue to pay the price of interference unless we get some help from you. □

* 12 Chalfont Road, Seer Green, Beaconsfield, Bucks HP9 2YG.



# Investigation by the Post Office of radio and television interference from amateur transmitting stations

Communicated by the Home Office

SINCE the circumstances in which interference may occur vary a great deal, it is impracticable to lay down hard and fast rules for dealing with it, but the following paragraphs summarize the general action taken by the Post Office when it receives a complaint that radio or television reception is suffering interference from an amateur's transmissions.

## Initial action

Before the Post Office will accept a complaint of interference, it requires from the person complaining either evidence of the source of interference or a record of the times at which the interference occurs over a period of two weeks. Where amateur interference is occurring it may well be that the person complaining can identify the amateur by hearing his callsign. The Post Office also expects the person complaining to have, or to equip himself with, a receiving installation of a reasonable technical standard. This normally means a receiver of ordinary commercial standard and an efficient aerial of a type needed to give adequate reception in the particular situation. The Post Office may tell the amateur at the outset, possibly by telephone, that a complaint has been received, in case he wishes to avoid neighbourly friction by ceasing to transmit on a certain band during, say, evening viewing hours.

## Detailed investigation

The aim is that a detailed investigation of the interference should be made as soon as possible after the complaint has been received. Since there are many different ways in which an amateur's transmissions may give rise to interference, tests have to be made to establish the mechanism by which the interference is occurring, the cure, and the responsibility for clearing the interference. This calls for the co-operation of the amateur and the people affected and the work has normally to be done in the evenings. This part of the investigation usually takes some time, bearing in mind the many calls upon the Post Office interference service, and it may be hampered by the attitude of the parties to the case. Not infrequently, people complaining of amateur interference simply want the amateur closed down permanently and are most unwilling to accept that the trouble may lie in their own receiving installations.

It is, unfortunately, Post Office experience that delay is sometimes caused by the failure of an amateur to deal promptly or effectively with trouble in his own equipment. If the investigation officer has reasonable grounds for thinking that an amateur's transmissions are causing interference, particularly where a number of people are affected, he may instruct the amateur to cease using specified amateur bands between certain hours pending detailed investigation. This is done by the most practicable means available. Usually it is during a visit to the amateur, but it may sometimes be done by letter or telephone. However, any oral instruction restricting the amateur's operations is confirmed in writing.

The investigation officer examines the transmitter and other equipment with the amateur to see if the interference is caused by such things as over-modulation or the generation of harmonics or spurious emissions, and, if so, whether the interfering signals are propagated by direct radiation or over the mains wiring. Assistance may be given in locating the stage in which unwanted signals are being generated, together with advice about dealing with the matter, but the responsibility for finding out what is wrong and what is the remedy lies with the amateur and modifications must be made by him. The amateur is asked to let the investigation officer know when the modifications have been made, and is instructed, with confirmation in writing, not to use the transmitter in the meantime during sound broadcasting or television hours as the case may be. If tests with the investigation officer show that the modifications have been successful, the amateur may be allowed, with confirmation in writing, to resume normal working.

When it has been checked that the interference is not being caused by the condition of the amateur transmitter or the way in which it is being used, and that the receiving installation affected is of a reasonable technical standard, investigation is made at the receiving installation. The interference may occur for a number of reasons; for example, blocking, cross-modulation, i.f. breakthrough or image effect. If reasonable remedial action, such as the fitting of a filter in the aerial lead, can be demonstrated by the investigation officer, then the responsibility for abating the interference lies with the set owner, who is advised in writing to obtain a similar filter from his radio dealer or from the manufacturer of his set.

A calendar month is allowed for him to obtain a filter, during which the amateur is instructed, with confirmation in writing, not to use the frequency band(s) in question during sound broadcasting or television hours as the case may be. At the end of the calendar month the amateur may be allowed to resume transmissions whether or not a filter has been fitted to the receiver. It may sometimes be possible to leave a demonstration filter in position for a trial period during which the amateur transmits normally. If so, he is advised to this effect, with confirmation in writing. It has been found that the amateur himself sometimes provides a filter or other remedy to ensure an amicable settlement.

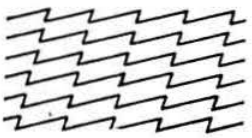
With superheterodyne broadcast receivers it may be possible to tune an amateur's transmissions in and out from one end of the receiver tuning scale to the other. Provided that reception of the local BBC stations is not affected, the case is not treated as one of interference.

Occasionally amateur transmissions are picked up by some electrical apparatus, such as a tape recorder or public address system, or by a wired television system. Provided tests show that the amateur is operating within the terms of

his licence, the Post Office does not give protection to the apparatus in question, and action is normally limited to giving advice on means of reducing the susceptibility of the apparatus to interference.

### Difficult cases

It sometimes happens that reasonable remedial action such as the fitting of a filter has little or no effect on the interference. Such cases have to be dealt with on their merits, all the known circumstances of the case being taken into account. The Post Office has to recognize that some television receivers suffer from a lack of immunity to amateur interference and to give them reasonable protection for the time being. Public opinion would not support a policy of telling the owner of a television set of ordinary commercial standard that he must write it off because of amateur interference. The amateur can quite often avoid the interference by using other amateur bands. The Post Office has no control over the manufacture of television sets, but it has impressed on the radio industry the need to make receivers that are less liable to suffer interference by, for example, i.f. breakthrough or image effect. □



# Interference problems in 1973

by P. F. JOBSON, G3HLF*,
Member, Interference Committee

EIGHTY cases were referred to the Interference Committee during 1973. Of these, 10 of the members who had made enquiries did not return the questionnaire sent to them, and it is assumed that they had taken other action. Of all the cases dealt with during the year the PO had already been called in to 33 per cent of them *before* the Interference Committee was approached.

Fifteen complaints were from members who were suffering from interference to the reception of amateur signals. Unless the interference is also affecting radio or television programmes, the help of the Post Office investigators cannot be called upon. This interference is often caused by factories or electricity supply cables, the owners of which are loth to accept responsibility if there is no official body to insist that they do so. By persistent negotiation, seven of these complaints were cleared.

Where radio amateur signals were alleged to be breaking through and causing interference to domestic or other appliances, 67 per cent were caused by hf band transmitters and 33 per cent by vhf band transmitters. In some cases the amateur concerned had found that both his hf and vhf transmissions were causing trouble.

The equipment which was being interfered with was mainly television, 51 per cent of the cases involving uhf 625-line transmissions and only 30 per cent vhf 405-line transmissions. This may be due to the fact that a larger proportion of viewers now use uhf.

Some 47 per cent of the cases involved interference to audio equipment, which is not protected by the Post Office because it is not intended to receive radio signals at all. Unless filtering of the external leads effects a cure, such cases must be referred to the manufacturer or his dealer.

A tv relay system was involved in 15 per cent, which, although almost invariably ultimately solved, required correspondence with the relay companies, and with local authorities often prone to invoking "omnibus" legal agreements rather than seeking technical solutions.

An interesting case was when a burglar alarm was being operated by amateur signals. The author also heard of an automatic garage door which was operated by what were assumed to be amateur signals.

We do not know how many cases of interference were cured with help from the committee; only five members actually wrote to tell us that they were now clear and to thank us for our efforts. Of the rest, some may be clear now, others may pop up again, and some operators, alas, may have taken the easy way out and given up. Fourteen of the cases are known to have been cleared even though some of the complainants have not informed us of this themselves.

There were also a number of cases dealt with in 1973 which had originated in earlier years.

A number of lessons can be learned from this brief survey. They are:

(a) If you have an interference problem, tell us.
(b) Tackle it, do not dodge it, it CAN be cured.
(c) If we help you to solve it, tell us. □

### Footnote

In 1974, 104 cases were referred to the committee—no further statistics are yet available.

**Television Interference Manual**

by B. Priestley, BSc, G3JGO

In this practical book the causes of interference by amateur transmitters to television, and audio equipment are examined and ways in which it may be avoided and suppressed are suggested.

The data and reference chapter collates data from various sources and provides references to other sources of tvi information. This is complemented by 12 appendices of other technical information.

**100 pages, spiral bound** **£1.05 inc p & p**

*Obtainable from*

**RSGB, 35 Doughty Street, London WC1N 2AE**

* 41 The Avenue, Gravesend, Kent.

# Determining azimuth and elevation for Oscar satellites

by R. O. PHILLIPS, G8CXJ*

VARIOUS methods have been published for obtaining the aerial pointing direction required for operating to the Oscar series of satellites. In general, these have indicated the required azimuth at various times throughout the satellite pass. This information is adequate when using low-gain, wide-beamwidth aerials, but when higher gains are required, such as at higher frequencies (432MHz), it will also be necessary to know the corresponding elevation angle. This article describes a method for deriving both of these parameters. The method was first published by W5PAG in the *AMSAT Newsletter* (December 1973), to whom acknowledgement is given.

## Azimuth-elevation contour chart

The major part of this method consists of drawing a chart indicating the azimuth and elevation contours appropriate to the altitude of the satellite. Since the altitudes of Oscars 6 and 7 are similar the chart may be used for both satellites. To calculate the points on the curves the following steps must be carried out:

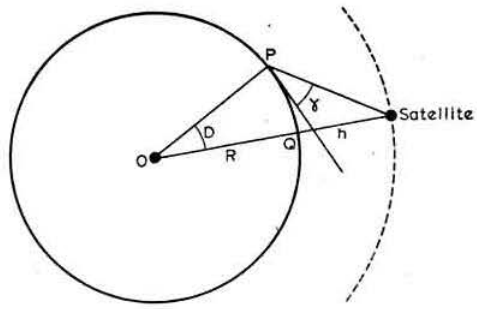



**Fig 1. Q is the point on the surface of the earth which is directly beneath the satellite. The latitude is $B°$ and the longitude relative to the receiving station at P is $L°$**

1. The great circle angle (ie the angle subtended at the centre of the earth) between the receiving station and the point on the earth which is directly below the satellite should be calculated. Fig 1 shows the great circle angle $D$ and the other parameters required in the calculations. This angle can be calculated as follows:

$$D = \cos^{-1}\left(\frac{R}{R+h} \cdot \cos\gamma\right) - \gamma \text{ degrees}$$

where $\gamma$ is the elevation angle of the satellite at the station, $R$

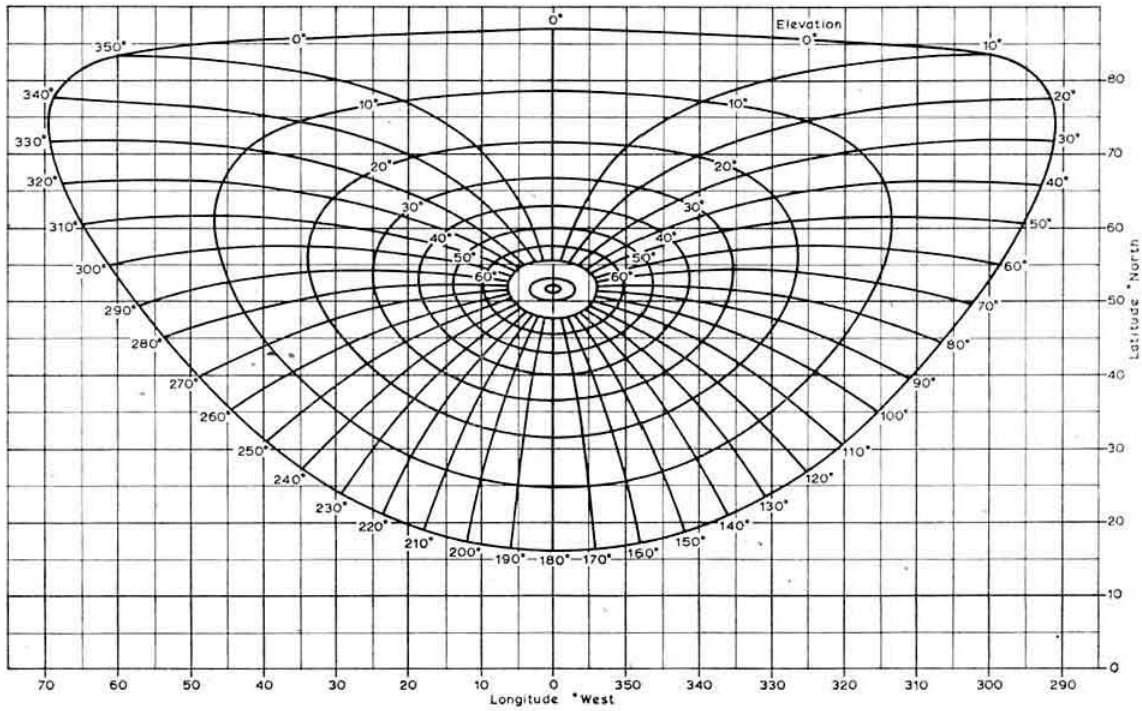



**Fig 2. Azimuth-elevation nomogram**

14 Hall Place Crescent, Bexley, Kent.

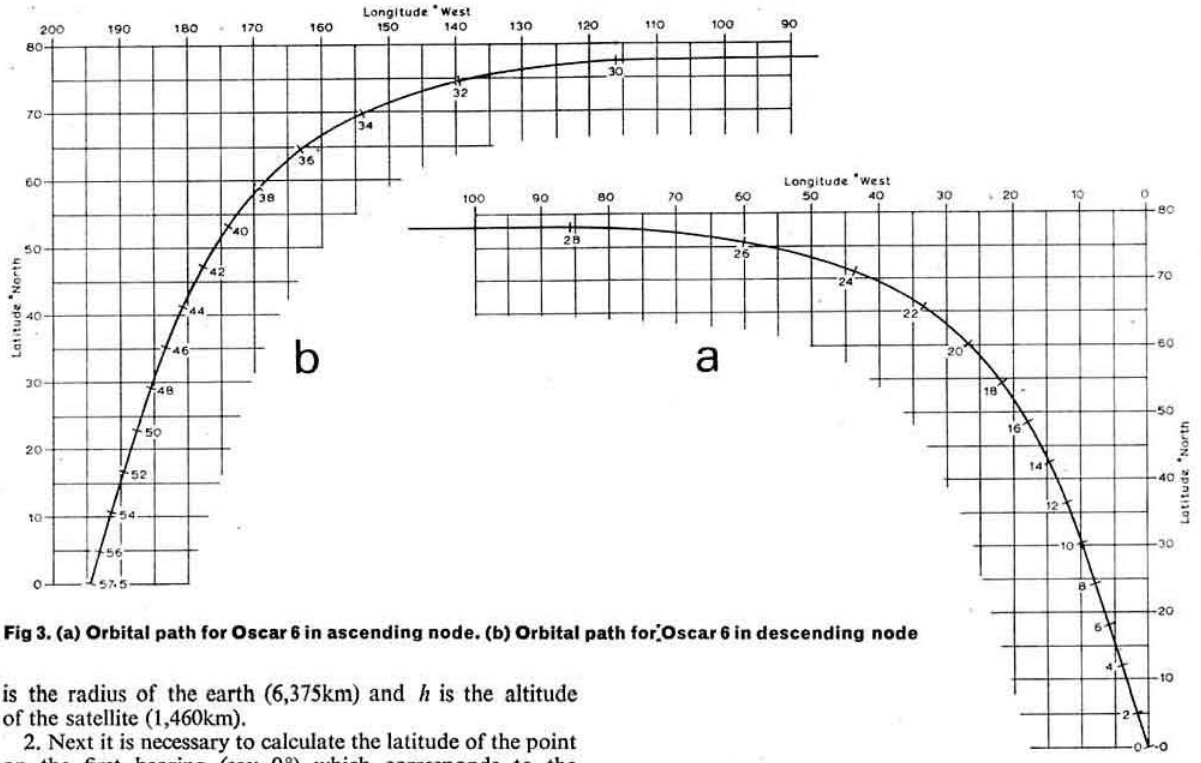



**Fig 3. (a) Orbital path for Oscar 6 in ascending node. (b) Orbital path for Oscar 6 in descending node**

is the radius of the earth (6,375km) and $h$ is the altitude of the satellite (1,460km).

2. Next it is necessary to calculate the latitude of the point on the first bearing (say 0°) which corresponds to the elevation angle $\gamma$.

$$\sin B = \sin \alpha \cos D + \cos \alpha \sin D \cos C$$

where $B$ is the latitude of the point below the satellite, ie the sub-satellite point, $\alpha$ is the latitude of the receiving station and $C$ is the bearing to north (in this case 0°).

3. Finally, the corresponding longitude of the sub-satellite point should be calculated:

$$\sin L = \frac{\sin C \cdot \sin D}{\cos B}$$

where $L$ is the difference in longitude between the sub-satellite point and the receiving station.

Thus the latitude and longitude of a point corresponding to a particular elevation angle have been calculated, on a heading of 0°. It is now necessary to calculate points on other headings at the same elevation angle. (Note it is only necessary to calculate points for headings between 0 and 180° since one side of the chart is the mirror image of the other). This procedure must then be repeated for other elevation angles up to 90°.

## Satellite orbital path

Having drawn the chart it only remains to determine where the satellite will be at any given time. The only information that is required about the satellite is the orbit period and the angle of inclination of the orbit to the equatorial plane. The latitude of the sub-satellite point is given by:

$$\sin b = \sin (360t/\tau) \times \sin \psi$$

where $t$ is the length of time after the satellite has crossed the equator, $\tau$ is the satellite orbit period and $\psi$ is the angle of inclination of the orbit. The values of $\psi$ for Oscars 6 and 7 are 101·77° and 101·71° respectively. However, such a small difference is unlikely to cause any significant error. This angle is greater than 90° and the satellite orbit is referred to as retrograde, ie the orbit moves in a westerly direction as the earth moves from west to east.

The corresponding longitude of the sub-satellite point at a time $t$ after the equator crossing is given by:

$$l = \cos^{-1} [\cos (360t/\tau) \div \cos b] \pm t/4$$

The factor $t/4$ is due to the rotation of the earth; the earth rotates by ¼° every minute. When the orbit is retrograde, ie when $\psi$ is greater than 90°, $t/4$ is added, otherwise it is subtracted.

As an example, consider Oscar 7 which has a period of almost 115min and an orbital inclination of 101·7°. To find the location of the sub-satellite point these two values must be substituted in the equation above. The location at a time $t$ = 18min after the satellite crosses the equator is obtained from:

$$b = \sin^{-1} \{\sin [(360 \times 18)/115] \times \sin (101{\cdot}7)\} = 54{\cdot}6°$$

and $l = \cos^{-1} \{\cos [(360 \times 18)/115] \div \cos (54{\cdot}6)\} + 18/4$
$= 21{\cdot}5°$

If the longitude of the equator crossing is, say, 15°W and the satellite is in the ascending node (ie moving in a direction towards the North Pole), the sub-satellite point at 18min after the equator crossing will be 54·6°N and 15 + 21·5 = 36·5°W.

To plot the complete orbital path as shown in Figs 3 and 4 the above calculations must be repeated for convenient intervals of time, say one or two minutes. The orbital path

should be plotted on a transparent sheet so that it can be positioned over the elevation contour diagram.

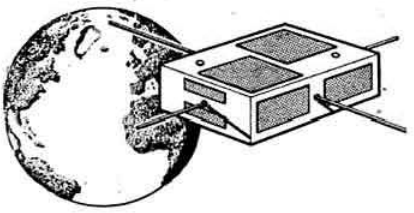
### Using the azimuth elevation chart

Having completed both parts of the chart, it may now be used to determine the appropriate azimuth and elevation of the satellite at any time during its pass in the following way.

The orbital path is first positioned on the elevation contour diagram and the equator lines on each are aligned. The equator crossing point on the orbital path overlay is positioned at the longitude of the equator crossing of the particular orbit. Most orbital data is given for the ascending node, although to calculate the descending node equator crossing all that is necessary is to subtract $(180 - x/2)$ from the ascending node crossing point, where $x$ is the longitude increment per orbit (28·8° for Oscar 7).

With the overlay in position it is now possible to read off the corresponding azimuth and elevation of the satellite to a sufficient degree of accuracy for most purposes. □

# OSCAR NEWS



### Reference orbits

| Date | | Equatorial crossing | | |
|---|---|---|---|---|
| Oscar 6 | Orbit No | ut | °W | Mode |
| 10 May | 11734 | 1736 | 314 | |
| 17 May | 11821 | 1620 | 295 | |
| 24 May | 11910 | 1855 | 334 | |
| Oscar 7 | | | | |
| 10 May | 2202 | 1049 | 212 | B |
| 17 May | 2289 | 0930 | 192 | A |
| 24 May | 2377 | 1005 | 201 | B |

### AMSAT-Oscar data

Enquiries are frequently made concerning the basic characteristics of the two spacecraft currently in orbit. The following is a summary of the relevant information.

**Oscar 6**

Period: 114·994min; increment: 28·74° per orbit.

Operating schedule: evenings—Monday, Thursday, Saturday; mornings—Sunday.

**Oscar 7**

Period: 114·944min; increment: 28·73° per orbit.

Operating schedule: even days of the year mode B, odd days of the year mode A, Wednesdays: experimental use only.

**Spacecraft transponder frequencies**

| | Uplink (MHz) | Downlink (MHz) | Beacon (MHz) |
|---|---|---|---|
| Oscar 6 | 145·900–146·000 | 29·45–29·55 | 29·450 |
| Oscar 7 | | | |
| Mode A | 145·850–145·950 | 29·40–29·50 | 29·502 |
| Mode B | 432·125–432·175 | 145·975–145·925 | 145·972 |
| Mode A/D | | | 435·100 |

**Oscar 7 aerial polarizations**

| System | Polarization |
|---|---|
| 145/29 uplink | left-hand circular |
| 145/29 downlink | linear |
| 432/145 uplink | right-hand circular |
| 432/145 downlink | right-hand circular |
| 435·1 beacon | left-hand circular |
| 2,304·1 beacon (not operational) | right-hand circular |

The above polarizations apply to the northern hemisphere and will be reversed for the southern hemisphere.

**Oscar 7 transponder bandplan, 29MHz downlink**

| Frequency (MHz) | Mode |
|---|---|
| 29·400–29·445 | ssb, rtty, sstv |
| 29·445–29·455 | all modes |
| 29·455–29·495 | cw |
| 29·495–29·500 | guard band for beacon |

Use upper sideband for uplink; recommended erp is 100W

### Oscar nets

To provide an opportunity for more inter-European contacts on Oscar events, a new 7MHz net will commence on Sunday 4 May. Particulars of this and existing nets are:

Saturdays: 1000ut, 14,280kHz. Control: G3IOR.

Sundays: 0915, 3,780kHz. Control G3RWL.

Sundays: 1000, 7,060kHz. Control: G3RWL.

Sundays: 1830, 144·280MHz, Control: G8CSI (New Malden, Surrey)

Sundays: 1800, 14,280kHz. Control: W3ZM and others. The international AMSAT net.

# UK REPEATERS

| Serial No | Location | Callsign | Channel | Status |
|---|---|---|---|---|
| 001 | Barkway, Herts | GB3PI | 6 | O |
| 002 | Myndd Machen | GB3BC | 6 | O |
| 003 | Malvern Hills | GB3MH | 7 | O |
| 004 | Crystal Palace | GB3LO | 7 | O |
| 005 | Four Marks, Hants | GB3SN | 5 | O |
| 006 | Martlesham Heath | GB3PO | 3 | AA |
| 007 | Barnsley, Yorks | GB3NA | 3 | AA |
| 008 | Black Hill | GB3CS | 4 | AA |
| 009 | Buxton, Derby | GB3HH | 4 | AA |
| 010 | Luton | GB3LT | 431·25/433·25 | AA |
| 011 | Bacton, Norfolk | GB3NB | 7 | AA |
| 012 | Cambridge | GB3PY | 431·35/433·35 | AOS |
| 013 | Turners Hill, Birmingham | GB3BM | 5 | AA |
| 014 | Newquay, Cornwall | GB3NC | 4 | P |
| 015 | Aberdeen | GB3GN | 7 | NS |

**Status abbreviations**

O Operational.
AOS Approved by Home Office, operational shortly.
AA Awaiting Home Office approval.
P Proposal with RSGB.
NS Proposal not yet submitted to RSGB.

### Repeater channels

| | Input | Output | | Input | Output |
|---|---|---|---|---|---|
| R0 | 145·000 | 145·600 | R5 | 145·125 | 145·725 |
| R1 | 145·025 | 145·625 | R6 | 145·150 | 145·750 |
| R2 | 145·050 | 145·650 | R7 | 145·175 | 145·775 |
| R3 | 145·075 | 145·675 | R8 | 145·200 | 145·800 |
| R4 | 145·100 | 145·700 | R9 | 145·225 | 145·825 |

### Simplex channels

| | | | |
|---|---|---|---|
| S20 | 145·500 | S23 | 145·575 |
| S21 | 145·525 | S24 | 145·600 |
| S22 | 145·550 | | |

## EQUIPMENT REVIEW

# The W2AU 1:1 balun transformer

by Z. T. CHOWANIEC, G3PTN*

AT present, with worsening propagation conditions, most amateurs are looking into the possibility of making their aerials more efficient. One of the ways to improve aerial characteristics is to fit a balun transformer, this being particularly important with beam aerials.

Although a balun transformer is a relatively simple device, there are certain constructional difficulties and some amateurs prefer to purchase the ready-made article. Amateurs in the UK have a number of these available to them from different manufacturers. The W2AU Balun submitted for this review is of USA origin and is distributed in the UK by TMP Electronic Supplies, 3 Bryn Clyd, Leeswood, Mold, Clywd CH7 4RU, North Wales.

### Description

From the external shape of the transformer it was deduced that it has a ferrite rod and not a toroidal core. (The circuit is not given in the instruction sheet.)

The housing is made of tough plastic material, and providing the balun is mounted with the breather holes facing downwards, it should be waterproof. Connections are via silver-plated uhf SO239 type socket for the coaxial cable, and flexible leads for the balanced side. The top of the housing has three stainless-steel eyehooks, allowing the transformer to be used as a centre insulator with wire aerials, or to be hung if used with a beam.

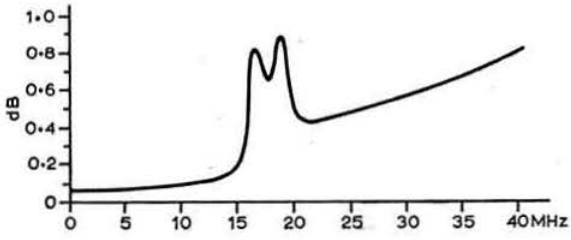



**Fig 1. Insertion loss measured at 1mW, 50Ω on a Hewlett-Packard spectrum analyser**

### Performance

Graphs showing insertion loss and introduction of swr are given in Figs 1 and 2. It will be noticed that when the transformer was used in a 50Ω system, it had two resonant points (at 17·3MHz and 18·9MHz) resulting in high insertion loss. This is of no practical consequence to amateurs, as the frequencies in question are outside of the amateur bands. The balance of the transformer at 14MHz was 10 per cent.

The above performance is typical of this type of balun transformer and is perfectly satisfactory for the use intended.

**Manufacturer's specification**

| | |
|---|---|
| **Models:** | (a) 1:1 matching 50 or 75Ω balanced load to 50 or 75Ω unbalanced lines. |
| | (b) 4:1 matching 200–300Ω balanced load to 50 or 75Ω unbalanced lines. |
| **Frequency:** | Broadband, 3MHz–40MHz. |
| **Power:** | 1kW dc input or 2kW p.e.p. |
| **Dimensions:** | 6in long, 1¼in diameter. **Weight:** 6½oz. |
| **Aerial pull:** | 650lb max, if used as centre insulator. |
| **SWR limitation:** | Must not be used with swr higher than 3·5:1. |

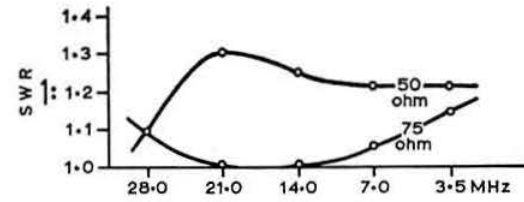



**Fig 2. SWR curves with terminating resistive loads of 50 and 75Ω**

### Comments

The reviewer felt that one of the advertising points could be misinterpreted and give a sense of false security, unless the instruction sheet is amended. It states that the balun has a built-in lightning arrester and although it advises running a heavy copper wire from the outer braid of the coaxial cable to a good ground, it does not make clear that unless this is done the lightning arrester is inoperative. □

*The UK distributors have advised us that the instruction sheet will in future carry a note pointing out the earthing requirements for lightning arrester operation.—Ed.*

## NEW BOOK

### IC databook

Plessey Semiconductors have published a 245-page databook giving details of its range of silicon integrated circuits. Circuits, electrical characteristics, performance curves and ratings are provided for each device. The four main sections of the databook deal with linear ICs (including the SL600 series), consumer products, MNOS, and digital ICs, each providing the requisite data and extensive operating notes. The databook, which is in a soft-cover A5 format, is available at £1 (cwo) from Plessey Semiconductors Ltd, Publicity Services, Cheney Manor, Swindon, Wilts SN2 2QW.

* 33 Elmete Drive, Leeds LS8 2LA, Yorks.

# TECHNICAL TOPICS

by PAT HAWKER, G3VA

THERE is a belief that a good way of opening up a conversation with a vaguely familiar face is to ask "How is the old complaint?". One can usually be sure of receiving a lengthy reply that gives you time to place just whom you are talking to. Well, for amateurs, there cannot be much doubt about what is the usual form of "the old complaint"—tvi, with which we must nowadays associate hi-fi and audio breakthrough generally. Since in this issue the Interference Committee is making a determined effort to "open up" various aspects of tvi, we start this month with some notes on "the old complaint".

## TVI then and now

Some 20 years ago I wrote in the *Radio & Television Engineers' Reference Book:* "The major problem that has faced amateurs in the post-war period has been the operation of transmitters in close proximity to domestic television receivers. Although amateur transmitters are the cause of only a very small percentage of the total number of complaints of television interference as investigated by the Post Office, the problem facing the individual amateur should not be underestimated . . ."

Nine main causes of interference were then listed as follows:

1. The radiation from the amateur transmitter of harmonic or spurious signals falling within the television channel concerned.
2. Direct breakthrough of transmissions at or near the intermediate frequency of the receiver (less of a problem since the adoption of the BREMA standard i.f. for tv receivers of 33·5 to 41MHz).
3. A spurious response of the television receiver (image, beating with harmonic of local oscillator, etc).
4. Over-loading of the "front end" of the television receiver causing cross-modulation.
5. Cross-modulation caused by the external rectification of the amateur signals by a faulty joint in the television receiver aerial, or nearby metalwork.
6. Parasitic oscillation in the audio section of the amateur transmitter (a function mainly of high-power a.m. equipment and seldom encountered today).
7. Harmonic radiation of the local oscillator of the amateur receiver (again this was largely a question of HRO and similar receivers interfering with Band I and is rare today).
8. Key clicks or telephony splatter from the amateur transmitter.
9. Direct pick-up of the amateur signals in the video amplifier or audio stages of the television receiver.

While, as we have noted above, one or two of these items have fortunately become less important, it would be a brave or foolhardy writer who would dismiss the majority as no longer applicable, or suggest that tvi has become significantly less of a problem—though the techniques for coping with it are better known and better understood. The progressive transfer in the UK of tv reception from vhf to uhf has brought some relief: mainly for hf operators in the reduction of harmonics, but also generally because the field strengths of tv stations are considerably greater, tv aerial elements less responsive to hf and vhf, and the arrays more directional. However, this relief is rather less than some of us had hoped, partly because tv manufacturers seem not to have made very determined efforts to prevent hf/vhf signals from reaching the first stages of the tv receiver—and these stages are now usually small-signal bipolar transistors with all that implies. Nor should it be overlooked that in the 'eighties this trend may to some extent be reversed as television Bands I and III are re-engineered for 625 lines, always supposing that the business mobile people have not taken over these frequencies (it would be nice to have an amateur band at 50MHz but I cannot really see this happening).

As though to counteract the modest easing of the tvi position there are considerably increased problems arising from the growth in popularity of high-fidelity and other audio systems with interconnecting wiring (particularly for loudspeakers spaced for stereo) that seem wide open to strong rf fields. Such interference is by no means always easy to cure when the equipment is within a few feet of a transmitting aerial. There is also greater use of Band II vhf/fm sound radio which tends to be rather more vulnerable to overloading than traditional mf/lf reception. Above all, the coming of transistor designs for almost all domestic equipment has significantly increased susceptibility to high rf fields. So tvi remains "the old complaint" since, even when the trouble is clearly caused by domestic equipment design, it is often socially impossible simply to shrug off complaints.

John Swinnerton, G2YS, on behalf of the Interference Committee, notes a useful advance in the attitudes of some of the set makers. For example the CES servicing organization concerned with Philips, Pye and Dynatron receivers recently stated: "To increase the immunity of our tv receiver to ambient high-level fields, we made a change to our basic G8 chassis a few weeks ago to incorporate a filter capacitor which will give a considerable improvement in its immunity to rf fields. Our experience so far has shown this to be a good cure for all cases of 'audio breakthrough'. Although this is incorporated on all G8 production, there may be cases of earlier production which will give trouble. In these cases CES (Combined Electronic Services) have information which should enable them to deal with the problems". Such changes are much to be welcomed—what a difference a capacitor can make!

## IVT—or tvi in reverse

While much attention has been paid by amateurs to trying to overcome or reduce the problems of tvi, it often seems that the same cannot be said of reverse tvi: those horrid little rasping whiskers that can be heard every 15kHz throughout the hf band (I am not sure about vhf), these being harmonics of the substantial amount of line-output energy developed for line scanning and eht generation in every television set.

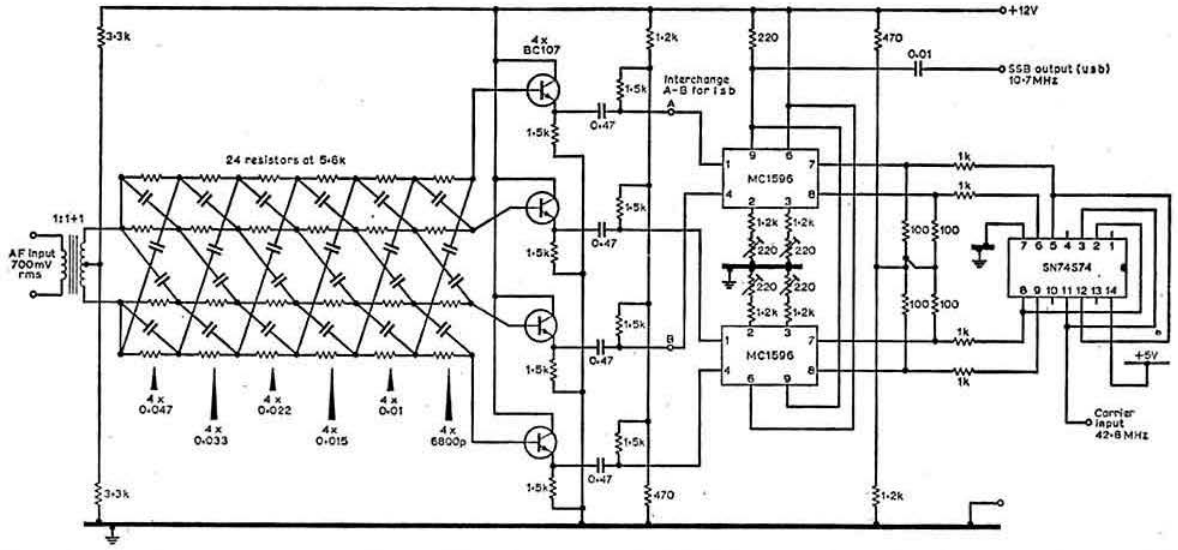



**Fig 1. The G3PLX polyphase ssb generator providing ssb output on 10·7MHz. To align: inject 1kHz sinewave input and adjust three of the four 220Ω potentiometers for minimum modulation of the output signal**

Personally I find these "nasties" have increased markedly over the past few years in my locality, presumably due to the increasing number of colour sets with their greater line-output requirements.

It would be useful if we had more knowledge of how these harmonics are propagated. Do they radiate directly out of the tv receivers? Do they travel mainly through the mains and then re-radiate from the mains wiring in the amateur's home? Are they, as I have heard suggested, radiated mainly from the tv aerials? Or, as may well be the case, is it a combination of all three? (Some probing with a transistor radio suggests direct and mains-borne the more important.) Has anybody found any cheap and effective cures other than the on/off switch on the tv receiver? Not long ago, when sitting in on an industry committee concerned with interference, I was shocked to hear the suggestion that since industry received so very few complaints about line-output radiation it might be possible to relax the specification (yes, there *is* one). I hope that my horrified outburst may, at least temporarily, have scotched that proposal!

IVT is a very real problem for weak-signal reception in most urban and suburban environments, yet very little effort seems to be being made to overcome it.

## G3PLX polyphase ssb generator

In *TT* of October 1973 I drew attention for the first time in any amateur journal to a novel system for polyphase ssb generation which had been developed by Michael Gingell at the Standard Telephone Laboratories. This provided in effect a new way of making a wideband audio phase-shift network not requiring the use of high-tolerance components.

This introduction was followed up (*TT*, December 1973) by some most useful comments and suggestions from Peter Martinez, G3PLX, who showed how a practical polyphase network could be designed so that it could be based entirely on preferred-value resistors and capacitors without needing any tighter tolerances than 1 or 2 per cent, and less than this for most sections of the filter. Although he built and tested several polyphase networks, the intention of building one into an ssb generator and testing this on the air had to be postponed owing to his moving QTH. Since then the 1973 notes have been included in *Amateur Radio Techniques* (5th edition) and various letters have been received commenting on the system; including in some cases the results of computer checks on the theoretical performance of polyphase networks. Nobody, however, has ever indicated, at least to me, that they have had a polyphase ssb generator on the air on the amateur bands.

At least, that is, not until recently. Now G3PLX once again has come up trumps. He writes:

"I have built a complete polyphase generator and am using it in a 144MHz transmitter. The circuitry is shown in Fig 1, using the same polyphase network explained in December 1973. The four-phase modulator uses not FETs as originally proposed but two MC1596 integrated circuits. Despite the recent comments about the use of chroma demodulators and limiter/discriminator devices as ssb modulators I can recommend the MC1596, which is a simple double-balanced modulator with very flexible bias and input/output possibilities: Fig 2 shows the internal connections to indicate how it is used in my generator. The push-pull input connection matches the polyphase network nicely, and helps to make use of the inherent error-correcting properties of the network.

"To provide the digital rf phase shift I use a Schottky-clamped 74S74 device as shown in Fig 3 (page 203 of March *TT*). The input is on 42·8MHz from an overtone crystal so as to provide an ssb output on 10·7MHz.

"Checking the performance of the generator on professional equipment, I found that sideband suppression could be adjusted to greater than 50dB (limit of my measurements) and the preset potentiometers all seemed to be at the same point on their tracks; this seems to imply that it might be possible to use 1 per cent resistors and obtain some 40dB suppression in an ssb generator *with no adjustments required*!

"For my polyphase network I had selected components to within 2 per cent but it should be noted that the components have only to be matched to each other in groups of four, and the absolute values are less important. I suspect that for most amateur applications, groups of 5 per cent tolerance components, if bought from the same batch, would most probably match each other rather better than 5 per cent and would give acceptable results.

"Although polyphase generation results in an exciter somewhat larger than a conventional phasing system, the fact that low-tolerance components of standard values are used should commend the system to those, perhaps younger, enthusiasts with limited financial resources."

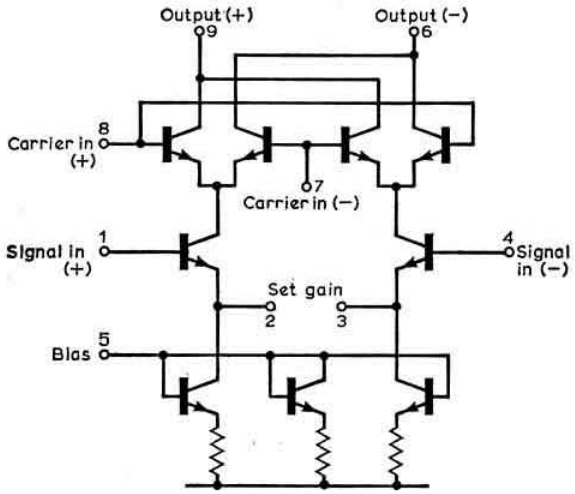



**Fig 2. Equivalent circuit of the MC1596 ic. In its normal use as a double-balanced modulator a resistor from pin 5 to ht+ sets the current and a resistor between pins 2 and 3 sets the conversion transconductor. In the G3PLX generator the two halves of the MC1596 are used as separate single-balanced modulators**

## The polyphase network analysed

Now that the practical value of the polyphase system has been demonstrated on the amateur bands it seems sensible to look a little more closely at the theoretical performance of the network as developed by G3PLX, since it seems likely that most potential constructors will simply adopt these component values even though they may not be quite optimum.

Leonard Anderson, a senior member of RCA Electromagnetic and Aviation Systems Division in California, was intrigued by the polyphase idea and carried out a detailed analysis of the network using the values suggested by G3PLX in December 1973. He sent his results along soon afterwards but we have held the information awaiting confirmation that a suitable generator could be effectively implemented.

From a mass of detailed information the following main points have been abstracted:

1. The four phase-shifted outputs are in fact nicely in quadrature, remaining within ±1° from 450Hz to 5,600Hz. This suggests that the network has a response a bit high for effective voice communications (the range 300 to 3,500Hz is usually considered about optimum).

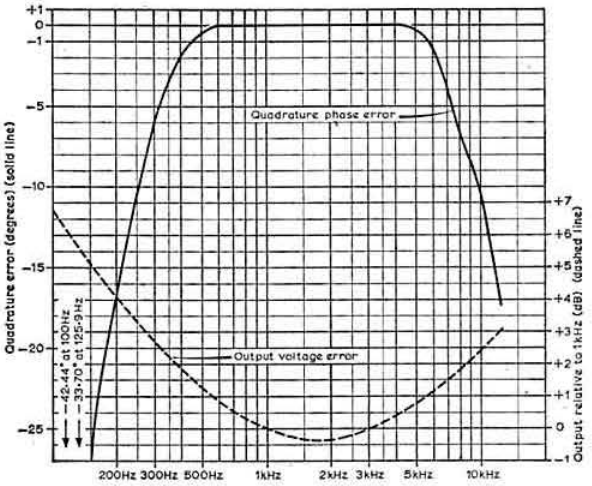



**Fig 3. Computer plot by Leonard Anderson of the G3PLX polyphase network, showing quadrature error of 90° and 270° outputs relative to 0° output. The lower curve shows the calculated output voltage in decibels relative to 1kHz. 1MΩ load each output, 100Ω source resistance each input**

2. There is some audio de-emphasis in the middle of the band.
3. The input impedance varies inversely proportional to frequency by a factor of approximately three per decade.

Leonard Anderson has provided detailed tabulation of his computer analysis, but his results are probably most readily grasped from Figs 3 and 4. From the shape of the quadrature error it would seem that the audio preceding the polyphase filter should be restricted by filtering to roughly the correct range in order to prevent the appearance of double sidebands at low and high frequencies. In general, he believes, the four-mixer/modulator network should prove more forgiving of tolerance variations than the Villiard/Norgaard form of phasing modulator.

Leonard Anderson suggests that the polyphase network be driven by op-amps (possibly 741 type) to ensure that input phasing is opposed, using a voltage-follower and a gain-of-one inverter so as to assure amplitude unbalance (with 1 per cent tolerance resistors) not greater than 2 per cent and phase-shift unbalance with 741 devices of less than 0·5 per cent.

As a possible way of bringing the response down to the more usual communication values (assuming the RC breakpoints correspond to conventional RC networks), changing all resistors to 8·2kΩ would give an audio bandwidth of 341 to 3,551Hz for 0·5° error; 10kΩ would give 280 to 2,912Hz; increasing the value of the resistors would also increase the input impedance.

He suggests that while ideally this is a circuit which really requires computer analysis for optimum results, especially if input and output impedances are taken into account, an easier route is probably to build a unit and check sideband suppression with a good receiver or spectrum-analyser/panadaptor.

As a final point, he also notes that one area which tends to be overlooked in the digital approach to supplying the

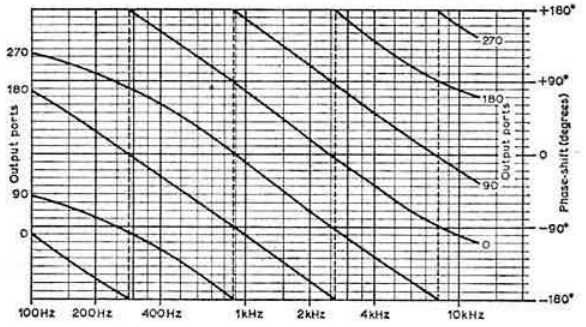



**Fig 4. Computer plot of phase angles of each output relative to input. 1MΩ load each output, 100Ω source resistance each input**

carrier phases with ssb generators is the phase-shift variation due primarily to propagation-delay variation within ic logic. For example, the period of a 14MHz carrier is 71·429ns; a propagation delay of only 2ns represents a 10·08° phase shift! For this reason, in ssb generators providing directly an hf output it is wise to use high-speed logic and also to derive phases from synchronous counters or shift generators rather than gating from toggle-chain counter types.

## Low-cost third-method ssb generation

The other highly-promising phasing method of ssb generation that does not require close tolerance components is the digital form of Weaver's "Third Method". Further information has come in about the generator outlined by A. de Muijnck in *Electron* and reprinted in *TT* (October 1974). It will be recalled that Joe Cropper, G3BY, successfully implemented this system (*TT*, January 1975). It now transpires that nobody was more relieved to learn this than Dick Rollema, PA0SE, in whose *Reflecties* column it originally appeared. For as he put it:

"I was slightly worried when I saw the ssb generator reproduced in *TT* because in my Dutch text I had warned that this was a paper design only. Usually I refrain from publishing untried circuits, but I made an exception this time because I found the idea so intriguing, though I warned that the single-section audio filters would probably be found unsatisfactory for proper suppression of the unwanted sideband. So it was with some relief that I learned that Joe Cropper—he must be an avid experimenter—was actually producing good results. It shows that either A. de Muijnck is a first-class designer or that modern integrated circuits are so safe that one can hardly go wrong!"

As though to emphasize this further, a day or two later a note from G3BY brought further welcome news of the results being achieved with this convenient and inexpensive design, plus some suggestions on the topic of the audio filters. He writes:

"The exciter has been in use here since writing the first notes and is now on 1·8 and 3·5MHz; it could readily be extended to other bands but I rarely use other than cw on hf bands above 3·5MHz.

"The TBA120 balanced modulators on the audio section are virtually perfect and there has been no need to readjust them, other than for satisfying myself that they had not drifted; they get massive help from the audio filter. The rf balanced modulators do drift from null but settle down after about 20min; in my case the adjusting potentiometers for these are brought out to the panel so this is of little consequence, although it would be useful to try purpose-made balanced modulators in this application, where the problem is only the same as has been overcome on ssb rigs generally.

"I am satisfied that this is, or should be, the system of the future; it is very tolerant of maladjustment and does not need expensive parts. There is *no* unwanted sideband—and what filter system could offer this? As pointed out in the original *Wireless World* article on the third method (January 1959), even the complete disabling of one channel will only result in equal speech and inverted speech in the same sideband: the transmitted bandwidth remains the same, so that the only one to suffer is the user—and even then the transmission is still readable as the brain tends to ignore the inverted speech (I have had the two channels in the ratio of 2 to 1 (amplitude) with no comments on the transmission until invited). The inverted speech is precisely in step with the wanted speech and is far less noticeable than might be thought.

"I have received several enquiries, chiefly as to where the inductors for the audio filter can be obtained. Here again the tolerance of the system appears. I was digging around for transistor transformers and the like when I came across two ex-Government chokes, quite small and which measured about 100mH as against the 500mH specified in the Dutch circuit. Capacitors were found, with the aid of an audio oscillator, which provided a cut-off at 1·6kHz. They were quite satisfactory and earned good reports of audio quality but in spite of being hermetically metal-sealed they did pick up some hum from nearby mains transformers. This was audible only to me but in view of the enquiries it persuaded me to try ferrite pot cores: Siemens "Siferrit" 14mm by 8mm core B65541 K0000-R030 (available from Electrovalue). These have a high inductance constant ($A_L$), but are wide tolerance so that some adjustment of turns is necessary to match the inductors. The cores will take about 520 turns of 42swg enamelled wire (mounted in a 4:1 ratio hand-drill). After adjustment these were about 300mH and, again using suitable capacitors, gave the required results and no hum pick-up.

"Larger sizes of core with 3 per cent tolerance are available with adjusting screws but having lower $A_L$. Inductance is given by $A_L \times n^2$, where $n$ is the number of turns, the results being in nH (1nH = 0·001μH), This may seem a small value but the nH soon mount up with $n^2$! A preliminary trial of one of these cores gave 70mH, which was rather too small and proved difficult to obtain good results, but clearly any value between about 100 and 500mH can be used. Equality of amplitude can be obtained by using series resistors (minipots) in one or both channels.

"On the general topic of high-frequency working of digital flip-flops, this question was discussed by G3UFP in *Wireless World*, September 1973, and one possibility is the SN74S112, which is listed by Burns Electronics at £1.80. I use one in a counter and it operates up to 130MHz (nominal value is 100MHz); it is a dual JK flip-flop but the pin connections are not the same as for the 7473.

"The audio oscillator used in my third-method generator may be of interest since it is simple and provides an output suitable for triggering the 7473: see Fig 5. It requires a stabilized supply but in any case this is necessary for the generator.

"Finally I have just fitted the "huff and puff" stabilizer arrangement to the system. Now there is no drift, no carrier and no unwanted sideband—guaranteed to make you the most hated station on the band!"

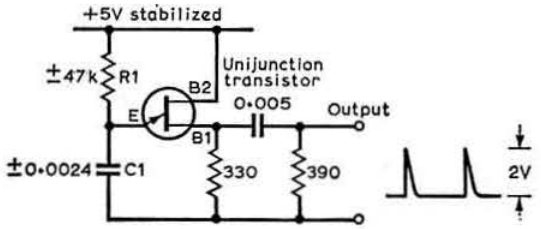



**Fig 5. The audio oscillator used by G3BY for the low-cost digital third-method ssb generator. R1 or C1 are selected to give 7·2kHz output (G3BY finds it better to select C1, which must be of good quality, than R1). The unijunction device was one of an "unmarked, untested" batch from J. Birkett of Lincoln and they all worked; in practice, almost any unijunction device should be satisfactory as the frequency depends upon R1, C1 and the supply voltage**

There is a basic reason why the audio filters in a third-method generator can be quite simple: with a bandwidth of 300 to 3,300Hz and an audio oscillator of 1,650Hz, the lowest *unwanted* frequency is 300 + 1,650 = 1,950Hz, while the highest *wanted* frequency is 3,300 − 1,650 = 1,650Hz, giving a most useful gap of 300Hz that allows the filter to be relatively tolerant.

Since compiling the above notes, a letter just received from Mike Funnell, G3YQW, gives his experience of a bench trial of this third-method system (with slight modifications) for both transmit and receive applications: this will appear in more detail next month. One quick point is that he says the TBA120 is basically the same as the more readily available SN76660. Despite a few problems he considers there are definite possibilities for an ssb transceiver costing less than the price of a crystal filter.

## All-band composite "T" aerials

Not a lot of space for aerial topics this month, but we will try and squeeze in a couple of ideas for multiband hf aerials, both drawing on the "T" principle.

Necessity led Bob Roberts, G2RO, to develop the composite, cut-and-try compact all-band (1·8 to 28MHz) arrangment shown in Fig 6, and applicable where there is a single high support point near the shack.

ABC, with an included angle as large as possible and with AB equal to BC, is resonated with a gdo as an independent $\lambda/2$ on 3·5MHz. DE is separately resonated as an earthed $\lambda/4$ to the same frequency. B and D are then permanently joined and the aerial is complete.

The matching arrangements are conveniently selected by a two-band, six-way switch. On 1·8MHz, E is connected to the inner conductor of the coaxial cable through a series capacitor. On the other bands, E and the coaxial cable inner conductor are connected to coil taps on a switch-selected tuned circuit. The cut-and-try of the taps is adjusted for maximum current or voltage on the aerial and for minimum swr, simply as an indication that the system is working as planned.

On 1·8MHz the aerial forms a long $\lambda/4$ matched directly to the coaxial feeder by the series capacitor of a non-critical value—around 680pF for 50Ω cable. Being top loaded, it has high current at the high point. On 3·5MHz the aerial couples like a $\lambda/2$ but has a vertical $\lambda/4$ component coupled to a $\lambda/2$ inverted V, both with maximum current at the high point. On 7MHz it again couples as a high impedance, representing a $\lambda/2$ vertical coupled to a co-linear pair of sloping $\lambda/2$ sections. On 14, 21 and 28MHz it couples as an odd or even number of approximately $\lambda/4$ sections.

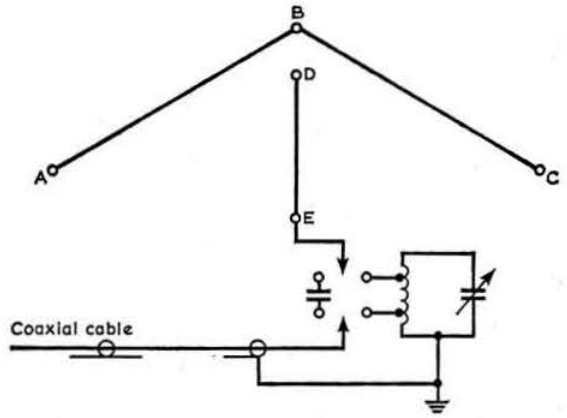



**Fig 6. G2RO multiband aerial for all bands from 1·8MHz to 28MHz. For dimensions see text. After adjustment with gdo points B and D are permanently joined**

On 1·8MHz it takes G2RO's 10W signals across the Atlantic. On 3·5 and 7MHz it forms a markedly competitive dx aerial. On 14, 21 and 28MHz it resonates tidily and radiates sufficiently.

The other system (Fig 7) comes from an article on L and T aerials by Hans-Joachim Brandt, DJ1ZB, in *QRV* Nr 2, 1975, and is based on a system used by DL2EO for 7 to 28MHz operation.

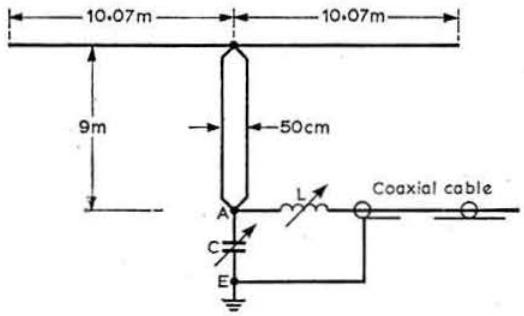



**Fig 7. "T" aerial used by DL2EO for 7, 14, 21 and 28MHz. The feed impedance (A-E) is given by DJ1ZB as: 7MHz 1,500Ω; 14MHz 800Ω; 21MHz 700Ω; 28MHz 600Ω. Suitable values for L and C are given as follows:**

| Band(MHz) | 7 | 14 | 21 | 28 |
|---|---|---|---|---|
| L(μH) | 6 | 2·3 | 1·4 | 1·0 |
| C(pF) | 80 | 50 | 40 | 30 |

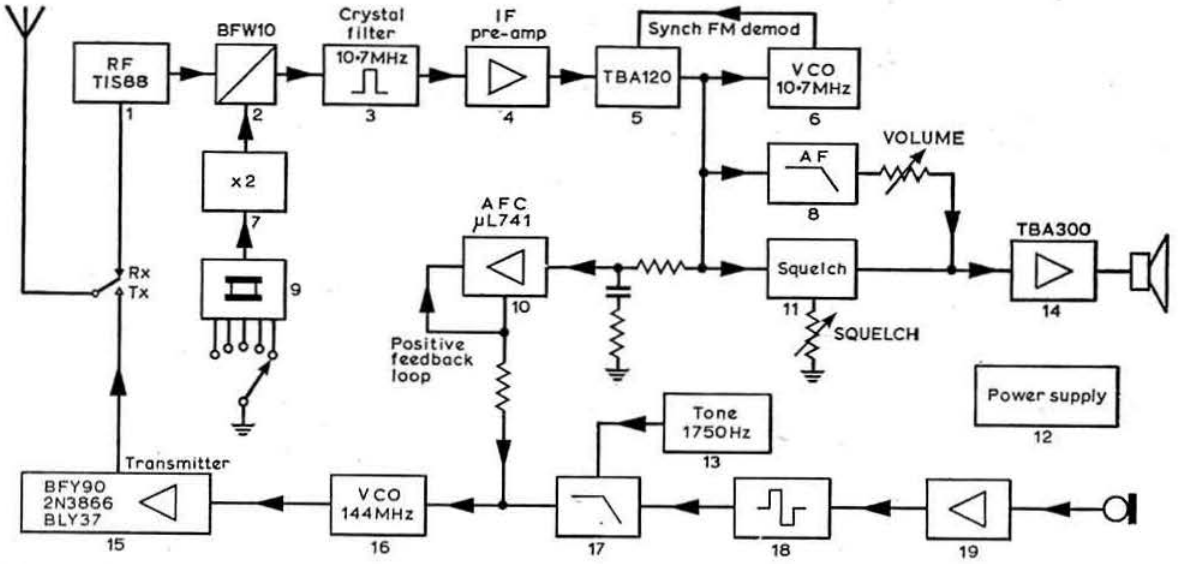



**Fig 8. Block outline of the Leiden group 144MHz nbfm portable/mobile transceiver using one crystal per channel and single-conversion receiver**

## Dutch 144MHz transceiver project

Dick Rollema, PA0SE, has also provided some notes in English on a most interesting group project undertaken by six Leyden amateurs and described in *Reflecties* in the November 1974 issue of *Electron*. The project has resulted in the joint production of six identical 144MHz portable fm transceivers, but with each of the six demonstrating his capabilities in one part of the operation. For example PA0EPS was responsible for the electronic design; one member the printed circuit layout; another the mechanical work, and so on. Each member of this amateur production line did the same job six times and the result, PA0SE reports, is six transceivers which are real beauties.

For example, in its basic portable form the rig is battery operated, but for operation in a car the battery block is replaced by a power amplifier module having the same dimensions as the battery and capable of providing 25W output from a 12V car battery, using a Philips BLY37 output transistor.

The transceivers are designed for five crystal-controlled channels and the block schematic is shown in Fig 8. A few highlights of the circuit design will be of interest.

The receiver is conventional up to the fm discriminator, which uses the TBA120 in a special way. Conventionally, the TBA120 would be used as a quadrature detector, but af output from an nbfm signal with a deviation of the order of 3kHz would be very low. In this design the TBA120 is therefore used as a phase detector in conjunction with a voltage-controlled oscillator (vco) that tracks the signal out of the i.f. amplifier. By making the sensitivity of the frequency to the control voltage low, a large control voltage variation is required to swing the vco over the 3kHz range. This control voltage simultaneously comprises the detected audio signal.

An even more unconventional arrangement is used in the transmitter, with a vco running at the required 144MHz output frequency: it is kept on channel by leaving the receiver on during transmission and then using the control voltage out of the phased-lock-loop fm detector *to control the transmitter vco*! In order to widen the capture range the i.f. crystal filter in the receiver is simply bypassed; in addition the i.f. preamplifier preceding the TBA120 is switched off to keep things under control. The 741 operational amplifier for the control voltage has a positive feedback loop around it that starts it oscillating so as to bring the loop within the capture range. Lock is acquired within a few milliseconds of the start of a transmission and during that brief time the output from the transmitter is blocked.

Some additional notes in *Electron* indicate that the crystal filter is a mobile radio type intended for 50kHz channel spacing; the receiver front end uses FETs and with only single conversion the dynamic range of the receiver should be good. The i.f. preamplifier uses a cascode amplifier with BFW10 fet and 2N221 bipolar transistor.

The Leiden six-man group responsible for this interesting project comprises PA0AXA, BM, EPS, HVA, PYL and RMW.

## Plastic low-noise microwave transistor

What is claimed as the first plastic low-noise gigahertz transistor has been introduced by Motorola as the type MRF901. This is listed as having a 2dB noise factor at 1·2GHz, less than 1·75dB at 500MHz, and less than 3dB at 2GHz. When used as an rf amplifier in front of a diode mixer it can result in an overall noise factor of about 3 to 5dB. Since collector current can be 20mA the device is stated to give low distortion and hence should provide a useful dynamic range. It has been introduced for uhf, vhf and community aerial television distribution amplifiers. Cost in the USA is given as being in the region of $9. □

# Building blocks for the novice

by SVEN WEBER, G8ACC*

## Diodes, diodes and diodes — and some experiments with them (Part 14)

### Negative-resistance devices

In the previous article, mention was made of the fact that every amplifier could be considered as the equivalent of a certain negative resistance. Measuring this peculiar quantity is often rather difficult, frequently having to be inferred rather than measured. Before this article gets under way, a short discussion on what is meant by a negative resistance could well be in order. What is it, and what does it do?

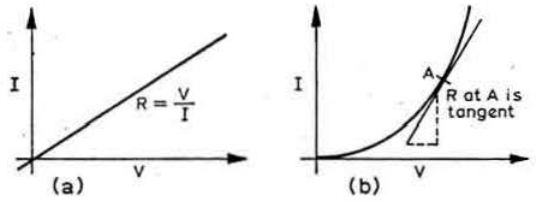



**Fig 96. (a) Linear and (b) non-linear positive resistances. In the non-linear case, the resistance at any point can be determined from taking a tangent to the curve at that point**

If a voltage is applied to an ordinary linear resistance, the current through it depends on this voltage, as in Fig 96(a) and likewise with a non-linear resistance, for example a diode, as in Fig 96(b). The resistance can be calculated, if it is not known, by dividing the voltage by the current in the linear case or, in the non-linear case, by taking a tangent to the curve at various points. The power absorbed by the resistance can also easily be calculated. These two types of resistance are said to be positive. If the curve (or slope) is similar to Fig 97, where the current drops when the voltage rises, the resistance is said to be negative. If two positive resistances are in series as in Fig 98, the proportion of the input voltage appearing across R2 is $R_2/(R_2 + R_1) \times V_{in}$. If R1 is a negative resistance, the result can be greater than unity, and goes up to infinity if the numerical value of the positive and negative resistances approaches equality. In fact, a positive resistance absorbs power and a negative resistance generates it. This implies getting something for nothing, or the old idea

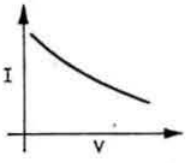



**Fig 97. Negative resistance: current goes down when voltage goes up**

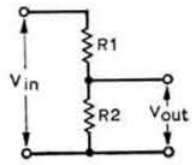



**Fig 98. Two resistances in series. I R1 is a negative resistance, $V_{out}$ can be greater than $V_{in}$**

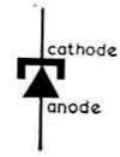



**Fig 99. Tunnel diode symbol**

of perpetual motion back again in a new form! Obviously, there could be no such thing as a negative resistance. However, if the additional power can be supplied to a device from another source, it might be possible to make something which does exhibit this quantity. From what was said above, it seems amplifiers do. In this series of articles only diodes are being considered, not controlled-current devices (like triodes or transistors and so on), and diodes do not normally amplify. Under certain conditions, however, as was explained in the last article, they can act as parametric amplifiers. Here the excess power was contributed from a pump rf oscillator. There are, however, some types of diode where the additional power is supplied by the dc bias and nothing else: tunnel diodes, backward diodes, Gunn diodes and so on. Tunnel diodes will be dealt with here as they are quite cheap (at least, some of them are!) and fairly simple to handle. Once one has an idea of how to cope with negative-resistance two-terminal devices, the consideration of other sorts of diodes showing a similar effect is not so difficult.

The symbol for a tunnel diode is given in Fig 99 and for the following experiments and discussion, a 1mA diode (1N2939 or 1N2940 or a similar type) could be used if available. A higher-current diode will have a lower value of negative resistance and could be difficult to "tame". The first thing is to find out the dc characteristics: arrange a circuit as in Fig 100. (Note that *all* connections around the tunnel diode should be as short as possible). The millivoltmeter across AB gives an indication of the current through the diode and although the voltmeter across BC measures the voltage

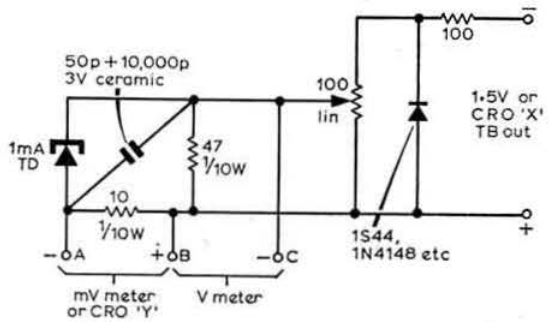



**Fig 100. Circuit for determining dc characteristics of a tunnel diode (in this case, a 1mA diode)**

* 132 Murray Road, Rugby, Warwickshire.

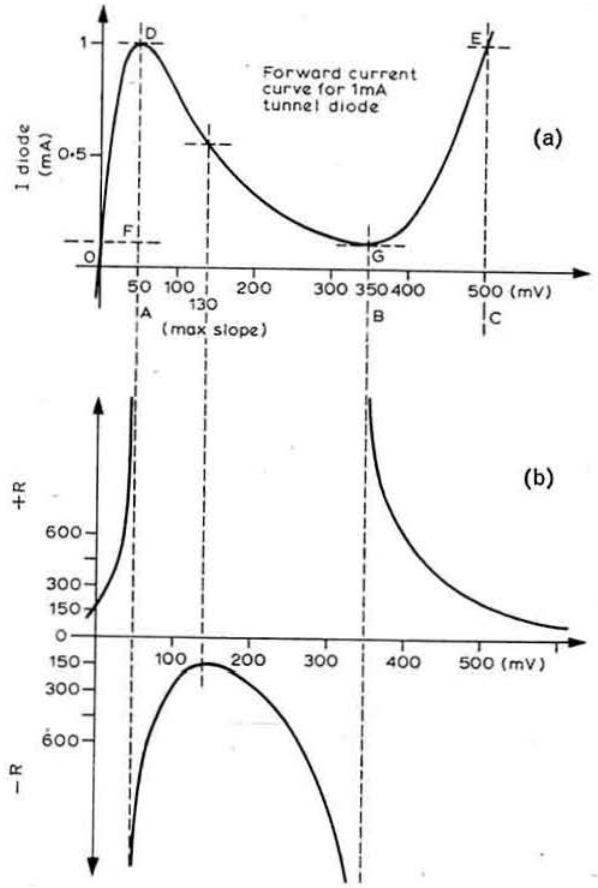



**Fig 101. (a) Forward current curve for a 1mA tunnel diode; (b) Resultant effective resistance (ac) curves**

across both the diode and the 10Ω resistor, this is sufficiently accurate for present purposes and avoids the danger of the diode "taking off", as it could do easily if there were too much inductance around its terminals. The forward-biased diode in the right-hand part of the circuit is for safety because it is very easy to burn out a tunnel diode. Plot a series of voltage/current readings at 25mV (preferably 10mV up to 100mV) intervals going up to 600mV on linear graph paper. Alternatively, if a cro is handy which has a low-resistance X-timebase output of about 1V peak, this output could be applied as power for the circuit, and the Y input terminals connected to AB. Either way, if the diode is properly connected and the source power is in the correct direction, a curve such as Fig 101(a) will, or should be, obtained. The part between A and B in this curve has, as stated above, a negative (ac) resistance and the resistance value at any point can be obtained by laying tangents to the curve (see Part 2, May 1974), when a graph similar to Fig 101(b) will be the result. As a matter of interest, the actual resistance of the diode between A and B is still positive for dc and absorbs power: it is only negative in the ac sense, ie it is negative for *changes* in conditions.

Returning to Fig 98, a graph would be useful to get some

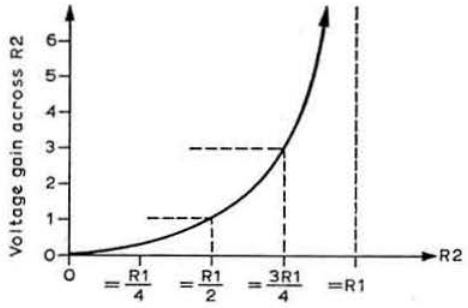
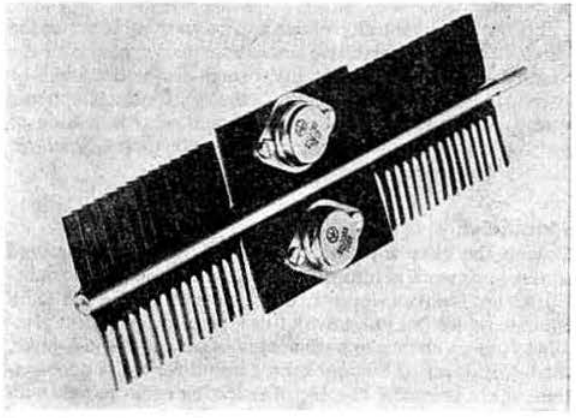



**Fig 102. Voltage gain across R2 in Fig 98 when $R_2$ is increased towards $R_1$**

idea of the voltage "gain" (that is, the proportion of $V_{in}$ across R2 when this is changed relative to R1, where R1 here is the diode negative resistance) and this is given in Fig 102. The negative sign that is produced at the end of any calculation of this kind up to $R_2 = R_1$ implies that the output is out of phase with the input. At $R_2 = R_1$, the gain goes to infinity. ie the circuit oscillates or switches, and with $R_2 > R_1$, the negative resistance part of the curve is overbalanced and the diode would switch extremely rapidly (in about 1ns) from either D to E (Fig 101(a)) or from G to F.

Part 15 will describe some practical tunnel diode circuits.

# NEW PRODUCTS



## Heat sinks

Conventional high-performance heat sinks are generally quite large and heavy, and where size and weight are of importance a series of heatsinks offered by Redpoint Associates Ltd provide an efficient, economical alternative. They comprise an assembly of twisted vane surfaces mounted on a tubular heat pipe. They can be mounted in any attitude and fixings are available for a range of devices. Further information and copies of the report *Redpoint Heat Pipes* are available from Redpoint Associates Ltd, Lynton Road, Cheney Manor, Swindon, Wilts SN2 2QN.

# FOUR-TWO-SEVENTY

by MARTIN DANN, G3NHE*

THE icy blast from the north which heralded what we laughingly call "spring" did little to improve conditions on the vhf/uhf bands. However, G3IPV of Norwich noted the occurrence of an auroral opening during the early evening of 27 March, which helped to lighten the gloom. The first station heard was GM4CXP at 1600gmt, followed by SM6ENY, SM6CJK, SM6GYB, UR2RDR and G3LQR; the opening ended around 1750gmt.

The same opening gave G3JIJ his first G QSO from his GM/P location on the Island of Lewis in the Outer Hebrides. With Jon, the opening lasted from 1704 until 1830gmt, but he also noted a repeat on 31 March.

## Aurora warning scheme

The DUBUS organization in Berlin has originated an aurora warning system, and has got the Continental end pretty well tied up. The RSGB Scientific Studies Committee has undertaken to organize the UK end of the chain and is looking for active 2m operators to take part in the exercise. The system works by having a chain of activating observers, starting in northern Sweden and Norway, and spreading out to cover all Europe. The most northerly observers, on detecting auroral activity, activate the next line of observers to the south of them by telephone. They monitor 144MHz but do nothing until they too hear signs of an opening, when they, in turn, alert the next links in the chain. In this way it is hoped to avoid false alarms caused by small localized auroral openings.

It is not intended to introduce a mass warning scheme; the idea is to alert representative active operators spread over the country so that by their activity, others on the band will be warned to beam north. Anyone who has the time, a telephone, a reasonable take-off to the north, and who is willing to become a link in the chain, should write to the Scientific Studies Committee, c/o G2FKZ, QTHR.

## Sporadic-E

Due to the ease with which modestly-sited low-powered stations can work extraordinary distances during a sporadic-E opening (contacts over 1,000 miles with hand-held QRP equipment are not unknown), this type of propagation gives all vhf users a chance to participate. As we know, the E-layer, the lowest layer of the ionosphere useful for radio propagation, is not normally capable of reflecting radio signals with frequencies higher than a few megahertz. However, at times of intense sun exposure (May to September in the northern hemisphere) patches of a much higher level of ionization can build up at sporadic times and places, giving rise to anomalous propagation, and while this is merely short skip on 28MHz it is extremely useful to the vhf user.

Walter Ertelt, OE1WEB, of Vienna, has been observing such phenomena since 1962, and is keen to encourage more use of these openings. To this end he passes on a few tips on how best to be prepared, and how to use the "Es" when they occur.

1. Be alert from mid-May to mid-July.

2. The most likely times for an opening to occur are between 0900 and 1600gmt.

3. The rising muf can be observed by first watching for interference with Band 1 tv stations. When this is noticed the fm Band 2 can be checked, and when distant stations are identified it is time to start looking on 2m. UK stations will also be able to look for ZB2VHF on 4m if the lift is in the right direction. Identifying the location of distant fm stations on Band 2 will give an indication of which way to point the 2m beam for best results.

4. Although sporadic-E openings can occasionally last a couple of hours, it could be as short as a few minutes, so such contacts should be kept as short as possible. It is also wise to use international phonetics.

5. It is not necessary to use high power. As mentioned earlier, contacts using 1W hand-held equipment were made during last year's big opening: a good reason for carrying a little 2m portable rig about during the summer months.

Should any openings occur this season, OE1WEB will be calling in the most hopeful direction using 144·200MHz ssb and 144·600MHz fm. For those who are crystal-controlled, Walter will tune the band, replying on the calling station's frequency.

## FM channel

To help those intending to use the London repeater, GB3LO, the UK FM Group (London) have issued an information sheet entitled *GB3LO Without Tears*. This explains how the logic has been designed to operate, and just what modulation parameters the device will accept. As the leaflet points out, repeaters are still in the experimental stage and further modifications and developments can be expected, but the information contained in the publication is obviously going to be valuable to prospective GB3LO users. It can be obtained by sending 5p in stamps, together with a large sae (preferably 12in long) to Richard Street, G3TJA, 3 White Ledges, Ealing, London W13 8JB.

The 750ft asl height of the aerial gives GB3LO a theoretical line-of-sight range of 50 miles, and although the contours of the land will obviously affect the range, it is clear that everything said through the repeater is going to be heard by many listeners—good reason, say the authors of the information sheet, for adopting the adage, "engage brain before putting mouth in gear". They also suggest that it would be a good idea for newcomers to repeaters to spend some time listening to others using the device before plunging in at the deep end.

Formed in January 1975, the North Western Repeater Group has now come up with proposals for a 2m repeater to be sited at Hameldon Hill, near Burnley, Lancashire. The proposed channel is R7, and the suggested callsign is GB3RF. The repeater would serve north-east, south-east and central Lancashire as well as the northern part of Greater Manchester.

* 49 Windermere Court, North Anston, Sheffield S31 7GJ.

G4ALG of Reading finds it hard to understand why certain newcomers to the 2m band find it necessary to use, out of all the frequencies available to them, the fm calling channel on 145·5MHz for local ragchewing. He finds this quite a problem in his area, and makes the suggestion that, under these conditions, S21 (145·525MHz) becomes the temporary calling channel.

## Keyboard news

The vhf/uhf bands are now represented in the British Amateur Radio Teleprinter Group's quarterly newsletter by a column entitled "RTTY 70MHz and up" by David Evans, G3OUF. One of the problems he raises in his first issue is that of keying speed, and it has been agreed to wait until the outcome of discussion on this point at last month's Region 1 IARU conference is known before giving any recommendation as to whether 45·5 or 50 bauds is adopted for vhf rtty in this country.

David reports that 2m rtty is increasing gradually, and there are now between 50 and 100 stations operational. The BARTG advocates the use of Sundays between 3pm and 9pm on 144·6MHz for the main activity period, and they strongly recommend the use of fsk to facilitate medium and long-distance contacts. Although different groups around the country use different speeds and shifts, it is hoped to unify standards over the next few months.

From G3LEQ, Gordon Adams of Knutsford, Cheshire, comes news that the rtty net in the north-west continues to grow. Regular meetings occur on 144·6MHz at 3pm and 8.30pm on Sundays, and at 8·30pm on Thursdays, using 170Hz shift fsk at 50 bauds. The frequency of 145·3MHz is mainly used for afsk with 2,125Hz as the *mark* tone and 2,295Hz as the *space* tone.

Some success has been achieved using the Oscar satellites, including a two-way contact between G8DVR and G3MWI through Oscar 6 using 170Hz narrow shift, in spite of the problems created by the Doppler shift. G3LEQ wonders whether this is a "first" for narrow-shift rtty via Oscar.

Finally, Gordon makes a plea for fm stations to avoid 144·6MHz, which has long been included in the band plans as an rtty frequency.

## Contest comment

It is often said that it is a great advantage when operating in contests to have a callsign that attracts attention, such as GM or GW, and with the added bonus of superb sites some of the groups who take to the Welsh mountains are certainly hard to beat. All credit, therefore, must go to G3XDY and G3ZSS who, signing G3XDY/P from the Lincolnshire Wolds, amassed a useful total of 482 contacts during the March 144MHz Open Contest.

Of the 482 contacts they worked, only two were on cw, the rest being on sideband, and Peter Bacon, G3ZSS, wonders where all the cw disappears to during contests. He is sure that more, and better, dx could have been worked had more stations been prepared to use the key.

The 70MHz Open on 5-6 April must have been a disappointment to those brave souls who took to the chilly heights, just as it was to those who endured the low level of activity and poor conditions from the comfort of their home QTH. Mike Gibbings, G3FDW, bemoans the early date of this major 4m event, pointing out that, although the spring weather has been unusually severe this year, in the north of the country it is not at all uncommon for conditions to be very harsh in early April at the sort of elevation portable stations are wont to head for. Mike anticipates a poor entry for this event, and hopes that it will not lead to any further reduction in the attention paid to this band by the VHF Contests Committee.

The rules for the annual RSGB Region 1 VHF Contest on Sunday 22 June (0900 to 1700gmt) show two interesting changes from those of last year. One is the introduction of a multiplier of 1·5 for 70MHz, and the other is the inclusion, for a trial run, of a separate 23cm section. Region 1 Contests Manager G2CUZ hopes for more entries this year, making the point that however well events of this sort are supported, they tend to be judged by the number of logs received.

Jim Edgar, GI8JWG, reminds us that there *is* another point of view, and there are those who see no merit in contests at all. He would have preferred some kind of activity table which, he feels, would tend to spread activity out rather than concentrating it into the occasional weekend with long blank periods in between.

## Four metres

The direction to beam for a 4m cw contact would seem to be towards GM, where the cw end of 70MHz regularly springs into life. GM3MXN has recently worked or heard GM3ZBE, 4DGT, 4BYF, 3HNE, 3HBT, 3ULP, 3NRP, 3UDJ, 4AOR and 3NKG, with G3JYP as the sole representative south of the border. Also known to be active are GM3OBC, 2BRA and 3GIG. GM3MXN invites frustrated 2m cw stations to move onto 4m and join them most evenings, conditions permitting.

G4ALG is all for encouraging activity on 70MHz, and is in favour of activity periods on Sunday mornings and Wednesday evenings. He would, however, like to see this concept carried a little further and modified to promote activity at a specific time *every* evening, and he suggests 8pm. What say 4m users?

G4CNY is now active on 70MHz from Hereford, running a Magnum Four transverter to a 4-el Yagi. Stuart Jesson would be pleased to hear from anyone wishing to work the new Hereford and Worcester county on 4m.

Many 4m men will be saddened by the news of the sudden death of Norman Guy, G2DN, on 4 March. Norman was a real 4m enthusiast and will be sorely missed on the band.

Observant users of 70MHz within range of the Sussex beacon, GB3SX, will have noted that despite the new nominal frequency being 70·685MHz, it is (at least up to the time of writing) considerably low in frequency, coming out below 70·68MHz.

## A cautionary tale

Common Market or no, the happy state has not yet arrived when one can enter foreign countries with impunity while festooned with choice radio gear; there is a trail of red tape to be followed, as the team which signed F0DA from Cherbourg during the March 2m contest found to their cost.

G8AWM, G8FBG and G8AUU were the intrepid travellers, and they met *their* Waterloo at Le Havre. Due to a misunderstanding, they did not think it was necessary to declare the portable gear (including two FT101s) to the Customs officials, but unfortunately *les douaniers* thought otherwise, and the cost of this difference of opinion was a £50 fine for non-declaration of declarable items. Also, before they were allowed to take any of the equipment through the

Customs (some five hours of "discussion" later) the team had to leave a £120 deposit, *plus* one of the FT101s. The deposit and FT101 were returned to them on their way home, but the £50 fine was not, so anyone contemplating taking radio equipment into foreign parts would be well advised to make sure that they have all the appropriate paperwork before doing so, otherwise it could turn out to be an expensive trip.

## On the air

Unusually, the call "CQ on two metres" was to be heard on BBC Radio 3 during a recent "Study on Three" programme. The occasion was a session on the art of communication, from pigeons through letter writing to amateur radio. To demonstrate the last named, G8PX of Oxford was interviewed, and it was his voice that was heard over Radio 3. Manfully, he did his best with the inevitable fatuous comments about "ham radio", and the equally inevitable extract from the unfortunate Tony Hancock "Ham Radio" record which the BBC producer apparently regarded as an essential part of the proceedings.

Another well-known vhf man who recently modulated the BBC kilowatts was Angus McKenzie, G3OSS. His counsels as an audio expert were sought in the "Nationwide" feature in connection with the speech processing of a telephone call received in the Whittle murder case.

## Expeditions

The Cambridge University Wireless Society will be out and about again this year, and hope to be active from sites in central Scotland during the period Monday 9 June until Saturday 14 June. They hope to have high-power ssb/cw on 2m and 4m, and medium-power ssb/cw on 70cm. Proposed operating times and frequencies are 8pm to 11pm on 144·17MHz (±10kHz) or 144·05MHz for cw, and 8am to 9am on 70·2MHz ssb and cw: 4m will be used at other times on request, and times for 70cm will be announced on 2m.

The callsigns used will be GM6UW/P (2m), GM4CIK/P (4m) and GM4CDF/P (70cm) and during the journey the call G(M)8IBO/M will be used on 2m ssb. Two transceivers are planned, which should allow simultaneous operation on two bands. Requests for skeds for 4m and 70cm will be welcomed and should be sent to Ken Vickers, G3YKI, Trinity College, Cambridge, enclosing an sae.

There is still time to write for skeds for the G5HD/G3WDG trip from Bristol to the Scottish border on 4m, 70cm and 23cm. The dates of the expedition are 25 May to 1 June, and sked requests should go to G5HD, QTHR.

After the mountain rescue authorities had advised against the project due to the unusually severe weather, GM8FVC and company regretfully had to call off their "three UK peaks" expedition. They wish to apologize to any who may have listened for them on 5 April, and have rescheduled the attempt for Saturday 5 July, the timings remaining the same as published last month.

Details of another welcome 4m trip by G3VPS have been received, and this year Peter Lennard will be following the cyclists in the Milk Marketing Board's "Milk Race" around the country. Operating will be on cw/a.m., and possibly ssb, on 70·165MHz, and the itinerary is: Monday 26 May, Dorset; Tuesday, Gwent; Wednesday, Mid-Glamorgan; Thursday, Hereford and Worcester; Friday, Salop; Saturday, Merseyside; Monday 2 June, Lincs; Tuesday, North Yorks; Wednesday, Humberside, and Thursday 5 June, Cleveland. Skeds are most welcome and requests for these should go to G3VPS, QTHR.

GM8BBA writes to keep us up-to-date on the continued attempts to keep activity going from the Outer Hebrides. GM8HXQ/P was active from North Uist during the March 2m contest using high-power ssb, and worked into Lincolnshire despite the unexceptional conditions. Many G stations were heard and called but, as most of them were crowded around the calling channel, GM8BBA suspects that the GM8HXQ/P signal was being lost in the QRM.

The same callsign will be used from North Uist during the May/June 144MHz portable event, but they will transmit around 144·28MHz in an attempt to avoid the QRM.

Also in the Outer Hebrides—this time on the Island of Lewis—G(M)3JIJ hopes to be active, as he was over Easter, during August on 144·17MHz, 2000gmt onwards. Jon Hague also heads for the hills, rucksack portable, each Sunday morning around 1200gmt, the location being Pen-y-Ghent in North Yorkshire.

## Awards

The latest list of FMD Awards received from the vhf awards manager is as follows:

**70MHz Transmitting:** certificate No 114 to G3VHH of Chigwell, Essex.

**144MHz Senior Transmitting:** No 73 to G3NAS of Aldridge. His claim includes no fewer than nine verifications from GM8AGU/P for the 1971 Scottish expedition and 11 for the '8AGU trip in 1973.

**144MHz Ordinary Transmitting:** No 430 to G8FDL; No 431 to G8FBL/P; GW3KGD (dx to much of the UK) of Haverfordwest gains certificate No 432; No 433 to G3ZKE; No 434 to G4BRO; No 435 to G8IMV; No 436 to G8GMC who as A6657 earned a receiving award in 1972; No 437 to G8DHC for his old QTH at Bletchley.

**432MHz Ordinary Transmitting:** Les Hawkyard, G5HD, gains certificate No 110, the first for this band to be issued for some months.

**144MHz Listener Award:** the vhf awards manager was delighted to receive this claim from Mike Allmark, BRS35217, of Leeds, who now gets parchment No 30. The awards manager adds that he has a box full of certificate stickers for 4m, 70cm and 23cm, as well as 2m, simply awaiting claims from the receiving men. Only four certificates have so far been issued for both 4m and 70cm, and in view of the greatly increased activity on both bands—and especially the ease with which a 4m converter may be built from no more than three transistors—it is hoped that many more BRS and A members will concentrate on these bands.

## Miscellany

Malcolm Connah, G8IMF, apologizes on behalf of the Swindon and District Amateur Radio Club and Plessey Semiconductor Contest Group for their poor QSLing record in the past. Anyone who needs a card for a contact with G3FEC/A or GW3FEC/P should get in touch with G8IMF, QTHR.

G8IMF also reminds us that the Swansea beacon, GB3GW, is on 144·25MHz where it is suffering considerable QRM. He asks that stations try to avoid this frequency if possible.

Do not forget the VHF Convention at Whitton on 10-11 May—hope to see you there.

Finally, items for inclusion in the June issue to G3NHE as soon as possible please, and for July the deadline is 4 June. □

# MICROWAVES

by DAIN EVANS, G3RPE*

## VHF Convention

G3JHM has offered to organize a 10GHz testing facility at the convention, where equipment will be available for measuring the noise performance of receivers, checking frequency and for calibrating those most useful devices, variable attenuators. This is a splendid opportunity for testing your equipment before the start of the summer season, which promises to be a most interesting one.

## Amateur licences for above 40GHz

Last year the RSGB proposed to the Home Office a set of new microwave bands within the spectrum 40 to 275GHz to cover future amateur requirements. The Home Office has recently indicated that while it is as yet unable to come to a decision about these specific proposals, it is prepared to consider requests to work above 40GHz on the basis of individual applications. This of course is excellent news—provided that the licensing conditions are less restrictive than those currently in force for the 24GHz band.

The bands the RSGB proposed were as follows:

| Band | Harmonic relationship |
|---|---|
| 48– 49 | 2 × 24GHz |
| 72– 74 | 3 × 24; 7 × 10·3GHz |
| 165–170 | 7 × 24; 16 × 10·3GHz |
| 216–220 | 9 × 24; 21 × 10·3GHz |
| 240–250 | 10 × 24; 24 × 10·3GHz |

The main features of this plan, which is similar to the one put by ARRL to the FCC, are that all bands could be generated from existing 10 and 24GHz equipment, at least in principle, that all fall in regions designated as "non-allocated" at the Geneva Convention, and that all are subject to fairly low atmospheric attenuation. These frequencies would therefore be a good basis for any requests to the Home Office.

## GB3IOW—the first 10GHz beacon

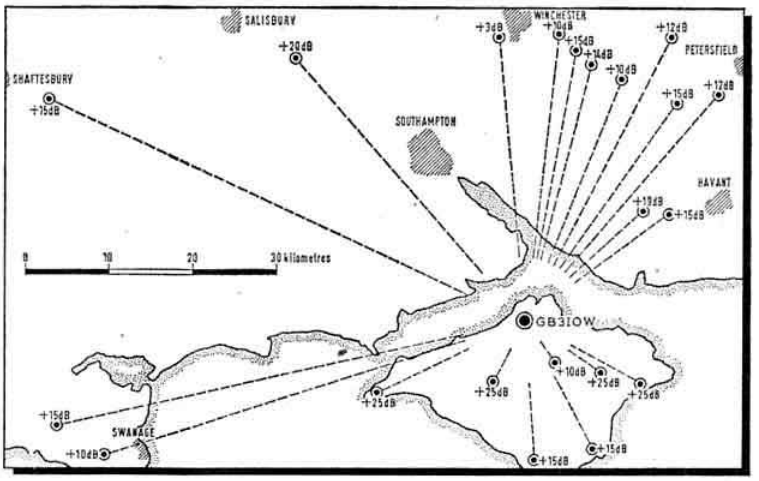
GB3IOW recently went on the air from a temporary site at Cowes. G8DEK, G3JHM and G3KSU have monitored it from a number of points along the south coast at distances up to 65km. All used receivers of similar sensitivity: aerials having a gain of about 20dB, noise factors of around 10dB and i.f. bandwidths of about 200kHz. The signal strength at each point was measured by increasing the attenuation of a calibrated attenuator fitted between the aerial and the receiver until the signal appeared to disappear into the noise, and these values are shown in Fig 1.

G8DEK also has monitored it regularly from his home in Winchester. This 35km path is definitely non-optical, there being an obstruction consisting of some tens of feet of ground topped by 50ft of trees. Nevertheless the beacon can be heard at all times when using a dish 18in in diameter. An interesting observation is that the signal strength usually increases by a few decibels in the early evening.

The beacon consists of an 80mW Gunn oscillator on 10,100 ±1MHz which feeds an omnidirectional aerial. This has a gain of about 11dB and was designed and built by G4BGP. The transmitter is frequency modulated by a keyed 1kHz tone. At present the beacon is being operated from a site in Cowes to check its reliability. This is only about 230ft asl, and the aerial is only 30ft agl, which is insufficient to clear all local obstructions.

(**Stop press.** Since 3 April the beacon, for which G3KSU has been mainly responsible, has been operating from its permanent site at St Catherine's Point which is 800ft asl.)

Other reports on the beacon will be most welcome, especially if they include details of the site, eg its NGR, and of the equipment so that an estimate can be made of its sensitivity. □




**Signal strength measurements in decibels above noise of the new 10GHz beacon GB3IOW**

* 4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

# THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

FOR a very long time it has seemed to your scribe that the absence of so many British stations from the bands during the evening hours might be due to the influence of television. However, he has secretly suspected that it is not the quality of the programmes that causes operators to stay off the air but the fear (sometimes justified, but infinitely more often not) that tvi would be caused if they did transmit. This is an unhappy and defeatist state of affairs and *MOTA* readers are urged to study this special interference issue of *Radio Communication* and to complete and send in the accompanying questionnaire.

Listener readers are invited to contact the HF Contests Committee with any ideas which they may have concerning ways in which the Society's contests could be made more interesting and attractive to them. Please address your suggestions to M. Harrington, 123 Clensham Lane, Sutton, Surrey, SM1 2ND.

## Top band news

W5RTQ has recently been investigating world long-distance records on 160m and his results have been passed on to your scribe by courtesy of G6CJ. The figures have been worked out using an electronic calculator with eight-digit accuracy and are as follows: G6GM-ZL3GQ (in 1955, G6GM using battery power) 11,940 statute miles. G6GM-ZL3RB (also in 1955) 11,902 miles. G6CJ-ZL3GQ 11,805 miles. G6CJ-ZL3RB 11,781 miles. EI9J-ZL3GQ 11,764 miles. JA5DQH-PY2FUS 11,719 miles. The greatest distances from the USA are from W1HGT to VK6HD (11,616 miles) and from the latter to W1BB/1 (3·6 miles less!) The farthest north-to-south contact seems to have been that between KL7HEE and a VP8 at Halley Bay, a distance of 10,955 miles.

## USA callsigns

*Official Bulletin* No 527 received from ARRL notes that FCC has made a number of new prefixes available to the amateur service. The blocks N1-N0, and AA1-AL0 will be available for assignment after 25 April. Callsigns with a single-letter suffix will also be available for the first time. Those with an "X" as the first letter after the call area designator will continue to be given to stations in the experimental radio service. It is believed that the new regulations will set the stage for the issue of special callsigns during 1976—the bicentennial year of the USA.

## News from overseas

Alva Excell, G4DII, is with the Royal Navy at Diego Garcia in the Chagos Is. He is using the callsign VQ9SS and has an FTDX401 transceiver with dipoles for 14 and 21MHz. Operation on all bands 3·5 to 28MHz was anticipated and Alva will be on the bands most days. He says that the best time for European contacts seems to be between 1200 and 1600. VQ9SS should be on the air until spring 1976 and it is thought that this may be the first full VQ9 callsign used from Chagos (other operators, such as the Americans, use their own callsigns /VQ9).

Brian Rous, G3RHL, is now back in the UK following his spell of activity in New Zealand as ZL1ACX. He has written to say that he has enjoyed his 15 months in a very pleasant part of the world, during which time he has been able to keep regular Sunday schedules with G3SZC and others. Much pleasure was also obtained from taking part in the Pacific DX Net on Tuesdays and Fridays at 0600 on 14,265kHz.

Barry Scarisbrick, G4ACK, at present at Gan in the Maldive Is, has a Trio TS515 and dipoles for 14, 21 and 28MHz hanging between two palm trees at about 15ft above ground. He also has a trap vertical and a long wire for 7 and 3·5MHz. He finds that even as VS9MAS he has problems in competing with kilowatts and processors!

BRS 35608 has forwarded a letter from TU2EF who was G3DHF before leaving the UK in 1956 to become a United States citizen. Hugh uses a Collins KWM-2A and is active mostly on 14, 21, 28 and 144MHz (the last named is used for Oscar), but also appears on 7MHz occasionally. He finds difficulty in conducting a proper contact without interference from breakers as very few Ivory Coast amateurs speak English and TU contacts are sought for DXCC. QSLs go via another Ex-G Radio Club member, WA6CEB, as the mail service is so poor.

## DX news

Stations in Truro, Nova Scotia, are using the prefix CH1 to celebrate their city's centenary. It is reported that all the JG1 series has been used up and that JI1 calls are now being issued. JH0 stations will also be appearing on the air from Japan in the near future. PI1ARU was the call used by PA0AA prior to 1 April, and after that date PI50ARU will be used to celebrate the 50th anniversary of IARU. 9G18AA was activated by 9G1AK and 9G1AR in mid-March and marked the 18th anniversary of Ghana's independence.

As mentioned in last month's *MOTA*, Father Dave Reddy, CE0AE, is back on Easter Is. It seems that he found some mail waiting for him from those who contacted him during his previous spell on the island some years ago. The situation is complicated as the call was used by another operator during the period 1967 to 1971.

K4DNU is on Midway Is and is trying to stir up interest in amateur radio among the military staff on the island. It is hoped to set up three operating positions and aerials to cover all bands 3·5 to 28MHz. The group is working through old KM6BI logs (some of which are missing) and trying to clear the QSL backlog.

There are two current VR3 licensees—VR3AJ, and VR3I who is Marty Vitousek from the University of Hawaii. The latter frequently visits both Fanning and Christmas Is. Robby, ex-VR1V/5W1AN/ZL1BKE, is now in the New Hebrides as YJ8AN.

KH6EVM/MM has been reported in the vicinity of Palmyra Is, and there is a possibility that he may move ashore

* 10 Knightlow Road, Birmingham B17 8QB

for a stay of several months. VK9XR/MM is an operator on a one-man round the world trip on a yacht. In early March he was giving his position as between St Helena and Ascension Is.

Fred Laun, who has held a number of different dx calls and who was kidnapped and ill-treated by bandits when he was in Argentina as LU5HFI, has been presented with the US Foreign Service Award for Valour by Dr Henry Kissinger.

Considerable activity in the Antarctic area has been recorded lately. XQ9BIJ is on the S Shetland Is and asks for QSLs via CE2AA. LU1ZA is on the S Orkney group and is often found on 14,297kHz after 0000. LU4ZS, who is on the Palmer Peninsular (Antarctica), favours 14,300kHz at 0100 and asks for QSLs via LU7DRL. LU1ZR is on Dunley Is, also in Antarctica, and uses the same frequency but asks for QSLs via LU2AFH. CE9AT (S Shetlands) keeps a schedule with LU2AFH daily except on Saturdays, Sundays, and Mondays on 14,210kHz at about 0100. He also uses 14,100kHz.

9L1JT leaves Sierra Leone in June and will become K4ZIN/5 for two years.

Japanese stations are said to be using the sector 3,793 to 3,802kHz now and to be expecting the use of the whole 80m band by 1980. Indian stations with special licences are using the VU1 prefix on the same band.

FB8XB, FB8XH, FB8XI, FB8XJ and FB8XK are now all asking for QSLs to be sent via F2MO. SM1CNS is no longer acting QSL manager of AP2KS as he has received no logs since March 1974.

LU4AHV is interested in 7MHz cw contacts with the UK. He has a modified BC457 feeding 100W into an inverted–V aerial and is active from 2300 to 0200 and from 0700 to 0800. Another 7MHz cw-only station, YN1LED, is also interested in British contacts and operates his Heathkit MT-1 between 2300 and 0200. OAN4AJI says that the OAN prefix is used by Peruvian novice licensees.

It is believed that FR7AI may come on the air from Glorioso Is as FR7AI/G late in May or early in June—rather earlier than originally expected. He will be there until July.

## Contests

**The USSR DX Contest**
2100 10 May to 2100 11 May.
CW only. 3·5 to 28MHz, Single-operator, single- or multi-band, multi-operator multi-band, and listener sections. Contestants send RST plus serial QSO number (from 001), and USSR stations reply with RST and their Oblast number. Contacts between different continents count three points, within the same continent one. The multiplier is the total number of "R-150-S" list worked—each counts once only—note that contacts with stations in one's own country count only for multiplier credit. Listeners score one point for recording one side of a contact, three for both sides. To be eligible for an award participants must operate for a minimum of six hours. Post logs before 1 July to PO Box 88, Moscow, USSR. Note that the various awards—R-150-S, R-100-O, Jubilee, W-100-U, R-15-R, R-10-R, and R-6-K—may be claimed without QSL cards if the contacts are made during the contest and shown in the log submitted.

**World Telecommunications Contest**
0000-2400 10 May (phone).
0000-2400 17 May (cw).

## QTH Corner

| | |
|---|---|
| **A4XVE** | G. R. Smith, via G4AJJ, Upper Bank, 161 Stepney Rd, Scarborough. |
| **C6AAN** | PO Box 1432, Nassau, Bahamas. |
| **W9MR/CE0** | via INDXA, Box 125, Simpsonville, Md, 21150, USA. |
| **F0RV/P** | via G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent. |
| **FP0MM** | via WA1JKJ, 147 Lincoln St, Franklin, Mass, 02038, USA. |
| **KF0UMD** | via WA0QIT, L. E. Taylor, 123 S. 65th Av W., Duluth, Minn, 55807, USA. |
| **KX6ZZ** | via VE3GUS, 72 Woodward Av, Thornhill, Ont, L3T 3R7, Canada. |
| **P29UC** | via WA7ILC, 561 Lone Oak Rd, Longview, Wash, 98632, USA. |
| **HB9AQM/TI9** | Aldo Diener, Box 48, 8406 Winterthur, Switzerland. |
| **TR8CM** | Max Carrat, PO Box 305, Libreville, Gabon. |
| **VK4AK/NI** | via W7OK, Box 95, Las Vegas, Nev, 89101, USA. |
| **VK6HG** | G2BOZ, Three Willows, Rushock, Nr Droitwich, Hereford—Worcs. |
| **VK9XR/MM** | via ON6GC, 2 Av de la Princesse, B-7358, Ville-Pommeroeul, HT, Belgium. |
| **VP1IL** | PO Box 790, Belize, Belize. |
| **VR3AJ** | Capt J. Watt, Fisheries Officer, Christmas Is, C. Pacific. |
| **VS9MAS** | via G3LQP, 56 Combe Rd, Tilehurst, Reading, Berks. |
| **XT2AP** | BP 112, Bobo Dioulasso, Upper Volta. |
| **YJ8AN** | Robby Beets, c/o PO Santo, New Hebrides. |
| **ZF1AU** | via WA4BTC, 275 Tollgate Trail, Longwood, Fla, 32750, USA. |
| **1S5MC** | via INDXA (see W9MR/CE0). |
| **3C1AGD** | via SM3CXS, Berghemsvagen 11, S860 21 Sundsbruk, Sweden. |
| **3D6BE** | PO Box 132, Mbabane, Swaziland. |
| **5L2JJR** | PO Box 1477, Monrovia, Liberia. |
| **5N2NAS** | Box 3034, Lagos, Nigeria. |
| **8R2AK** | Rev R. Pete, Plantation Providence, Berbice, Guyana. |
| **9G1BAA** | PO Box 194, Accra, Ghana. |
| **9M8TT** | Telecoms Training Unit, Jalan Batu Lintang, Kuching, Sarawak, Malaysia. |

**RSGB QSL Bureau, G2MI, Bromley, Kent, BR2 7NH.**

Organized by the Brazilian Ministry of Communication. Single-operator multi-band only—1·8 to 28MHz. Exchange RS/T and ITU zone. Contacts with own country count only for multiplier, with other countries in own zone one point (two on 3·5 and 1·8MHz), with other zones in same continent two points on 28, 21 and 14MHz, three on 7MHz, and four on 3·5 and 1·8MHz. Contacts with other continents count three on 28, 21 and 14MHz, five on 7MHz, and six on 3·5 and 1·8MHz. Final score is total QSO points times different ITU zones worked (each counts once only). Stations may be worked on each band for credit. Mail logs before 30 June to: Ministerio das Comunicacoes, DENTEL, Edifficio COTELB, 4. Andar, 70,000, Brasilia, DF, Brazil. (Mention of the ITU contest on the envelope may also be advisable).

**Michigan QSO Party**
1800 17 May to 0200 19 May.
Similar rules to above, but QSO counts one point, QRGs 3,540, 7,035, 14,035, 14,280, 21,035, 21,125, 21,380, 28,035, 28,125, 28,580kHz. Logs by 20 June to WB8FUO, 24101 Meadowlark, Oak Park, Mich, 48237, USA.

Results of the **1974 WAE DX Contests** have been received. In the cw section **G3FXB** came European fifth with 334,152 points. Other UK scores were as follows: G3KDB (232,271), G3SXW (100,101), G3ESF (54,372), G4BUE (38,535), G3GRL (32,900), **GM3CFS** (25,935) and G2AJB (960). In the multi-operator category **G4BTJ** (134,310) was the only British entrant. In the phone section G3GNC was the only single-operator entrant with 4,074 points. However, in the multi-operator single-transmitter class **G4DAA** achieved the distinction of coming European second with 684,204 points.

## Dxpeditions

A party of amateurs from the Glenrothes & District ARC is planning a trip to the Isle of May for the week-end of 9-12 May. All bands 1·8 to 28MHz will be used with the callsign GB3IOM. It is intended to carry out some propagation tests on the 3cm band via ducting over a sea path, and also to be active during the WAB LF phone contest on 11 May. The

island lies at the mouth of the Firth of Forth, and is in WAB area NT69 Fife. Special QSLs will be sent to all contacts. Further information may be obtained from GM3YOR (QTHR).

## Band reports

Considerable improvement has been noted by most correspondents, and your scribe is particularly pleased to have received reports from several new reporters.

Very many thanks to the following for submitting logs from which this section has been compiled: G2HKU, G4RZ, G5JL, G6GH, G3s GVV, NKQ, UOL, GW4BLE, G4DFN, GM4DGE, BRSs 17567, 17991, 25429, ORS 30694, BRSs 35413, 35608 and As 7056, 8088, 8312, 8428, 8713, 8752 and 8893.

Stations listed in italics were using cw, the rest ssb.

**1·8MHz. 0000** *KV4FZ*. **0400** WB8APH. **0500** *PY1RO*. **2100** *DJ6SI/I3*. **2200** HB0AZD.

**3·5MHz. 0000** CR4BS, *CT3HA*, PZs VP2DM, VU2BT, 5L2AK, 9Y4s. **0100** VP1FF. **0400** *GC5BLG/P* (DJ5UA). **0500** FP8DH, *FY0BHI*, VP5B, YVs, 9Y4NP. **0600** HH2V, *VP2KX*, W0GYH, XE3EB, ZLs *IDI*, 2BT, *3FZ*, *3GG*, *3GQ*, 4AV, 4KF. **0700** *HK0BKX*, **1900** OE2SCL/YK. **2100** A2CJP. **2200** DJ3DH/ET3 (QSL to DL6ME), UW0MF, W4EV/VP9, VS6DO, YVs, ZS5LB, W1CF/5N2, 5Z4LW, 9X5SP. **2300** AP2KS, EA9EL, HZs 1AB, 1KE, PA0IWH/S2, VE3CUD/SU, TA1HY, VP2s LL, MJ, SG, VU2GBF YB0ABV, 5L7F, 6W8DY, 9M2DQ, 9V1SH.

**7MHz. 0000** *CR7IZ*, *HP1AH*, *HK0BKX*, *TU2EF*, VPs 1FF, *2KK*, *2KX*, *5AH* (QSL to WA4DRU), VU2ABC, *5Z4LW*, *9G1BAA*, 9Y4VU. **0100** CR4BC, HC2BV, VUs. **0500** ZF1AU (QSL to WB4BTC). **0600** VKs, ZLs. **0700** *PY2ZZ/9*, *TI2PZ*, *TU2DD*, *VK*s, *VP2VL*, *ZLs*, *ZP5EC*. **0800** *FG7AQ*. **2000** JA2BAY. **2100** *JA2CG*, 4Z4HF. **2200** CXs, *JY9PP* (QSL to DJ2GW), VPs *2A*, *5AH*, *9HO*, *ZS5EL*, *9G1UB*. **2300** *CEs*, *CP*, *FG7*, *HI*, *OA*, *LU*, *PZ*, *TI*, *VK6IZ*, *XE*, ZP, ZS.

**14MHz. 0000** W6/W7s, *ZL3BQ*. **0600** OE2SCL/YK. **0700** *KL7s*, VKs. **0800** JAs, KL7IEU, KS6SFA, VKs, ZLs, 3D2AJ, 9X5MK. **0900** *JT1KAA*, P29CD, VP2AR, 5T5ZR. **1000** HM1HJ, VU2AID, ZLs. **1100** A4XFV, JAs. **1200** SV0WKK (Crete), 9M8VLC. **1300** FK8CA, UA9VH/JT1, VS6DO. **1400** AP2KS, DUs, *P29BG*, VE3CUD/SU, VK6s, W6s, 9M8TTI. **1500** CR8AB, JAs, VS5s DB, JS, VS9MB, YK1AA. **1600** JY9CS, *KG6JBE*, VS5MC, VQ9NLB. FH8CE, TJ1AF, VQ9SS/C, VU7GV, 5H3JL, 7X0WW (QSL via REF only). **1800** KH6s *CF*, OR, XW8s *BP*, HR, 4W1AM. **1900** FG7AM, *HZ3TYQ*, *KL7s*, VP8s *NP*, *NU*, *OA*, *OP*, VQ9s GP, HCS, *ZD7PS*. **2000** SU1MA, TR8BJ, VP8NO, *4S7WP*. **2100** *HH2WF*, HR6SWA, VP1s FF, MT, W6/W7s, *ZD8TM*, ZF1MA (QSL to VE3BWY), 3B8CV, 3C1AGD. **2200** *PJ2ARI*, *XQ3ED*. **2300** CEs, KC4AAB/MM, TR8VE, 9G1AR.

**21MHz. 0800** TA1HY, ZC4DI, LU2DZ/4U. **0900** VUs, *ZD7PS*, *3D6AX*, 9M2CJ. **1000** CR6s, FH8CY, JAs, *VS5MC*, 3B6DW. **1100** *JY9FOC*, *VP8NT*, VE3CUD/SU, VQ9NEW, OE2WSL/5B4. **1200** CEs, TU, VKs, VUs, ZEs, 9G1. **1300** *FR7BB*, JR3PYP/MM (nr ZD7), 3B8s, 3C1AGD. **1400** PYs, TR8BJ (QSL to DJ5DA). **1500** VP2s A, EEE, *VP8NT*, 7P8AT. **1600** CEs, *CV0Z*, OAs, TUs, VUs, ZD9BT, 5N2AAJ. **1700** VP5B, VQ9HCS, 5V7AR. **1800** *CE8AA*, OA8AH, 9L1JM. **1900** *5T5ZR*. **2000** HH2V, VE5. **2100** VP2s, ZPs.

**28MHz. 1000** *7Q7RM*, 9J2s (audible until 1400).

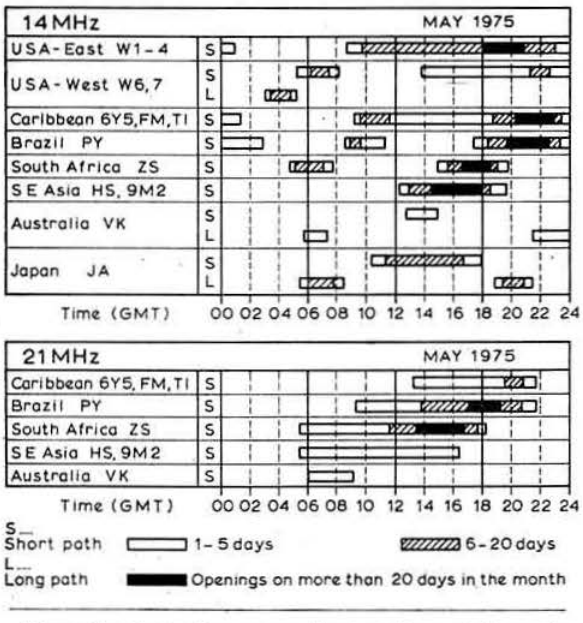
# Propagation Predictions

**Summer conditions become more and more dominant during May. As a result of short nights the F2 night frequencies are much higher compared with those of the winter months and the periods around the equinoxes, and this will lead mainly to an improvement in dx conditions on 14MHz during night-time. Because of low sunspot activity, 28MHz has no practical importance now for dx, but both 28 and 21MHz may liven up for short periods during the month with short-skip conditions over distances of about 700–1,800km. Traffic with North America and Japan will not be possible on 21MHz. Perhaps North America may be heard in conditions influenced by sporadic-E layer transmissions; the most favourable time for this should be around 1700 and 2000gmt.**

**Conditions for dx will improve remarkably on 14MHz, especially during late evening and at night. The summertime Es-short-skip conditions which may improve 28 and 21MHz will lead to some QRM on 14MHz, mainly in the afternoon or early evening. As 14MHz lies much lower than 28 and 21MHz there will be no interruption by the dead zone. So many more European stations should be heard on 14MHz than on 21 or 28MHz. Summer conditions will mean extra dx chances via the indirect path, especially with western North America and Japan. Traffic with western North America during the morning will only be possible after the middle of May, but should continue with a few interruptions till August.**

**The rise of summer time QRM will lead to a worsening of dx conditions on 7MHz, the most favourable time being the latter half of the night and early morning, provided the greater length of the path lies in darkness. Conditions on 3·5MHz will remain as they were in April, and the band will only seldom be interrupted by the dead zone.**

**The provisional sunspot number for March 1975 from the Swiss Federal Observatory was 12·0 with sunspot activity at a low level throughout the month. The predicted smoothed numbers for July, August and September 1975 are 16, 15 and 14 respectively.**




Many thanks to all correspondents, and especially to the authors of the following for items obtained from their publications: the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0TO*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), **World Radio News**, the **29 DX Club Newsletter** (*VK6WA*), the **Dx'ers Magazine** (*W4BPD*), and **Long Skip** (*Nick Sawchuk*).

Please send all items for June issue **to reach G3FKM** no later than **6 May**, and for **July** issue by **3 June.** □

# SWL NEWS

by BOB TREACHER, BRS32525*

## QRP

The mention of QRP in the last *SWL News* seems to have provoked some interest among listeners. George Dobbs, G3RJV, has had many enquiries from listeners and as a result has now sent details of the following two awards which are available to SWLs.

The "Heard QRP-C Award" is awarded on submitting written confirmation of the reception of 20 QRP Club member stations when the stations were using an input not exceeding 5W. Endorsements will be issued for proof of reception of each further group of 20 stations. "QRP Listener Award" goes to listeners who submit written proof of the reception of amateur signals from 15 countries, each station using an input power not exceeding 5W. Endorsements will be issued for each additional 15 countries. In addition, the club is hoping to issue a certificate for the best swl log submitted for the DL AGCW QRP Contest to be held in July.

Award claims should be submitted to: The Contest and Test Manager, Mr A. D. Taylor, G8PG, 37 Pickerill Road, Greasby, Wirral, Merseyside. If QSL cards are sent and are to be returned, 25p should be enclosed to cover the cost of postage. If QSL cards are not submitted, the applicant shall submit a list of the callsigns, dates, times, frequencies and modes of reception on which the claim is based. This should be signed by two licensed amateurs.

A complete list of members of G-QRP-C is soon to be published and will be available from George, G3RJV, upon receipt of an sae, at the QTH given in the March *SWL News*. In the meantime, however, SWLs may be interested to listen for the following stations who will welcome a report on 80m or 160m transmissions: G2NJ, G4AL, G8KB, G8PG, G2CAS, G2FWA, G2HKU, G2ANQ, G3BGR, G3CEL, G3CED, G3DBU, G3DNF, G3DOP, G3ENB, G3EPU, G3FCK, G3FMW, G3GET, G3IGU, G3JSP, G3KAN, G3KPP, G3KPT, G3LGX, G3NEO, G3RFE, G3RJV, G3UYM, G3WZA, G3ZNK, G4AYS, G4BCY, G4BKQ, G4CLN, G4CMY, G4CVE, G4DEP, G4DOU, G4DRZ, GI2DZG, GM3MXN, GM3RFR.

The G-QRP club is still expanding and is very interested in having listeners join it. Details of membership can be obtained from G3RJV, but swl material for publication in the club magazine *SPRAT* should be directed to Ken Bailey, G3EPU, 32 Strathearn Road, Wimbledon Park, London SW19 7LH.

## Postage rates

Now that the new postage rates have been announced, listeners are asked to send stamps to David Borne, G4CYW, so that their envelopes at the bureau can be updated. The new rates are as follows: 2oz–1st class 7p, 2nd class 5½p; 4oz–1st class 10p, 2nd class 8p; 6oz–1st class 12½p, 2nd class 9½p. David's address is "Roughways", Chub Tor, Yelverton, Devon PL20 6HY.

* 392 Rochester Way, Eltham, London SE9 6LH.

**1975 HF Countries Table**

| Station | 10 | 15 | 20 | 40 | 80 | 160 | Total | Mode |
|---|---|---|---|---|---|---|---|---|
| A8482 | 5 | 82 | 138 | 59 | 101 | — | 385 | ssb |
| A8312 | 10 | 54 | 108 | 68 | 98 | 25 | 364 | ssb/cw |
| BRS34658 | 4 | 8 | 64 | 45 | 94 | 7 | 222 | ssb |
| A8088 | 3 | 35 | 72 | 26 | 41 | 8 | 185 | ssb |
| BRS35754 | — | — | 38 | — | 51 | 1 | 90 | ssb |

## The mail

Mike Green, A8088, provides details of his radio activities last year. He seems to be quite interested in the contest side of the hobby, having entered four events, and obtained a first place in the Sheffield Contest. He also becomes involved in VHF NFD for the Mid-Cheshire Club each year. At home, Mike uses an Electroniques QP166 valve ham-band front-end with a CR100 as an i.f. strip into an audio filter. A ½λ dipole is in use for the hf bands, and a long wire for 40, 80 and 160m.

Dave Sharred, A8312, entered the swl section of the 1975 BERU Contest and amassed a reasonable score. On 160m he has JY (JY9FOC) heard on that band. Dave's top band total for 1975 numbers 25, all on cw.

When Keith Kerr, A8482, wrote he had just completed his second week's radio of 1975. He was on holiday from university where alas he has no receiver. Conditions, however, have been poor and during the 10m set listening period Keith heard only G stations working locally. Since 15m has been poor also, 20m has been fully used. The 40m band has just meant 9Q5BJ on ssb for Keith; apart from this solitary gem, *Radio Tirana* continues to dominate the band. One listening spell on 80m produced YB0ABV, 9M2DQ, KP4AN, 9X5PT, KV4FZ, PZ1AP, AP2KS and ZS5LB, all within one hour of each other at good strength. He also stumbled upon the Caribbean Net on 3,813kHz, signals peaking at 2330. VP2L, VP2D, VP2S, VP2G, FG7, 8P6 stations made up the group, and stations from VP1, FP8 and 9Y4 called into the group. 3C1AGD, the expedition to Fernando Poo, was also reported active on 20m but was not audible in G. Keith has recently received a QSL card direct from 9M8VLC. It was posted in Kuching at 1130 on 13 March and arrived at Keith's QTH two days later. Very speedy communication indeed!

Andrew Roberts, A8428, wrote asking for QSL information for 9K2DR. Bob has asked for QSLs via PO Box 2, Kuwait. The 1975 *Radio Amateur's Callbook* is now available in the UK and lists the QTHs of every dx station in the world. Alternatively, the 1974 *QSL Manager's Directory* is available at £2.50, and this lists the full QTH of each of 4,000 QSL managers. It is available from Geoff Watts, 62 Belmore Road, Norwich NR7 0PU.

## Tailpiece

Oscar contacts are not to be counted in the Countries Table, which is of course compiled from the RSGB countries list.

News, comment and table updates should reach the writer not later than Wednesday 28 May for inclusion in the July edition. □

# CONTEST NEWS

## IARU Region 1 VHF and UHF/SHF Contests

As last year, the September event will be held on 144MHz only, and we would like to see a much larger entry from UK stations. UK entries for the October contest will be judged and published as for any domestic events, and the RSGB will award its own certificates to the UK winners.

The **RSGB October UHF/SHF Contest** will take place at the same time as part of the IARU contest.

This year's organizing society is the Austrian national society OeVSV.

### September 1975 IARU Region 1 VHF Contest rules

The following rules have been extracted from the general rules for IARU Region 1 vhf/uhf contests:

**1. Eligible entrants.** All licensed radio amateurs resident in Region 1. Multiple operator entries will be accepted provided only one callsign is used. Contestants must operate within the letter and spirit of the contest and at no greater power than permitted in the ordinary licences of their country. Stations operating under special high-power licences do so *hors concours* and cannot be placed in the contest proper.

**2. Sections.**

(i) Fixed stations 144MHz

(ii) Portable/mobile stations 144MHz

Portable/mobile stations may not change their location during the event.

**3. Date and time.** 1600gmt on 6 September to 1600gmt on 7 September.

**4. Number of contacts.** Each station can be worked once only, whether fixed, portable or mobile. If a station is worked again only one contact will count for points, but any duplicate contacts should be logged without claim for points and should be clearly marked as duplicates.

**5. Types of emission.** Contacts may be made on A1, A3, A3j, F2 or F3.

**6. Contest exchanges.** Code numbers exchanged during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for each band and increasing by one for each successive contact. This exchange must be immediately followed by the QTH Locator of the sending station. (Example 579021YG46E.) QTHs may also be exchanged if desired.

**7. Scoring.** Points will be scored on the basis of one point per kilometre. The final claimed score must be shown at the top part of the first sheet.

**8. Entries.** Entries must be set out as shown in the example below. (See notes and VHF NFD Rule 19). They must be postmarked not later than 22 September and must be addressed to: The Chairman, VHF Contests Committee, 20 Harcourt Road, Wantage OX12 7DQ. Late entries will not be accepted.

**9. Disqualification.** Entrants deliberately contravening any of these rules will be disqualified. Minor errors may result in loss of points. Errors in callsigns and code numbers will be penalized by deducting the following percentage of claimed scores for both stations.

One error: 25 per cent. Two errors: 50 per cent. Three or more errors: 100 per cent.

The claimed contact will be disqualified for

(*a*) an obviously wrongly stated QTH when no QTH Locator is exchanged, or (*b*) a time error of more than 10 minutes.

**10. Judging.** Submission of a log implies acceptance of the rules. The decision of the organizing society is final.

**11. Awards.** The winner of each section will receive a certificate. The top scorer, whether fixed or portable, will be awarded the Region 1 VHF Trophy. The winner in the remaining category will be awarded the PZK Cup.

### RSGB UHF Open and SWL Contest rules

The RSGB October UHF/SHF Contest is open to both fixed and portable stations, and takes place at the same time as the IARU Region 1 contest. Since the rules are compatible, all entries for the RSGB event will be passed on to Region 1 for inclusion in the International listings.

The following general rules, published in the January issue of *Radio Communication*, will apply unless superseded below:

**1. Date:** 5-6 October. **Time:** 1600-1600gmt.

**2.** All entries and check logs to: VHF Contests Committee, c/o G2HIF, 20 Harcourt Road, Wantage OX12 7DQ.

After adjudication all entries will be passed on to IARU Region 1 as entries for the International UHF/SHF Contest.

**3, 4a, 5b, 6a.** Unchanged.

**7.** (i) Scoring will be at one point/km.

(ii) Separate logs and cover sheets must be made out for each band. Claimed scores should be multiplied by the following factors: 432MHz × 5; 1,296MHz × 25; 2·4GHz × 50; higher microwave bands × 100.

(iii) After multiplication, the scores should be tabulated, *together with the callsign and name of group if applicable*, on a vhf/uhf multiband contest summary sheet (obtainable from any adjudicator on receipt of an sae).

**8.** An award will be made to the overall winner and the band leaders.

**9a, 10a, 11-22.** Unchanged.

### RSGB VHF Open and SWL (Jubilee) Contest rules

Unless superseded below, the following general rules, as published in the January issue of *Radio Communication* will apply:

**1. Date:** 5-6 July. **Time:** 1600-1600gmt.

**2.** All entries and check logs to: VHF Contests Committee, c/o G3XHU, 94 Hermon Hill, South Woodford, London E18.

**3, 4b, 5a, 6a.** Unchanged.

**7.** (i) Operation will be on the 70MHz, 144MHz, and 432MHz bands using one callsign.

(ii) Contacts will be scored according to General Rule 7a (radial rings).

(iii) Separate logs and cover sheets should be made out for each band. Claimed totals should be multiplied by the following factors: 70MHz × 2; 144MHz × 1; 432MHz × 5.

(iv) After multiplication the scores should be tabulated, with the callsign, and the name of group if applicable, on a multiband vhf/uhf contest summary sheet (available from any contest adjudicator on receipt of an sae).

**8b.** An award will be made to the highest scoring station in each zone and to the runner-up in each zone in which there are more than 10 entrants.

**9a, 10a, 11-22.** Unchanged.

### 144MHz QRP Contest rules

**0900-1700. 27 July.**

All entries and check logs to VHF Contests Committee, c/o G2HIF, 20 Harcourt Road, Wantage, Berkshire OX12 7DQ.

The following general rules, published in the January issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9a, 10a, 11-22.

### RSGB 21/28MHz Telephony Contest 1975 rules

Radio amateurs and SWLs throughout the world are invited to take part in this contest for single-operator stations. Suitable contest log and cover sheets may be obtained from The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE.

Please note that this contest has been reduced in length to 12 hours and that the scoring system is now based on a system of multipliers.

**GENERAL**

A station, whether fixed, portable, mobile or alternative address may be logged only once on each band for the purpose of scoring.

**TRANSMITTING SECTION**

**1. The General Rules for RSGB HF Contests,** published in the January 1975 issue of *Radio Communication*, will apply.

**2. When.** 0700 to 1900gmt on Sunday 12 October 1975.

**3. Eligible entrants.** Single-operator stations only.
(a) Home section: RSGB members resident in the British Isles.
(b) Overseas section: Licensed amateurs in all parts of the world except the British Isles.

**4. Contacts** may be made using any telephony system for which the entrant is licensed on the 21 and 28MHz amateur bands. Stations may be contacted once on each band.

**5. Scoring.** British Isles stations may not work each other for points. Overseas stations may only claim points for contacts with stations in the British Isles.

(a) **British Isles stations.** Each completed contact will score three points. The final score is the total number of points multiplied by the total number of countries worked on each band. A country worked on both bands therefore scores two multipliers. For the purposes of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as a separate country.

(b) **Overseas stations.** Each completed contact with a British Isles station will score three points. The final score is the total number of points multiplied by the total number of British Isles prefixes worked on each band. A prefix worked on both bands therefore scores two multipliers. The British Isles prefixes are: **G** 2, 3, 4, 5, 6, 8,; **GC** 2, 3, 4, 5, 6, 8; **GD** 2, 3, 4, 5, 6, 8; **GI** 2, 3, 4, 5, 6, 8; **GM** 2, 3, 4, 5, 6, 8; **GW** 2, 3, 4, 5, 6, 8. Contacts with GB stations do not score for points or multipliers.

**6. Entries** should be sent to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. Entries should be posted to arrive not later than Monday 8 December 1975.

**7. Awards.** The Whitworth Trophy will be awarded to the leading Home Section entrant.

**RECEIVING SECTION**

**1. The General Rules for RSGB HF Receiving Contests,** published in the January 1975 issue of *Radio Communication*, will apply.

**2. When.** As rule 2 of the transmitting section.

**3. Eligible entrants.** The contest is open to all short-wave listeners throughout the world. All entrants agree to be bound by these rules.

**4. Scoring.** British Isles entrants may only log overseas stations working British Isles stations in the contest. Overseas entrants may only log British Isles stations in contact with overseas stations in the contest.

(a) **British Isles entrants.** Each complete log entry will score three points. The final score is the total number of points multiplied by the total number of countries heard on each band. For the purposes of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will count as separate countries.

(b) **Overseas entrants.** Each complete log entry will score three points. The final score is the total number of points multiplied by the total number of British Isles prefixes (as shown in rule 5 of the transmitting section) heard on each band.

**5. Entries.** As rule 6 of the transmitting section.

**6. Awards.** The Metcalfe Trophy will be awarded to the leading British Isles entrant.

## DF Qualifying Round—South Manchester

**Date:** 18 May 1975.
**Map:** OS Sheet 118—The Potteries, 1:50,000 series.
**Assembly:** 1300bst for start at 1320bst.
**Location:** Lay-by on A536 approximately 2¾ miles NNE of Congleton, NGR 876681.

This event is being organized by members of the South Manchester RC, and competitors requiring teas should notify Mr D. C. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire M33 3GW (Tel 061-962 2803) not later than 12 May. The club will present a prize to the competitor travelling the longest distance to this event.

## DF Qualifying Round—Stratford-on-Avon

**Date:** 1 June 1975.
**Map:** OS Sheet 151 Stratford-on-Avon, 1:50,000 series.
**Assembly:** 1300bst for start at 1320bst.
**Location:** Yarningale Common, NGR 189659.

This event is being organized by members of the Stratford-on-Avon ARS, and competitors requiring teas should notify Mr J. R. Vickers, G3ORI, Wrekin Cottage, Great Coxwell, Faringdon, Oxon SN7 7NG (Tel Faringdon 20582) not later than 23 May.

## AFS Contest 1975 results

The HF Contests Committee is pleased to report that there were more entries this year than in 1974 (48 against 40), and that the competition was as fierce as ever, with very few points separating the leading stations.

The winner is the Surrey Radio Contact Club, who will receive the Edgware Trophy. In second place is the Sutton and Cheam RS' 'A" station just one point ahead of their neighbours (and rivals!) the Thames Valley ARTS. Except for the winner, who used a λ/2 loop, the first ten stations used at least a λ/2 long-wire aerial.

In most cases the log-keeping was good, although there were plenty of errors as can be seen from the difference between the claimed and final scores. There were, however, a few clubs whose writing was almost illegible.

This year, certificates will be sent to all acceptable entrants.

| Posn | Club | Callsign | QSOs | Points | Points claimed |
|---|---|---|---|---|---|
| 1 | Surrey Radio Contact Club | G3SRC | 146 | 1,562 | 1,657 |
| 2 | Sutton & Cheam RS "A" | G2DMR | 148 | 1,554 | 1,657 |
| 3 | Thames Valley ARTS | G3TVS | 143 | 1,553 | 1,627 |
| 4 | Swindon & DARC | G3FEC/A | 156 | 1,521 | 1,694 |
| 5 | Cray Valley RS | G3RCV | 143 | 1,486 | 1,599 |
| 6 | Crawley ARC "A" | G3WSC | 125 | 1,475 | 1,525 |
| 7 | East Kent RS | G3LTY/A | 133 | 1,464 | 1,528 |
| 8 | Glenrothes & DARC | GM3YOR/A | 175 | 1,462 | 1,588 |
| 9 | Addiscombe ARC "A" | G4ALE/A | 124 | 1,429 | 1,474 |
| 10 | Nunsfield House ARG | G3EEO | 126 | 1,428 | 1,498 |
| 11 | Crawley ARC "B" | G3TR | 107 | 1,425 | 1,478 |
| 12 | Edgware & DRC | G3ASR/A | 127 | 1,423 | 1,484 |
| 13 | Horsham ARC | G3TNO | 118 | 1,399 | 1,447 |
| 14 | IBM Lab ARC | G3YXR | 116 | 1,393 | 1,457 |
| 15 | White Rose RS | G3XEP | 154 | 1,376 | 1,525 |
| 16 | Leyland Hundred ARG | G3WYY | 109 | 1,355 | 1,380 |
| 17 | Reigate ATS | G3REI/A | 116 | 1,344 | 1,488 |
| 18 | Southgate RC | G3SFG/A | 138 | 1,307 | 1,465 |
| 19 | Shefford & DARS | G3FJE/A | 108 | 1,289 | 1,354 |
| 20 | Maidstone YMCA ARS | G3TRF | 120 | 1,288 | 1,571 |
| 21 | Verulam ARC | G3VER | 110 | 1,275 | 1,369 |
| 22 | Bromsgrove & DRC | G3VGG | 102 | 1,272 | 1,404 |
| 23 | Chelmsford ARC | G3WDF/A | 122 | 1,269 | 1,378 |
| 24 | Addiscombe ARC "B" | G3WRR | 100 | 1,257 | 1,331 |
| 25 | Kingston & DARC | G3KIN | 102 | 1,255 | 1,335 |
| 26 | Winchester ARC | G3ZPT/A | 112 | 1,250 | 1,395 |
| 27 | Hereford ARS | G3YDD/A | 103 | 1,236 | 1,306 |
| 28 | Bracknell ARC | G4BRA | 104 | 1,230 | 1,320 |
| 29 | Univ of Keele ARS | G3UOK | 112 | 1,229 | 1,424 |
| 30 | Nottingham ARC | G3EKW | 106 | 1,224 | 1,351 |
| 31 | Grimsby ARS/Hereford School | G3YMF | 94 | 1,160 | 1,199 |
| 32 | Leicester RS | G3LRS/A | 121 | 1,140 | 1,479 |
| 33 | Wirral ARS | G3NWR/A | 95 | 1,138 | 1,313 |
| 34 | Echelford ARS | G3UES/A | 108 | 1,129 | 1,255 |
| 35 | Sutton & Cheam "B" | G4CWH | 101 | 1,125 | 1,304 |
| 36 | Clifton ARS | G3GHN | 98 | 1,107 | 1,257 |
| 37 | Peterborough E & RS | G3DQW | 95 | 1,023 | 1,127 |
| 38 | Acton, Brentford & Chiswick RC | G3IIU | 85 | 1,022 | 1,121 |
| 39 | Mansfield RS | G3GQC/A | 78 | 1,038 | 1,100 |
| 40 | RAF ARS | G3RAF | 81 | 814 | 1,089 |
| 41 | Colchester Radio Amateurs | G4CRA/A | 90 | 795 | 924 |
| 42 | Southdown ARS | G3WQK | 60 | 737 | 873 |
| 43 | Gloucester ARS | G4AYM | 59 | 686 | 745 |
| 44 | Solway RC | G4BBX | 46 | 208 | 317 |

The following entries were disallowed:
Brunel ARS, G3UBR, General rule 8(a) and (f).
Chiltern ARS, G3CAR, General rule 8(a) and (d).
Royal Naval ARS, G3BZU, General rule 4(b) (ii) and 8(d).
Sutton & Cheam RS "C", G4ADM, AFS rule 3.1.

The following are thanked for their useful check logs: G4ATH/A, G4BUO, OK30PEG, and OK30AQM.

## First 1·8MHz Contest 1975 results

GM3OLK completed a fine double with his win of this contest when coupled with his success in the Second 1·8MHz Contest 1974. Joint second are G3XVY and GW3UCB, the latter station being the winner last February.

Conditions were variable with stations in the north of England experiencing heavy QRN and difficulty to make contacts to the south, though Scotland fared considerably better.

VO1KE made 18 contacts and many OK stations were active as also were a few from the USA and a KV4. GM3OLK made 136 contacts, G3XVY and GW3UCB made 124 and 123 contacts respectively.

Comments in the logs indicate that the last hour was heavy going

for some entrants running out of stations to contact. There are also some suggestions for multipliers to revise the scoring system. The new county codes caused little trouble though one or two people looked up the *Call Book* and substituted Lancashire for Greater Manchester and Lincolnshire for Humberside.

| Posn | Callsign | Points | Cnty | Posn | Callsign | Points | Cnty |
|---|---|---|---|---|---|---|---|
| 1 | GM3OLK | 768 | FFE | 21 | G3TR | 410 | SXW |
| 2 | G3XVY / GW3UCB (op: G4BRK) | 718 | KNT / GDD | 22 | G3YMC | 361 | BRK |
| | | | | 23 | G4CWH* | 336 | SRY |
| 4 | G3ORP | 687 | KNT | 24 | G4ALG | 328 | BRK |
| 5 | G3MXJ | 673 | SXE | 25 | G3SVW | 290 | MCH |
| 6 | G3XTJ | 609 | LDN | 26 | G4AEM | 288 | HFD |
| 7 | G8ZK (op: G3SJJ) | 594 | NOT | 27 | G3DCZ | 278 | SRY |
| | | | | 28 | G4BOU | 276 | HFD |
| 8 | G3JEQ | 589 | SRY | 29 | G2FNK | 266 | SRY |
| 9 | G3TIR | 559 | SXE | 30 | G2CIL | 254 | SXW |
| 10 | G3XDY / G4BUO* | 531 | HBS / KNT | 31 | G3YRZ | 248 | CBE |
| | | | | 32 | G3ZNH | 222 | WLT |
| 12 | G4BUE | 525 | SXE | 33 | G3IKR | 210 | HWR |
| 13 | G3RWL | 515 | LDN | 34 | G3TPJ | 181 | LDN |
| 14 | GM3YOR | 469 | FFE | 35 | G3ZRZ | 176 | LNH |
| 15 | GI3JEX | 452 | DWN | 36 | G4CZB | 166 | LDN |
| 16 | G3XWZ | 450 | NOT | 37 | G4CMY | 156 | GLR |
| 17 | G3KKQ | 424 | SRY | 38 | G2XP | 114 | SRY |
| 18 | G4BWP* | 423 | BFD | 39 | G4DPP | 106 | LDN |
| 19 | G4BXT | 420 | KNT | 40 | G3FVW | 82 | YSN |
| 20 | G4BBX (op: G4CJP) | 414 | CBA | 41 | G3ING | 66 | LDN |

* Entrant under 18 years of age.

The Contests Committee gratefully acknowledge check logs from DL0RZ, G2AYG, G3IAS, G4BOH, G4DPT, G6UW, GW3JI, OK30PEG, OK30AXD, OK30KFF, OK30KPV, OK30PGF, OK30PGU, OK30TAO, OK30TPV, OL30CBJ, VO1KE and A8306.

## Contests calendar

| | |
|---|---|
| **18 May** | —DF qualifying —South Manchester (Rules in May issue) |
| **31 May-1 June** | —144MHz Portable (Rules in April issue) |
| **1 June** | —DF qualifying—Stratford on Avon (Rules in May issue) |
| **7-8 June** | —HF NFD (Rules in February issue) |
| **21-22 June** | —Microwave FD (Rules in April issue) |
| **22 June** | —DF qualifying—High Wycombe |
| **22 June** | —RSGB Region 1 VHF |
| **28-29 June** | —Summer 1·8MHz |
| **5-6 July** | —RSGB VHF Open and SWL (Jubilee) (Rules in May issue) |
| **12-13 July** | —SSB Field Day (Rules in March issue) |
| **13 July** | —DF qualifying—Salisbury |
| **27 July** | —144MHz QRP (Rules in May issue) |
| **3 August** | —DF qualifying—Dartford Heath |
| **10 August** | —70MHz Portable |
| **31 August** | —DF qualifying—Coventry |
| **6-7 September** | —VHF NFD and SWL (Rules in March issue) |
| **6-7 September** | —IARU Region 1 VHF (Rules in May issue) |
| **14 September** | —80m Field Day |
| **21 September** | —DF final—Slade |
| **5-6 October** | —RSGB UHF Open and SWL (Rules in May issue) |
| **12 October** | —21-28MHz Telephony (Rules in May issue) |
| **18-19 October** | —7MHz CW |
| **1-2 November** | —144MHz Open |
| **1-2 November** | —7MHz Phone |
| **8-9 November** | —2nd 1·8MHz |
| **16 November** | —432MHz Open |
| **7 December** | —144MHz Fixed |

# OBITUARIES

*The Society records with regret the deaths of the following radio amateurs:*

**Mr T. Bentley, G3HZ**
Tom Bentley died on 3 April at the age of 68. A clever electronics engineer, he made many friends in this field before his death.

**Mr R. J. Bradley, G2FO**
Richard James Bradley died on 28 March. He was first licensed in 1929 with an AA call, and became G2FO in 1931. A member of the Society since 1930, he had been a life member since 1947. Prior to 1939 he experimented on 5m, and was a pioneer on 2m. He operated cw only on 2, 10, 15 and 20m, and won WAC and WBE certificates and the Irish society's Leonora Trophy in 1937.

**Mr N. E. N. Guy, G2DN**
Norman Guy, who died on 4 March, was first licensed as 2CS and later became G2DN. He joined the Surrey Radio Contact Club before the war, became its first post-war chairman in 1946, and was a member until his death. His recent interest was concentrated on 4m.

**Mr T. W. J. Homewood, GM3BGW**
Bill Homewood has died at the age of 73. He joined the RN as a boy telegraphist at the age of 16 and served for 28 years before transferring to the Home Office (Radio Section). He obtained his amateur licence in 1938 and had been a member of RNARS since 1968. His main interest was 2m, as well as cw on all bands.

**Mr R. E. Ludman, G8BJZ, G6RGX/T**
Roy Ludman died on 22 March. He was a founder member and secretary of March & D RAS. His main interests were the vhf/uhf bands, using home-constructed equipment built to professional standards.

**Mr J. C. Morgan G3YIK**
John Morgan died at the age of 55 on 2 April. He was a keen home-constructor and operated a completely home-brewed station on hf and 2m. As secretary of Stratford-upon-Avon RC, he enjoyed setting up and operating special activity stations in and around the town.

**Mr J. W. Swain, G3ODS**
Jack Swain died on 20 March. He was a founder member of the Redbridge Amateur Radio Society.

**Mr J. W. Rudge, G3ZAQ**
John Rudge died on 8 March. He was a member of RAIBC, and in amateur radio he found a great number of friends. To all who helped and advised him he was deeply grateful.

We have also been informed of the death of **Mr Alvaro G. P. Rossi (Vara)**, GM3JGQ, on 13 March.

# Special event stations

**Dundalk Maytime Festival, 16-25 May**
The Dundalk ARS will operate EI0DMF in conjunction with this festival on bands from 80 to 10m.

**Border Rotary Fair, 25 May**
The Border ARS will operate exhibition stations on 80-20m and 2m, using a special callsign, from this fair to be held in the grounds of Mellerstain House, five miles NW of Kelso on the A6089. Many attractions for visitors. Details from GM8IIO, QTHR.

**Ingham Fair, Stalham, Norwich, 26 May**
GB2IF, organized by G3PFS and G4CKB, will be operational on 80-10m at this fair from 10am to 6pm. The fair has been revived by Stalham & D Round Table.

**Isle of Wight Communications Fair, 26 May**
"Communications" will be the theme of this fair being organized by the Sandown High School Radio and Electronics Society at the school. Two stations using GB3IW will be operating on the hf bands. Tickets cost 30p and proceeds will go towards maintaining the school newspaper *Communicator*. Any IoW amateurs will be most welcome. Organizer, G3TKN; operators, G3YVL and G2DZN.

**Fleetwood Leisure & Pleasure Exhibition, 27-30 May**
**Cheshire Homes Fete, Garstang, 7 June**
The Thornton Cleveleys ARS will be organizing and operating stations at both the above events.

# YOUR OPINION

The Editor
*Radio Communication*

Sir—I hasten to second G3APA's words of praise for the almost fifty years of publication of the *T & R Bulletin*, now *Radio Communication*, and to give my own thanks for the very hard work put in by all those past and present workers and contributors who have done so much to keep amateur radio alive and strong in these islands. These are difficult times and no one can foresee the future but it is my sincere hope that *Radio Communication* will survive and continue to be published for many a year to come.

On another matter may I also place on record my complete agreement with the timely and penetrating comments of your contributor, G3UXV. I have wanted to say something of the sort for a long time but Mr Alderton has beaten me to it but I could not have dealt with the problem of the decline in the amateur radio spirit, as he has done in his letter, so succinctly.

R. E. Wilkinson, G8CTF

The Editor
*Radio Communication*

Sir—With the proliferation of fm repeater stations on the 2m amateur band in the UK and the attendant increase in mobile and portable activity, it seems to me that the time has come for a code of standards to be established, governing facilities provided and mode of operation of the devices.

While one fully recognizes that fm repeaters are still in a developmental state in this country (no doubt an "ideal" system for amateur purposes has yet to be devised), one nevertheless finds it disconcerting to travel from one repeater service area to the neighbouring one only to discover a device displaying a totally different set of operating parameters.

Surely, at the very least, one might reasonably expect agreement on what constitutes an "acceptable deviation level"; at present an acceptable signal in London merits rejection in the south! One might also feel justified in expecting a uniform "penalty" for over-deviation; GB3LO merely attenuates an offending signal, whereas GB3SN locks into the beacon mode for the remainder of the time allocation.

There are many other peculiarities unique to individual repeaters —notably the non-standard access tone frequency of GB3PI. (*Action to standardize this is in hand*—Ed).

One certainly does not wish to belittle the hard work and ingenuity of those responsible for building and maintaining the devices, and it is understandable that fm groups will wish, where possible, to improve on the work of their colleagues. However, it would seem to fall on the RSGB, as the licence-holder, to define a basic set of standards for 2m repeaters so that the devices may be used to the fullest advantage by amateurs throughout the country.

Perhaps it would be worth airing the point at the forthcoming VHF Convention?

W. A. F. Davidson, G3NYY

The Editor
*Radio Communication*

Sir—We have now gained tremendous experience of fm repeater operation in this country, and the upsurge of activity resulting on our vhf bands can do the hobby nothing but good.

However, it would appear we have certain groups in our midst who wish to use their repeater as an "exclusive club" by specifying tightly-controlled access frequencies.

Surely we now have sufficient evidence to show that careful geographic choice for co-channel repeaters results in a minimum of interference and "dual access" of repeaters. The broadcasters have for many years run co-channel high-power transmitters with instances of interference being measured in fractional percentages.

No, gentlemen; let us standardize on one common access frequency for all. Keep specifications tight if you wish. This only serves to encourage high-quality transmissions. But do not discourage the experimenter by the requirement of professional standards. Our hobby must remain essentially amateur radio.

Finally may I propose a vote of thanks to all those who have worked so hard to build up our repeater network.

Roger Jones, G3YMK

The Editor
*Radio Communication*

Sir—In his thoughts on cw communication in the February issue, Mr Skelton appears to have omitted to take into account the nature of cw transmission on the air.

I will accept his 20Hz bandwidth figure for 25wpm morse code as a basis on which to work, though I believe it is too optimistic. What is more important is that the 20Hz bandwidth seems to relate to the bandwidth required in the keying circuit which is half that occupied by the transmitted signal. Morse as transmitted is an amplitude modulation of the transmitter carrier and likewise of the carrier in the receiver i.f. stages and the af carrier, ie the beat note, to which we listen. As in any other form of a.m. the cw transmission has a pair of sidebands occupying a bandwidth twice that of the modulating signal. Thus the 20Hz bandwidth in the keying circuit becomes 40Hz in the received transmission. This figure is not far below bandwidths long used in cw reception.

Since cw is a double sideband a.m. emission, it is possible to save bandwidth by adopting a single sideband telegraphy. However, the extra complexity and cost might well outweigh any operational benefit. In any case, with effective modulating frequencies down to a few hertz, the problem of separating the sidebands seems formidable. Possibly phasing techniques using digital circuitry could achieve this.

If significant reduction in bandwidth in the conventional cw receiver is possible, I am surprised that it has not been discovered by experiment. Audio filters and other devices, such as the Q-multiplier, capable of achieving very narrow bandwidths have long been known and used. Their passbands are nearer the cosine² response of Mr Skelton's Fig 1 than a rectangular passband. He says the former reduces ringing yet I think most operators find a usable minimum bandwidth is reached somewhere between 50 and 100Hz.

In my view the use and art of cw would benefit more at the present time by the more widespread adoption of good filters having bandwidths up to say 300Hz. Too many receivers fail to provide cw filters having high skirt selectivity as well as a narrow bandwidth to take advantage of the high order of frequency stability in modern equipment. Use such a filter and one truly appreciates how efficient cw communication can be.

J. W. Bluff, G3SJE

The Editor
*Radio Communication*

Sir—A small number of the transceivers built from my article "An SL600 series ssb transceiver" published in the September 1974 issue suffer from apparent agc instability. The symptoms are generally motor-boating at certain signal levels.

The problem is not, in fact, due to the agc but to instability caused by i.f. feedback through the unused transmitter section of the circuit. It may easily be cured by connecting a single 0·1μF capacitor with low rf resistance between the transmitter section power supply rail and ground—as near as possible to the SL610C amplifier.

Installing this capacitor does not remove the necessity of grounding the transmitter power rail during reception, and vice versa.

I apologize to anyone who has been inconvenienced by this fault but the majority of these transceivers are not affected and the problem has only recently been brought to my attention.

Brian D. Comer, G3ZVC

The Editor
*Radio Communication*

Sir—Can I comment on Mr Crowe's point on shorting turns of a pi-tank coil (p206, March issue). It is a justified thought, as if one shorted, say, half a 220V transformer primary to run from 110V mains, disaster would be immediate. However, some years ago I conducted some detailed tests covering 10–160m pi-tanks; particularly, as example, the use of an inductor suitable for 3·5MHz, shorted for 7MHz, or even 28MHz. These details have been published elsewhere and cannot be repeated, but suffice it to say that for various reasons the use of an if bands coil, with turns shorted to reach an inductance suitable for hf bands (as provided in very many transmitters) results in no measurable loss of power, compared with the use of an individual coil having turns only sufficient for the hf band concerned. Indeed, had it been otherwise it seems unlikely that such coil arrangements would remain so popular.

F. G. Rayer, TEng (CEI), AIERE, G3OGR

# CLUB NEWS

## New Regions and Regional Representatives

**The terms of office of present regional representatives expire on 30 June 1975. From 1 July the existing 17 regions will be increased to 20 and from that date the representatives of those regions will take office.**

**"Club News" appearing in the July issue will be listed under the new regions, and clubs are asked to send their entries to their regional representatives who will take office on 1 July. In order that they can forward their contribution to the editor by the scheduled date, regional representatives should receive news and programmes for the July/August period by 24 May.**

**The new regions and representatives are as follows:**

**Region 1** Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.
**RR**—B. O'Brien, G2AMV.
**Region 2** All that part of Humberside north of River Humber North Yorkshire, South Yorkshire, West Yorkshire.
**RR**—R. C. Andreang, G4CMT.
**Region 3** Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.
**RR**—H. S. Pinchin, G3VPE*.
**Region 4** Derbyshire, all that part of Humberside south of River Humber, Leicestershire, Lincolnshire, Nottinghamshire.
**RR**—T. Darn, G3FGY.
**Region 5** Bedfordshire, Cambridgeshire, Northamptonshire.
**RR**—P. F. Chilcott, G4BBA.
**Region 6** Berkshire, Buckinghamshire, Oxfordshire.
**RR**—*(Late nominations, ballot to be held).*
**Region 7** Greater London south of River Thames, Surrey.
**RR**—A. H. Othen, G8FSZ*.
**Region 8** Kent, East Sussex, West Sussex.
**RR**—D. N. T. Williams, G3MDO.
**Region 9** Cornwall, Devon.
**RR**—H. W. Leonard, G4UZ.
**Region 10** Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan.
**RR**—R. G. Barrett, GW8HEZ.
**Region 11** Clwyd, Gwynedd
**RR**—*(No nomination received).*
**Region 12** Grampian, Highland, Island Authorities, Tayside.
**RR**—F. D. Hall, GM8BZX.
**Region 13** Borders, Fife, Lothian.
**RR**—Rev S. J. Smith, GM4DNM.
**Region 14** Central, Dumfries and Galloway, Strathclyde.
**RR**—A. J. Mitchell, GM3UDL*.
**Region 15** Northern Ireland.
**RR**—H. J. Campbell, GI8FOK.
**Region 16** Essex, Norfolk, Suffolk.
**RR**—R. E. G. Kendall, G8BNE*.
**Region 17** Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.
**RR**—L. Hawkyard, G5HD.
**Region 18** Cleveland, Durham, Northumberland, Tyne and Wear.
**RR**—P. J. Fay, G3AKG*.
**Region 19** Greater London North of River Thames, Hertfordshire.
**RR**—D. S. Smith, G4DAX*.
**Region 20** Avon, Gloucester, Somerset.
**RR**—G. Mather, G3GKA.

* *Appointment, subject to Council approval.*

**Until the vacancies are filled, clubs in Regions 6 and 11 can send their entries direct to the editor.**

### REGION 1 — RR B. O'Brien, G2AMV

**Ainsdale (ARC)**—Thursdays every two weeks, 8.15pm. 8 and 22 May, 5 and 19 June, 3 July. Ainsdale Scout Headquarters. Further details from N. Horrocks, G2CUZ, QTHR.

**Blackburn (ELARC)**—First Thursday in each month, 7.30pm, YMCA, Shearbank Road, Blackburn. Visitors always welcome. Sec W. E. Baxendale, G8FDG, "Juverna", Westland Ave, Darwen, Lancs.

**Blackpool (B & DARS)**—Mondays, 8pm. Pontins Holiday Camp, Squires Gate. Morse tuition 7.30pm.

**Bolton (B & DARS)**—3rd Wednesday in each month, 8pm. Clarence Hotel, Bradshawgate. Sec S. Macdonald, G4AQB, 8 Archer Avenue, Bolton.

**Bury (B & RRS)**—2nd Tuesday in each month, and informal meetings every Tuesday, also morse and RAE classes. Mosses Community Centre, Cecil Street, Bury. May meeting ("Electronic measuring equipment used in electronics today" by Mr Speake). Sec Mike Howarth, G8ECM, 11 The Worthington Avenue, Heywood, Lancs. Tel Heywood 65911.

**Carlisle (C & DARS)**—Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD, QTHR.

**Cheshire (Mid-Cheshire ARC)**—Wednesday evenings, 7.30pm. Technical Activities Centre, rear of Verdin Buildings, Verdin Comprehensive School, Grange Lane, Winsford, Ches. RAE and cw classes start 7.30pm, main feature 8pm. 160m net, 7.30pm Mondays; 2m net, 7.30pm around 145·5, Tuesdays. Club station G3ZTT on 160m Wednesday evenings, 7.30pm to 8pm. Chairman is G3IAK. Further details from sec G3SIQ, QTHR.

**Chester (C & DARS)**—Tuesdays, 8pm; except first Tuesday in each month, which is a net night. YMCA, Chester. Further details from GW8DMR, QTHR.

**Douglas IoM (D & DARS)**—Sec GD3YUM will be pleased to hear from any member who plans to visit the island.

**Eccles (E & DARC)**—Tuesdays, 8pm. Bridgwater School, Worsley, Manchester. Club 2m net, 11am Sundays on 145·66MHz. All visitors and prospective members welcome. Sec G4AEQ, QTHR.

**Lancaster University (UoLARS)**—Wednesdays, 7pm. Furness College. RAE and morse classes. The society is active on the hf bands and 2m using G3ZBY and G8DOU. Skeds and visits welcomed; enquiries please to Colin Pegrum, Department of Physics.

**Leyland Hundred ARG**—2nd Monday in each month, 7.30pm. Rose & Crown, Ulnes Walton, Leyland. Net night Saturdays 2000gmt on 145·8MHz. Details from F. Harrison, G3XII, 78 Lancaster Lane, Leyland, Lancs.

**Liverpool (L & DARS)**—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Watertree. Sec G3WCS.

**Liverpool (NLRC)**—Tuesdays, 8.30pm. Informal meetings. "Nags Head", Thornton, Crosby, Liverpool 23. Visitors welcome. Sec R. B. Porter, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD.

**Liverpool University (UoLARS)**—Details of meetings from J. M. Pagett, G8IAV, c/o The Students Union.

**Manchester (M & DARS)**—Wednesdays, 7.30pm. All meetings include morse classes. 203 Droylesden Road, Newton Heath, Manchester 10. Sec G3IOA.

**Manchester (SMRC)**—2 May (Home-built equipment contest), 9 May ("Mini" df practice event), 16 May (Annual general meeting—8pm prompt), 23 May (Natter Nite), 30 May ("Some thoughts on QRP" by W. R. Parkinson, G3FNM), 6 June (Technical forum), 13 June ("Modern telephone exchanges" by J. McBurney, G4AUR), 20 June ("Mini" df contest), 27 June (Night on the air). Every Friday, 8pm. Sale Moor Community Centre, Norris Road, Sale, Cheshire. Morse precedes lectures. VHF and df lads meet at about 8pm on Mondays, at the club shack, "Greeba", Shady Lane, Manchester 23. Visitors are welcome either night. It is hoped to arrange a number of df practice contests during the summer, anyone interested contact hon sec G3WFT, QTHR.

**Manchester University (ARS)**—Details of meetings from sec G. T. Phelan, G8EPS, c/o The University Union.

**University of Manchester (UoM—IoS & TARS)**—G3CXX is active on all hf bands and G8FOT on 2m and perhaps 23cm. Items for club magazine/newsletter or letters from intending members gratefully received by G8GOS, 66 Howard Road, Kings Heath, Birmingham B14 7PQ.

**Preston (PARS)**—8 and 22 May, 5 and 19 June, 3 July. Morse practice 7.30pm, main feature 8pm. Windsor Castle (private room), St Paul's Square, Preston.

**Salford (DHRS)**—Wednesdays 5pm. Dial House, Chapel Street, Salford. Members assemble in canteen and proceed to club room on roof. Sec G3WFW, QTHR.

**Stockport (SRS)**—2nd and 4th Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road, Stockport, Sec G. R. Phillips G3FYE, 6 Ross Avenue, Davenport, Stockport.

**Thornton Cleveleys (ARS)**—1st and 3rd Wednesdays in each month, 8pm, morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to Gardener's Arms), Thornton. Details from hon sec J. Meredith, G8OY, 31 Orchard Drive, Fleetwood, Lancs FY7 7NQ. Additionally there are two special events: May 27-30: a station will be organized and operated by the group at

the Fleetwood Leisure and Pleasure Exhibition at the Grammar School, Poulton Road, Fleetwood. Top band hf bands and 2m will be in use. 7 June: a station will be organized and operated by the group at the Cheshire Homes, Garstang, Fete. Top band talk-in station, hf bands and 2m will also be in use. There will be a bring & buy sale. The following callsigns have been applied for but not yet confirmed: GB3FLP and GB3CHG.

**Warrington (W & DARS)**—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall. Sec J. Weaver, c/o Grappenhall Community Centre.

**Wigan (W & DARS)**—1st and 3rd Wednesdays, 2nd and 4th Tuesdays in each month. Poolstock Cricket Club, Keats Avenue, Poolstock, Wigan. Sec G. J. Bell, G8FTF, 157 Preston Road, Coppull, Nr Chorley, Lancs.

**Wirral (WARS)**—1st and 3rd Wednesdays in each month, 7.45pm. Sports & Recreation Centre, Grange Road West, Claughton, Birkenhead. Sec G3DLF, QTHR.

**Wirral (Wirral DXA)**—Members or visitors, who will be welcome, should contact sec F. Haughton, G3VZM, 4 Painswick Road, Great Sutton, Ellesmere Port, Cheshire, for details of meetings.

**Merseyside members** meet for lunch on the 1st Monday of every month. It is essential to book beforehand and obtain details of the venue from either G3VQT or G2AMV.

**VHF Contest 22 June.** Details may be obtained from G2CUZ, QTHR.

**REGION 2** **RR J. E. Agar, G8AZA**

**Hull (H & DARS)**—9 May (Quiz on the air, G8GBY v G8HUC), 16 May ("Servicing—transistors" by G3RDM), 23 May (Preparations for Hull Mobile Rally), 30 May ("Get it off your chest"—general discussion), 6 June (NFD preparations), 13 June ("Oscilloscope displays" by G3PQY), 20 June ("Moog synthesizer" by G4BHF), 27 June ("High fidelity equipment" by R. Varey). Details from G3PQY, G8GDD, QTHR.

**Hull (HUR & ES)**—Meetings held as notified in *INFO* and personally to members' pigeon holes. More frequent meetings will be held when new premises are acquired next year. Regular expeditions to the Yorkshire wolds; activity nights for newly-licensed members, and local visits. Prospective members within the university and from affiliated colleges in Hull contact Jon Hind, G8EDS, The Students Union, The University, Cottingham Road, Hull.

**REGION 3** **RR B. Kennedy, G3ZUL, G6AGT/T**

**Birmingham (MARS)**—13 May, 17 June. The Birmingham and Midland Institute, Margaret Street, Birmingham. *G8GOC.*

**(Slade)**—Alternate Fridays, 8pm. The Committee Room, Church House, Erdington. *G4BRT.*

**(South)**—First Wednesday in each month. Hampstead House, Fairfax Road, West Heath, Birmingham 31. *G8GDZ.*

**Bromsgrove (BDARC)**—10 May (Talk and demonstration of QM70 Products). Avoncroft Museum of Buildings, Avoncroft Art Centre, Bromsgrove. J. Harvey, 22 Elm Grove, Bromsgrove.

**Dudley (DARC)**—Second and fourth Tuesday of the month, 7.45pm. Central Library, Dudley. *G4BFT.*

**Hereford (HARS)**—First and third Friday of the month. Civil Defence HQ, Gaol Street, Hereford. *G4CNY.*

**Solihull (SARS)**—The Manor House, High Street, Solihull. *G4AEJ.*

**Stourbridge (STARS)**—19 May (Lecture on HF NFD), 16 June (Garden Party). Third Monday of the month, 7.45pm. Longlands School, Brook Street, Stourbridge. Informal meetings on alternate Mondays at the Shrubbery Cottage, Heath Lane, Stourbridge. *G4CLX.*

**Telford (TDARS)**—Wednesdays. Phoenix School, Manor Road, Dawley except first Wednesday of the month when at Walker Technical College near Wellington. *G4AXZ.*

**Wolverhampton (WARS)**—5 May (Home-built gear competition), 11 May (Provisional df contest). Neachells Cottage, Stockwell End, Tettenhall. *G8GCV.*

**Worcester (W & DARC)**—The Old Pheasant, New Street, Worcester. *G8ASO*, Tel Worcester 351565.

**REGION 4** **RR T. Darn, G3FGY**

**Derby (DADARS)**—7 May (Surplus sale), 14 May (Film show), 21 May (DF event No 2), 28 May (Junior night), 4 June (Surplus sale), 11 June (Film show), 18 June (DF event No 3), 25 June (Open evening). 7.30pm. Room 4, 119 Green Lane, Derby. Visitors and prospective members are always welcome. The society will be taking part in HF NFD at Drum Hill Boy Scouts Camp on 7/8 June. There will be a barbeque on the Saturday evening. *G2CVV.*

**Derby (NHCAARC)**—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Contact G4CTZ, QTHR.

**Leicester (LARS)**—Mondays, 7.30pm. Gilcross Estate Cottage, Groby Road, Leicester. *G3TQF.*

**Lincoln (LSWC)**—Wednesdays, 7.30pm. Lincoln Astronomical Society, Westcliffe Street, off Burton Road, Lincoln.

**Mansfield (MARS)**—First Friday in each month. The New Inn, Westgate, Mansfield.

**Melton Mowbray (MMARS)**—16 May ("Aaland Island expedition" by G3YUT), 20 June (Visit to Radio Derby, courtesy of the BBC and G3VGW). Top band net 11.15am Sundays 1,960kHz. VHF nets 11.45am Sundays and 8pm Tuesdays and Thursdays. *G3NVK.*

**Nottingham (ARCON)**—8 May (Forum), 15 May (Open), 22 May (Technical film show), 29 May (Open). 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham.

**Scunthorpe (SARC)**—Tuesdays and Thursdays. The Shack, Grange Farm Centre, Scunthorpe.

**REGION 5** **RR P. J. Simpson, G3GGK**

**Bedford (B & DARC)**—1 May ("Raynet" by G8ENS and friends), 8 May (Evening out), 15 May (Sinclair Electronics—guest speaker), 22 May (2m contest planning and vhf df techniques), 29 May ("DTL to CMOS" by G8HGW), 31 May-1 June (2m portable contest), 5 June (2m df contest part 1 by G8FMG), 12 June (2m contest results), 19 June (Radio model control), 26 June (SSB field day planning and mini lecture by Bob Woodhouse). 8pm. United Services Club, The Broadway, Bedford.

**Dunstable Downs (DDRC)**—2 May (Natter nite), 9 May ("A modern business communications system" by G8BOY), 16 May (Club eyeball QSOs). Every Friday at 8pm. Chews House, 77 High Street South, Dunstable.

**Peterborough (PE & RS)**—16 May (Scope night—D. Sylvester, G3RED), 20 June (DF hunt). 7.30pm. Scout Hut, Lincoln Road, Peterborough. ASR Peter Chilcott, G4BBA, 258 Coneygree Road, Stanground, Peterborough.

**Stevenage (S & DARS)**—1st and 3rd Thursdays of the month, 8pm. Hawker Siddeley Dynamics, Gunnelswood Road, Stevenage. Hon sec Cliff Barber, G4BGP, 473 Canterbury Way, Stevenage.

**Your RR would like to take this opportunity to wish all members in Region 5 farewell at the end of his term of office and to wish every success to Peter Chilcott, G4BBA, who will be taking over. Please give him your support. 73, Peter Simpson, G3GGK.**

**REGION 6** **RR L. W. Lewis, G8ML**

**Banbury (BARS)**—Fridays, 7.30pm. 43 North Bar, Banbury. New members and visitors very welcome. Details from secretary G3LTN, QTHR. Tel Banbury 710623.

**Cheltenham (CARS)**—Wednesdays, 8pm. St Marks and Hesters Way Community Centre, Brooklyn Road, Cheltenham. *G8DVA.*

**Cheltenham RSGB Group**—First Thursday in each month, 8pm. Royal Crescent Hotel, Clarence Street, Cheltenham. *G3KII.*

**Gloucester (GARS)**—First Thursday in each month, 8pm, Oddfellows Club, Barton Street, Gloucester. Other Thursdays, 7.30pm. Leisure Centre (Drill Hall), Painswick Road, Gloucester.

**Milton Keynes (MK & DRS)**—Second Monday of each month. Lovat Hall, Silver Street, Newport Pagnell, Bucks. Details from G8HUH.

**REGION 7** **RR R. S. Hewes, G3TDR**

**Acton, Brentford & Chiswick (ABRC)**—20 May ("Digital frequency meter, Part 2" by G3CCD), 17 June ("The FL400 and FR400" by G4DLK). 7.30pm. Chiswick Trades and Social Club, 66 High Road, Chiswick W4. Hon sec W. G. Dyer, G3GEH, QTHR.

**Addiscombe (AARC)**—Tuesdays, 9pm. "Spread Eagle", Portland Road, South Norwood. Hon sec J. R. Cockrill, G4CZB, QTHR.

**Ashford, Middlesex (Echelford ARS)**—12 May (Constructional contest), 29 May (Talk by Roy Stevens, G2BVN), 9 June (Chairman's evening), 26 June (HF transmitters and transceivers appreciation evening). 7.30pm for 8pm. St Martin's Court, Kingston Crescent, Ashford. Visitors very welcome. Hon sec John Ellis, G2FNK, QTHR. Tel Staines 54828.

**Barking (BR & ES)**—Mondays, 7.30pm (constructional), Tuesdays, 7.30pm (morse classes), Thursdays, 7.30pm (Informal and constructional). Visitors very welcome. Westbury Recreation Centre,

**At Sutton & Cheam RS annual dinner and dance on 15 March. From left: Mrs J. Mears, xyl of G8SM; Mr C. H. Parsons, GW8NP, BSGR President, and his xyl; Mr A. V. Tillin, G3MES, president of S & C RS, and his xyl; Mr J. Korndorffer, G2DMR, vice-chairman of S & C RS, and his xyl: and Mr L. Seaton, G3HSK, past-president of S & C RS**

Westbury School, Ripple Road, Barking, Essex. Details from hon sec J. R. Wiles, G8JEG, QTHR.

**Bexley Heath (North Kent RS)**—Second and fourth Thursday in each month. New QTH is St Mary's Institute, 2 North Cray Road, Bexley. 8pm. Hon sec R. Wells, G4ARQ, QTHR.

**Burnham Beeches (BBARC)**—First Monday in each month. Hedgerley Scout Hut, Hedgerley, near Slough, Bucks. Hon sec E. Brown, 20 Balmoral Close, Chippenham, Slough.

**Cheshunt (CDRC)**—First Friday in each month, 8pm. Rosedale Sports Club, Cheshunt. Hon sec C. West-Bulford, G8JXU, QTHR.

**Chingford (Silverthorn RC)**—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Visitors very welcome. Hon sec C. J. Hoare, G4AJA, QTHR. Tel 01-529 2282.

**Cray Valley (CVRS)**—1 May, 6 June (To be announced), 15 May, 19 June (Natter nites). 8pm. Eltham United Reformed Church Hall, 1 Court Road, SE9. Hon sec Peter Vella, G3WVP, QTHR.

**Croydon (Surrey Radio Contact Club)**—Third Tuesday in each month, 8pm. "The Ship", 47 High Street, Croydon. Further details from hon sec Sid Morley, G3FWR, QTHR. Tel 01-657 3258.

**Crystal Palace (CP & DRC)**—17 May, 21 June (To be announced). 8pm. Emmanuel Church Hall, Barry Road, SE22. Hon sec Geoff Stone, G3FZL, QTHR. Tel 01-699 6940.

**Dartford Heath (DF Club)**—2 May (AGM), 18 May (RSGB DF Qualifying Event—South Manchester), 25 May (Maidstone Rally), 1 June (RSGB club hunt—evening), 22 June (RSGB DF Qualifying Event—High Wycombe). 8pm. Scout House, Broomhill Road, Dartford. Hon sec Alan Burchmore, G4BWV, QTHR.

**East London RSGB Group** —18 May ("QSL Bureau" by G2MI), 15 June (Being arranged). 3pm. Wanstead House, The Green, Wanstead E11. Buses 10, 20, 66, 101, 167; Underground, Wanstead Central Line. Refreshments available. All SWLs, transmitting amateurs and friends welcome. Hon sec Peter Hull, G4DCP, QTHR. Tel 01-432 6122.

**Edgware (E & DRS)**—8 May ("Single-conversion 2m and 4m receivers" by Robin Hewes, G3TDR), 22 May (Being arranged), 12 June ("Radio control" by Dennis Lisney, G3MNO), 26 June ("Beacons" by John Bluff, G3SJE). 8pm. Watling Community Association, 145 Orange Hill Road, Edgware. Hon sec Peter Ling, G4BZY, QTHR. Tel 01-952 2495.

**Trophy presentations at the Edgware & D RS AGM. From left: Enthusiast's Cup to SWL Wheeler; Constructor's Cup to G3GC; DF Shield to SWL Ling; and on right, G4KD who made the presentations**

**Esher (Thames Valley ARTS)**—7 May (Mainly NFD), 4 June (Junk sale and last-minute NFD). 8pm. King George's Hall, Esher (next door to fire station). Hon sec Rod Blasdell, G3ZNW, QTHR. Tel 01-432 2343.

**Farnborough (Bromley RC)**—Third Monday in each month. Rear of Farnborough (Kent) Village Hall (opposite "The Woodman" public house). Details from Derek Morgan, 59, Bassetts Way, Farnborough, Kent.

**Gravesend RSGB Group**—Mondays, 7.30pm. "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative P. F. Jobson, G3HLF, QTHR.

**Guildford (G & DRS)**—Second and fourth Fridays in each month, 8pm. Model Engineering HQ, Stoke Park, Guildford, Surrey. Hon sec Dave Coltart, G3SYM, QTHR.

**Harlow (DRS)**—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow, Essex. Details from G3WUX, QTHR.

**Harrow (RSH)**—Fridays, 8pm. Sea Cadets HQ, Woodlands Road, Harrow. Hon sec Les Light, G3KDL, QTHR. Tel 01-902 2570.

**Havering (H & DARC)**—7 May (Arrangements for HF NFD), 21 May (DF hunt on 2m, details to be announced), 4 June (Jubilee arrangements), 18 June (To be announced). 8pm. British Legion House, Western Road, Romford. Hon sec C. W. Cousins, G4DEL, QTHR.

**Holloway (Grafton ARS)**—2 May ("Valves and transistors" by G3ONS and G3KRH), 9 May (Being arranged), 16 May ("Design and measurement techniques" by G3UFB), 23 May (Field Day training), 30 May (Contest preparation), 6 June (Lecture by "Prof", G3KEB), 13/14 June (Stoke Newington Show at Clissold Park), 22 June (Grafton Field Day, Hampstead Heath), 27 June (Constructional contest).

**Ilford RSGB Group**—Thursdays, 8pm, Mortlake Road (Off Ilford Lane), Ilford, Essex. Hon sec Derek Sopsworth, G3YMW, QTHR.

**Kingston (K & DARS)**—14 May (Surplus equipment sale), 11 June (Mini-events including talk on amateur radio in Japan, G3KIN on the air). 8.15pm. Tolworth Scout Hut, Stirling Walk, Raeburn Avenue, Surbiton, Surrey. PRO is Alex Piper, G8HUW, QTHR.

**London (UK FM Group)**—8 May, 12 June (Being arranged). 7.30pm for 8pm. Note new QTH, "The Clay Pigeon" Hotel, Field End Road, Ruislip, Middlesex. Sec Richard Street, G3TJA, QTHR.

**Loughton (L & DRS)**—Second and fourth Fridays in each month, 8pm. Loughton Hall, near Debden Station. Hon sec P. J. Lawler, G4CMD, QTHR.

**New Cross (Clifton ARS)**—Fridays, 8pm. 224 New Cross Road, London SE19. Details from hon sec R. A. Hinton, 48 Camilla Road, Bermondsey SE16.

**Northolt (British Airways European Division ARS)**—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact David Evans, G3OUF. Tel Amersham 21573 for details. Civil Aviation Sunday net at 1100-1200gmt on 3·68MHz, listen for G3NAF or G3BEA.

**Purley (P & DRS)**—2 May (Natter night—preparing for HF NFD), 6 June (Final last-minute arrangements for HF NFD). 8pm. Lansdowne Hall, Lansdowne Road, Purley. Hon sec N. A. Marshall, G8JAZ, QTHR.

**Reigate (RATS)**—6 May, 3 June (Natter nights). 8.30pm. "Marquis of Granby", Hooley Lane, Redhill. 27 May ("SSB transmitters" by G3RZP), 17 June (Surplus equipment sale). 8pm. St Mark's Church Hall, Alma Road, Reigate. Hon sec F. H. Mundy, G3XSZ, QTHR. Tel Reigate 43130.

**St Albans (Verulam ARC)**—21 May (Mainly HF NFD and "RSGB publications" by G3TDR), 18 June (To be announced). 8pm. Market Hall, St Albans. Visitors very welcome. Hon sec Hugh Young, G3YHY, QTHR. Tel Watford 25633.

**Southgate (SRC)**—Second Thursday in each month, 8pm. The Green, Winchmore Hill, N21. Hon sec Brian Oughton, G4AEZ, QTHR. Tel 01-336 7166.

**South Kensington (Baden Powell House Scout ARG)**—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington.
**Sutton & Cheam (SCRS)**—20 May (HF NFD preview), 17 June (Surplus equipment sale). 7.30pm. The Library, Cheam, Surrey. Hon sec Alan Keech, G4BOX, QTHR.
**Welwyn (Mid-Herts ARS)**—Third Monday in each month, 8pm, 20 Jan, 17 Feb. Welwyn Civic Centre, Prospect Place, Old Welwyn. Visitors very welcome. Further details from hon sec J. U. Burke, G3HEA, QTHR. Tel Stevenage 4251.
**Wimbledon (W & DRS)**—Second and fourth Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon, SW19. Hon sec F. W. Hill, G3WDO, QTHR.

**Many thanks for your contributions, news letters and eyeball QSOs during my period of office. 73, G3TDR.**

## REGION 8 — RR D. N. T. Williams, G3MDO

**Brighton (BTCARC)**—Room B7, Richmond Terrace Building. Details of meetings from J. McKernan, A8291, 37 Balsdean Road, Woodingdean, Brighton.
**Canterbury (EKRS)**—1 May (Informal), 15 May (Informal devoted mainly to the beginner and constructor). Morse tuition at the beginning of meetings. Further details of meetings from G3XDV, QTHR.
**Crawley (CARC)**—9 May (Annual dinner and dance at the George Hotel, Crawley. Guest of honour GW8NP, President of the RSGB), 28 May (Members' evening at the United Reformed Church Hall, Ifield, consisting of short talks by members on a variety of topics). Further details of meetings from G3MGL, QTHR.
**Dover (SEKYMCARC)**—First and third Wednesday in each month. All meetings in three parts: (1) Morse tuition; (2) Talk/demo; (3) Practical. 7.30pm. YMCA Centre. The shack is open to all members any evening 7-10pm. Further details from sec G8DRS, QTHR.
**Eastbourne (SARS)**—First Monday in each month at Victoria Hotel, Eastbourne, Further details of meetings from PRO G3JFM.
**Horsham (HARC)**—First Wednesday in the month. Civil Defence HQ, Moons Lane, Brighton. Further details from G3NPF.
**Maidstone (MYMCAARS)**—Maidstone Trade and Exhibition Rally, "Y" Sports Centre, Melrose Close, Off Cripple Street, Loose, Maidstone. GB3YSC talk-in on 160, 80 ssb and 4 and 2m multi-mode. Details from G3WXL (trade) and G3ORP, QTHRs.
**Medway (MARTS)**—Fridays, 7.30pm. "Aurora Hotel", Gillingham. Details of meetings from T. R. Blackmur, G8FHN, QTHR.
**Mid-Sussex (MSARS)**—Marle Place, Leylands Road, Burgess Hill. Details of future events from G3RXJ, QTHR.
**West Kent (WKARS)**—Adult Education Centre, Tunbridge Wells. Further details of future meetings from G4CCQ, QTHR. Tel Lamberhurst 393.

## REGION 9 — RR H. W. Leonard, G4UZ

**Bath (B & DRG)**—Mondays, 8.30pm. Church of the Ascension, Claude Avenue, Oldfield Park, Bath. Further information from John Noden, Flat 4, 30 Paragon, Bath BA1 5LY.
**Bristol RSGB Group**—19 May ("SSB on vhf" by Prof. W. Gosling —University of Bath), 29 June (Longleat mobile rally), 30 June ("Potted lectures"). 7pm. Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*
**Bristol (BARC)**—Tuesdays, 7.45pm. 24 Bright Street, Barton Hill, Bristol 5. *G4BZZ.*
**Bristol (Shirehampton ARC)**—Fridays, 7.30pm. Twyford House, Shirehampton. New members most welcome. *G4BOL.*
**Bristol (University ARS)**—Most Saturdays during term time, 2.30pm. Dept of Physics, Royal Fort, Tyndall Avenue, Bristol 8. Full details from G3WDG.
**Cornish (CRAC)**—First Thursday in each month. 7.30pm. SWEB Clubroom, Pool, Camborne.
**West Cornwall (CRAC)**—Now third Thursday in each month. 7.30pm. The Guildhall, Penzance. Full details of Cornish and West Cornwall clubs from G3NKE, QTHR. Tel Camborne 2419.
**Exeter (EARS)**—Second Monday in each month. 7.45pm. ATC Hut, Colleton Hill, The Quay, Exeter. Details from Jack Bawden, 232 Exwick Road, Exeter, EX4 2BA.
**Newquay (N & DARS)**—Alternate Wednesdays, 7.45pm. Treviglas School. Full details from G8GOR, QTHR.
**North Devon (NDRC)**—Second Wednesday each month at QTH of G4CG, Barnstaple; fourth Wednesday each month at QTH of G2FKO, Bideford. New chairman is G2FKO. *G4CG.*
**Plymouth (PRC)**—First and third Tuesdays in each month, 7.30pm. Virginia House, Bretonside, Plymouth. Visitors most welcome. Hon sec S. E. Croft, 2 Crozier Way, Mutley, Plymouth.
**Saltash (S & DARC)**—First and third Fridays in each month. 7.30pm. Burraton Toc H Hall, Saltash. *G4DHA.*
**South Dorset (SDRS)**—First Tuesday in each month. 7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. *G3WAO.*
**Taunton (T & DARS)**—Fridays, 7.30pm. Jelalaband Barracks, The Mount, Taunton. Hon sec G. Swetman, "Little Copse", Monkton Heathfield, Taunton. Tel West Monkton 298.
**Torbay (TARS)**—31 May ("Plotting Oscar satellites" by RSGB Council member Bill Scarr, G2WS), 28 June (Talk). Every Tuesday with special meeting on last Saturday in each month, 7.30pm. Rear of 94, Belgrave Road, Torquay. Visitors always welcome. *G3UIQ.*
**West Dorset (WDARG)**—First Friday in each month, 8pm. British Legion Club Hall, Dorchester. Hon sec L. A. Barnes, G8GHU, Flat 1, 107 The Esplanade, Weymouth. *G8GHU.*
**Weston-super-Mare (WsMRS)**—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. *G3PQE.*
**Yeovil (YARS)**—8 May (AGM), 22 May (Tape lecture—"DX working—The station and the operator" by G3IOR). Every Thursday, 7.30pm. The Youth Centre, 31 The Park, Yeovil. *G3NOF.*

## REGION 10 — RR R. G. Barrett, GW8HEZ

**Barry ARS**—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec GW3VPB, QTHR.
**Blackwood ARS**—Fridays, 7pm. Oakdale Community Centre, Blackwood. Social evening on 13 May, buffet etc, tickets 65p each, details from GW3KYA.
**Cardiff RSGB Group**—Second Monday in each month, 7.30pm. BBC Social Club, 118 Newport Road, Cardiff. Mobile picnic at Porthkerry Park, Barry on 11 May from 1pm, df hunt on 144MHz and 160m starts at 2.30pm. Further details from GW3GHC.
**Glamorgan VHF/UHF Group**—Third Tuesday in the month, 7.30pm. NCB Social Club, Tonddu, Bridgend. A portable/picnic event on 25 May at Myndd Gaer, OS Grid ST967857, Sheet No 170. Details from GW3ZTH.
**Pembroke RSGB Group**—Last Friday in each month. Defensible Barracks, Pembroke Dock. Details from GW3AKO.
**Pontypool RSGB Group**—Tuesdays, 7pm. Educational Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
**Porth (Rhondda ARS)**—Every other Thursday, 7.20pm. Transport Employers Club, Porth. Details from GW3PHH.
**Port Talbot ARS**—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW3ACF.
**Sully (S & DSWC)**—Tuesdays, 7pm. Sully Bowls & Social Club, 59 South Road, Sully. Details from GW4CJC.
**Swansea (SARC)**—Tuesdays fortnightly, 7.30pm. The Commercial Inn, Killay, Swansea. Details from GW4BIQ.

## REGION 11 — RR P. Hudson, GW3IEQ

**Bangor (UCoNWARS)**—Thursdays, 5.30pm. Small lecture theatre, School of Engineering Science. Visitors welcomed.
**Rhyl (R & D ARC)**—2nd Tuesday in each month. Meetings take place in the lecture room of the Ambulance Station, Coast Road, Rhyl.
**Conway Valley (CVARC)**—Second Thursday in each month, 7.30pm. The Quarries, Llandulas, Colwyn Bay.

## REGION 12 — RR A. J. Oliphant, GM3SFH

**Dundee (Kingsway TCSAARC)**—Wednesdays, 6.30pm. Visitors always welcome. Details from J. M. Kelly, GM4AQM, QTHR. Tel Dundee 730265.
**Elgin (Moray Firth ARS)**—Wednesdays, 7pm. Elgin Technical College, Moray Street, Elgin. GM3TKV is on the air every Wednesday from 7pm on the 80, 40 and 20m bands. Any person interested in joining the MFARS should contact Mr A. J. Wills, 1 Police Houses, Moray Street, Elgin. Tel 3103 extn 45. New members are made very welcome.

**REGION 13** **RR V. W. Stewart, GM3OWU**

**Berwick (BARS)**—Last Sunday in each month, 3pm. Tweed View Hotel. Further details from G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.

**Dunfermline (DRS)**—Second Wednesday in each month, 7pm. CCTV Studios, Pittencrieff School, Maitland Street, Dunfermline. Further details from D. G. L. Anderson, GM8HEY, 10 Cairneyhill Road, Crossford.

**Edinburgh (Ferranti, Edinburgh AR Section)**—Second and fourth Wednesdays in each month, 7pm. Recreation Club, Stewart Terrace, Edinburgh. Non-Ferranti employees can attend by arrangement with the society. Further details from N. F. MacLeod, GM4DHN, 54 Drumbrae South, Edinburgh.

**Edinburgh (LRS)**—8 May, 22 May (AGM), 15 June (DF hunt), 26 June (Forward planning), next meeting in September. Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Hon sec GM8GEC.

**Glenrothes (G & DARC)**—4 May, 14 May (Visit), 1 June (NFD preparations), 6 July (Film). First Sunday in each month, 7.30pm. Old Nursery Building, Leslie, Fife. Special meeting for project groups every Wednesday. Hon sec GM3YOR, QTHR.

**St Andrews (UStAARS)**—Details from R. Marchant, GM3ZCQ, Dept of Physics, North Haugh, St Andrews.

**REGION 14** **RR M. A. Comrie, GM3YRK**

**Ardeer (ARCARS)**—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenston, Ayrshire.

**Ayrshire ARG**—Every second Sunday. Community Leisure Centre, 24 Wellington Street, Ayr. Further details from hon sec R. D. Harkess, GM3THI, 55 Woodend Road, Alloway, Ayrshire.

**Falkirk & D RSGB Group**—Temperance Cafe, Lint Riggs, Falkirk. Further details from J. Ramsay, GM3OQI, 78 Wheatlands Avenue, Bonnybridge, Stirlingshire.

**Greenock (G & DARC)**—GM3ZRC. Tuesdays and Fridays, 7.30pm. Watt Library, Union Street, Greenock. Enquiries to hon sec N. C. Henderson, GM3LYI, QTHR.

**Glasgow (GURC)**—George Service House, University Gardens, Glasgow, Details from hon sec, c/o Dept of Engineering.

**Mid-Lanark RSGB Group**—Main meetings recommenced 10 January and thereafter fortnightly, with alternate Friday meetings informal. RAE classes held at 7pm every Wednesday, new enrolments for the advanced section of the course are welcome. Details from GM3KMG. Tel Hamilton 28759.

**West of Scotland**—Fridays, 8pm. Temporary premises at 300 St Vincent Street, Glasgow. Meetings chairman is Tom Hughes, GM3EDZ. Programme and other details from GM3RHR, QTHR.

**REGION 15** **Deputy RR H. J. Campbell, GI8FOK**

**Ballymena Radio Club (GI3FFF)**—Tuesdays, 8pm. 86 Old Cullybackey Road, Ballymena. RAE and morse classes. Fridays, club night; Sundays, special projects, 3pm. QRV "Top" to "Two".

**Bangor (B & DARS)**—First Friday in each month, 8pm. Redcliffe Hotel, Seacliff Road, Bangor. Concluding talks by GI4BFZ "Transistors without tears". An expedition is planned to Copeland Island (off North Down coast) on 20 July. This will count for WAB and WAI. Details later about annual mobile rally in Castlewellan Forest Park. Hon sec N. S. Newell, GI3YMY, QTHR.

**Belfast (QUoBRC)**—Tuesdays 8pm. Queen's University Radio Club, 37 Fitzwilliam Street, Belfast. All welcome.

**Belfast RSGB Group**—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. 21 May meeting to be followed by a quiz with members from all over Ulster competing. For further information contact H. J. Campbell, GI8FOK, QTHR.

**Belfast (C of B YMCARC)**—Saturday afternoons, 2.30pm. 7 Brunswick Street, Belfast. All welcome to this friendly group. Hon sec R. K. Quigg, GI4CRQ, QTHR.

**Mid-Ulster RSGB Group**—First Sunday in each month, 3pm, at GI4BAC, QTHR. Everyone welcome. May venue Bannville House, Banbridge for an all-province get-together. Further details from hon sec Sid Davison, contact via GI3WEM, QTHR.

**North Ulster RSGB Group**—For details of all activities contact Ian Kyle, GI8AYZ, QTHR.

**REGION 16** **RR E. T. Jacobs, BRS32513**

**Chelmsford (CARS)**—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from B. G. Tew, G3WFF, 334 Gloucester Avenue, Chelmsford.

**Colchester (CRA)**—Most Wednesdays, 7.30pm. Stanway School, Colchester. Details from E. York, G8HOR, 22 Owen Ward Close, Shrub End, Colchester.

**Colchester (UoEARS)**—Details from J. Masterton, G8FUL, Eddington 6.

**Great Yarmouth (GYRS)**—Last Thursday in each month. 67 Southdown Road, Great Yarmouth. Details from A. D. Besford, G3NHU.

**Ipswich (IRC)**—Meets every other week. Handford House, Ranelagh Road, Ipswich. Details from P. Hubert, G3YWM.

**Lowestoft (L & DARC)**—Twice weekly, 7.30pm. YMCA, Park Road, Lowestoft. Details from R. P. Finch, G4AJO.

**Martlesham (MRS)**—Details from G. Murchie, G8AXU. Post Office Research Centre, Martlesham.

**Norwich (Norfolk ARS)**—Weekly, 7.45pm. Crome Community Centre, Telegraph Lane, East Norwich, Norfolk NOR 36T. Details from J. M. Draper, G8BLD.

**Norwich (UoEAR & EC)**—Details from P. Gowen, G3IOR.

**Stowmarket (S & DARS)**—Details from hon sec K. J. Bertrard, 35 Curwen Road, Stowmarket.

**Vange (VARS)**—Thursdays, 8pm. Youth Hall, Barstable Community Centre, South Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon.

**REGION 17** **RR L. Hawkyard, G5HD**

**Basingstoke (BARC)**—First and third Saturdays in each month. Chineham House, Popley, Basingstoke. 7.30pm. Sec R. H. Oakley, G8FKT.

**Basingstoke (UK FM Group (Southern))**—First Wednesday in each month, 8pm. Chineham House, Popley, Basingstoke. Sec G3ZRM. Details from G8HWO, QTHR.

**Bournemouth (Wessex ARG)**—First Friday in each month and the Monday 17 days later, 8pm. Cricketers Arms, Windham Road. Hon sec G8BBN.

**Bracknell (BARC)**—Mondays, 7.30pm. Cooper's Hill Community Centre. *G3YMC*.

**Fareham (F & DARC)**—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Details from G8FFI, QTHR.

**Farnborough (F & DRS)**—Second and fourth Wednesdays in each month, 7.30pm. 8th Air Scout's Hut, Rectory Road, Farnborough. Sec G8ECO or PRO G8ATK, both QTHR.

**Jersey (JARS)**—Sundays, 8.30pm, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Hon sec Mary McTaggart, 19 Parade Road, St Helier.

**Harwell (AERERC)**—Third Tuesday in each month, 7.30pm. Also informal meetings every Friday lunchtime. Social Club, AERE, Harwell. *G3NNG*.

**Maidenhead (M & DARC)**—7.30pm. British Red Cross Hall, The Crescent, Maidenhead. *G3FVC*.

**Portsmouth (P & DRC)**—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. *G3NCO, QTHR*.

**Reading (RARC)**—First and third Tuesdays in each month, 8pm. "White Horse", Emmer Green. *G4BLT*.

**Salisbury (SR & ES)**—Tuesdays. Salisbury Activity Centre, Wilton Road. Hon sec G2FIX, QTHR.

**Southampton (SUARC)**—Tuesday evenings, also informal meetings every lunchtime during term in the clubroom, Old Union Building. Hon sec I. Mercer, G3ZER.

**Southampton RSGB Group**—Second Saturday in each month at the Lanchester Building, Southampton University, also Wednesday at the clubroom, Kent Road. Both at 7.30pm. *G4AEU*.

**Swindon (SDARC)**—Wednesdays, 7.30pm. Penhill Junior School, Swindon. *G3YKC, QTHR*.

**Winchester (WARC)**—First & third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. Hon sec G4BKE.

## Looking ahead

**10-11 May** — 21st National VHF Convention, Winning Post Hotel, Whitton, Twickenham, Middlesex.

**24 May** — BARTG Convention, Village Hall, Meopham, Kent.

**28 June** — RSGB Region 12 Amateur Radio Assembly, Robert Gordon's Institute of Technology, Schoolhill, Aberdeen.

**30 Oct-1 Nov** — Amateur Radio Retailers Association Exhibition, Granby Halls, Leicester.

## Mobile rallies calendar

**18 May** —Northern Mobile Rally, Victoria Park Hall, Keighley. Commences 11.30am. Talk-in on top band and 2m a.m. and ssb. Trade stands, bring and buy stall, licensed bar, refreshments, grand raffle, cartoon film shows, lectures on speech processing by D. A. Tong, G8ENN, and on digital frequency synthesizers by G. Spink. Organized by Otley Radio Society; details from G8BZY, QTHR.

**25 May** —Maidstone Trade Exhibition and Rally, "Y" sports-centre, Melrose Close, off Cripple Street, Loose, Maidstone. GB3YSC talk-in on 160, 80 ssb, and 4 and 2m multimode. Details from G3WXL, QTHR (trade) and G3ORP, QTHR.

**25 May** —Hull & D ARS Rally, East Riding College of Agriculture, Bishop Burton, near Beverley. Rally opens at 12 noon. Organizer G3AGX, QTHR.

**1 June** —RNARS Rally, *HMS Mercury*, near Petersfield, Hants.

**8 June** —Elvaston Castle Rally. Talk-in on 2 and 160m by G3ZBI/P and G3EEO/P. Details from G4CTZ, QTHR.

**15 June** —Bangor & D Rally, Castlewillan Forest Park.

**15 June** —Humberside Radio Rally, High School, Boothferry Road, Goole, North Humberside. Talk-in: G8HSG on 2m ssb and a.m., G4CQG on 160m. Many events for all the family. Organized by Goole & D ARS; details from G8ERX, QTHR, or G3VBI, QTHR.

**29 June** —Longleat Mobile Rally, Longleat House, Longleat Park, near Warminster, Wiltshire. Commences 10am. Talk-in stations: G6YB/P on 1,920kHz; G3JMY/P on 3,775 kHz, G3TAD/P on 145·00MHz, 145·50MHz plus vfo. Walking df hunt on 160m commences 3pm. Trade stands, RSGB bookstall, bring and buy stand (all goods to be marked with price, and name and callsign of seller), refreshments.

Wild life park, stately home, gardens, children's zoo and pets corner. Plenty of parking and picnic space. Overnight camping from 6pm 28 June. Car parking for rally adjacent to marquees but outside roped-off site area.

Organized by City of Bristol RSGB Group which makes no charge for entrance to rally, although visitors must pay entrance fee to Longleat Park. Further details from G3ULJ, QTHR.

**6 July** —Upton Rally, organized by Worcester & D ARS. Details from G8ASO, QTHR.

**20 July** —Cornish RAC Rally, Cornwall Technical College, Pool, Camborne. Talk-in on 2m, 80m and 160m from 10am. All the usual attractions. Details from G3NKE, QTHR.

**20 July** —Polegate Steam Engine Rally (A27 Polegate to Lewes). Southdown ARS. Exhibition station GB2SS, talk-in on 2m and 4m on GB3SS. Details from G8CFZ, QTHR.

**20 July** —Anglian Mobile Rally, Stanway School, Stanway, Colchester, Essex. From 10am to 6pm. Talk-in on 80m and 2m. Bring and buy, trade stands, junk sale, and entertainment for all the family. Organized by Colchester Radio Amateurs; details from G3YAI, QTHR.

**3 August** —Woburn Rally, coach park, Woburn Estate. Details from G3MVV, QTHR.

**17 August**—Derby & D ARS Rally, Rykneld School, Bedford Street, Derby. From 12 noon. Talk-in on 2m and top band. Admission and parking free. All the usual attractions, including a monster junk sale. Details from G3FGY, QTHR.

**24 August**—Torbay ARS Rally.

**31 August**—Preston ARS Rally. **NOTE CHANGE OF DATE.**

**21 Sept** —North Ulster Group Rally, Castle Grounds, Antrim. Details from GI8AYZ, QTHR.

**28 Sept** —Harlow & D ARS Rally, Netteswell School, Harlow. Details from G8JXU, Mark Hall Barn, Harlow, Essex.

**NOTE**—The Amateur Radio Mobile Society has cancelled the proposed rally on 18 May at the Clinical Research Centre of the Northwick Park Hospital.

# RAYNET

## by S. W. LAW, G3PAZ*

We have been asked to correct an error in reporting the Barford Rally in the March issue. The rally is organized by the Norfolk group (controller G3HRK, QTHR) and not as written. Apologies to those concerned and we trust the weather will behave on Sunday 15 June to ensure a good attendance.

While on the subject of rallies, Raynet will naturally be at the RSGB Rally at Woburn on 3 August. May we once again make the usual appeal to members to proffer assistance at our stand? Just an hour is little to ask but makes a very welcome break for a hard-working few who so often tend to be forgotten in the turmoil of this very popular event.

### Raynet Committee

At its meeting on 1 March the committee were pleased to welcome three representatives from Leicester. It is always a pleasure to have Raynet visitors at these meetings, and controllers who feel that they would like to attend should contact the chairman, G3BPT, QTHR, who will make the necessary arrangements.

A lengthy discussion took place on the problems of Raynet channels on 2m and the difficulties involved. The following decisions have been discussed and confirmed, but naturally are open to comment from any controller or group who have any ideas on this subject. The committee feels that new groups should try to conform to the recommended frequencies and that existing groups should, subject to the prevailing crystal situation, also come into line as soon as their technical and financial position permits.

The frequencies decided upon are: 144·8, 144·825, 144·850, 144·875 with 145·2 and 145·8 as common Raynet channels, and national Raynet ssb channel of 144·26MHz. It will be noted that four of these channels have a 25kHz separation, the a.m. channel of 145·2MHz is highly unlikely to cause trouble with GB3LO (London repeater), and 145·8MHz is (so far as is known) not a popular frequency. We are, of course, open to correction on these comments. As a matter of courtesy the list has been submitted to G3FZL for study by the VHF Committee for its comments.

Reverting again to the vexed subject of controllers' meetings, the committee is very pleased to learn that a successful Midlands controllers' meeting has been held under the auspices of Alan Dennis, G3CNV. Others please copy!

### National controllers net

As was to be expected from our knowledge of the hf bands, the amended time of the 80m national net was well proven at midday on the trial run on the third Sunday of March. G3BPT reports a score of some 14 stations worked including Cornwall, Yorkshire and Deeside. We hope to learn of even better results from the third Sunday in April. So remember to tune in to the net at midday on the third Sunday of this and every month on 80m to hear comments and reports of progress from as many groups as can get on at that day and time. Frequency around 3·7MHz as QRM permits.

### Kent again

The Kent group certainly get things done, as many members may well be aware by the time this is read. The media provide excellent coverage when on to a good thing. Liaison in the outer London area of Kent is first class thanks to the unremitting effort of those concerned, so Exercise Nemesis must be rated as a really notable effort. For those who missed the news coverage we shall provide a report next month.

**Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.**

* 130 Alexandra Road, Croydon, Surrey CR0 6EW

# MEMBERS' ADS

**These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in each issue of *Radio Communication*, or on a postcard similarly laid out. Each must be accompanied by a recent *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 40p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.**

**The closing date for each issue is the 1st of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.**

**Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way.**

**The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale. Advertisements may be edited or abbreviated as necessary.**

**Members are advised to enclose a stamped addressed envelope when replying to advertisements.**

**Post to: MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE**

## FOR SALE

**Cambridge AM10D tunable a.m./fm rx,** £25. HRQMX, good cond, 4gc/2bs coils, stab psu, spare valves, handbooks, £30. BS coils 28/21/7, £3 each. Heathkit OS2 scope, £25. G2DAF rx, Philpotts cabinet, Eddystone dial, 100kHz calibrator, £20 ono. 300V psu, £2. 500V psu, £2. G8APH, QTHR.

**Vibroplex bug key** with carrying case, £12 ono. G3NKS, QTHR. Tel Copthorne 712165.

**Two HROs** with PSUs, 23 coil packs, manual, spare dial and valves, Microwave Modules 4-6MHz 2m converter. PR30 preselector, £40 the lot or will split. Also Creed 7Bs and spares. *Wanted:* FR50B. G4BLT, QTHR. Tel 049-162 293 or 0344 3232 extension 336.

**Aerial masts,** professional, galvanized, 20ft lengths 2ft by 1ft cross section with all mast fittings, £12. Del by arrangement. Eddystone EC10 as new, £35. 4X150A (new), 4CX250B (unused), £2.50 each. 3B28 (new), £1 each. E88C (new), 50p each. G8ACF, QTHR. Tel Orford 328.

**Sommerkamp FLDX500,** £110. Trio JR500S. Both vgc, little used, with handbooks. Reason for sale: space needed. G3NBT, QTHR.

**Labgear LG50 tx,** 50W a.m., £20 ono. Eddystone 840c rx, £35. G3TAZ, 69 Stopsley Way, Luton, Beds. Tel Luton 28177, 9am-5pm.

**Viceroy mk4 tx,** beautiful cond, £80. Dow-key coaxial relay DK60-G2C, 1kW, new, boxed, offers. G3BRW, 17 Harbour View Road, Poole, Dorset. Tel 0202 747756.

**AR88D,** valves, handbook, S-meter, mint cond, £60. HRO, 9 gc coil packs, £20. 2m Pye Ranger, £7. DET22s, 50p. KT66s, £1.50. 70cm cavity with DET24, £8. All ono. G8GGH, QTHR. Tel Tadley 4111 ext 7926 (business).

**Drake R4B** with manual plus 1·8MHz xtal, £165. Trio 9R59DS, £45. Astatic D104, £4. Archer swr bridge, £3. 6-way co-ax switch (uhf sockets), £4. Buyer inspects and collects RXs. McClements, Old Schoolhouse, Sandystones, nr Jedburgh, Scotland. Tel Kelso 2178 (office).

**Telford TC9 mk2,** £60. Swap for HW17A. SSM medium wave converter, £15. USA ex-govt surplus hf tx, ART13, full conversion data, mint cond, £30. Murphy mobile tx/rx vfo rx, £10. G8HQX, QTHR. Tel 01-303 1553 evenings.

**625-line tv camera** less lens, £30. G8CQE, QTHR. Tel 01-656 5285.

**Mini Products Inc 3-el beam** comprising B24 with RK3 for 10-15-20m, good cond, 2½ yrs old, £20. G3OFJ, QTHR. Tel 01-647 5099.

**Microwave Modules 5W a.m. tx,** as new, used about six times, comp with new mic and 3 xtals, £25 ono. G8JAL. Mike Marriott, "Red Lion", Hockwold, Thetford, Norfolk. Tel Feltwell 391.

**Collins 32S3 tx,** one owner from new, direct from USA, mint cond, no mods, plus 516F-2 psu and spkr, £375. Swan de luxe model 55 mobile antenna, motor operated, band change 80 to 10, ball mount included, £50 ono. G3NRS, QTHR. Tel 0723 61238 (day), 0723 60623 (evening).

**"Radio Communication Handbook",** 4th ed, mint cond. *Radio Communication*, comp sets 1962, 1963, 1966, 1968 to 1974, incomplete sets 1961, 1964, 1965, 1967. Wavemeter Class D. Bugkey Ediswan 1918. Offers. G3CEW, QTHR. Tel East Grinstead (0342) 22013 after 7.30pm.

**F10 AM Cambridge,** 6 chan xtal-controlled tx/rx with xtals for 145·0 and 145·8, £25. AM10PV portable Cambridge (quick-heat pa), 6 chan xtal-controlled tx/rx, with xtals for 145·8, less batteries, £25. G8AWN, QTHR.

**RTTY model 85B/A,** comp with keyboard, £20 ono. Prefer buyer collects. Tel Skelmanthorpe (Yorks) 3489 after 6pm.

**FT75, FP75, DC75, vfo FV50B,** £145. *Wanted:* FTDX150, SB101, SB102, HW101, KW2000A or B with psu. Also practical circuit diagram for FTDX150, urgent. G3KYR, QTHR.

**Audio filters** from modern modems, suitable cw, rtty, repeaters, send sae for list. HT transformers with heaters, 250-0-250V 250mA, £3. 425-0-425V 120mA, plus 275-0-275V 65mA, £4. Buyer collects. *Wanted:* Xtal 3,500kHz exactly. G3SBA, QTHR. Tel 05827-4815.

**Cossor 1049 scope,** vgc, handbook, diagram, graticule, hood, £25. Limited delivery area. G3HGR. Tel Sevenoaks 62227 after 6pm or weekends.

**Microwave Modules 2m converter,** 28MHz i.f., £8. Mobile whip for 2m, £4. Power meter 0-900MHz, 5-500W, £5. G8CRP, QTHR. Tel. 01-654 1761.

**FT2F 2m fm tx** comp with xtals, 13 chan inc R6 and R7, handbook and circuit diagram, £80. Buyer collects or carriage extra. HC25U 12·0833 tx xtal, new, £1·50. G3UUO, QTHR. Tel Cirencester 3389 after 1830.

**SB610 sig monitor,** £50, or exchange for FV401 or sstv monitor. *Also wanted:* base and chimney for 4CX250B. Johnson, 29 Chatburn Road, Clitheroe, Lancs BB7 2AW.

**Drake R4C rx,** 1st class cond, 160m-10m. First reasonable offer secures. G4BJF, QTHR. Tel Loughborough 63324.

**Avo electronic test meter mk4,** mains with handbook. Offers. All enquiries answered. Bawden, 232 Exwick Road, Exeter EX2 2BA.

**Marconi TF867 sig gen,** 15kHz-30MHz, mod/cw, 4V rf, good cond, £75. Buyer collects. G3SDK, QTHR.

**Comp 2m portable/fixed station:** 5W Microwave Modules tx with 6 xtals, modded for cw, Microwave Modules rx plus 6-el Yagi and 20ft co-ax, £65. R. Hammond, 43 Durant Road, Hextable, Kent BR8 7SR. Tel 82-64356 after 6pm.

**Going portable?** Telford TC7 mk2 with bandsearcher cct and handbook, vgc, £32.50 ono. Pellett, "Marimead", Marlpits Lane, Ninfield, Sussex TN33 9LD.

**18AVT/WB hi-gain aerial, £30.** 50ft Telomast, 2m 6-over-6 aerial, Stolle memomatic rotator, £35. Sig gen TF144G, £10. TW Topmobile rx, £5. Pye 2m base station a.m./fm, £20. R209, £5. G3MCL, QTHR. Tel 881060.

**Liner 2,** with pre-amp, £115. FR50B rx with full 10m coverage, calibrator and WWV, £50. Both exc, in original packing. Going hf. GM8HYC, QTHR. Tel 041-959 4455.

**FT2FB,** like new, 4 chan, £90. Buyer collects. G8JGA. Tel Fleet (02514) 3814 after 7pm.

**FT2FB** with xtals 144·48, 145·00, R6, R7, 145·50, 145·55, with all accessories, almost new, £85. Coward. Tel Bristol 292811 (day), 624236 (evenings).

**Heath HW17A,** recently serviced, plus xtals, £50. 25W Ranger, comp, £15. Electroniques CC166T plus i.f. strip, 898 dial, £30. Will sell 898 separately. Lucas 11 ac alternator, comp, £30. J beam 8/8, £5. 'TDZ rx, completed, £8. G8DXD, QTHR.

**Heathkit HW202** with 10 xtals including R5 and R7, manual, and all fittings, £95 ono. *Wanted:* Trio TR2200 or similar, 2m aerial, small mast, cheap rotator, gdo, vhf wavemeter, why? Sayers, 13 Hodge Bower, Ironbridge, Telford, Salop.

**Kustom 300 amplifier,** 12 inputs, 2 giant spkrs, ideal for professional group, cost new £1,300, in mint cond, will accept £600 or exchange for radio equipment of similar value. G3XKX. Tel Leicester 715454.

**Pye Bantam P1AM** inc xtals (145·8) and battery, £60. Pair Cathodeon 1·4MHz ssb filters plus xtal, £8. Transformers 24-0-24V 1A, 60p. Sinclair S60 preamps, new, £1. G8JHE, 22 Newmarket Road,

Fordham, Cambs CB7 5LL. Tel Fordham (063872) 545. G4AUP, QTHR. Tel Milnthorpe (04482) 2526.

**Trio 9R59DS,** match spkr, PM11A preselector, good order, £45 ono. FR50B, xtal cal, PM11 dx preselector, built-in spkr, mint, £75 ono. Inspect, collect, carriage extra. G. E. Bartlett, 25 Westbourne Avenue, Emsworth, Hants PO10 7QT. Tel 02434-2900.

**HRO 5T (octal),** sparkling cond, with psu and 20 gc, 5 bs coils, £30. Pye hf base station, good cond, £15. Bob Beauchamp, 17 Sundridge Road, Birmingham. Tel 021-360 4473.

**Verticals:** Mosley Atlas, 10-40m, £15 ono. 18AVT/WB, £30. G8IPP, QTHR, Tel Peterborough 69622 after 7pm.

**Sinclair Memory Executive,** as new with leather carrying case, 4-function, 8-digit calculator with constant and memory, £15 ono. J. R. Ward, 18 Laurel Avenue, Wickford, Essex. Tel Wickford 2282.

**Eddystone 358X,** psu, coils and box, wkg order, need room. *Wanted:* Eddystone EC10 mk2 mains psu. A. Humphriss, 14 Fosseway Crescent, Tredington, nr Shipston-on-Stour, Warks CV36 4NX.

**Wier Electronics 2m converter** 28-30 i.f., £8.50. Solid State Modules Sentinel 2m preamp, £3. Heath IO-18U scope, exc cond, £35, ono. G8IKY, QTHR. Tel Lancing (Sussex) 62134.

**Unica communications rx,** good cond, mains/battery with dipole and ext aerial, £35 plus £1.50 carr. Also pocket waterheater for NFD, £3.50 postage paid. Transistor radio mains adaptor/battery charger, £5.50. Brian Smith, 20 Beckets Way, Framfield, Uckfield, Sussex. Tel Framfield 288 evenings.

**2m tx/rx 25W a.m. base station,** fully tunable on rx, £30. 144·230MHz xtal HC6U, £1.07. Several 10XJ xtals 160m, 80m, 40m, 75p. Acos stick mic, £1.25. 65ft UR70 coax. Any offers? Several 807 valves 28p. G3ZPA, QTHR.

**FT75, DC75, FV50C,** £150. Trio TS510 exc order and appearance, offers. *Wanted:* Nova-Pal or similar marine rdf rx and service details Sanyo M18 tape recorder. GW3VFZ, QTHR.

**B44 4m rx,** £5. Giant atu, £4. 5-10 amp, £5. Pair variacs, £3. Car radio, £1. Tool box, £1. Carr extra or buyer collects. Dr Nicholls. Tel 061-330 4321 (day), 061-485 8018 (night).

**Heathkit RA-1** with xtal calibrator and spkr, Q-multiplier QPM-1, Codar preselector, comp with instr manuals. Details: Sutton, 4 Ickenham Close, Ruislip, Middx HA4 7DJ. Tel Ruislip 38846.

**14AVQ vertical** 40-10m, £15. Creed 7TR/3 perf, £10. Low-band Pye base stn plus case, good cond, £10. *Wanted:* Heathkit aerial switch. G4DPF, 23 Jesmond Drive, Bury, Lancs. Tel 061-764 2624.

**Pye Motafone** 3-channel solid-state mobile tx with xtals for 145·00, 145·08, 145·2, offers. GW8EQJ, QTHR.

**DX100U,** wkg cond, buyer collects, £25. Hamgear PM2BX mains preselector/rx atu, £7. *Wanted:* FT200/250 or FT150, KW E-Z match, cheap gen cov rx, cond unimportant, for school club. N. Taylor, 23 Welland Way, Oakham, Leics LE15 6SL. Tel Oakham 2721.

**IBM magnetic tape store,** ex-computer peripheral, offers. *Wanted:* KW2000. G3UUU, 22 Tredington Road, Glenfield, Leicester. Tel 0533 872525.

**FT-2F** in good cond, fitted with extra channels 145·50, 145·80 otherwise standard, £85. R. T. Payne, c/o Gowan, 3 Nelson Street, Perth. Tel Perth 21241 ext 238 (office).

**Bush VTR178 portable rx,** mw, sw1/2, fm and 108/176MHz, fitted bfo, mains/battery, exc cond, genuine offer, £25. *Wanted:* R1392 in wkg cond or set of valves for same. G3XLL, QTHR. Tel Norwich 48685.

**Spacemark slow-scan monitor,** £95. Hitachi stereo cassette deck, ok for sstv, £30. Buyer collects. G3VGU, QTHR. Tel Grays Thurrock 5677.

**Superb Poucel el-key handle,** £6. New mounted xtal, 5,500kHz, £1. Valves as new: 12AT7 (2), ECF80 at 20p; 12BY7A (2), ECL80 at 30p; pr 813s with base, £4, all post extra. Woden fil transformer 10V, 10A (for 813s), £6 (wt 12lb) plus carr. G2GM, QTHR. Tel Freshwater 2709.

**2m linear,** "mark" lines, QV06-40A, blower etc, £45. 12V dc, psu for QRO mobile/portable, +1kV 200mA, +300V, —120V outputs, £45. Xtals: 10·245MHz (=10·7 MHz−455kHz) HC18/U, £1 each or all four £3. G8CHE, QTHR. Tel 01-953 2030 ext 3394 office hours only.

**Homebrew linear,** 80-10m, four pa valves, new, suit KW2000 series, no mods, £45. G2FFN, QTHR. Tel 52441.

**Garex mk2 Twomobile special** to owners specification, fm 10W out, 6-xtal toneburst, variable deviation, listen a.m./fm on rear contacts, m/c switch for relay operation, mains power, phone socket, S-meter contacts, spkr psu extra, mint cond, £100. G8FRE, QTHR. Tel 01-894 1244.

**12-digit electronic calculator** with all the usual functions, runs off a 9V battery, comp with case and instructions, £20 ono. R. Webster. Tel 031-332 5736 after 6pm except Mondays.

**Eddystone 940,** mint, £130. 2m TW tx a.m. xtal or vfo control, mains or mobile with pos earth, very little used, £50. G3EJC, QTHR. Tel 01-979 4751.

**Xtals,** ideal for 2m reception, HC6/U, hardly used, 12·925MHz, 12·958333MHz, 13·008333MHz, £2 each including postage. Also 'forties valves, wkg. G8JBH, 63 The Drive, Edgware, Middx. Tel 01-958 5113.

**23cm cavity wavemeter,** silver plated, brand new, in makers' sealed container, calibration chart, £16. 9cm wavemeter, direct-reading micrometer head, £8. Klystrons, £5. 3cm waveguide adaptors, thermistor sections, wavemeters, etc. 72BA/B klystrons, disc-seal valves. Inquiries sae, please. G3IUD, QTHR.

**Liner 2** with preamp and manual, £120. G8DZD, QTHR. Tel 021-354 1899.

**New triband Dexbeam** (planning problems), £22. 50m UR67 co-ax, £12. EK9X keyer, £5. *Wanted:* HQ1 Mini beam. GM3GJB, QTHR. Tel Falkirk 23608.

**BC639 rx,** 100MHz 160MHz, with handbook, requires 200V ht, 6·3V fil, £15. PSU 250V, 6·3V fil, £5. Would suit above, will separate. Howard communication rx with circuit, 4 ranges, 0·15 to 1·7MHz, 1·7 to 5·5MHz, 5·5 to 18MHz, 16 to 40MHz. G2IJ, QTHR. Tel Ports 65053.

**Contant variable stabilized psu** 0-35V at 2A, £6. 100W dummy load 70-75Ω co-ax input (400W in oil), £3. Enclosed 75Ω ½W load BNC plug, 40p. New LM565 pll ic, £2. 60·75MHz xtal (ok for G3TDZ 2m rx), 75p. Carriage extra. G8ENI, QTHR. Tel Cheslyn Hay 415374.

**KW E-Z match,** £13. Katsumi EK105D keyer, £12. Tech TE20D rf sig gen, £15. Heathkit RA1 rx, £15. All good cond. G4ASB, QTHR. Tel Derby 74479.

**Microwave Modules** 144MHz a.m. tx with mic, xtals 144·2, 144·3, 144·5, 145·0, 145·05, tunable rx, perf cond, £48. OH2CD type 9MHz ssb bilateral i.f., 2 KVG XF9A filters, £40. Many small items, sae list. G3LWT, QTHR. Tel Broughton (Hants) 446.

**Yaesu F line:** FL400, FR400, FL2500, plus matching spkr, valves, etc, Mosley wide-spaced tribander, Classic 33. All mint cond, £420. G3UDR, QTHR. Tel Bidford-on-Avon 2781.

**KW2000,** ac/dc PSUs, recent KW service, vgc, £135 cp. Two s/s caps, 30-250pF, 35-400pF, ideal full-power Z-match, £6 cp each. Mod a.m./fm, QQVO6-40A, with cct dia, £5 ono. *Wanted:* HF tx with 28-30MHz. G3WAO, QTHR. Tel Weymouth 71529.

**SB220,** mint cond with instruction book and original packing, £200 ono. 6146 valves, new, boxed and guaranteed, £2.75 each inclusive. G3HCU, QTHR. Tel Dorking 730215.

**2000B,** ac psu, 444 mic, £160. G3REO, QTHR. Tel Coniston 329 evenings.

**Eddystone 840C,** mint, £45. 432MHz Microwave Modules converter, £16. J-beam 46-el Multibeam, £10. Both new. *Short Wave* magazines 1962-1969, mint, £5. Can del approx 100 miles. *Wanted:* Eddystone 730/4 or 940. G3OHC, QTHR. Tel 021-308 2512.

**Trio 9R59DS,** internal spkr, immac, £40. Joystick and Joymatch atu, brand new, £10. RAE course, £10. Prefer buyer collects or carriage extra. Cross, G4DXG. Tel 01-679 3215 evenings only.

**F27 AM high band,** new rf valves, 2m, £25. Echo 40-10m trap vertical, £15. Sentinel 2m converter, 10m i.f., £13. 19 set mk3 with extras, good, £7. 62 set, £12. G3YWT, 6 Cherry Orchard Lane, Salisbury. Tel 20649.

**Hustler 4BTV trap vertical,** 40-10m, £6. PW Clubman homebrew transistorized rx 160-80m, suit beginner, £4. WAB area book and check log, 50p. Trap dipole 80-10m, £2. G3ZZD, QTHR. Tel Tunbridge Wells 34117.

**FT101B tx,** mint cond with hand mic, £305. 2m Microwave Modules converter. 28-30MHz i.f. with 116MHz osc output, little-used, still with 5 months' guarantee, £15. G8IZQ, 36 Brewery Lane, Freshfield, Formby, Lancs. Tel Formby 77920.

**KW Viceroy,** vgc, £55. BC221 with stab ac psu, original charts, exc cond, £20. Heath RF1U generator and V7AU vvm, manuals, £10 each. AVO 7, good cond, £15. Offers considered. *Wanted:* SB101 or similar tx/rx with ac psu, £200 max. G3MFL, QTHR. Tel 027-55 4351.

**Creed 7B and 8B,** in good order, 240V ac motors, one synchronous, £22 pair. L/band boot Ranger, £3. FM tuner boards, varicap tuning, audio out, tested, with circuit, £3.50. Matching stereo decoder, £2.50. G3YLQ, QTHR. Tel Luton 25595.

**Multi 2000,** fb cond, fitted toneburst unit, offers around £205. Tel Stratford-on-Avon 4718 after 6pm. G8GAG, QTHR.

**Heathkit IB101 counter,** 20MHz plus, £80. Inoue IC700R solid state rx, £50. AR22 rotator with cable, £20. 455kHz Panadapter, £15. 6ft Admiralty rack, £3. "C" core transformers, chokes, oil-filled capacitors, etc. G3PBV, QTHR.

**Complete station:** Eddystone 888A, KW Viceroy, mast, beam, Leak a.m./fm tuner, *Short Wave* magazine bound Vols 10-15. Offers. G3PRP, QTHR. Tel Coalville 34907.

**CDR TR44,** HQ1 hybrid quad with balun for 10, 15, 20m, 90ft control cable, 90ft RG8U 50Ω co-axial, £80 complete. Klystron 2K25 and 4X150A tubes, offers. SAE please. GM4AGS, QTHR.

**Yaesu FR50B rx,** as new, £50. G4DWP. 76 Barrowby Road, Grantham, Lincs. Tel Grantham 2825 evenings.

**Collins S-line.** KWM 2A PM-2 psu 32B5 station control unit vfo 30L1, with carrying cases. Also 32S-1, 75S3, 30L1, PM-2 psu, FT101. Offers. G3KZI, QTHR. Tel 01-530 2028 after 7.30pm.

**Heathkit RA1** with manual and calibrator. Pye Vanguard, acc, manual. Hudson AM108. BC342 manual. R107. Delivered reasonable distance. Sensible offers. Tel Waltham Cross 28144.

**Heathkit SB101 tx/rx** comp with spkr unit, ac psu and cw filter, latest Heath mods, good cond, £180. Also several 6146 tubes (new) at £2.25. G3VZJ, QTHR. Tel 01-977 8928.

**Eddystone 940,** mint, £85. TW 2m communicator LS/240V psu, £25. 70cm Pye uhf base station, tulip mic, £25. TW 2m converter, 240V power, £12. Codar AT5, control and 12V psu, £20. 4m Pye Trans Ranger, £5. G3KAS, QTHR. Tel York 27123.

**R107 rx** plus phones, 1·2-17·5MHz in three ranges, fully wkg order, £15. Class D wavemeter, £2. Will del reasonable distance. J. Donnithorne, Little Homestead, Hackenden Lane, East Grinstead, Sussex. Tel 0342 26366 evenings.

**Complete station,** ssb/a.m./cw tx/rx. Hallicrafters HT32 tx, £70. Hallicrafters SX101/A rx, £70. Both very good, with manuals. Buyer arranges collection. G2BTY, QTHR. Tel Deveron 863198.

**Heathkit 2m converter** for SB300 rx, £10. Heathkit HW17A tx a.m./fm transmit and receive, £55. Pye Cambridge AM10D, 6 chan on 2m, a.m./fm transmit/receive, £35. Pye Cambridge AM10D, 12·5kHz specification, wkg on 145MHz, £40 ono. G8CJM, QTHR. Tel Medway 47280.

**Creed 7B,** base, silence cover, loop and motor supplies, £15. 19in rack cabinet, 5ft high, wheels and doors, £6. 70cm Parabeam, £2. 70cm tripler with QQVO2-6s, £5. 10ft by 1½in galvanized pole, £1. Buyers collect. M. Gasper. Tel 01-500 4529 (Chigwell).

**KW201 rx,** exc cond, £68. Mk1 G2DAF tx renown for cw note, 898 dial, with matching pair 813s G2DAF linear containing PSUs for whole rig, Phillpots cabinets, £50, parts worth that. Heath OS2 scope, £14. G3OHP, QTHR. Tel Medway 220536.

**Pye Cambridge AM10B,** boot mounting with control box, 3 tx xtals, rx tunable 2m, £20. TW 2m converter, i.f. 1·8-3·8MHz, £5. Wavemeter Class D with built-in mains psu, £5. G4CVA, QTHR. Tel Mansfield 28373.

**Heathkit RA1 rx,** factory-built, calibrator, vgc, built-in spkr, £25. Burgis, 11 Morningside Avenue, Portchester, Fareham, Hants. Tel Portsmouth 812611 ext 102 (office).

**SWL's comp station sell-out:** FR50B rx, mint with xtal calibrator, comp No 19 station, spares, valves, aerials, books, maps, etc, £90 lot. Will sell separately. Offers. A8426, 1 Arthog Road, Didsbury, Manchester 20.

**Drake TR-3 tx/rx,** contest winner, good cond, comp with RV-3 remote vfo, AC-3 psu, DC-4 mobile psu, recently re-valved, deliver 100 miles, £220. Mike Rowlands, 13 Watery Lane, London SW20. Tel 01-542 9101 evenings.

**Gen cov rx,** Electroniques valve front end, double conversion, ½ lattice, 898 dial, etc, built on pcb, excellent, £38 ono. Also ham-band coilpack, interchangeable in above rx, £10 ono. FT101/277 mk2, exc cond, 1 year, mic, leads, etc, £255 ono. Collect or extra. G4BZE, QTHR. Tel Exeter 51646.

**Starwet spectrum analyser,** brand-new, unused, 10MHz to 800MHz, £55 ono. Marconi TF958 vtvm, exc wkg cond, £10. Both units with manuals. Buyers collect. BAY96, new, unused, £2.50 each. BAV46, unused, 60p each. CXY11, £1 each. G3RNV, QTHR.

**9MHz Yakumo ssb filter** with usb xtal, 2·4kHz, 1·8 shape factor, only 4cm by 2cm by 2cm, new and unused, £15·50. D. Gething, Neuadd Emrys Evans, Menai Avenue, Bangor, Gwynedd.

**Three-element beam,** 20m, 15m, 10m (DB3), £21.50. BC221 with charts, less psu, £8.50. G4BTE, QTHR. Tel Bilston 45296.

**Hammarlund HQ180 gen cov rx,** fitted 24-hour clock, manual, £70. Prefer exchange 2m fm /M, IC20, FT2, etc. G3TDJ. Tel Bude (0288) 3701.

## WANTED

**60ft tilt-over tower,** Versatower P60 or BP60. G4BUP, QTHR. Tel Stafford 822395.

**Weston No 772 analyser,** loan or buy instruction book or circuit to trace fault. Pattullo, 1 St Michaels Close, Aylsham, Norwich NR11 6HA. Tel Aylsham 2305.

**Philips tape recorder type EL3542 four-track erase head,** original lost, makers cannot supply spare. Can you? Please quote price. G2UV, QTHR. Tel 01-904 2727.

**Valves** type 4X150A, 4X250B or 4CX250B. Details of price and cond to G3NPF, QTHR. Tel Horsham 66290.

**Valves** 26A6, 26G6, 26D6, any number. Price including post and package. G8AHN, QTHR.

**FT101,** any model, must have official mod for 160 and clean case, good mechanics, electrical faults no objection. All replies answered. G8FZF, QTHR. Tel 01-640 3618.

**Circuit/manual** for Triplett sig gen model 1632 to purchase or loan (will copy). Expenses re-imbursed. G3CVS, QTHR.

**Vertical all-band aerial** suitable for roof mounting to exchange for 3-el 10m quad. Misc components and junk available free to first caller who will take the lot. G3ZDF, QTHR. Tel Peacehaven (07914) 5112 after 18.30 weekdays or at weekends.

**KW600 or 1000 linear amplifier.** G3TKL, QTHR. Tel Cleveleys 74363.

**Mains transformer unit** for Solartron-Hartley CT436 double beam oscilloscope. G8JWS, 101 Main Street, Frizington, Cumbria, CA26 3PE.

**Ultra 4A4-AH4 (Valiant)** and Ultra 3A4-AH3 (hand portable) transmitter/receivers. Any information on circuits and/or conversion to 2m reqd, to buy or borrow. All replies answered and postage refunded. G8CZM, QTHR. Tel 021-422 2986.

**A.M. tx** with modulator and psu in wkg order to cover all bands 160–10m, preferably commercial rig but anything considered. Armistead, 45 Swanston Gardens, Fairmilehead, Edinburgh EH10 7DF.

**Voight corner horn,** Hartley-Turner, very old spkrs, receivers, transmitters (especially spark), valves, components, headphones, pickups, also pre-war wireless books, magazines, catalogues, service sheets, (wanted for museum archives and research purposes). Collection arranged. G3KPO, Alverstone Manor Hotel, Shanklin. Tel 2586.

**Manual of Hartley 13A scope,** buy or borrow. GW8BPG, QTHR.

**Manual for KW Viceroy mk3A tx** to buy or borrow. G3RNU, QTHR. Tel 0452 24900.

**Eddystone EC10,** also psu for HRO. G3NJP, Shandon, Willesley Pound, Cranbrook, Kent. Tel Sissinghurst 482.

**FV-400** separate vfo for FTDX500 Sommerkamp tx/rx, also cw tx for top band. G4DBR, QTHR. Tel 088-94 2912 after 1800.

**Heathkit OS-1,** OS-2 or similar, good cond and small size essential. Will collect to 50 miles. G3FN, QTHR. Tel 0246 417510.

**Trio remote VFO-5D** for TS-510, any cond. G2HDU, "Willow Green", Brockhampton, Swindon Village, Cheltenham, Glos GL51 9RS.

**RCA AR8506B rx circuit diagram** for photocopy and return. GM4CBV, QTHR.

**Topband ssb tx,** ie Cannonball, must be in good wkg cond (Midlands). Also large roller coaster inductor. J. T. Gell, 94 Glapton Lane, Clifton, Nottingham.

**Circuit, connections, information** on Electroniques Qoilpax (transistor). Will copy and return with costs immediately or purchase. Also FT101, any, repeat any, condition if reasonable price. Selling Codar T28 rx, £10 post paid. Harry Pearson, 8 Bridge Street East, Penshaw, Houghton, Tyne-Wear.

**Circuit or any info** on radar unit type TR3699 or would consider comp radar for boat. G3SMK, QTHR. Tel 021-744 6381.

**R206 lf adaptor unit,** 50 to 600kHz. Details please. R216 or similar rx, 30 to 150MHz approx. Andrew Glanville, 47 Brookway, Romsey, Hants SO5 8JZ.

**Pre-1930 morse keys,** PMG, spark or other type gear, any condition. Write VK4SS, 35 Whynot Street, West End, Brisbane, Q, 4101 Australia.

**Original marine-band xtals** including 9·1MHz. PSU for Redifon GR286A vhf radiotelephone. KW107 atu. Lee, 400 Edgware Road, Paddington W2. Tel 723 5521 (day), 904 2104 (evening).

**Telefunken early valve type EBC11.** Tuning capacitor, Mitsumi PVC25 for Tech TE15 dip meter. Edwards, 244 Ballards Lane, London N12 0EP. Tel 01-455 4321.

**Silence cover** for Creed 75RPR teleprinter, please state price or have 75RPK silence cover for swap. G3YKB. Tel Medway 571909.

**Receiver R3673** by collector of WW2 equipment in Czechoslovakia. Offers pse via G2BVN, QTHR.

**Scarborough Amateur Radio Society** urgently require KW2000 tx in good cond and with psu. Offers to G3RTN, treasurer, QTHR.

**To buy/loan information:** R101-B-ARN6, *Practical Wireless* May 1955 RA10DA, Cosmochord pu head LP/GP19 "cube format", circa 1928 Osram "Music Magnet" kit set and literature, any 'twenties Gamages radio catalogues. G3NHU. Tel 2677.

**Pye base 19in rack cabinet,** 4ft or 5ft and a Pye tulip mic. John Bulpin, 9 Wyndham Street, Tongwynlais, Cardiff CF4 7LN.

**SB300, SB301 or JR310,** with ssb filters. Heathkit OS1 oscilloscope. *For sale:* CR100, good cond, £12 ono. R. Kell, 177 Main Street, Seahouses, Northumberland. Tel 463.

**Exchange small chart recorder** with chart paper. Colour tv patt/gen for 20m b/s coil HRO hf cw tx. Tel 01-472 8479.

# VHF COMMUNICATIONS

*VHF COMMUNICATIONS*, the English language edition of the German publication *UKW-BERICHTE*, is a quarterly amateur radio magazine especially catering for vhf/uhf/shf technology. It is published in spring, summer, autumn and winter. The current subscription rate is £2.80 postfree.

All special components required for the construction of the described equipment, such as printed circuit boards, coil formers, semiconductors and crystals, as well as complete kits, are available for despatch direct from Germany. Many of the printed circuit boards, in addition to a few selected kits, are being stocked in the UK. A new price list of kits and materials is now available—send sae for your copy.

Price of the magazine is as follows:

| | | |
|---|---|---|
| Complete volumes: | 1969, 70, 71 | — £2.30 per year |
| | 1972, 73, 74 | — £2.65 per year |
| | 1975 | — £2.80 |

Individual back issues — 85p each (from UK stock)

| | | |
|---|---|---|
| Special offers: | Vols 1969-1971 with free binder | — £6.90 |
| | Vols 1970-1972 with free binder | — £7.60 |
| | Vols 1972-1974 with free binder | — £7.95 |
| | Vols 1969-1974 with two binders | — £14.40 |
| Plastic binder to hold 12 editions (3 volumes) | | — £1 |

All above prices are post free.

See the range of kits and magazines at the VHF Convention at Whitton on 10 May.

Orders and enquiries should be addressed to our UK representatives:

**AMATEUR RADIO BULK BUYING GROUP**
**20 Thornton Crescent, Old Coulsdon, Surrey.**



# ham radio
*magazine*

**the no-nonsense look at American state-of-the-art amateur radio**

**Subscription: £4.30 per annum**
**(including air delivery)**

**UK subscription office: Ham Radio Magazine (UK), PO Box 63, Harrow, Middlesex HA3 6HT**



## An excellent speech compressor for only £7.80

**THE EMUPRESSOR**
This old favourite will give your audio a lift at low cost. No clipping, so minimum distortion, practically the same output whether you speak into the Mic. or ten feet away. No knobs to adjust, fit and forget. A sample tested gave a 6dB change of output for 60dB change of input. Fitted with co-ax sockets for in and output. Needs 12vdc at 35mA supply. Size is only 4¼ × 2¼ × 1¼" so you should be able to find room for it somewhere.

**THE EMU VFO**
This unit is proving a huge success so it is now available for 6, 8, 9 or 12MHz to give others a chance to take advantage of this small VFO. There is a sine wave output of not less than 2v p-p into low impedance via a co-ax socket. It is tuned by a potentiometer (supplied) and the VFO is housed in a die-cast box 114 × 64 × 30mm and a polythene box for optional thermal insulation. A separate diode to give you good quality FM or FSK is employed. A supply of 12vdc Neg. earth is required to power the unit. Stability is adequate for most Amateur applications. **Price £9.50.**

**THE EMU FM-UNIT**
This will look after the Rx side of the FM station. A compact add on unit measuring 6 × 2¼ × 2¼" containing limiters, squelch, audio and output stages giving approx. 1 watt for a low imp speaker. There is also an output from the "S" curve that can be used for AFC, etc. There is only one connection needed to the main Rx, a small capacitor to the last IF stage and fed via co-ax to the Unit. A negative earth 12vdc supply is required to power it. For those wishing to include inside an Rx there is a PC board version. 450/465kHz or 1·6MHz. **Price £13.50.** PC version **£11.50.**

**THE EMUMARKER**
The well-known crystal calibrator still available in a 4¼ × 2¼ × 1¼" box. There are 3 co-ax sockets on top, one for each of the outputs which are 1MHz, 100kHz and 10kHz or in the Emumarker 25 the last output is 25kHz instead. Most useful for finding spot frequencies. This needs a supply of 9vdc at 100mA. **Price £9.50.**

**EMU-CALL**
This will send your own callsign at intervals in Morse from a small speaker or from a jack socket to wire in to the modulator if preferred. It is all solid state with TTL 74 series and will give your station a distinctive sound. **Price £28.50.**

**Post and packing all units to UK. 15p.**
Money-back guarantee if not satisfied. Please write for any further details required to:

**I. N. CLINE, G3EMU, 15 KNIGHT AVENUE, CANTERBURY, CT2 8PZ KENT**



## GET IT TAPED!

**THE COMMUNICAIDE MORSE MASTER**
**is the certain way to learn morse**

**START NOW! PICK A PACK TODAY**

Each pack contains three 90 minute cassettes.
Seven day refund guarantee.

| | |
|---|---|
| BEGINNER PACK | 3—8 w.p.m. |
| INTERMEDIATE PACK | 8—12 w.p.m. |
| ADVANCED PACK | 12—15 w.p.m. |
| FIGURE PACK | 3—8 w.p.m. |
| QUALITEST PACK | Simulated exam exercises. |

**Special offer for the complete beginner— 90 min. Introductory Tape for only £1.65**

Discover for yourself how our unique home study techniques will sustain your interest and enthusiasm.

Any one pack £6.30. Any two packs £12.
Any three packs £17.55. Any four packs £22.80.

**The complete course of five packs—£27.00.**

Cassettes only. Milton Keynes (0908) 77710

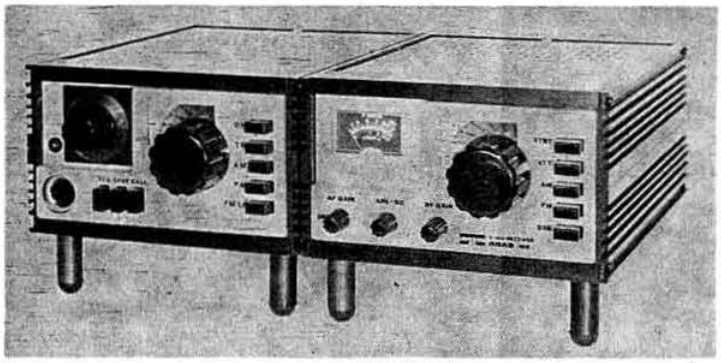
**MINIWISE PRODUCTS**
**P.O. BOX 99, MILTON KEYNES MK3 5BR**

G3LRB

# STEPHENS-JAMES LTD

G3MCN

**70 Priory Road, Anfield, Liverpool L4 2RZ  Tel. 051-263 7829**



## ARAC 102 MOSFET RECEIVER

**28-30MHz · 144-146MHz**
**AM, FM, SSB**
**12V DC OPERATION**

**IDEAL FOR OSCAR 7 TRACKING £87.30** (From stock)

## ATAL 228 TRANSMITTER

**144-146MHz AM-FM 8 watts**

**Yaesu**

| | |
|---|---|
| FT101B Transceiver | £356.40 |
| FT201 Transceiver | £313.20 |
| FTDX401 Transceiver | £334.80 |
| FR101D Receiver | £356.40 |
| FT200 Transceiver | £232.20 |
| FL2100B Linear | £205.20 |
| YC355 Frequency Counter | £137.00 |
| FT220 VHF Transceiver | £291.00 |

**BELCOM**

| | |
|---|---|
| Liner 2 VHF Transceiver | £156.00 |
| 100 watt 2m Linear | £172.00 |

**Hy-Gain**

| | |
|---|---|
| 12AVQ 10-15-20m Vertical | £27.54 |
| 14AVT/WB 1- to 40m Vertical | £50.00 |
| 18AVT/WB 10 to 80m Vertical | £56.18 |
| BN86 Balun | £10.26 |
| TH3MK/Tribander Beam | £107.00 |

**Microwave Modules** (post free)

| | |
|---|---|
| 2, 7, 4m Converters, state I.F. | £16.42 |
| MMC144/20 LO Converter | £17.60 |
| 432MHz Converter | £19.55 |
| 432 Varactor Tripler | £18.90 |
| 144MHz Dual Outpu pre-amp | £9.72 |

**Swan**

| | |
|---|---|
| 700 CX Transceiver | £426.00 |
| 1200 Linear Amplifier | £189.90 |
| SS-200A Transceiver | £538.00 |
| TB-4HA 4 Element Tribander | £135.00 |

**Antenna Rotators**

| | |
|---|---|
| AR22R (post 65p) | £29.70 |
| AR30 ,, 65p | £27.00 |
| AR40 ,, 65p | £32.40 |
| CD44 ,, 75p | £64.80 |
| HAM 2 (post £1.00) | £97.20 |
| Stolle Automatic | £33.48 |
| Stolle Multimatic | £37.80 |

**Barlow Wadley**

| | |
|---|---|
| XCR30 Solid State Receiver | £125.00 |
| TR801 FM Tuner | £17.15 |

**DRAKE**

| | |
|---|---|
| TR4C Transceiver and AC PSU | £349.92 |

**MICROPHONES** (post free)

| | |
|---|---|
| Yaesu 844 Desk Microphone | £16.12 |
| Yaesu 846 Hand Microphone | £6.30 |
| Shure 201 Hand Microphone | £7.00 |
| Shure 444 Desk Microphone | £16.00 |
| Shure 444T Desk Microphone | £16.50 |
| Electro Voice 729 Desk | £13.50 |

**JAYBEAM**

Send SAE for latest catalogue and price lists of beams, mast, clamps, etc for 2m, 4m, 70cms.

**ATLAS**

180 Watt PEP Solid State Transceiver 20-40-80-160M 12V DC operation £280.00

**G. Whip**

Full range of the most popular range of antennas. Send SAE for information

**KW Electronics**

| | |
|---|---|
| KW2000E Transceiver | £373.68 |
| KW204 Transmitter | £273.78 |
| KW Linear Amplifier | £198.18 |
| KW107 Matching Unit | £74.31 |
| KW109 Matching Unit | £95.04 |
| KW Monitorscope | £95.04 |
| KW160M Antenna Match | £20.05 |
| KW E-Z Match | £24.41 |
| KW Balun | £3.46 |
| KW Antenna Switch | £6.70 |

**Solid State Modules**

| | |
|---|---|
| PA3 Dual Mosfet Pre-Amp | £5.94 |
| 2m FET Pre-Amp | £7.31 |
| Europa Transverter | £88.00 |

**Accessories**

| | |
|---|---|
| Twin Meter SWR Bridge | £11.20 |
| Single Meter SWR Bridge | £6.60 |
| 3" Ceramic Insulators | 28p |
| Dipole "T" Pieces | 28p |
| PL259 Plugs 42p SO259 Skts | 40p |
| Cable reducers | 14p |
| 300 & 75 ohm twin feeder | 8p yd |
| UR43 16p yd UR67 40p yd | |
| Omega Noise Bridge TE702 | £22.00 |
| Omega Noise Bridge TE701 | £14.75 |
| Morse Practice Oscillators | £2.75 |
| MF100 Audio Generator | £22.00 |
| Planet 808 Speech Compressor | £32.39 |

**Electronic Developments**

| | |
|---|---|
| 2m and 4m Transvertors | £95.00 |

**Secondhand Equipment**

**DUE TO BUDGET INCREASE, 25% ON MOST EQUIPMENT. SEND S.A.E. FOR LATEST PRICE LIST.**

Due to postal increases minimum postage charge parcels 25p.

S.A.E. with all enquiries please.

We are in urgent need of good secondhand equipment. We pay spot cash. State price and full details of equipment you have for sale. Collections and deliveries can be made in some areas. Instant HP and credit facilities available. Full after sales service on all equipment. Shop hours: 9.30 till 1pm, 2.15 till 6pm Half Day Wednesday

**MEMBER OF THE A.R.R.A.**

## NORTH EAST DIVING LTD

**Storno CQM**-39-25 L.B. VISCOUNTS FM used, **£8** each + p/p £1

**Control units £4**, used, **£3** in poor condition + p/p 50p

**Repeater Base station** CQF 31-3-25kHz L.B. Mains. FM 60W. One only, **£25**. Buyer to collect.

**Base set** CQF 33 C-14 L.B. Mains. With control unit. Very good condition, **£20**. Without control gear, **£15**

**Creed Teleprinter** model 85/BM, unused, with terminal unit, **£16**, collect.

**Racal SSB** adaptor for RA17 and RA117, **£28** + £1 p/p

**Valve voltmeter** No 3, **£15**. Without probes, **£12**

**FM deviation test set**, 5-100MHz, **£25** p/p £2

**B 40 C Communications receiver, £38** + p/p £3.50

**All prices include VAT**

CASH with order to: **NORTH EAST DIVING LTD., 165 Whitley Road, Whitley Bay, Tyne & Wear NE26 2DN.  Tel: W. B. (08944) 23553**

## TMP ELECTRONIC SUPPLIES

**Now an appointed agent for South Midlands Communications Limited**

All Yaesu in stock, FT-101Bs, monitor scopes, frequency counters etc, Hy-Gain range of Antennae, Shure mics, SWR Bridges, Microwave Modules converters and the new KP12 speech processor etc, etc. Equipment demonstrated by appointment or just write or 'phone your order.

**OSKER SWR 200** Powermeter/SWR bridge, 52 or 75 ohms switchable impedance, direct reading from 2w FSD to 2KW FSD, 3-200MHz. A joy to own (p.pd.) **£22.50**

**W2AU BALUNS** with built-in lightning arrester, 1:1 or 4:1, suitable for all antennae, the Rolls-Royce of baluns. Few only at old stock price (p. pd.) **£7.50**

**NYE-VIKING SPEED X MORSE KEYS**, as advertised in the March issue. All were cleared within a week but a further small quantity are available, those disappointed last time drop a cheque or PO in the mail for (p. pd.) **£6.50**

HQ-1 Mini Beams, Toroidal cores, Balun Kits etc.

**3 Bryn Clyd, Leeswood, Mold, Clwyd CH7 4RU**
Tel.: Pontybodkin 846  STD 035 287

# GAREX (G3ZVI)

**STOP PRESS! VAT ON ELECTRONIC GOODS IS 25% FROM MAY 1st. OUR PRICES QUOTED BELOW INCLUDE 8% VAT. PLEASE ADD A FURTHER 15% (17/108ths) TO YOUR ORDER TOTAL.**

**THE GAREX Mk II TWOMOBILE FM/AM TX-Rx**

Brief technical details:

**Tx, Rx and PSU** for 12V DC input contained in one unit 12 × 4½ × 8" deep.

**Tx** Transistorised crystal oscillator (8MHz), multipliers and modulator, quick-heat tetrodes YL1080 driver and PA. No standby current. 6 switched crystal positions. Fist mic. with press-to-talk. Switched AM or FM. Tone-burst generator—2 tones + off switch.

**Rx** Fully transistorised. Continuous tuning from 144 to 146MHz directly calibrated dial. VFO supplied from i.c. voltage regulator for improved stability under mobile conditions. 2 RF amplifiers, FET 1st mixer, 1st IF 10·7MHz, crystal controlled 2nd FET mixer, 2nd IF 455kHz, squelch, audio output to drive external 3Ω speaker. FM/AM reception selected by switch independent of Tx mode, utilising i.c. quadrature detector on FM.

35 transistors, 3 i.c's, 15 diodes. Floating supply for pos. or neg. earth.

Price complete with one Tx crystal and detailed handbook **£129.60** inc. VAT. Securicor delivery £3.50 extra.

**Garex Loudspeaker Unit.** Matching style to Twomobile, dual-purpose table-top or mobile mounting 5 × 3" 3/5Ω drive unit. Ideal for popular R/T equipment **£4.32.**

**Printed circuit boards from Pye R/T equipment, with circuits.** All transistor, all in good used condition, unless otherwise stated.

**FM AF** board provides audio for FMTx also Rx audio preamp, suitable valve or transistor Tx **£1.25**

**10·7MHz I.F.** board **£1.90**

**455kHz block filters** 25kHz chann. spacing, low impedance **£1.80**
25kHz chann. spacing, high impedance **75p**
12½kHz chann. spacing—details & prices on application

**455kHz AM I.F.** board (ex AM25B) **£1.10**

**Squelch** boards (ex Cambridge) AM **35p** (ex AM25T) **45p**
(ex AM25B) Type A or B, **15p** 2 for **25p**

**Mic. amplifier** board ex AM25B **85p** ex AM25T **85p**

**Mod. output** board ex AM25B or T **45p**

**Rx Audio** board ex AM25B **45p**; ex AM10 **£1.50**; ex AM25T **45p**

**6kHz Audio block filter** ex AM25B **25p**

**AGC Assembly** ex AM25B **25p**

**Mic. preamp** board, 2 transistor, emitter follower output **60p**

**NOTE**—Apart from providing spares for the specific equipment, all the above boards are an ideal basis for home-brew equipment.

**Modulation transformers** with connection data
p.p. NKT404/OC28/OC35 to QQV03-10 **£1.25** Driver to suit **40p**
Single EL84 to QQV03-10 **£1.30**
p.p. EL91 to QQV03-10, + 3Ω LS & 15Ω pub. address **£1.30**
p.p. EL84 to QQV03-20a ex-Murphy **£2.25**

**Mod. and Driver Transformers** pp NKT404 to QQV03-20A **£1.25 the two.**

**Audio Transformers** 6AQ5 to 3Ω & 10Ω, pp NKT404 to 3Ω, small or large. Drivers to suit, small or large. **35p** ea, any **2** for **60p, 4** for **£1.00.**

**Lt Choke** 3A 0·1Ω, for psu or hash filter, **2** for **50p, 5** for **£1.00.**

**Camera video** board (Lynx) new **£3.85**

**Rectifier** plug in valve replacement stack of silicon diodes, full wave 2·6kV p.i.v at 400mA. Int. oct. base, wired as 5U4, easily moded. **80p**

**Circuit breakers,** panel mounted, 0·3, 0·5 and 2 amp (new) **50p**

**Reed switch** S.P.C.O. 33mm × 5mm dia. (75mm over leads) 10VA rating **35p**

Reed relay coils to match above, 24V (2·5k res.) **20p** each 3 for **50p**

Low loss SP reed and 24V coil glass encap. **50p**

**Painton (min. Jones) connectors,** chassis mtg. 18 way female **30p**
ditto, 6 way (2 pins at rt. angles) male or female **15p**

**Toggle switches,** SP biased off **15p**

**Crystals** HC6U: 12·700MHz, 11·155MHz **50p**

HC6U for 2m Tx 9·0655, 9·0688, 9·0719MHz **£1.50**

**Valves** (New or tested ex. equip.) EB91, EC91, ECC91, ECF80, ECH83, ECH84, 6AT6, 6BH6, 6BJ6, 6CB6, EZ81, EY81 **15p** each, any 4 for **50p**

**Transistors** (tested, with mtg. kits) NKT404 **15p** each, 4 for **50p**

**Integrated circuits** (new, full spec.)
723 voltage reg. TO5 metal case, 2/37V out at 150mA for 5/40V in **80p**
SN76660 FM quadrature detector **£1.25**
CD4001 AE quad. 2-input NOR gate for tone-burst gen. **55p**
NE555 Timer for tone-burst gen. or time-out indicator **85p**

**Relays** 12V 2 pole co 6A contacts, ex-Cambridge **25p**
Miniature 12V plastic cover SPCO **35p**; 4PCO **40p**

25 AMP 6V single make 6V double make 12V d/make 12V s/make **40p**
Type 2400 ex AM25, please specify coil/contacts required **25p**

**Mains transformers** multitap prim. unless stated otherwise
HT Transf. 5 windings: 35V 0·2A, 75/115V 0·15A, 50V 0·5A, 150V 0·3A, 170/220V 0·3A (13lb) **£5.70**
(For quick heat QQZO6-40 Tx) 7 windings 232V, 276V (300mA); 60V, 50V (50mA) 2·1V 8A; 17·5V 1A; 12·6V 4A (11·5lb) **£4.95**
170–0–170V 90mA, 50V 50mA, 6·3V 3·3A, 5V 2A (5·5lb) **£1.95**
0–146–232V 160mA, 26·5V 1A, 13·9V 5A, 50V 50mA (10·5lb) **£3.50**
Small 110V Pri. 30V 100mA sec. **40p** each, 2 for **75p** (series pri. for 240V)
230/240V Pri. 72V 40mA, 6·8V 10A, 6·3V 4·6A C core (7lb) **£4.75**
200/250V Pri. 31·5–0–31·5 ½A tapped 22, 24, 25·5, 28·5V **£2.95**
Auto 0–100–110–150–200–230–240–250V 200VA **£2.95**
345–0–245V 150mA, 5V 2A (POF) **£4.75**
6·5–0–6·5V 2.3A, 6·5–0–6·5V 2·9A, 6·5–0–6·5V 4·25A, 6·5V 2·7A, 37V 30mA (POF) **£4.75**
515–450–0–450–515V 240mA, 50V 50mA, 5V 2A, 6·3V 4A (12lb) **£5.50**
Charger transf. 240V in, 17·5V 1A out **95p**
Selenium bridge rectifier for above **20p**

**HT chokes** 5H 80mA, 4H 240mA, 1H 240mA, 1·25H 350mA, 1·8H 125mA **95p**
Top grade types: 9H 250mA 107Ω **£2.25,** 10H 20mA 100Ω **£1.35**
8H 240mA (POF) **£2.25**; 35H 25mA (POF) **£1.35**
**N.B.** POF = Potted, oil-filled.

**Toroidal inverter transformers** (with circuits)
Input 6/12V DC, output 265V 150mA (Cambridge) **£1.80**
Input 12V DC, output 170/375V 180mA (Vanguard) **£1.95**
Input 12V DC, output 80/130V 150mA (Ranger) **£1.70**
Pye Continental type **£2.80**
HT choke suitable for 2–3kHz Inverters **50p**

**Rectilinear pots** multiturn, preset, p.c. mtg. (new)
10, 20, 25, 100, 250, 500, 1·5k, 2k, 2·5k. **30p** each, any 4 for **£1.**

**Neons,** min. wire ended, **5p** ea., 12 for **50p.**

**Diodes** CS34–A **35p**

**Air spaced Trimmers** (ex) small: 2–20pf, 2·4–30pf, large: 10pf, 25pf **15p**
small 2–20pf with spindle ¼" × ¼" **25p**

**Butterfly trimmers** large 2 × 17·5pf, 2 × 10pf **70p**

**Beehive trimmers** 2–8pf **5p**

**Tetfer trimmers** 2–10pf, multiturn, OK for UHF. **60p**

**Tx Multiplier Transformer** for AM10, AM25B or T, High or Low Band **30p**

**Other Pye coils and transformers also available**

**10·7 IFT** (valve type) 2½" × ¾" square double tuned **20p**; 2 for **35p**; 8 for **£1.00**

**Coil formers,** ceramic, single hole fix 1½" × ¼", (with slug) 10 for **60p**

**Modulator kit** for QQV03-20a. Includes **all** necessary components; ready assembled pc boards, driver and output transformers, power transistors (with mtg. kits) circuit and connection details; also suitable for QQV03-10, for 12V working, bargain price **£2.60**
**Type 2,** similar to above, but output transformer has additional 15Ω output winding for pub. address. **£2.80**

**Rx audio kit** similar to above, but 3Ω output **£1.20**

**Mobile PSU** 12V DC input (floating for + or − E) transistor inverter 170, 220 or 380V DC at 180mA output, fully smoothed, chassis section, self-contained, fully wired and tested, with circuit **£4.85**
As above, but partly assembled (as cut out), complete with all components, circuit, finish-it-yourself **£2.95**

**Ventilated steel cabinets** 12 × 12 × 18" high, with wall-fixing lugs, internal chassis frame 11½" × 11" × 13". New condition **£2.** Buyer inspect and collect by appointment.

**Pye Ranger spares** IFT's 10·7MHz, 2MHz, Noise lim. assy., Rx osc. mult. transformer: all at **30p**
Tubular split stator pa capacitor **40p**

**BNC 50ohm free sockets** (new) **15p** ea; 12 for **£1.30,** 50 for **£4.50**

**Paper block capacitors** (Mfd/voltage) 0·5/400, 1/500, 1·5/500, 2/350 at **54p**
8/600, 8/800, 8/1000 at **£1.08**

**Walkie-talkie canvas satchel,** main compartment approx. 8½ × 7 × 2", plus mic/batt compartment approx. 7 × 5 × 1½" for Murphy Rover, (Bantam will fit) **£1.80**

**Rotary Converters** 12V DC to 320V 160mA DC **£1.50**

**Fist mike,** PTT db carbon insert, curly lead, octal plug, for Murphy, also BCC69 Reporter **80p**

**Input transformer** for above mike **35p**

**Inductive loop paging system:** complete scheme with control amps, 20 pocket Rxs, batts. and charger. Recent manufacture. Details on appln.

**Ultra F5AO fixed station,** with rcu, 12½kHz spec, needs slight attention. Buyer collect **£40.**

Unless stated otherwise, components are ex-equipment, in good condition, your satisfaction guaranteed. Wherever possible, full supporting data is given. Prices quoted are inclusive of UK post & packing.

**Mail order only. Sole address for orders and enquiries**
**GAREX ELECTRONICS**
**7 NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS**
S.a.e. with all enquiries please. Phone Cheddington (STD 0296) 668684
6.30pm-9pm and weekends only.

# TELECOMMUNICATIONS INTERNATIONAL AGENCY LTD.

**Brockenhurst Studios, Fibbards Road, Brockenhurst, Hants. Tel: Brockenhurst 2219, 3430 or 3434.**

---

**NEW RADIO TELEPHONES.** FM or AM. High, low and Marine bands. Catalogue on request.

**LINER 2** Add on amplifier module comprising of 40 watts P.E.P. amplifier and preamp for the RX. Extremely simple to use with any liner 2, but could be easily adapted for use with any TX RX requiring more power and better sensitivity.
With RX preamp **£47.42** carriage £1.00
Without RX preamp **£46.10** carriage £1.00

**VALVES**
Various New and Second-hand. Price on application. Discounts on quantity.

Heathkit HD-1234 Aerial switch. New. **£6.00** carriage 24p

MR 960 Units LB Bootmount used condition. No remote units. Can be converted to 12·5Kc/s. **£5.00** carriage £1.00

New Power Unit for transmitter. Complete **£30.00.** New 50 Watt AM Transmitter Chassis less Valves & Coils **£30.00**
Steel cases blue for the above Units. **£20.00.**
N.B. The above Unit can be used on 12·5Kc/s. Carriage charges Securicor **£8.00**

5 pin type B din plugs **14p** 5 pin type B din sockets **8p**
Painton 6 way plugs **12p**

Toggle switches 10 amp—25V (centre off position) **15p** + 7p p&p

**MC MURDO RED RANGE**
24 way plugs **40p** 12V 2·2 lamps MCC 643 **10p** for 10
32 way sockets **50p** 6·5V 3 amps lamps MCC **10p** for 10
32 way plugs **50p**
F. & E. plugs **45p**

**TRANSISTORS**
2 N2569 **15p**
PT 4176D 44W **£3.00** PT 4176B 10W **67p**
PT 4176C 20W **£2.23** PY 4176A 3W **45p**
2N 4427 5W **67p** carriage 7p each
Various other transistors. List on application.

PL 259 plugs **30p** carriage 7p

**ULTRA FM & AM BASE STATION.** 12½kHz type approved in extremely good condition. In working order, complete with desk controller 7–9 watts **£66.00** carriage £1.00

**XTAL OVENS.** Cathodeon reduced price **48p** carriage 7p

**RELAYS.** Mains contact heavy duty 12V coil **75p** carriage 12p

**PAIGNTON.** 4 way Chassis mounting sockets and 6 way free sockets **12p** each + 7p p&p

**MOBILE** Car Aerials complete on 144 megs. Fibre glass whip **£1.50** each + 20p p&p

**NEW MURPHY PSU** stabilised 12·5V. DC at 10 amps **£29.95** carriage 62p
24V–12V converters **£16.45** carriage 62p

**SCHOMANDL** frequency counter. Slight attention needed **£50.00** carriage £1.00

**H.B. CAVITY FILTERS** **£4.50** carriage 60p

**H.B. 20 WATTS ULTRA VALIANT** & Control Unit S/H AM **£40** carriage £1.50

**H.B. STC AM 663 UNIT.** Complete SH. **£35** carriage 95p

**HAND SETS** New SG Brown handsets **£5.00** carriage 23p

**HAND PORTABLES** Cossor type CC2/8 Mk2 VHF Walkie Talkies. High Band FM **£60.00** carriage 50p

**SGB CLASSIC** Ultra modern mobile microphone dynamic **£7.00** carriage 20p

**S.G. BROWN MICROPHONE** storage units. New **45p** carriage 7p

**S.G. BROWN** fist microphone. Dynamic 300 ohms **£4.50** carriage 15p

**S.G. BROWN DIPLOMAT** 300 ohm headset and 300 ohm microphone **£7.50** carriage 22p

**S.G. BROWN DIPLOMAT** headset 22 ohms with 22 ohms microphone complete with din plug **£5.50** each. carriage 22p

**S.G.B. PACIFIC** 4c400/5 3k ohms mic + 150 ohm RX **£7.50** carriage 22p

**S.G.B. DIPLOMAT HEADSET** 68 ohm mic + 50K ohm RX **£7.50** carriage 22p

**S.G.B. HEADSET ONLY** 250 ohm + 250 ohm series **75p** carriage 22p

**S.G.B. HEADSET ONLY** 22 ohm + 22 ohm **75p** carriage 22p

**S.G.B. HEADSET ONLY** 50k ohms **75p** carriage 22p

7 & 25 way multi-core cable **12p** per foot inc. carriage

**SUBJECT TO EQUIPMENT BEING UNSOLD. All prices exclude VAT.**



# MODULAR ELECTRONICS
## G8CQS G8EON

### 144MHZ EQUIPMENT

**LINER LINEAR 40.** This popular unit now supplied direct by the manufacturer with a considerable saving. 12 volt supply with a solid state power supply, producing 28 volts. 28V 60W RF transistor for 40W O/P with very low intermodulation distortion. Price **£34.**

**LINER LINEAR 40P.** Unit as above but with low noise Mosfet preamplifier in receive path. N.F.2·5dB, gain 16dB approx. **£38.**

**LINER PREAMP.** 1¾" square Mosfet preamplifier designed for the Liner 2 and noise matched to the circuit impedances. N.F. 2·5dB, gain approx. 16dB. **£4.00**

**144 PREAMP.** As above but noise matched to 50Ω on input and output.

**FM40 PA.** 12V FM PA using stripline transistor, 40W O/P for low input. RF sensing changeover. **£32.**

**FM12 PA.** Small low price amplifier designed for increasing output of hand held 2m walky talkies when used mobile or base. 12V supply. 8dB gain. 12W max O/P 1-2·5W drive, RF sensing C/O. **£16.**

**LINEAR AMPLIFIERS.** We have designs for up to 100W pep, and will quote to specific requirements. SAE please.

**24V—4 AMP** Inverter power supplies. 12V I/P enables 28V power transistors to be run from 12V supply, a must for the DIY transistor constructor. **£10.**

**MOSFET 144.** 144MHz low noise converter using 3rd generation Mosfets. 2·5dB N.F. >28dB gain. IF breakthrough, >65dB down. IF's 8-10MHz, 28-30MHz. **£12.**

### 432MHZ EQUIPMENT

**LINEAR 432-25.** 25W PEP O/P for 10W input. OK for FM up to 25W CW. Uses CTC stripline UHF transistor >4dB gain, 12·5 to 13·8V supply, 50Ω impedance, **£27.**

**LINEAR 432-10.** 10W PEP O/P for only 250mW input. OK for FM from pocketphone. Stripline design. 3 amplifier stages. **£30.**

**28-432 TRANSVERTOR.** 12V supply Tx path, 250mW output. Rx path N.F. 5dB, gain >28dB. Produces a faultless 70cm signal with no birdies, operates with linear 432-10 to give full 10W PEP. **£37.50.** Delivery 6 weeks.

### CTC POWER TRANSISTORS

We supply this range together with free design information on linear amps. FM amps. Up to 100W O/P.

Items normally stocked:

144 B3-12, B12-12, B25-12, B40-12, BAM80.

432 C1-12, C3-12, C12-12, C25-12.

First figure indicates watts O/P followed by voltage. Data **20p**, free with purchase.

**ENQUIRIES SAE PLEASE. LINEARS AND CONVERTERS, Post 80p, TRANSISTORS, Post 25p.** ALL PRICES INCLUDE VAT.

## MODULAR ELECTRONICS

**1 Coniston Close, Felpham, near Bognor Regis, Sussex PO22 8ND**

**PHONE: BOGNOR 23603**



# FT.101 Mk I—Mk 2 and 'B' OWNERS— WHY RF CLIPPING?

Normal mic lead type clippers generate harmonics. (Clip 500Hzs and you get 1kHzs, 1·5kHzs, 2kHzs, 2·5kHzs etc.) These distortion products waste TX power, clutter up the audio channel, and reduce clarity of speech.

G3LLL's RF Clipper clips the FT101's SSB signal at the I.F. frequency of 3·180MHzs. All harmonics, being radio frequency, are removed and no audio harmonic distortion is produced. Processed signals is passed through second SSB filter to remove any out of channel intermodulation products.

RF Clipping has been "plugged" by the A.R.R.L. Handbook for years—we've just made it easy for FT101 owners. Run the equivalent of a kilowatt mobile, or at home without a linear?

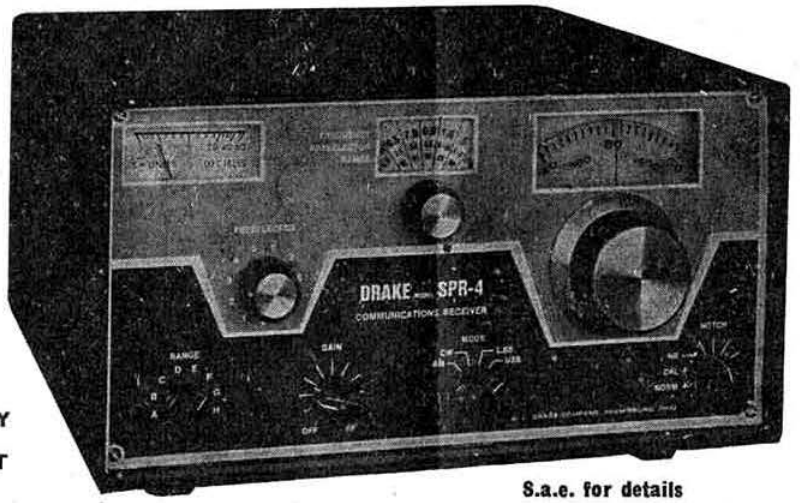
Improved RX performance is achieved by wiring Clipper SSB filter and extra gain into circuit on receive.

**Full details:**

**G3LLL, HOLDINGS LTD.,**

**39/41 Mincing Lane, BLACKBURN BB2 2AF** **Tel: 59595/6**

# Radio Shack Ltd ★ London's Amateur Radio Stockist




**SENSITIVITY IS EXCELLENT**

**ALL SOLID STATE**

**S.a.e. for details**

# DRAKE'S superb general purpose communications receiver—SPR-4

**IDEAL FOR SHORT WAVE LISTENING. MAY BE PROGRAMMED TO SUIT YOUR INTERESTS —AMATEUR BANDS, MARINE, ETC.**

*Full Range of Accessories—Matching Speaker, Noise Blanker, Loop Antenna, etc.*

**SPECIFICATIONS**

| | |
|---|---|
| **Frequency Coverage** | Can be programmed with accessory crystals for 23 ranges (each tuning a 500kHz band) from 0·5 to 30MHz plus 150 to 500kHz. Crystals supplied with the receiver allow coverage on these ranges: 150-500kHz, 0·5-1·0MHz, 1·0-1·6MHz*, 6·0-6·5MHz, 7·0-7·5MHz, 9·5-10MHz, 11·5-12 MHz, 15-15·5MHz, 17·5-18MHz, 21·5-22MHz. |
| **Modes of Operation** | AM, CW, LSB, USB, (RTTY with RY-4 accessory installed) |
| **Selectivity** | AM: 4·8kHz @ -6dB, 10kHz @ -60dB<br>SSB: 2·4kHz @ -6dB, 7·2kHz @ -60dB<br>CW: 0·4kHz @ -6dB, 2·7kHz @ -60dB |
| **Intermediate Frequencies** | 1st IF 5645kHz four pole crystal lattice filter, 2nd IF 50kHz four pole Hi-Q Ferrite LC filter. |
| **Frequency Stability** | At room temperature, drift for all causes (including ± 10% change in supply voltage) is less than ± 100Hz. |
| * Generous overtravel gives additional 50kHz or more off each end of range. | |
| **Sensitivity** | SSB and CW: 0·25microvolt for 10dB $\frac{S+N}{N}$, AM: 0·5microvolt with 30% modulation for 10dB $\frac{S+N}{N}$. |
| **Calibration** | Dial is accurate to better than ± 1kHz when calibrated at nearest 100kHz calibration point. |
| **Hum and Noise** | More than 60dB below rated output. |
| **Size and Weight** | 5½" H × 10¾" W × 12¼" D 140mm H × 274mm W × 324mm D. 18 lbs (8·2 kg). |

**S.A.E. WITH ENQUIRIES PLEASE**

## RADIO SHACK LTD.

**188 BROADHURST GARDENS, LONDON, NW6 3AY**

Just around the corner from West Hampstead Underground Station

**Telephone: 01-624 7174. Cables: Radio Shack, London NW6**

**Giro Account No.: 588 7151**

**Open Mon—Fri 9—5. Sat 9—1. Closed for lunch 1—2**


**& ACCESS**

# TELFORD COMMUNICATIONS

### TC 10

Mains or D.C. operated 2 Metre Tx with A1/A3H/A3J/F3 modes, full high stability Mixer VFO coverage plus one Xtal controlled A3J calling channel. 10 Watts RMS 25 Watts PEP output. Repeater Tone access. Integral solid state aerial C/O and Control/Muting Relays. Fully stabilised and protected PSU. **£140·40.**

### TC 5

12 Volt negative earth 2 Metre Tx, 2 Watts output with up to 5 channels Xtal controlled A3, or with companion TC 6 A3/F3. Ideal for Mobile use, supplied with Ch 1 Xtal on 145·5 MHz complete with Ac C/O relay, Converter muting and Microphone. **£37·80.**

### ANCILLARY EQUIPMENT

**2 Metre Bandpass Aerial Filter**
Ideal to clean up those unwanted Tx sprogs or to remove the Rx Broadcast/TV sprogs. Rejection at ± 10 MHz not less than 22dB. 10 Watt power handling capacity. **£6·48.**

**TC 7 Bandsearcher**
Enables automatic electronic scanning of the band to be selected with a TC 7 Tunable IF, by application of a decaying bias to the varicaps. Scans and Resets approx. once per minute. **£5·40.**

**Solid State Ae C/O Relay**
10 Watts capability up to 23 cms. Insertion loss 0·8dB. Isolation 28dB at 23 cms. 12 Volt Negative Earth required. **£5·40.**

**Solid State Ae C/O Device**
As used in the above, will handle 150 Watts CW with appropriate heat sinking up to 10 GHz. Complete with circuit and gen. **£3·24.**


*Photo by Chris Cooper*

### G8AEV MK.2 2 METRE CONVERTER

The well-known kit in ready-built form with 3 IF outputs for contest use etc. All popular IF's available. 12 Volt D.C. operated either polarity earthed. Typical gain 20dB, typical N.F. 3dB. Join the other 650 users for **£14·04.**

### TC 7

Tunable I.F. unit A1/A3J/A3/F3. Any 2 MHz coverage between 20 and 30 MHz. (Standard Model 28-30.) Mains or DC operation. Varicap tuned front end. 4in. Scale length individually calibrated at 100 kHz increments. S Meter (c. zero on F3) integral monitor loudspeaker. I.F. output at 1·6 MHz for 'scope etc. Can't be beat at the price, over 250 now sold. **£54·00.**

### TC 9

Mains or DC operated 2 Metre Tx with A3/F3 modes, full high stability Mixer VFO coverage plus one Xtal controlled channel to choice. 10 Watts output. Integral solid state aerial C/O and Control/Muting Relays. Fully stabilised PSU. **£91·80.**

Repeater Access outboard Unit available for an extra **£10·80.**

### TC 6

Companion Unit to TC 5 providing full high stability coverage of the 2 Metre band with A3 or F3 mode.

Also available with 45 MHz output for the DIY S.S.B. enthusiast. **£32·40.**

All prices VAT inclusive at 8%.
Securicor delivery of TC 10/9/7 please add **£4·86.**

H.P. available, otherwise C.W.O. or small deposit with balance pro-forma invoice on longer delivery terms.

**London Agent**—Reg Vincent, Hoddesdon 64285 EVENINGS only.

Large SAE please for further details and delivery schedules.

**FOR ALL YOUR 2 METRE SOLID STATE BRITISH-BUILT EQUIPMENT**

**78B HIGH STREET, BRIDGNORTH, WV16 4DS, SALOP. Telephone 074-62 4082 9 a.m. - 5.30 p.m.**

---

# G8JVL **LEE ELECTRONICS** G8JVL

**LONDON'S LEADING STOCKISTS OF — "YAESU", "STANDARD", & "SOMMERKAMP" AMATEUR COMMUNICATION EQUIPMENT.**

**"YAESU-MUNSEN" RANGE:**

| | |
|---|---|
| FT.224 Transceiver, 2 metre 10 watt 24-Channel | £130.00 |
| FT.101B Transceiver, 260 watt p.e.p., 10 to 160 metres | £330.00 |
| FT.201 Transceiver, 260 watt p.e.p., 10 to 160 metres | £290.00 |
| FT.501 Transceiver, 560 watt p.e.p., 10 to 80 metres | £350.00 |
| FP.501 AC Power Supply for FT.501 | £49.00 |
| FV.101B External V.F.O. for 101B/201 | £48.00 |
| SP.101B External Speaker for 101B/201 | £13.00 |
| YO.100 Monitor Scope | £93.00 |
| FL.2100B Linear Amplifier, 1·2kW p.e.p. | £195.00 |
| FR.101S Standard Receiver, 10 to 160 metres, 1 Filter | £245.00 |
| FR.101DL Standard Receiver, 2 to 160 metres + Broadcast Bands | £330.00 |
| FL.101 Transmitter, 240 watt p.e.p., 10 to 160 metres | £265.00 |
| YC.355 Frequency Counter, 30MHz 250V AC | £75.00 |
| YC.355 Frequency Counter, 30MHz 250V AC 12V DC | £90.00 |
| YC.355D Frequency Counter, 200MHz 250V AC 12V DC | £125.00 |

**"SOMMERKAMP" RANGE:**

| | |
|---|---|
| FT.250 Transceiver with Power Supply/Speaker | £205.00 |
| FT.277B/101B Transceiver, 260 watt p.e.p., 10 to 160 metres | £310.00 |
| TS.288A Transceiver, 260 watt p.e.p., 10 to 160 metres + C/Bands | £325.00 |
| FT.DX.505 Transceiver, 560 watt p.e.p., 10 to 80 metres | £295.00 |
| Hand-Held Transceiver, 2 watt 3-Channel, 10 metres | £60.00 |
| FL.2277, 1,200 watt p.e.p., Linear Power Amplifier | £185.00 |

**"STANDARD" RANGE:**

| | |
|---|---|
| C.826MB 12-Channel 10 watt Transceiver | £110.00 |
| CV.100 Dual V.F.O. for above Transceiver | £29.00 |
| C.828M 12-Channel 10 watt Transceiver | £118.00 |
| C.146A 5-Channel 2 watt FM Hand-Held Transceiver with T/Bst. | £74.00 |
| C.830S 5-Channel 1 watt FM Marine Band Transceiver | £88.00 |
| CSA Mains Base Master Charger for above units | £14.00 |
| Set of 10 Ni-cad rechargeable batteries for above | £10.00 |
| Mallory 1·5V rechargeable batteries, size AA | 92p each |
| KP.202 6-Channel 2 watt FM 2 metre Hand-Held Transceiver | £75.00 |
| KP.202A 6-Channel 2 metre Transceiver (as above) with Tone Burst | £81.00 |
| Mains Charger Units for KP.202 Transceivers | £8.75 |

**ACCESSORIES:**

| | |
|---|---|
| T.C.C. S.W.R. and Power Meter—Twin Meters | £11.20 |
| OSKER S.W.R. and Power Meter—Twin Meters | £21.00 |
| YAESU YD.846 Hand Microphone | £5.75 |
| SHURE 201 Hi-Z Hand Microphone | £6.00 |
| YAESU TD.844 Desk Microphone | £13.00 |
| SHURE 444 Desk Microphone | £15.00 |
| YAESU FF.50DX Low-Pass Filters 1,200 watt with 259 plugs and sockets | £12.00 |

**Aerial Rotators**
**AR.30 at £25.00** Type **AR.40 at £30.00** Type **CD44 at £60.00**

| | |
|---|---|
| Microwave Modules 144MHz Converter 28-30 MHz | £15.00 |

Microwave Modules 144MHz Converter I.F.S.—available: 2 to 4MHz, 4 to 6MHz, 104 to 106MHz Output.—Other I.F.S. available to order.

**"SOLID STATE MODULES":**

| | |
|---|---|
| PAS Dual-Gate Mosfet Pre-Amplifier | £5.50 |
| SENTINEL Low-Noise FET 2-metre Pre-Amplifier | £6.50 |
| SM70 70cm Converter IF Output 144-146MHz | £15.00 |
| SENTINEL MF Car-Radio, 2-metre Converter | £19.50 |
| SENTINEL Dual-Gate Mosfet 2- and 4-metre Converters | £15.00 |
| SENTINEL Dual-Gate Mosfet Converters (as above), IF Outputs to order | £15.00 |
| EUROPA "B" 2- and 4-metre Transverters, IF 28-30MHz | £81.00 |
| EUROPA "B" (as above), Less Valves | £65.00 |

BANTEX Mobile VHF Aerials from stock—¼ and ⅝ wave models available

HY-GAIN ANTENNAS: 12 AVQ, 14AVQ, 18AVT/WB available from stock.

**SECONDHAND ITEMS:**

| | |
|---|---|
| Ultra Cub Transceivers with Deac, less Xtals each | £24.00 |
| Hudson Low-Band Mobiles with valves each | £5.00 |
| EAGLE 4-Waveband Bandspread Receiver | £20.00 |
| TRIO JR310 Amateur Band Receiver | £65.00 |
| Stabilised Power Supplies. Ex-units from each | £8.00 |
| HEATHKIT 2-metre Transceiver, Model HW17, complete with HWA17 FM adaptor | £55.00 |
| PYE "Vanguard", Complete with Speaker, Valves, Control Box, and Cables | £24.00 |
| REDIFON, Model GR.286A. Base-Station AM/FM High-Band Radio Telephone, less Valves, less Xtals and less TX Power Supply | £19.00 |
| REDIFON, Model GR.286A (as above) but with all valves | £25.00 |

**XTALS:**

| | |
|---|---|
| For Standard C826 and 146 Models at per pair Plus postage and packing at 10p | £4.50 |
| For Yaesu FT.224 at per pair Plus postage and packing at 10p | £4.50 |

SPECIAL NOTE—V.A.T. MUST BE ADDED TO ALL THE ABOVE PRICES

**400 EDGWARE ROAD, PADDINGTON, LONDON, W.2. 01-723-5521**
**Hours of business: 9.30 to 6.00 p.m. Closed all day Thursday**
*SEND S.A.E. FOR ILLUSTRATED LEAFLETS*

# J. BIRKETT

## RADIO COMPONENT SUPPLIERS

**SUB-MINIATURE AIR SPACED 60pF TRIMMERS** @ **8p** each.
**VHF TUNING VARACTORS BB 121A** @ **15p** each.
**VHF FET's** type BF 256B 800MHz equivalent to MPF 102, 2N 3819, TIS 88 @ **25p** each. 5 for **£1.10.**
**50 ASSORTED PNP-NPN PLASTIC TRANSISTORS** 85% Good @ **50p.**
**UNMARKED BC 109 TRANSISTORS** @ **10p** each.
**VHF POWER TRANSISTOR** 2N 3375 @ **£2.16** each.
**200 TUBULAR CERAMICS** Assorted for **50p.**
**1N 4007 SILICON DIODES** 1000 PIV 1 Amp. 16 for **£1.**
**20 ASSORTED 250mW BRANDED ZENERS** for **75p.**
**BF 271 1GHz RF AMPLIFIER NPN TRANSISTOR** @ **15p.**
**MULLARD C 280 POLYESTER CONDENSERS** ·1µf 400v.w. @ **20p** doz, ·47µf 400v.w. 6 for **15p.**
**SN 76550 (TAA 550) VOLTAGE STABILISER IC** @ **10p.**
**MATCHED QUAD DIODES** like CV 2279 **50p** the four.
**BY 103 SILICON DIODES** 1300 PIV 1 amp @ **15p.**
**TO 18 PHOTO TRANSISTORS** @ **44p** each. 3 for **£1.**
**75 ASSORTED MULLARD POLYESTER C 280 CONDENSERS** @ **80p.**
**50 AC 128 TRANSISTORS** Untested for **50p.**
**TEXAS THYRISTORS (SCR's)** TIC 45 60 PIV 600mA @ **15p.**
**ZN 414 RADIO IC** with data @ **£1.20.**
**GERMANIUM DIODES** 1N 34A, OA 85, OA 91, OA 95. All at **8p** each.
**DC MOVING IRON BATTERY CHARGER METERS** 0–2, 0–3, 0–5, 0–6 amp, All at **60p** each.
**LARGE PACKET OF MICA WASHERS,** Bushes etc., for TO3, TIP series for **30p.**
**UHF STRIPLINE TRANSISTORS** like BRF 90 with data @ **£3.**
**BRANDED TRANSISTORS** BC 107, BC 237, BC 307, BC 308, BC 177, BC 213L, BC 214, 2N 706, 2N 706A, BSY 95A, Lockfit types. BC 147, BC 148, BC 149, BC 157, BC 158, BC 159, BF 194, BF 195, BF 196, BF 197. All at 6 for **50p.**
**GOLD BONDED DIODES** unmarked **£3** per 1000.
**Unmarked 10 Watt ZENERS** 12, 13, 15, 16, 18, 20 Volt. All at **20p** each.
**TANTALUM BEAD CONDENSERS** ·1µf 35v.w., ·15µf 35v.w., ·22µf 35v.w., 1µf 35v.w., 2µf 25v.w., 2·2µf 35v.w., 4·7µf 35v.w., 5µf 25v.w., 6·8µf 25v.w., 6·8µf 35v.w., 10µf 16v.w., 15µf 10v.w., 20µf 6v.w., 22µf 16v.w. All at **8p each.**
**PLASTIC GENERAL PURPOSE UHF NPN SIGNAL TRANSISTORS** Tested **40p** doz.
**PLASTIC GENERAL PURPOSE UHF PNP SIGNAL TRANSISTORS** Tested **40p** doz.
**SPECIAL PHOTO TRANSISTOR PACK** consisting of 4 Germanium types, 4 Silicon types for **£2.16.**
**1N 4000 SERIES MANUFACTURERS FALL-OUTS** 50 for **50p.**
**SGS 5 Watt AUDIO IC TBA 800 £1** with data.
**DISC CERAMICS** ·1µf 3v.w. **10p** doz, ·1µf 30v.w. **15p** doz.
**20 "P" CHANNEL MOS FET'S** with data for **60p.**
**VHF TUNING VARACTORS** Untested 6 for **25p.**
**10 10amp SILICON DIODES** Untested for **25p.** 50 for **£1.**
**10·7MHz CERAMIC FILTERS** with conversion for 10kHz Bandwidth @ **27p** each.
**TEXAS 100 PIV 1 amp BRIDGES** type 1B10J10 @ **22p** each.
**AF 279 STRIPLINE PNP TRANSISTOR** @ **44p.**
**X BAND PIN DIODES** MA-4571-A1 @ **50p** each.
**BF 224 RF AMPLIFIER TRANSISTORS** FT 600MHz 6 for **50p.**
**365pf 3 Gang TUNING CONDENSERS** size 2¼" × 1⅜" × 1⅜" @ **66p.**
**THYRISTORS (SCR's)** 10 amp 100 PIV @ **25p,** 400 PIV @ **50p,** 800 PIV @ **60p.**
**DIVIDE BY 2 300MHz COUNTERS** with data @ **80p.**
**DUAL GATE MOS FET's** 40601 @ **50p,** 40603 @ **50p,** 40673 @ 55p, MEM 616 (40673) @ **50p.**
**10 Watt MULLARD AUDIO MODULE** type LP 1173 @ **£2.16.**
**SMALL PANEL WITH TAA 350** Plus other components @ **40p.**
**BRANDED 400mW ZENERS** 3·3, 3·6, 4·7, 5·1, 6·2, 6·8, 9·1, 10, 11, 12, 16, 18, 24 volt. All **10p** each. 5 for **45p.**
**TV DIODES** AY 102 @ **30p,** BA 148 @ **10p,** BA 144 @ **10p,** BA 145 @ **5p,** BA 156 @ **5p,** BA 116 @ **10p.**
**TEXAS HIGH SPEED DIODES** type 1N 3881R 200 PIV 6 amp @ **20p.**
**SUB-MINIATURE 10 amp SILICON BRIDGES** Untested. 10 for **£1.25.**
**BF 180 or BF 181 VHF TRANSISTORS 25p** each. 5 for **£1.**
**TRIPLE 300MHz NPN TRANSISTOR PACKAGE** in 10 Lead TO 5 can untested with data 5 for **44p.**
**IC's** similar to TAA 570 (10·7MHz I.F.) Untested with data. 5 for **55p.**
**6 PLASTIC POWER NPN TRANSISTORS** Untested for **50p.**
**COMPRESSION TRIMMERS** 10pf, 30pf, 50pf, 1000pf. All at 5p each.
**BRANDED 3·6 volt 250mW ZENERS** 10 for **30p.**
**DISC CERAMICS** ·01µf 50v.w., ·02µf 50v.w. Both **15p** doz.
**25 TRANSISTORS** similar to BC 107–8–9 Range. Untested Extremely Good for **50p.**
**COLOUR TV CONVERGENCE POTS** 10 ohm, 50 ohm, 75 ohm. All at **10p** each.
**DUBILIER GREYCON MINIATURE METALLISED POLYESTER CONDENSERS** ·01µf 400v.w. @ **15p** doz.
**TRANSISTOR ARRAY LIKE CA 3045/6** Tested with data @ **35p.**
**1000 PIV 1 amp METAL DIODES** 10 for **£1.**
**500+500+17+17pf TUNING CONDENSER** with SM Drive @ **33p.**
**X BAND GUNN DIODES** with data @ **£1.65.**
**X BAND DETECTOR DIODES** like SIM 2 @ **15p,** 1N 23 @ **25p.**
**SUB-MINIATURE ROTARY SWITCHES** Small Spindle 1 Pole 6 Way @ **15p,** 2 Pole 5 way 2 Bank @ **20p.**
**300+300pf TUNING CONDENSERS** with SM Drive @ **33p.**
**10pf TUNING CONDENSER** C804 type @ **30p.**
**SANYO 15 Watt AUDIO AMP.** Type STK-015 with circuit @ **£3.**
**1N 4004 400 PIV 1 amp DIODES** @ 6 for **25p.**
**MULLARD POLYESTER CONDENSERS** C 280 Series 250v.w., ·01µf, ·015µf. ·022µf, ·033µf, ·047µf, ·068µf, ·1µf. All at **15p** doz, ·15µf, ·22µf. 6 for **12p,** ·33µf, ·47µf, ·68µf. All at 6 for **15p,** 1µf, 2·2µf, 6 for **20p.**
**800 PIV 5 amp SCR's** Selected for Car Ignition Systems @ **50p** each.
**10·7MHz TRANSISTOR I.F. TRANSFORMERS** @ **11p** each.
**8 TO 1 VERNIER DRIVES** 1" @ **88p,** 2" @ **99p,** 2½" @ **£1.30.**
**SOLDER-IN FEED THRO'S** 1pf, 2pf, 10pf, 15pf, 18pf, 22pf, 300pf. All at **15p** doz.
**COMMUNICATION SERIES OF IC's** Untested consisting of 1 × RF, 3 × I.F., 2 × AGC, 2 × VOGAD, 1 × Mike Amp, 2 × Double Balanced Modulator, 1 × Mixer. The 12 IC's with data for **£3.**
**SUB-MINIATURE CERAMIC PLATE CAPACITORS** 50v.w., 1·8pf, 3·3pf, 5·6pf, 6·8pf, 270pf, 1500µf, ·01µf All **15p** doz.
**MULLARD SUB-MINIATURE SEMI-AIRSPACED TRIMMERS** 1·4 to 4pf @ **8p** each.
**100 PIV 10 amp SILICON BRIDGES** at **83p** each.
Quote for large Quantities
**UHF TRANSISTOR TV TUNERS** Brand New @ **£1.10.**

Please add 10p for orders under £1

**25 THE STRAIT, LINCOLN LN2 IJF.** **Telephone 20767**

# THE AMATEUR RADIO SHOP G4MH

## 13 CHAPEL HILL, HUDDERSFIELD (20774)

YAESU · KW · SSM
ATLAS · BARCLAY
CARD · ACCESS

### TECH TRADIPER MODEL TE 15

"GRID DIP METER"

440kHz to 280MHz

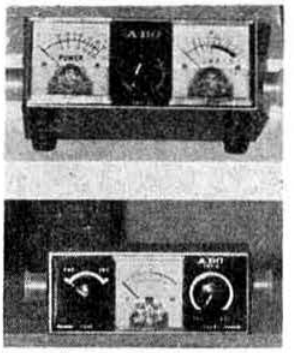
Many uses:

Frequency meter

Test oscillator

Field strength meter

Supplied with earphone, battery, etc. **£17.00** + VAT incl. post.



### SWR 50

3·5MHz to 150MHz

52 to 75Ω

1kW

SWR Ind. and power meter.

**£10** + VAT incl. post.

### SWR 10

3·5MHz to 150MHz

IMP 52Ω

1kW rated

Switched SWR and power.

**£5** + VAT incl. post.

**YAESU NOW IN STOCK**

FT101 B — FL101 TX
FT200 — FT4O1 B
FT201 — FR101S/D/
FL2100 LIN — YO100 MON SCOPE
VFO'S, L/S, FILTERS, ETC.

**SECOND HAND:**
SAE FOR LIST OF GEAR
WANTED ALL TYPES OF EQUIPMENT
SPOT CASH PAID FOR GOOD GEAR
REQUIRED LINER II (IN GOOD CONDITION)

CLOSED WEDNESDAY. LATE OPENING THURSDAY. MEMBER A.R.R.A.



# ambit international

Ambit specializes in linear technology, TOKO Coils, filters and inductors. And we know more about the devices we sell than any other retailer of electronic components—being actively involved with design and development in consumer and communications applications.

Our new style catalogue is a folder with a series of loose leaf data sheets, that provide up to the minute data and ideas on a whole range of devices. So from one source, you can gather information and ideas from all manufacturers involved in the business of wireless—consumer or communications. The first issue of data sheets cost 30p, and the folder costs 15p all inclusive. The charges are now refundable against purchases—details with the new style folder.

Items included are:

**TOKO** Ceramic filters. 6 or 8kHz @ 470kHz **45p**
CFS10·7 WBFM 10·7MHz ceramic filters **40p**
AM IFTs **27p** FM IFTs **30p**

**Linear ICs:**

| | | | | | |
|---|---|---|---|---|---|
| NE560/1/2 | £3.19 | LM38ON | £1.00 | TBA651 | £1.81 |
| NE565A | £2.75 | LM381N | £1.85 | CA3089 | £1.94 |
| NE566V | £2.10 | TBA810S | £1.30 | MC1310 | £2.70 |
| NE567V | £2.75 | ICL8038 | £3.10 | (KB4400) | £2.70 |
| LM309K | £2.05 | CA3123E | £1.40 | SN7666ON | 75p |

Plus applications boards, modules and items for the radio communication enthusiast concerned with modern technology.

PRICES EXCLUDE VAT. PP **15p** below **£5.** Orders over **£5** post free.

**Send to:**
**37 HIGH STREET, BRENTWOOD, ESSEX. CM14 4RH**
**DEPT RCN**
**Tel. 216029 Telex 995194**



# C & C ELECTRONICS

**(Dept. C), 10 WEST PARK, LONDON SE9 4RQ Tel: 01.852 9397**
**MAIL ORDER ONLY • MADE TO ORDER CRYSTALS**

Holder type available HC6/U, HC17/U, HC18/U, HC25/U and HC33/U
Fundamental crystals 50ppm (0-60 C) or 30ppm (ambient) 1·5-21MHz **£2.97**
Overtone crystals 50ppm (0-60 C) or 30ppm (ambient) 21-105MHz **£2.97**
*Note:* Frequencies below 4MHz are not available in HC18/U or HC25/U
Normal delivery time within 4 weeks.

**CUT PRICE CRYSTALS IN POPULAR FREQUENCIES**
**TX CRYSTALS (MHz) IN HC6/U PRICE £2.00**

| S20 | S21 | S22 | S23 | R5 | R6 | R7 |
|---|---|---|---|---|---|---|
| 145·500 | 145·525 | 145·550 | 145·575 | 145·125 | 145·150 | 145·175 |
| 4·0416 | 4·0423 | 4·0430 | 4·0437 | 4·0312 | 4·019 | 4·0326 |
| 8·0833 | 8·0847 | 8·0861 | 8·0875 | 8·0025 | 8·0638 | 8·0652 |

Additional Frequencies
145MHz 4·0277/8·0555 433·2MHz 8·0222 70·26MHz 8·7825

**RX CRYSTALS (MHz) IN HC6/U PRICE £2.00**

| S20 | S21 | S22 | S23 | R5 | R6 | R7 |
|---|---|---|---|---|---|---|
| 145·500 | 145·525 | 145·550 | 145·575 | 145·725 | 145·750 | 145·775 |
| 10·3603 | 10·3621 | 10·3639 | 10·3657 | 10·3764 | 10·3782 | 10·3800 |
| 44·9333 | 44·9416 | 44·9500 | 44·9583 | 45·0083 | 45·0166 | 45·0250 |

Additional Frequencies
145MHz 10·3246/44·7666 70·26MHz 29·7800

**REPEATER I/P CHANNEL CRYSTALS**

| R5 | R6 | R7 |
|---|---|---|
| 145·125 | 145·150 | 145·175 |
| 44·8033 | 44·8166 | 44·8250 |

**CONVERTER CRYSTALS IN HC18/U PRICE £2.86**

| 144/28 | 144/4 | 432/28 | 1,296/28 | 144/28 |
|---|---|---|---|---|
| 38·6666 | 70·0000 | 101·000 | 105·666 | 116·000 |

**PYE POCKETFONE CRYSTALS IN HC18/U PRICE £5.50/PAIR**
433·2MHz TX 12·9333 RX 84·5000
GB3PY TX 11·9819 RX 84·5300

**BURNDEPT LION CRYSTALS FOR GB3PY** In HC25/U, TX 13·4796MHz, RX 37·0042MHz. PRICE **£5.50**/PAIR

**1,000kHz CRYSTALS in HC6/U PRICE £2.70**

All prices now include VAT and postage. 10% discount on orders of 5 or more crystals. Crystals supplied to any specification for PMR marine or military use, etc. State equipment/specification when enquiring. Please send s.a.e. with all enquiries. Rapid delivery service is available. Information supplied on request.

# EUROPA B

## NOW IN USE IN OVER 50 DIFFERENT COUNTRIES!

## 2 metre, 4 metre or 6 metre receive and transmit converters to 28-30MHz

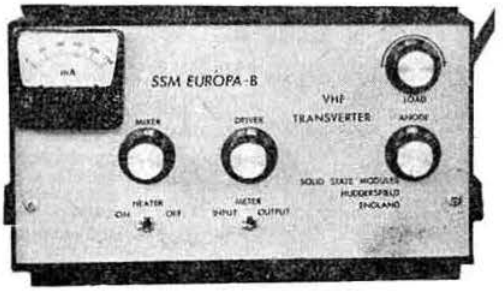
**Exotic calls like A2, C31, 5WI, 9HI, 5BC, 2D8, KV7, KH6, TF, YB, VP8, VE8, etc.**

**Many of these people never use the receive converter—they have no local VHF activity and use their Europas exclusively for OSCAR work.**

The Europa can be used with any normal HF equipment ★ Europa B features:

- ★ An aerial change over relay and SO239 antenna socket.
- ★ Adequate power for OSCAR work.
- ★ High transmit power. Up to 200W input, 50% efficiency.
- ★ Highest receiver sensitivity available—2dB N.F.
- ★ 28-30MHz I.F. standard.
- ★ Cleanest output spectrum.
- ★ Extremely stable circuitry.
- ★ Well established and reliable design.
- ★ Additional crystals can be switched for extended frequency coverage.
- ★ Size: 9" × 4½" front panel, 4½" deep.
- ★ Low price, **£88.00** complete to plug into Yaesu/Sommerkamp equipment Ex stock.
- ★ **£74.00** less valves (2 off QQV03/10 and 1 off QQV06/40A required. Ex stock.

For use with 6·3V Yaesu equipment (FL400, FT401 etc) you feed in 12·6V ac at 2 amp into the control socket. A suitable transformer is **£3.24** or in a case to match the Europa, **£6.37.** All from stock.




**NEW!** We how have in stock a complete AC PSU for the Europa, Type CSP 10. This supplies all the voltages to power the Europa or Europa B. It also contains a 50 ohm adjustable dummy load power attenuator and change over relay to reduce the 10 metre output power to a suitable level for driving the Europa.

This makes the Europa B compatible with HF equipment without transverter output sockets with NO modifications.

Size: Same as the Europa B.

Price: **£38.50.** Ex stock.

**EUROPA 70—70cm TRANSMIT CONVERTER**
Designed like our Europa B to provide sufficient power for Oscar working—70W input hybrid design valve for transmit—transistors for oscillator amplification. Size: 6" × 6" front panel, 12" deep. Price **£43.20.**

All the prices include British Isles delivery. We export goods daily, so this is no problem. We can give same day C.O.D. service (£50 limit). All our products carry a 12 month guarantee. HP a pleasure. If you have any doubts, ring or write for assistance. See you at Leeds and Drayton Manor rallies. Please do not hesistate to contact us if you think we can help. Paul, G3MXG.

**PLEASE SEE NOTE BELOW RE VAT**

---

## Our own tests carried out on laboratory test equipment, and independent tests, have shown that these units provide the highest performance you can buy on the amateur market.

**CONVERTERS** 2 metres, 4 metres, 70cm, Satellite Band (136-138MHz), Marine Band from stock. Other frequencies to order.

**SENTINEL DUAL GATE MOSFET 2 METRE OR 4 METRE CONVERTERS**

★ N.F. 2dB. Gain 30dB. ★ Dual gate MOSFETS in RF and MIXER stages.
★ No oscillator frequency multiplication.
★ 2 metre I.F.s: 28-30MHz, 2-4MHz, 4-6MHz. ★ 4 metre I.F.: 28-28·7MHz.
★ Size: 2½" × 3" × 1½" except 2-4MHz and 4-6MHz being double conversion are 4" long. ★ Price only **£16.20.** Esx stock.

**SENTINEL X DUAL GATE MOSFET 2 METRE CONVERTER.** A de-luxe version of our Sentinel converter, containing a mains power supply or external battery operation. It has front panel RF gain control. Technical data is the same as the Sentinel. Size: 5" × 1½" front panel, 4" deep. Stock IFs: 2-4MHz, 4-6MHz, 28-30MHz. Price: **£21.06.** Ex stock.

**THE SENTINEL 2 METRE CONVERTER KIT, 28-30MHz—Ex stock.** The kit is supplied with printed circuit board drilled and all coils mounted to make assembly so simple. All components, metalwork, nuts and bolts etc. are supplied. Performance data is the same as our Sentinel converters. Price: **£11.00.** IF it doesn't work, send it back with £2.00 and we will fix it for you.

**THE SENTINEL MF DUAL GATE MOSFET 2 METRE TO MEDIUM WAVE CONVERTER.** Receives 2 metres on a conventional MW BC receiver, very good used with a car radio. IF output of 0·5MHz-1·5MHz for 144-5 and 145-6MHz in two switched bands. Size: 5" × 1½" front panel, 4" deep. Price: **£20.25.**

**SM 70 FET CONVERTER**
★ IF output 144-146MHz. Noise figure 3·5dB. Gain 30db.
★ Size: 2½" × 3" × 1½".
★ By using the SM70 with your 2 metre receiver you get excellent 70cms receiving performance for only **£16.20.** Ex stock.

**EUROPA 70CM FET RECEIVE CONVERTER.** Can be used as a receive converter on its own or in conjunction with our Europa transmit converter for transmit operation as well.
★ IF output 28-30MHz. Noise figure 3.5dB. Gain 30dB.
★ Two FET RF amplifiers and FET mixer.
★ Oscillator chain uses a 101MHz crystal with oscillator output socket to drive the Europa 70 transmit converter. ★ Size: 2½" × 4" × 1½".
★ Price of this extremely high performance unit, **£20.52.** Ex stock.

**PRE-AMPLIFIERS.** 2 metres, 10 metres (Oscar), 70cms, Satellite (136-138MHz) from stock. Other frequencies to order.

**SENTINEL LOW NOISE FET PRE-AMPLIFIER—Ex stock.** If you want the ultimate in 2 metre sensitivity and selectivity:
★ Built in a box which matches our converters.
★ Isolated supply lines make it compatible with any existing polarity.
★ Low noise figure—1dB. Gain 18dB.
★ High selectivity tuned circuits. ★ Price: **£7.36.**

**THE PA3 DUAL GATE MOSFET PRE AMPLIFIERS—Ex stock**
★ Small (about one cubic inch) printed circuit board pre-amplifier developed to fit inside transceivers where it can be wired into the receiver aerial lead after the c/o relay.
★ Low noise figure—2dB. Gain—18dB. Price: **£5.94.** Supplied with fitting data.

**SM 71 70CM PRE-AMPLIFIER—Ex stock.** A selected 2 stage FET pre-amplifier.
★ Noise figure 3·5dB. Gain 18dB. ★ Size: 2½" × 4" × 1½". Price: **£9.72.**

**★ VAT IS NOW 25%. Please add 15% to all prices shown, which include only 8% VAT ★ MEMBER OF ARRA**

# SOLID STATE MODULES

**63 Woodhead Road, Solid, Lockwood, Huddersfield, HD4 6ER** **Phone 0484-23991**

# AMATEUR RADIO

**CHAS. H. YOUNG LTD.**
**021-236 1635**

# G3VFV

**170/172 CORPORATION STREET BIRMINGHAM B4 6UD**

**MICROWAVE MODULES**

| | |
|---|---|
| 70MHz Converters 28-28·7MHz IF | £16.42 |
| 136MHz Converters (Satellite Band) 28–30MHz IF | £16.42 |
| 144MHz Converters 2–4MHz IF | £16.42 |
| 144MHz Converters 4–6MHz IF | £16.42 |
| 144MHz Converters 28–30MHz IF | £16.42 |
| 144MHz Converters 28–30 IF with 116MHz output | £17.60 |
| 432MHz Converters 28–30MHz IF | £19.55 |
| 432MHz Converters 144–146MHz IF | £19.55 |
| 1296MHz Converters 28–30MHz IF | £25.92 |
| 1296MHz Converters 144–146MHz IF | £25.92 |
| 432MHz Varactor Triplers | £18.90 |
| 1296MHz Varactor Triplers | £27.00 |
| 144MHz Preamp (2 outputs) | £9.72 |

**OTHER IF'S TO ORDER**

All above post free.

**SOLID STATE MODULES**

| | | p & p |
|---|---|---|
| 144MHz Converters 4–6MHz IF | £16.20 | 50p |
| 144MHz Converters 28–30MHz IF | £16.20 | 50p |
| 432MHz Converters 144–146MHz IF | £16.20 | 50p |
| 144MHz Preamp in case | £7.36 | 50p |
| 144MHz Preamp PA3 for equip. | £5.94 | 25p |

**MICROPHONES**

| | | |
|---|---|---|
| Shure 201 | £6.60 | 60p |
| Shure 444 | £16.50 | 70p |

• *Midland Agents:*
**for EDDYSTONE, JOSTYKITS, AMTRON KITS, J. BEAM,**

**WE SPECIALISE IN THE SERVICE OF EDDYSTONE RECEIVERS AND CAN ACCEPT MOST MAKES OF COMMERCIALLY MADE COMMUNICATION EQUIPMENT**

**WE ARE ALSO INTERESTED IN PURCHASING GOOD QUALITY UNMODIFIED SECOND-HAND EQUIPMENT**

**EDDYSTONE**

| | | p & p |
|---|---|---|
| EC10 MkII | £165.00 | £2 |
| EC10 A2/1 Marine 300–500kHz, 1·5–30MHz and 2182kHz | £230.00 | £2 |
| 770U Ex dem. as new. 140–500MHz am/fm | £500.00 | £4 |
| Active Aerial LP1506 10kHz–30MHz | £26.40 | 75p |
| Headphones LP3301 (padded) 400Ω | £14.25 | 75p |
| Headphones LP3242 (600Ω) | £12.95 | 75p |
| Slide rule geared dial Type 898 | £15.79 | 75p |
| Diecast Boxes Various sizes in stock. | | |

**YAESU**

| | | |
|---|---|---|
| FT101B | £356.40 | £4 |
| FR101S | £264.60 | £4 |

**KW**

| | | |
|---|---|---|
| KW Traps with AT | £7.56 | 60p |
| KW Z MATCH | £25.92 | £1 |
| KW103 52Ω | £17.28 | £1 |
| KW Balun 50/75Ω 1:1 | £3.24 | 30p |
| KW Ant SW 3 way | £5.40 | 30p |

**MULTI-STOREY CAR PARK at rear of shop**

**NO C.O.D. PLEASE PRINT YOUR NAME AND ADDRESS. YOU MAY ORDER GOODS BY PHONE AND PAY BY ACCESS OR BARCLAY. Enquiries S.A.E. please.**

**AERIALS AND AERIAL EQUIPMENT**

| | | p & p |
|---|---|---|
| Bantex ¼ wave 2m fibre glass | £3.98 | 50p |
| Bantex ⅝ wave 2m fibre glass | £5.40 | 50p |

**JAYBEAM**

| | | |
|---|---|---|
| 2m Halo (head only) | £2.80 | 70p |
| 2m Halo (with mast) | £2.38 | 70p |
| 5 ele 2m beam | £4.64 | £1 |
| 8 ele 2m beam | £6.05 | £1 |
| 10 ele 2m beam | £11.88 | £1 |
| 14 ele 2m beam | £18.25 | £1 |
| 5 ele 2m crossed beam | £8.86 | £1 |
| 8 ele 2m crossed beam | £11.02 | £1 |
| 5 over 5 ele 2m beam | £8.55 | £1 |
| 8 over 8 ele 2m beam | £11.34 | £1 |
| 4 ele 4m beam | £7.34 | £1 |
| 18 ele 70cm beam | £11.77 | £1 |
| 46 ele 70cm beam | £13.97 | £1 |
| Low Loss 52Ω Coax per yd | 46p | 70p |
| Low Loss 75Ω Coax per yd | 20p | 70p |
| Twin Feed 300Ω per yd | 4p | 40p |
| Twin Feed 300Ω 110 yd. drum | £3.80 | 75p |
| 14swg h/d Copper wire 140 ft. | £3.30 | 70p |
| Raymart Ins 3" ribbed | 20p | 15p |
| Raymart AT (centre T) Ins | 20p | 15p |
| SWR50 SWR/POWER | £12.10 | 60p |
| FSI Field Strength Meter | £3.68 | 40p |
| ML2 200lb line (approx. 140 yards) | £1.50 | 30p |
| ML4 400lb line, per yd. | 4p | 30p |

**Prices include VAT and are subject to change without notice.**

Buy it with Access

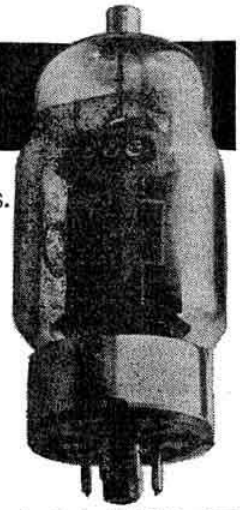
BARCLAYCARD welcome here



# Problem.

Where to obtain a low-cost device to use as a linear output stage for mobile and marine radio under SSB conditions.

# Solution.



M-OV long-life beam tetrodes.
A single TT21/22 gives
100W PEP at 1200V H.T.
and one TT100 delivers
180W PEP at 850V H.T.

**EEV and M-OV know how.**

THE M-O VALVE CO LTD, Hammersmith, London, England W6 7PE.
Tel: 01-603 3431. Telex: 23435. Grams: Thermionic London. GEC



# G. W. M. RADIO LTD.

**ALL PRICES include VAT and Post or Carriage.**

**TRANSCEIVERS B44 Mk 3.** Ideal for 4 metre conversion, 12v supply and speaker built in, clean, untested, £11.

**AVO TRANSISTOR** Testers, CT446 battery operated, £25 and CT537 Mains operated, £35. Good clean condition.

**Oblong PANEL METERS,** transparent case, 1 ma 100 ohms, calibrated 0 to 1.0 and 0 to 5, £1.60.

**EDDYSTONE 770U RECEIVERS,** 150 to 500 Mc/s, £75

**BCC 221** complete charts, no psu, £18

**AERIAL VARIOMETER TUNERS** for 19 set, £2.

**OSCILLOSCOPE, SOLATRON CD1212.** 5" tube. TB 100 nanosecs to 5 secs. Input 200 mic/volts to 100 volts. Clean condition and working order, with 24 mc/s dual trace plug in unit, £80. Wide band 40 mc/s unit, £20 (only sold with 'scope).

**AERIAL INSULATORS,** 1½" white egg type, 6 for 55p. Pyrex 2½", 55p.

**TRANSMITTER P.A.** units STC T4188, tunes 2.8 to 18 Mc/s manual or 28V meter drive. 13" × 8" × 8". Pair CV2518 (4 × 150) 28v blower cooled. Bases are NOT UHF type. Ideal basis for Linear Amplifier construction, £9.

**EX-MINISTRY** quality wrist watches. **VERTEX,** screw back case, £9 and **LEMANIA** stainless steel, screw back case Chronographs 1/5th second, stop/start/return button, minutes dial, £16.75. Fully overhauled, new strap and sent by registered post.

**REED RELAYS,** 4 reed normally open, 5v DC coil as used in recent keyer designs 15p each post 10p for any number. Also reed inserts 1.85" overall (body length 1.1") diameter 0.14", max ratings 250v DC and 500 ma. Gold clad normally open contacts, 75p per dozen, £4.12 per 100, £30.25 per 1,000.

**POCKET DOSIMETERS** (Radio activity monitors) 10 for £1.25.

All receivers and Test Equipment are in working order at time of despatch. Carriage charges are for England and Wales only.

**Telephone 34897**

Terms: Cash with order. Early closing Wednesday

**G. W. M. RADIO LTD.**

**40-42 PORTLAND ROAD, WORTHING, SUSSEX**

# BURNS ELECTRONICS

# NEW MODULES

## KITS OR MADE & TESTED

### TONE BURST GENERATOR TBG-2

Three channel tone burst for repeater access 1700Hz, 1750Hz, 1800Hz, with adjustable burst duration. 1 volt p-p output sinewave, 9-15 volt dc supply, PCB dimensions 4 × 2 inches.

**Price:** kit £7.55 + VAT M&T £8.90 + VAT

### TRANSMITTER TIMER TT-1

Timer for use with TBG-2 to prevent transmission after repeater timed shut down. Adjustable over range 17-70 secs. Generates audible and visual warnings when used with an external lamp and audio amplifier. 9-15 volt dc supply. PCB dimensions 3 × 2 inches.

**Price:** kit £5.50 + VAT M&T £6.55 + VAT

### AFSK OSCILLATOR FSG-1

This module converts the output of a teleprinter keyboard into two audio tones with a common mark of 2125Hz. Space frequency is 2295Hz (narrow) and 2975Hz (wide). Output level is 1 volt p-p sinewave and dc supply 9-15 volts. CW Indent facility. PCB dimensions 2 × 4 inches.

**Price:** kit £7.45 + VAT M&T £8.85 + VAT

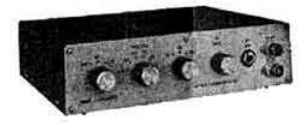
### HF/VHF PREAMPLIFIER MA-1

Single stage MOSFET preamp with screened tuned input and output, provides 16dB of stable gain and 3dB noise figure. Features AGC point and various methods of interconnection to current rigs. Available for 28/50/70/144MHz (specify). PCB dimensions 1·5 × 1·7 inches, DC supply 9-15 volts.

**Price:** kit £5.10 + VAT M&T £6.00 + VAT

### FREQUENCY STANDARD SD-11

Price: £126.00 + VAT



### CRYSTAL CALIBRATOR CC-10

Price: £34.50 + VAT

### WAVEMETER TC-101

Price : £29.90 + VAT

*Delivery approx. 12 weeks*

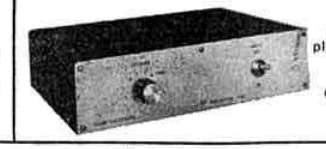
### FET CONVERTER FS2/4

Price: £19.00 + VAT or £18.00 + VAT less case

### FET CONVERTER FC70

Price: £19.70 + VAT or £18.50 + VAT less case

### MULTIVERTER MC3



Price: £12.20 + VAT plus "less case" cost of each converter Optional mains PSU-2 £6.95 + VAT

### SPEECH PROCESSOR SP-1

kit £7.65 + VAT
M&T £9.05 + VAT

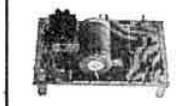
### PHASE MODULATOR PM-1

Specify crystal frequency 4-12MHz
kit £6.90 + VAT
M&T £8.10 + VAT

### FM DETECTOR FMD-1

Specify intermediate frequency in range 85kHz-3·5MHz
kit £8.30 + VAT
M&T £9.80 + VAT

### POWER SUPPLY MODULE PSM-1



Specify output voltage in range 5-17 volts ± 5%
kit £4.48 + VAT
M&T £5.50 + VAT

### KIT STOCKISTS:

**CRAYFORD ELECTRONICS**
32 Iron Mill Lane
Crayford, Kent, DA1 4RR
Tel: Crayford 24625

**PM ELECTRONIC SERVICES**
7A Arrowe Park Road
Upton, Wirral, Merseyside L49 0UB
Tel: 051-677 8918

### AGENTS:

**R. E. FAIRBAIRN G8HAX**
17 Kingslyn Crescent, London, SE19. Tel. 01-653 6306

**A. PAUL, G3RJI**
14 Lamerton Road, Ilford, Essex. Tel. 01-550 8798

**J. H. JONES, GW3TMP**
TMP Electronic Supplies,
3 Bryn Clyd, Leeswood, Mold, Clwyd CH7 4RU
Tel. 035 287 846

**Issue 7 Components Catalogue and Issue 3 Equipment Catalogue 20p**

VAT Reg. No. 218 4215 82. Please add 8% VAT on all orders including post and packing charges

Equipment and kit prices include carriage. Minimum component order 50p. P&P 20p, free over £5 excl VAT

**43a CHIPSTEAD VALLEY ROAD, COULSDON, SURREY, CR3 2RB** **Tel: 01-668 7766**

**IC-22** All future IC-22s are fitted with the following frequencies: 145·00, 145·500 (S20), and 145.550 (S22). Crystals for other channels, including repeaters, can be supplied at **£4.00**+ VAT, per pair.


Buy it with Access

**TRADE ENQUIRIES WELCOME**
**24-hour Ansaphone Service**

# THANET ELECTRONICS

**DAVE G8ELP** **PAUL 3GVJF**

**IC-22** A very popular mobile rig with 22 channels available (3 fitted). complete with all accessories and a tone generator which only operates on repeater channels. An excellent little rig at a sensible price (ask anyone who's using one) .. .. .. .. .. .. .. .. **£109.26**

Extra channels for above (repeater crystals stocked) .. .. **£4.00**

**IC-255** The luxury mobile rig. Small and compact yet fitted with 80 channels and full repeater coverage. Tone burst introduced on repeater mode. Excellent copy on both transmit and receive. It may sound a bit expensive but there are no more crystals to buy and you can get (or make) a VFO to give you full coverage on Transmit and Receive. .. .. .. .. **£195.00**

**IC-210** We still have a few of these base station, fully VFO, FM transceivers available at the bargain price of .. .. .. .. .. **£200.00**

**PL-V1** External VFO for IC-225 or IC-210 .. .. .. .. **£42.00**

**IC-201** They won't be much longer now! We already have a very long list of people waiting for details. Get your name down NOW for details of this all singing—all dancing rig built to INOUE standards about .. .. **£300**

**IC-3PA** Stabilised power supply and speaker to turn your IC-22 or IC-225 into a base station .. .. .. .. .. .. .. .. **£35.00**

**DV-21** A digital, synthesized VFO for the IC-21 or IC-21A. Works on transmit and receive, simplex or duplex. Type in the frequency you want to within the nearest 5kHz or let it scan the band looking for an empty or full channel. A lot of very clever electronics for .. .. .. .. **£172.00**

**All prices are NETT. Please add VAT at current rate**
**Delivery FREE by SECURICOR**

**3 Sheppey View, WHITSTABLE, Kent CT5 4PG. Phone (02272) 62555**
**Northern Agent: Peter Avill, 7 Moorland Crescent, Mapplewell, Barnsley. Tel: Darton (022 678) 2517**



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

**YAESU FT101B.** 10–80 metre AC/DC Transceiver, 260 watts PEP. All modes—AM, CW, SSB .. .. .. .. .. **£330·00**

**YAESU FR101D RECEIVER.** 160 metre to 2 metre. SSB, AM, FM, CW with digital readout .. .. .. .. .. **£330·00**

**YAESU FT220.** 144–146 MHz. Transceiver. SSB, CW, FM. 10 watts Rms. Mains and 12 volt. Complete with microphone .. **£264·00**

**INOUE IC22 TRANSCEIVER.** Two metre, 22 channel mobile (3 channels supplied) .. .. .. .. .. .. .. **£109·26**
(Extra crystals for above £4·00)

**INOUE IC255 TRANSCEIVER.** 80 channel. Pretuned. Max. freq. dev. + 5 kHz with dynamic mic. .. .. .. **£195·00**

**MICROWAVE MODULES PRODUCTS:**

2 metre Converters IF's 2–4, 4–6, 28–30 MHz .. .. .. **£15·20**

2 metre Converters 28–30 MHz IF with 116 MHz Lo. output for transverter .. .. .. .. .. .. .. .. **£16·30**

70 Cms. Converters IF 28–30 or 144–146 MHz .. .. .. **£18·10**

2 metre Low Noise Preamp with 2 isolated outputs .. .. **£9·00**

70 cms. Triplers. 2 metres in 70 cms. out. max. input 20 watts. Giving 12 watts out. .. .. .. .. .. .. .. **£17·50**

**SECOND-HAND EQUIPMENT**

**"TRIO" 9R59DS RECEIVER,** as new .. .. .. .. **£40·00**

**"PYE" CAMBRIDGE.** Low band with 70·26 XTAL. .. .. **£12·00**

**"HAMMERLUND" 170A RECEIVER.** .. .. .. .. **£100·00**

**"LABGEAR" E5051.** Top band TX. .. .. .. .. .. **£12·00**

BUYERS COLLECT

DENCO COILS—CHASSIS—DIE-CAST BOXES. Hosts of components always in stock.

*ADD POSTAGE ALL GOODS 20p*

Add 25% for VAT. Part exchange welcome. Barclay Card or Access.

**11 KING ST., LUTON, BEDS. Tel. 20907**



# CRAYFORD ELECTRONICS

**32 IRON MILL LANE · CRAYFORD · KENT**
**Tel. Crayford 24625 (STD 03225)**

| | |
|---|---|
| **MICROWAVE MODULES** | |
| 4m & 2m converters with LO o/p | £15.20 £16.30 |
| 70cm converter | £18.10 |
| 23cm Converter | £24.00 |
| 70cm Varactor | £17.50 |
| 23cm Varactor | £25.00 |
| 2m Preamp | £9.00 |
| **ELECTRONIC DEVELOPMENTS** | |
| 4m & 2m ssb Transverter | £87.96 |
| **KEN 2m HAND PORTABLE** | |
| KP202 6 channel | £75.00 |
| Set 10 nicads | £8.50 |
| Charger | £8.80 |
| **SWR BRIDGES** | |
| SWR10 | £6.30 |
| SWR50 | £11.20 |
| **MODULAR ELECTRONICS** | |
| 40W o/p linear with preamp | £40.00 £44.00 |
| **INOUE** | |
| IC22A | £115.00 |
| IC210 | £200.00 |
| IC225 | £195.00 |
| DV21 VFO | £172.00 |
| PL-VI vfo | £42.00 |
| IC3PA psu | £35.00 |
| Crystals each | £2.00 |
| **BURNS KITS** | |
| PSMI psu | £4.48 |
| FMDI FM detector | £8.30 |
| TBG2 tone burst | £7.55 |
| TTI Tx timer | £5.50 |
| SPI Speech processor | £7.65 |
| PMI Phase mod. | £6.90 |
| MAI 2m preamp | £5.10 |
| FSGI rtty gen | £7.45 |
| **ANTEC VHF AERIALS** | |
| 4m ½ hinge A5–2 | £3.06 |
| 2m ½ screw A6–5 | £4.81 |
| 2m ½ hinge A5–6 | £4.74 |
| 70cm ½ screw A6–9 | £3.66 |
| FXBNC 2m helical | £3.44 |
| **JAYBEAM** | |
| 5Y/2M | £4.30 |
| 8Y/2M | £5.60 |
| 8XY/2M | £10.20 |
| 10XY/2m | £14.10 |
| PBM14/2m | £16.90 |
| UGP/2m ground plane | £4.15 |
| PBM18/70cm | £10.90 |
| MBM68/70cm | £16.10 |
| SPM & PME mast | £6.60 |
| **CDE ROTATORS** | |
| AR30 | £25.00 |
| AR40 | £30.00 |

**PRICES DO NOT INCLUDE VAT. PLEASE ADD 25% TO ALL ORDERS. ALL ITEMS EXCEPT AERIALS CARRIAGE FREE. Enquiries S.A.E. please.** Part exchange welcome—secondhand equipment in stock. We also carry small components, eg capacitors, resistors, transistors etc, in stock from Mullard, Erie, Radiospares, Texas, Bulgin, Jacksons. We are situated close to the London end of the main A2 road near the Dartford Tunnel.

WE'VE MOVED . . .

# AMATEUR RADIO BULK BUYING GROUP

PLEASE NOTE NEW TELEPHONE NUMBER

**We have now moved into larger premises—giving us room to expand our activities and offer an even better service to our many customers**
**Callers are welcome at our Carshalton office—but please telephone first, Mail orders and enquiries should continue to be sent to our Old Coulsdon address**

## THE G3ZVC SSB TRANSCEIVER

All components for this project are now generally in stock. PC Board, £1.90. CRO71-8A Toroids, 16p. MD108 Ring Mixer, £5.90. Filter £26.65.
**MiniKit 1** (which contains all the above), **£34.50.**
**MiniKit 2** (17 semiconductors), **£24.50**; **MiniKit 3** (Rs & Cs), **£3.15.**
Special price for complete kit: **£61.00.** Reprint of article (Sept. '74), **20p.**
Also available (not included in kits):
25Ω Loudspeakers—2½", **£1.35**; 5", **£1.75**; Metal cabinet, **£1.55**; Min. 50Ω coaxial connectors—PCB mount socket, **44p** and plug, **86p.**
The first of a series of add-on units for the G3ZVC SSB Transceiver are now available:
**2m Preamplifier Kit** with tailored bandpass and gain to suit G3ZVC Board. PCB size: 3·5" × 1·8". **Price £4.00.**
**12V to 6V Regulator/1W Audio Amplifier Kit** to power the G3ZVC Board from + 12 volt supply and provide increased audio output. PCB size: 3·5" × 1·8". **Price £6.00.**
**2m V.F.O. Kit (by DJ5HD-VHF Communication, Edition 1/71)**
This V.F.O. is of the mixer type, having a VFO tuning 11 to 13MHz and a crystal oscillator on 62MHz. The 135-137MHz output is fed into the MD108 mixer stage on the G3ZVC board. It is designed for operation on 12V supply. **Kit price: £31.60**
**VHF Communications Ed 1/71 75p extra**
Components for H.F. Preselector Unit also available—write for details.

## OTHER 'RADCOM' DESIGNS

**G3TDZ 2m TX/RX** (Jan. '73)—Reprint 20p plus large SAE. Kits available as follows: **RX—£18.50; TX—£9.45** (State Xtal frequency required).
**MOD—£3.30** (transformer and board not available).
**G3XGP MINI D.F.M.** (June 1973)—Reprint 20p plus large SAE. Details of all parts available in our price list.

## KVG FILTERS IN STOCK

We are now the leading UK stockist for KVG Filters and normally hold the following range in stock (—9B model may be subject to temporary shortages):

| Model | Application | 6dB BW | Supplied with | Price (inc. VAT) |
|---|---|---|---|---|
| XF-9A | SSB TX | 2·5kHz | 2 × Xtals | £19.75 |
| XF-9B | SSB RX/TX | 2·4kHz | 2 × Xtals | £26.65 |
| XF-9E | FM | 12kHz | None | £24.75 |
| XF-9M | CW | 500Hz | 1 × Xtal | £19.00 |

## SEMICONDUCTORS

The following is a selection from our range of brand new semiconductors—all carrying full manufacturer's warranty:
**BC213**—20p **BF224**—24p **BF244**—29p **BF245A**—66p **BF245C**—60p **LM309K**—£2.16 **LM380**—£1.09 **SL610, 611, 612**—£1.71 **SL613**—£3.72 **SL620, 621**—£2.58 **SL622**—£6.53 **SL623**—£4.81 **SL624**—£2.45 **SL630**—£1.62 **SL640, 641**—£3.15 **SN72741P**—42p **TIS88A**—31p **2N3819**—29p **2N3866**—93p **40673**—53p.

## IGNITION SUPPRESSION COMPONENTS

Screened Plug Connectors (essential for VHF), straight or angled—78p. Plug In Distributor Suppressor—55p. 1μF Capacitor, available with normal push fit lucar connector, large lucar or fully insulated with wire connections, 28p. 2μF, normal or large lucar connector, 45p. 2·5μF Coax type, £1.63. 3μF Capacitor for Lucas ACR alternator, £1.43. 3A Chokes, 66p. 7A Chokes, £1.00. Solid Copper Stranded Ignition Cable, 7p per ft. Connectors, 18p for 6.

We also still have available all components previously advertised plus **THE FULL RANGE OF JAYBEAM AERIALS, Mini-Beam HF aerials, Microwave Modules and Swan Transceivers. Write for free Price List (SAE please). All prices include VAT at 8%.** Please note that our minimum UK post & packing charge, except where indicated is 15p. Export orders are welcome—deduct two twenty-sevenths (2/27) from the cost of goods and then add 60p for post and packing.
**Cheques and P.O's** should be crossed and made payable to "Amateur Radio Bulk Buying Group" **or pay by GIRO**—Account no. 31 523 4008.
**VAT INCREASE—PLEASE ADD 15% TO TOTAL**
See our range of components and kits at the VHF Convention, Whitton.

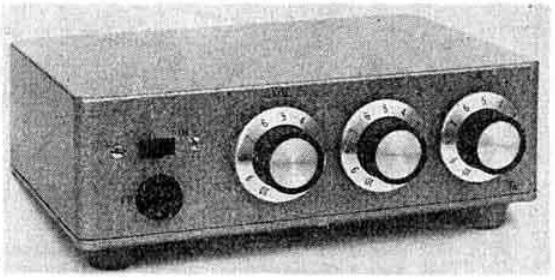
**ADMINISTRATION ADDRESS ONLY:**
**39 POUND STREET, CARSHALTON, SURREY**

**ALL MAIL ORDERS AND ENQUIRIES to:**
**20 THORNTON CRESCENT, OLD COULSDON, SURREY**

**NEW TELEPHONE NO.—01-669 6701 (10 a.m. to 7 p.m.)**

# TECHNICAL ASSOCIATES

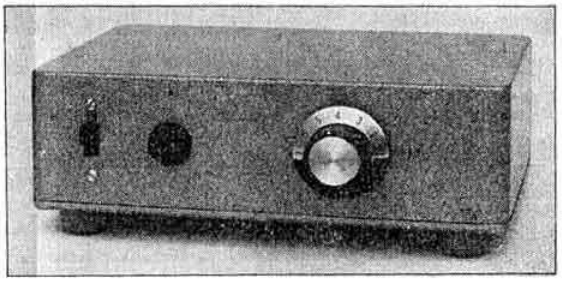
## FOR THE T.X. AMATEUR AND THE S.W.L.



### AUDIO COMPRESSOR

★ Suitable for SSB/AM/FM ★ pure compression, no clipping! ★ 14 transistors ★ 24 to 26dBs of compression, with less than 1% distortion ★ fast attack time in the order of 200 microseconds ★ variable decay time, on front panel ½sec to 2secs ★variable noise gate on front panel prevents ambient noise level tripping vox or being tx in pauses in speech ★ does not produce hard audio! ★ gives high talk power without high cost rf clipping and distortion making af clipping ★ all functions routed to output in "off" position ★ goes between mic and tx no mods involved ★ standard jack socket input ★ runs from internal PP6 battery, draws 3·5 m/a ★ these compressors have been tested alongside commercial rf and af clippers, the only difference at the receiving end was far superior audio quality on the Technical Associate compressor. Why pay more?

**£22.50 + VAT**



### AUDIO FILTER

★ 9 integrated circuits ★ covers ssb and cw in one unit ★ built in loudspeaker amplifier ★ headphone socket ★ 8 positions of filter ★ high pass—2·5kHz-2·00kHz-1·5kHz-200KHz-180Hz-110Hz-80Hz ★ no mods to equipment, goes between rx and loudspeaker ★ bypass switch allows unit to beleft incircuit ★ makes the superb rx better and the poorest rx superb ★ runs from internal PP9 type battery ★ no ringing when in circuit ★ your rx volume control controls the audio o/p of the filter.

**£26.00 + VAT**

**83 SCOTLAND WAY . HORSFORTH • LEEDS • YORKSHIRE**

# CW IS STILL VERY MUCH ALIVE!

## SAMSON ELECTRONIC KEYERS

—the choice of Ships and Coast Stations the world over. Two different models:

**ETM-2b TRANSISTORISED KEYER**
Developed from the well-established ETM-2. Printed circuit, 11 transistors, 6 diodes. Ratio Control. Single paddle. Speed control, 8-50 wpm. Sidetone oscillator. Almost-inaudible sealed reed relay. Grey case 4" × 2" × 6". Powered by four ZM9 mercury batteries available world-wide (Price includes batteries). Well engineered keying lever, fully adjustable gaps and tensions.

**ETM-2b** —with make-break relay contacts,
(Ratings: 1A, 400V, 30W max.)
Complete with mercury batteries, £36.95
(or with penlite batteries, £35.46)
**ETM-2bS**—with spdt changeover relay contacts,
(Ratings: 0·5A, 250V, 10W max.)
Complete with mercury batteries £41.95
(or with penlite batteries, £40.46)

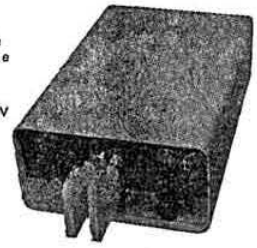
**ETM-3b INTEGRATED CIRCUIT SQUEEZE-KEYER**
Printed circuit with 4 ICs and 13 semiconductors. Twin paddles. Constant 3:1 ratio. Speed control, 8-50 wpm. Operate/Tune button. AC mains power supply. 110/220-240V. Almost-inaudible sealed reed relay. Grey case 4" × 2" × 6". The renowned SAMSON keying lever movement with fully adjustable gaps and tensions. Can be used either as an iambic mode squeeze-keyer (characters made with fewer paddle movements—you can make a 'C' with one squeeze!)—or as a normal electronic keyer.

**ETM-3b** —with make-break relay contacts,
(Ratings: 1A, 400V, 30W max), £42.95
**ETM-3bS**—with spdt changeover relay contacts,
(Ratings: 0·5A, 250V, 10W max), £48.20

## OR, IF YOU LIKE IT STRAIGHT

**JUNKER PRECISION HAND KEY**
A superbly engineered straight hand key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing—it does not have to be screwed to the operating desk. Good weight distribution and large rubber feet stop it sliding or rocking. Weight 2¼lbs. Front and back contacts of precious metal, with fine adjustment of contact gaps by positive click-stop action. Lever-action spring tension adjustment. Spring pigtail at keying arm pivots ensures good contact. Insulated keying arm, moulded knob with rubber anti-slip insert. 3-way terminal block and cable clamp at rear. Key-click filter (L, C & R) built into base. Rear-hinged cover (with spring catch) and other metal parts finished in attractive hammertone grey. Base area: 3½"W × 7½"D. Overall height: 2⅞". £18.56

**BAUER KEYING PADDLE**
Single-paddle unit on 1½" × 2" base for home built El-Bugs. Adjustable gaps and tensions. £5.77



**88mH Toroids** for CW, RTTY, SSTV and other filters. 54p each.

ALL PRICES INCLUDE VAT

ALL GOODS POSTPAID UK

Send stamp for Catalogue RP6.

## SPACEMARK LTD.

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



# RSL Components
G3LWM

## 2 METRE F.M. MODULES

**RX-2SB**
12 Channel Receiver Board, (cw 4 xtals) S20, 22 and R6, 7 output **£28.00** + vat

**TX-2SB**
12 Channel Transmitter Board, (cw 4 xtals) S20, 22 and R6, 7 input. 1W o/p **£20.00** + vat

**P-210SB**
Power Amplifier Module (2m fm only) Fully screened unit 1W in for 10W **£15.00** + vat

**PB-267**
Aerial/Power Relay and Power Reg board. For use with the above boards. Provides changeover functions, input filtering and regulated supplies **£6.00** + vat

These are brand NEW and top spec. units. All are fully guaranteed. The addition of a few extra components will enable the following to be constructed.

1. Purchase all four boards and get 10% discount and you have most of the parts for a Mobile Rig for only **£62.10** + vat
2. Mobile Monitor Receiver
3. Fixed Station Monitor Receiver
4. Hand portable Rig
5. 10W Power amp for your existing Hand Portable
6. Used with Converters/Varactors make 70cm equipment

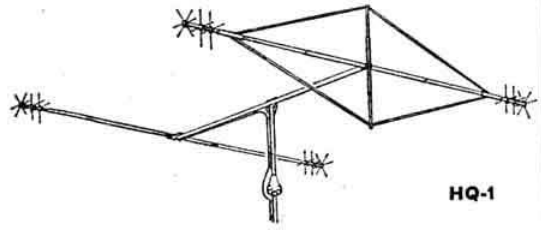
*Send 25p POSTAL ORDERS ONLY for FULL DETAILS (refundable if you purchase any one unit).*

## RSL COMPONENTS
**52 SILVER STREET, STANSTED, ESSEX**
**Telephone: Stansted (0279) 814929**



# IMPROVE YOUR SIGNAL

**FABULOUS MINI-BEAM BRINGS DX OPPORTUNITIES TO EVEN THE SMALLEST GARDEN**



**HQ-1**

HQ1–18AVT–14AVQ–J Beam, FL2100B, RF Clipper for FT101, Shure mics, (ring for special Shure prices)

**A NEW RIG?**
**FT101B**—if you find anything that equals this in all aspects when used with our RF Clipper please let us know! (Note—we don't think much of the mic insert and provide a new one free).
**FT401B**—now available with 160m if bought from us (Sorry our D.I.Y. 160m kit isn't for the 401B).

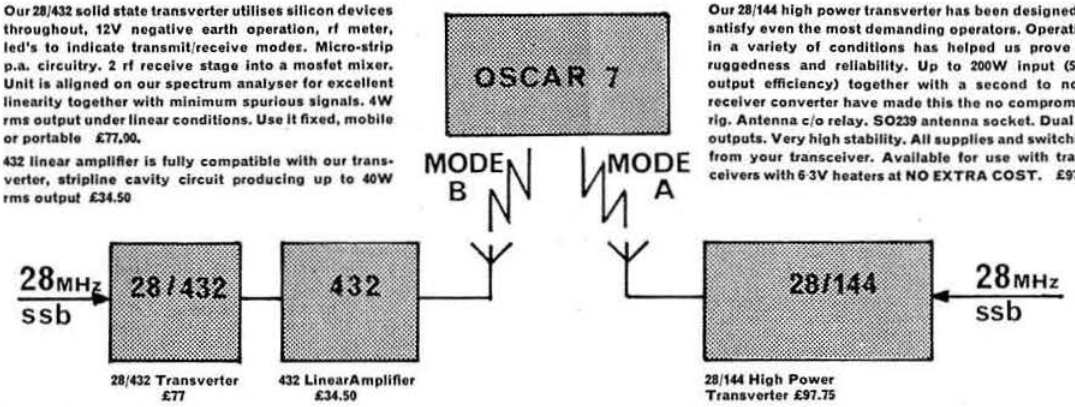
**SERVICE**—Well, we've been at the same address for over 20 years!

## HOLDINGS LTD
**39/41 Mincing Lane, Blackburn BB2 2AF.**
**Tel: 59595/6.**

# QM70 PRODUCTS

**Our 28/432 solid state transverter utilises silicon devices throughout, 12V negative earth operation, rf meter, led's to indicate transmit/receive modes. Micro-strip p.a. circuitry. 2 rf receive stage into a mosfet mixer. Unit is aligned on our spectrum analyser for excellent linearity together with minimum spurious signals. 4W rms output under linear conditions. Use it fixed, mobile or portable £77.90.**

**432 linear amplifier is fully compatible with our transverter, stripline cavity circuit producing up to 40W rms output £34.50**




**Our 28/144 high power transverter has been designed to satisfy even the most demanding operators. Operation in a variety of conditions has helped us prove its ruggedness and reliability. Up to 200W input (50% output efficiency) together with a second to none receiver converter have made this the no compromise rig. Antenna c/o relay. SO239 antenna socket. Dual i.f. outputs. Very high stability. All supplies and switching from your transceiver. Available for use with transceivers with 6·3V heaters at NO EXTRA COST. £97.75**

**ALSO AVAILABLE.** 28/144 solid state transverter. 12V neg. earth. RF o/p meter. LED's to indicate transmit and receive states, antenna c/o relay 5W p.e.p. output. Dual i.f. output. **Ideal for the QRP men** or for driving a linear amplifier. **£51.75. P.S.U.** suitable for transverter in matching cabinet **£17.25.**

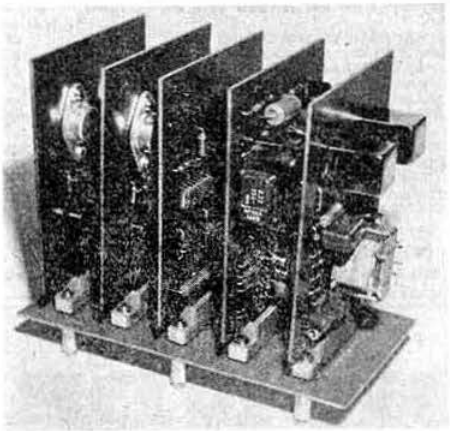
**Send large SAE for full detailed literature of all our units.**

All units carry full 12 months parts and labour guarantee. All prices include CARRIAGE and VAT (25 %)

**QM70 PRODUCTS, 10 PILGRIM ROAD, DROITWICH, WORCESTERSHIRE WR9 8QA**

*Agent:* Chris Goadby, 58 Savill Road, Lindfield, Haywards Heath, Sussex.

## SSTV MONITOR COMPONENTS



| | |
|---|---|
| Set of 6 PC boards, wired and tested, as illustrated, with handbook, instructions, etc. ... ... ... ... | £37.00 |
| Set of 6 PC boards, less components, with handbook ... | £7.50 |
| Cabinet, punched and drilled, complete with CRT bracket ... | £6.80 |
| Resistor kit ... ... ... ... ... ... | £1.30 |

PHASE LOCKED LOOP BOARD AVAILABLE MID-MARCH

## MK PRODUCTS

**5 LANCASHIRE DRIVE, BELMONT, DURHAM**
**Durham 63111 or Sunderland 284849**
SAE for further details

## REMEMBER the DB.3?

(Patents applied for)

**THAT REVOLUTIONARY NEW TRIBAND ANTENNA THAT WAS INTRODUCED IN OCTOBER 1974 AND NOW ACCLAIMED AS ONE OF TODAY'S BETTER - VALUE ANTENNA SYSTEMS**

(Production has been increased to meet the growing demand, so that the DB-3 is still *AVAILABLE FROM STOCK*)

### WHAT IS A DB-3?

IT IS A HIGH-QUALITY, STRONG, COMPACT, LIGHT-WEIGHT ANTENNA designed for operation on the 10, 15 & 20 metre bands.
IT IS A THREE-ELEMENT YAGI, based upon the principles of the Log-Periodic antenna, but of small, easily rotatable dimensions, and designed for the Amateur with restricted space.
IT IS BROAD-BANDED, with low, narrow angles of radiation, giving low-powered signals that DX-raising punch that linear amplifiers give. GOOD F/B ratios help null unwanted QRM.
EASILY ASSEMBLED AND ERECTED SINGLE-HANDED, using light poles, house chimneys etc, with elements strong enough to withstand the strongest winds (weather damage GUARANTEE given).
WEIGHT—22 lbs BOOM—9 ft long TURNING RADIUS—12 ft POWER RATING —2 kW plus. NO POWER-WASTING TRAPS, COILS OR STUBS.
THE DB-3 GETS YOU THROUGH—Time after time, after time, after time . . . . .
JOIN THE DX SET NOW—At a price that will not put a hole in your pocket!

**£32.50** ONLY (Plus carriage) brings you one of today's TOP-PERFORMANCE ANTENNAS.

DEXBEAM ALSO OFFER Rotators, cable, feeder, mounting stubs, etc., *AND A NEW UNIQUE SERVICE TO THE AMATEUR.* For those people wishing to build their own beam antennas, we are now offering highest quality dural tubing, Tufnol insulating tubing, terminal posts, top-grade steel clamps etc. Tubing available in standard or cut sizes.
STAMPED ADDRESSED ENVELOPE (9" × 4") brings FREE DETAILS and price list of all products. DON'T DELAY—SEND TODAY

## DEXBEAM LTD.,

**2 Fairfields Walk, Stratford on Avon, Warwickshire, UK**

# P.M. ELECTRONIC SERVICES

## CRYSTALS FOR AMATEUR AND PROFESSIONAL USE

We are pleased to announce we have been appointed Northern Stockists of **BURNS ELECTRONICS** kits etc. and are able to supply most of their products from stock. We will also be representing them at many of this year's rallies.

**MARKER CRYSTALS**

1MHz in HC6/U **£2.85** 10MHz & 10·7MHz in HC6/U or HC25/U **£2.75**

**PYE POCKETFONE (PF1) & PYE CAMBRIDGE (U10B) Crystals for 433·2MHz**

TX 12·0333MHz and RX 84·5000MHz in HC18/U per set .. .. .. **£6.00**
Tx 12·0333MHz RX 30·1785MHz in HC6/U per set .. .. .. **£5.00**

**CONVERTER/TRANSVERTER CRYSTALS—HC18/U—Close tolerance (MHz)**

| | | | |
|---|---|---|---|
| 4m 42·0000 (70/28) .. .. | **£3.50** | 2m 70·0000 (144/4) .. .. | **£4.10** |
| 2m 38·6666 (144/28) .. .. | **£3.45** | 2m 116·0000 (144/28) .. .. | **£4.90** |
| 70cm 101·0000 (432/28) .. .. | **£4.30** | 70cm 96·0000 (432/144) .. .. | **£4.20** |
| 23cm 105·6666 (1296/28) .. | **£4.60** | 23cm 96·0000 (1296/144) .. .. | **£4.20** |

**CRYSTAL SOCKETS—HC6/U & HC25/U (Low loss)**

20p each plus 10p P & P per order (P & P free if ordered with crystals)

**CRYSTALS SPECIALLY MANUFACTURED FOR AMATEUR USE TO CUSTOMERS REQUIREMENTS**

In either code PE (+0·003% at ambient) or code ID (+0·005% 0 to 60°C). Fundamentals in HC67U 2-21MHz or in HC18/U & HC25/U 4-21MHz **£3.50.** Overtones in HC6/U, HC18/U & HC25/U 21-105MHz **£3.66.** Delivery approx 4-5 weeks. Fundamentals will be supplied to 30pf load capacity circuit conditions unless otherwise specified. Overtones can only be supplied to series resonance conditions. For details of closer tolerance crystals please send SAE.

**CRYSTALS TO COMMERCIAL SPECIFICATIONS**

We can supply crystals to most commercial and MIL specifications, with an express service available for that urgent order. Please send S.A.E. for details or telephone between 4.30-7pm and ask for Mr Norcliffe. Regret no phone enquiries 26 May-23 June).

**TERMS: CASH WITH ORDER — SAE WITH ALL ENQUIRIES — MAIL ORDER ONLY — PRICES INCLUDE P & P AND VAT at 8% EXCEPT WHERE STATED**

7a Arrowe Park Road, Upton, Wirral Merseyside. L49 0UB
Tel: 051-677 8918 4.30-7.30pm (Regret no phone enquiries 26 May-23 June)
Cables: CRYSTAL, BIRKENHEAD

**TX CRYSTALS (MHz)**

| | | | |
|---|---|---|---|
| 4·0111 in HC6/U (144·4–433·2) .. | **£2.10** | 8·0833 in HC6/U (145·500–S20) .. | **£2.10** |
| 4·0277 in HC6/U (145·0) .. .. | **£2.10** | 8·0847 in HC6/U (145·525–S21) .. | **£2.10** |
| 4·0291 in HC6/U (145·050–R2) .. | **£2.10** | 8·0861 in HC6/U (145·550–S22) .. | **£2.10** |
| 4·0298 in HC6/U (145·075–R3) .. | **£2.10** | 8·0875 in HC6/U (145·575–S23) .. | **£2.10** |
| 4·0305 in HC6/U (145·100–R4) .. | **£2.10** | 8·0888 in HC6/U (145·600–S24) .. | **£2.10** |
| 4·0312 in HC6/U (145·125–R5) .. | **£2.10** | 8·1000 in HC6/U (145·8) .. .. | **£2.10** |
| 4·0319 in HC6/U (145·150–R6) .. | **£2.10** | 8·1083 in HC6/U (145·95) .. .. | **£2.10** |
| 4·0326 in HC6/U (145·175–R7) .. | **£2.10** | 8·7825 in HC6/U (70·26) .. .. | **£2.10** |
| 4·0416 in HC6/U (145·500–S20) .. | **£2.10** | 36·2500 in HC6/U (145·0) .. .. | **£2.30** |
| 4·0423 in HC6/U (145·525–S21) .. | **£2.10** | 36·2500 in HC25/U (145·0) .. .. | **£2.50** |
| 4·0430 in HC6/U (145·550–S22) .. | **£2.10** | 36·3750 in HC6/U (145·5) .. .. | **£2.10** |
| 4·0437 in HC6/U (145·575–S23) .. | **£2.10** | 36·3750 in HC25/U (145·5) .. .. | **£2.30** |
| 4·0444 in HC6/U (145·600–S24) .. | **£2.10** | 48·3333 in HC6/U (145·0) .. .. | **£2.30** |
| 4·0500 in HC6/U (145·8) .. .. | **£2.10** | 48·3333 in HC25/U (145·0) .. .. | **£2.50** |
| 4·0541 in HC6/U (145·95) .. .. | **£2.10** | 48·5000 in HC6/U (145·5) .. .. | **£2.30** |
| 8·0222 in HC6/U (144·4–433·2) .. | **£2.10** | 48·5000 in HC25/U (145·5) .. .. | **£2.50** |
| 8·0555 in HC6/U (145·0) .. .. | **£2.10** | 72·0150 in HC25/U (144·03) .. | **£2.95** |
| 8·0583 in HC6/U (145·050–R2) .. | **£2.10** | 72·2000 in HC25/U (144·4–433·2) . | **£2.95** |
| 8·0597 in HC6/U (145·075–R3) .. | **£2.10** | 72·3500 in HC25/U (144·7) .. .. | **£2.95** |
| 8·0611 in HC6/U (145·100–R4) .. | **£2.10** | 72·5000 in HC25/U (145·0) .. .. | **£2.95** |
| 8·0625 in HC6/U (145·125–R5) .. | **£2.10** | 72·6750 in HC25/U (145·35) .. | **£2.95** |
| 8·0638 in HC6/U (145·150–R6) .. | **£2.10** | 72·7500 in HC25/U (145·5) .. .. | **£2.95** |
| 8·0652 in HC6/U (145·175–R7) .. | **£2.10** | 72·9000 in HC25/U (145·8) .. .. | **£2.95** |
| 8·0666 in HC6/U (145·2) .. .. | **£2.10** | 72·9750 in HC25/U (145·95) .. | **£2.95** |

**RX CRYSTALS (MHz)**

| | | | |
|---|---|---|---|
| 10·3246 in HC6/U (145·0) .. .. | **£2.10** | 44·7666 in HC6/U (145·0) .. .. | **£2.30** |
| 10·3603 in HC6/U (145·500–S20) .. | **£2.10** | 44·7666 in HC25/U (145·0) .. .. | **£2.50** |
| 10·3621 in HC6/U (145·525–S21) .. | **£2.10** | 44·8333 in HC6/U (145·2) .. .. | **£2.30** |
| 10·3639 in HC6/U (145·550–S22) .. | **£2.10** | 44·9333 in HC6/U (145·500–S20) .. | **£2.30** |
| 10·3657 in HC6/U (145·575–S23) .. | **£2.10** | 44·9333 in HC25/U (145·5) .. .. | **£2.50** |
| 10·3675 in HC6/U (145·600–S24) .. | **£2.10** | 44·9416 in HC6/U (145·525–S21) .. | **£2.30** |
| 10·3710 in HC6/U (145·650–R2) .. | **£2.10** | 44·9500 in HC6/U (145·550–S22) .. | **£2.30** |
| 10·3728 in HC6/U (145·675–R3) .. | **£2.10** | 44·9583 in HC6/U (145·575–S23) .. | **£2.30** |
| 10·3746 in HC6/U (145·700–R4) .. | **£2.10** | 44·9666 in HC6/U (145·600–S24) .. | **£2.30** |
| 10·3764 in HC6/U (145·725–R5) .. | **£2.10** | 44·9833 in HC6/U (145·650–R2) .. | **£2.30** |
| 10·3782 in HC6/U (145·750–R6) .. | **£2.10** | 44·9916 in HC6/U (145·675–R3) .. | **£2.30** |
| 10·3800 in HC6/U (145·775–R7) .. | **£2.10** | 45·0000 in HC6/U (145·700–R4) .. | **£2.30** |
| 10·3817 in HC6/U (145·800) .. | **£2.10** | 45·0083 in HC6/U (145·725–R5) .. | **£2.30** |
| 10·3925 in HC6/U (145·95) .. | **£2.10** | 45·0166 in HC6/U (145·750–R6) .. | **£2.30** |
| 11·1916 in HC6/U (145·0) .. .. | **£2.10** | 45·0250 in HC6/U (145·775–R7) .. | **£2.30** |
| 11·2333 in HC6/U (145·5) .. .. | **£2.10** | 45·0333 in HC6/U (145·8) .. .. | **£2.30** |
| 11·2586 in HC6/U (145·8 Raynet) | **£2.10** | 45·0833 in HC6/U (145·95) .. .. | **£2.30** |
| 29·7800 in HC6/U (70·26) .. .. | **£2.30** | | |

# TVI PROBLEMS?

**YOU NEED HP3A TV HIGH PASS FILTER**

**£2.16 inc. vat (p. & p. 10p)**

**(for UHF tv receivers)**

Simply plugs into tv aerial socket.
Filters both inner and outer conductors.
Smartly packaged for domestic use.
Complete with "TVI Hints" sheet.
A small price to pay for TVI free operation.

# AUDIO INTERFERENCE?

Ferrite ring filters together with data sheet on how to overcome Hi-Fi interference. Needs no electrical connection or modification of the Hi-Fi installation.
Only **23p** each, p & p 20p any quantity.

# WATERS&STANTON ELECTRONICS

**HOCKLEY AUDIO**

**SPA ROAD, HOCKLEY, ESSEX. Tel. 03 704 6835**

# DISCOUNT DIGITAL CLOCKS

All 24 hour and guaranteed for 12 months (Copal) or 24 months (Electronic)

| **BUDGET? NO INCREASED VAT ON CLOCKS** | *OUR PRICE (VAT included)* |
|---|---|
| **COPAL "222"** in White or Charcoal | **£5.75** |
| **COPAL "225"** in White, Red or Yellow | **£5.75** |
| **COPAL "227"** Alarm in White | **£7.50** |
| **COPAL "227"** Alarm in Simulated Wood | **£7.75** |
| **COPAL "601"** Satin aluminium with Calendar | **£12.50** |
| **COPAL "T-11"** Battery, tuning fork controlled, alarm in Gold | **£19.95** |
| **ELECTRONIC II** 6 DIGIT SPERRY MATRIX Display—Black Case | **£23.50** |
| **ELECTRONIC II** 7 DIGIT SPERRY MATRIX Display—Black Case | **£26.00** |
| **ELECTRONIC III** 6 DIGIT with Alarm and Calendar. S/Wood Grain | **£29.95** |

Our clocks are all carefully tested and sent return of post
Full refund guaranteed if you are not completely satisfied

**PLEASE ADD 40p TOWARDS THE COST OF POSTAGE AND INSURANCE**

**Aero & General Supplies** (Dept. SD)

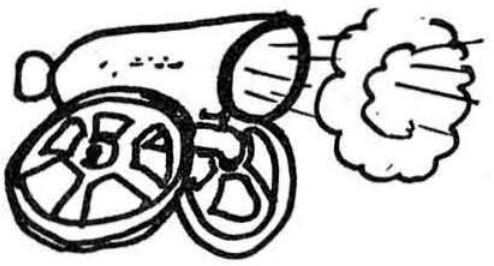
**NANAIMO HOUSE, 2 RINGWOOD AVENUE, LEEDS LS14 1AJ. Tel. 658568**

SPRING SALE OF

# HONDA GENERATORS

FOR FULL DETAILS AND **SALE PRICES WHICH INCLUDE FREE DELIVERY IN THE UNITED KINGDOM.**
Call, write or phone Godalming 23279. (24-HOUR ANSWERING SERVICE). OPEN TUES-SAT. 10.30-12.30, 2.30-6.30.

**Ashley Dukes**
**FARNCOMBE ST.**
**FARNCOMBE**
**GODALMING**
**SURREY**



# mosley makes impact

TOWERS
ROTATORS
COAX
ROPES &
LINES

BASIC
PRICES.
ADD VAT

## SOME ANTENNAS

| | | |
|---|---|---|
| **MONO-BANDERS** | | |
| A-310 | 3 Elements, 10 metres | £35.00 |
| A-315 | 3 Elements, 15 metres | £40.00 |
| D1-10 | Ground Plane, 10 metres | £28.00 |
| MCQ-20 | 20 metre Quad | £60.00 |
| **DUAL-BANDERS** | | |
| Elan | 3 Elements, 10 and 15 metres | £44.00 |
| Elan | 2 Elements, 10 and 15 metres | £32.50 |
| TD-2 | Trap Dipole, 40 and 80 metres | £21.00 |
| TCD-2 | Compressed Trap Dipole, 40 and 80 metres | £21.00 |

| | | |
|---|---|---|
| **TRI-BANDERS** | | |
| Mustang. | 3 elements, 10, 15 & 20 metres | £70.00 |
| TA-33 Jr. | High Power Model incl. Balun 3 Elements, 10, 15 and 20 metres | £61.00 |
| TA-33 Jr. | 3 Elements, 10, 15 and 20 metres | £53.00 |
| TA-32 Jr. | 2 Elements, 10, 15 and 20 metres | £37.00 |
| TA-31 Jr. | Rotary dipole, 10, 15 and 20 metres | £23.00 |
| Classic-36 | 6 Elements, 10, 15 and 20 metres | £115.00 |
| V-3 Jr. | Trap Vertical, 10, 15 and 20 metres | £17.50 |
| MCQ-3B | Cubical Quad, 10, 15 and 20 metres | £100.00 |
| El-Toro | Vertical, 20, 40 and 80 metres | £16.00 |
| TD-3Jr. | Trap Dipole, 10,15 and 20 metres | £13.00 |
| **QUAD-BANDERS** | | |
| Atlas | Trap Vertical, 10, 15, 20 and 40 metres | £30.00 |
| **SWL Antennas** | | |
| SWL-7 | Dipole, 11, 13, 16, 19, 25, 31 and 49 metres | £16.00 |
| RD-5 | Dipole, 10, 15, 20, 40 and 80 metres | £16.00 |
| Orbit | Vertical, 11, 13, 16, 19, 25, 31 and 49 metres | £28.00 |

*Send for HANDBOOK containing full details of Antennas and other technical information. 33 pages 30p. Refundable upon purchase of Antenna.*

MOSLEY Electronics Ltd

All antennas available ex works carriage and insurance extra

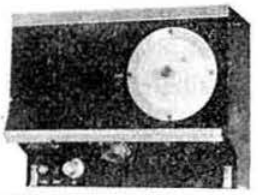
**Administrative Address only**

**40 Valley Road, New Costessey, Norwich, Norfolk NR5 0BD**

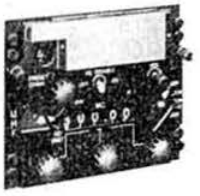
ENGLAND



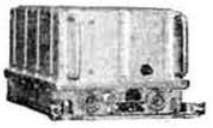
# WANTED FOR CASH



490-T Ant. Tuning Unit
(Also known as CU1658 and CU1669)



ARC-51 Control Box



ARC-51 Transceive

618-T Transceiver
(Also known as MRC95, ARC94, ARC102, or VC102)

Highest price paid for these units. Parts purchased. We will trade for new amateur gear. GRC106 and PRC74 also required. **Contact Ted, W2KUW, or write:**

## THE TED DAMES CO.

**308 Hickory Street, Arlington, N.J. 07032**
**(201) 998-4246 Evenings (201) 998-6475**



# Choose your carpets with confidence

# from DODSON BULL

# UP TO 30% DISCOUNT

Wilton • Axminster • Oriental • Tufted

• All makes available with full Manufacturers' Guarantees
• Free delivery in U.K. • Expert fitting service available

**£200,000 carpets on display**
in our extensive London and provincial showrooms

*Free brochure on request to Dept.* RC

## DODSON-BULL CARPET CO. LTD.

**LONDON:** 5 & 6, Old Bailey, EC4M 7JD. Tel: 01-248 7971
**BIRMINGHAM:** 164, Edmund St., B3 2HB. Tel: (021) 236 5862
**BOURNEMOUTH:** 268, Old Christchurch Rd., BH1 1PH. Tel: 21248
**BRIGHTON:** 2-5, North Road, BN1 1YA. Tel: 66402
**BRISTOL** 2-3 Royal London Hse, Queen Charlotte St. BS1 4EX. Tel: 28857
**EXETER:** 157, Fore St., EX4 3AT. Tel: 32019
**GLASGOW:** 166, Howard St., G1 4HA. Tel: (041) 221 3278
**LEEDS:** 12, Great George St., LS1 3DW. Tel: 41451
**MANCHESTER:** 55-61, Lever St., M1 1DE. Tel: (061) 236 3687/8/9
**NEWCASTLE-upon-TYNE:** 90-92, Pilgrim St., NE1 6SG. Tel: 20321/21428
**WESTCLIFF-on-SEA:** 495, London Rd., SS0 9LG. Tel: Southend 46569

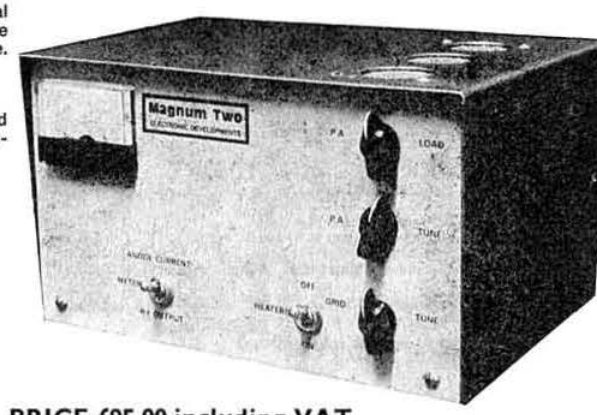
*Open: 9.00-5.30 Mon.-Fri., Sat. 9.00-12.00 (Manchester 9.00-4.00)*

# Electronic Developments

**22 Barnmeadow Road - Gateacre - Liverpool 25 - Telephone: 051-428 5916**

## 70MHz & 144MHz TRANSVERTERS

Until recently we have been supplying our transverters to special order only, but following the success of our products at the Leicester Exhibition we are now offering them for general sale.




### RECEIVE SECTION

We incorporate in our design one of the well known and highly respected MICROWAVE MODULES mosfet converters with the following specifications:

Noise Figure—2·5dB Max.
Gain—30dB Typical
Image Rejection—65dB
Frequency Error 2 Metres & 4 Metres 2kHz Max.
Fully Stabilised Oscillator. (2m) 116MHz
(4m) 42MHz

### TRANSMIT SECTION

Compatible with most equipment.
Power input up to 200 Watts
Full aerial switching.
SO259 aerial output socket.
Out of band signals 60dB down.
ALC if required, linked to the Prime Mover.
Compact construction with good ventilation.

**PRICE £95.00 including VAT**

*All units are thoroughly air-tested before despatch*

**If you require h.p. why not contact our agents: Stephens-James, 70 Priory Road, Liverpool L4 2RZ**

## 2-METRE CRYSTALS

**for Pye Cambridge, Storno Viscount, etc**

All popular channels in stock in HC6/U:

| | 50 *PPM* | 25 *PPM* | 10 *PPM* |
|---|---|---|---|
| 4, 8, 10, 11MHz | £1.80 | £2.40 | £3.00 |
| 45MHz | £2.25 | £2.85 | £3.45 |

**FREQUENCY STANDARDS:** 100kHz 100 PPM and 1MHz 50 PPM—£3.00, 10MHz 20 PPM—**£2.00**

10% off for eleven or more of any frequency, post free but please add VAT.

Made to order crystals, including those to current radiotelephone specs—delivery five weeks. Also, L.F. TO-5 clock crystals (10-250kHz), prices from **£2.22.** Please send for details.

## INTERFACE QUARTZ DEVICES Ltd

**29 MARKET STREET, CREWKERNE, SOMERSET**
**Tel: (046031) 2578, Telex: 46283**

## R.T.& I. offer the finest selection of first-class new and fully overhauled second-hand communications and electronics equipment in the U.K.

- ***Constantly changing stocks of a vast range of equipment.***
- ***Cash or Hire Purchase terms easily arranged.***
- ***Part exchanges welcomed.***
- ***We are 'spotcash' buyers for almost all electronic equipment.***

**Send S.A.E for our latest list of over 50 receivers and many other interesting items.**

**R.T. & I. ELECTRONICS LTD.**
**Ashville Old Hall, Ashville Road, London E.11** ***Tel: 01-539 4986***

## J.M.G. ELECTRONICS

**67 LONDON ROAD, WEST CROYDON, SURREY, CRO 2RF. 01-688 1297**

**½ Day Wed, 1pm close. Mon, Tue, Thur, Fri 09.30-13.30, 14.30-18.00, Sat 0930-13.30, 14.30-17.30**

Various 'scopes, AVO and other multimeters (8 × £32.40 and 7 × £21.60 no leads or cases), Signal generators and Test Gear, Insulators large and small, plus much much more surplus and new gear for the Ham, Hi-fi and Electronic enthusiast. Please give us a call, send a letter or just drop in the shop. We are awaiting **YOUR** enquiry as we are at **YOUR** service. We also buy various plugs and sockets.

**WATCH THIS SPACE... THIS MONTH'S SPECIALS**

All while stocks last—prices include VAT and P & P:—Large "Rollacoasters", **£4.50** Londex 24V ACO relays **£4.00** 13,000μF/50V DC **£1.20** 7,000μF/50V DC **80p** 500μF/300V DC **80p**. All special items ex-equipment.

Please mention

**RADIO COMMUNICATION**

when

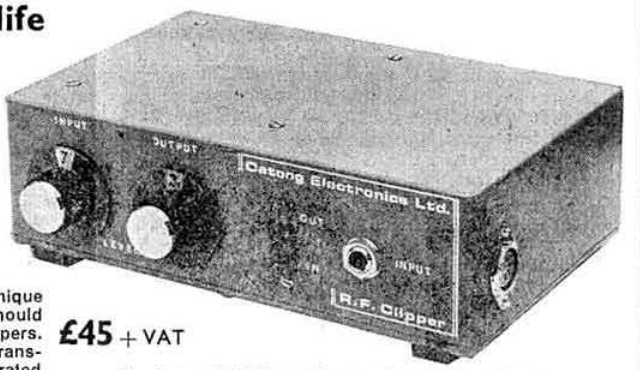
replying to advertisements

# NEW! Universal R.F. Speech Clipper

## INCREASES 'TALK POWER' — ELIMINATES 'FLAT TOPPING'

## Easy to install — long battery life

- ★ **Simply connect in series with your microphone lead. Needs no internal connections to your transmitter. Push-to-talk facilities are retained.**
- ★ **Can give increased "punch" or "talk power" comparable to a times-ten power increase, plus improved speech characteristics**
- ★ **Ideal for SSB, AM, or FM.**
- ★ **Advanced circuit uses optimised combination of digital and analogue techniques for long-term reliability and stability.**
- ★ **Seven integrated circuits, one transistor, three diodes.**




**£45** + VAT

*See August Rad. Comm. for a review of this equipment*

**DESCRIPTION:** The Datong R.F. Clipper brings the unique benefits of rf clipping to any conventional transmitter. It should not be confused with agc-type speech compressors or af clippers. The Datong R.F. Clipper is a complete closed-circuit ssb transmitter and receiver. Amplitude clipping of the internally generated ssb signal (at 60kHz) greatly increases the average-to-peak amplitude ratio of the speech input signal. This is achieved without harmonic distortion.

**Price, including delivery by parcel post, only £45 plus VAT. Add 43p for delivery by registered first class mail.**

Write or phone for full information, including a copy of the installation and operating instructions.

## DATONG ELECTRONICS LTD.

**11 MOOR PARK AVENUE ● LEEDS LS6 4BT**

**Telephone 0532-755575**

### JAPANESE MICROPHONE SOCKETS

The Datong Clipper is now also available fitted with a Japanese 4 pin screw-locking type of input connector, in place of the normal stereo jack. This allows, for example, FT101 or TS700 microphones to plug straight in. Since connection details vary, please specify the actual connections required when placing your order. Price: £47 plus VAT, or, if ordered complete with output lead fitted with matching connector (i.e. lead type RFC/JAP 4 pin), £48.50 plus VAT for the pair. Add 40p plus VAT for registered first class delivery.

## FM CRYSTALS for Repeaters and Simplex

| HC25/U | R5 | R6 | R7 | S20 | S21 | S22 | S24 |
|---|---|---|---|---|---|---|---|
| Tx | 6·04687 | 6·04792 | 6·04896 | 6·06250 | 6·06354 | 6·06458 | 6·06667 |
| Tx | 12·0937 | 12·0958 | 12·0979 | 12·1250 | 12·1271 | 12·1292 | 12·1333 |
| Tx | 18·1406 | 18·1437 | 18·1469 | 18·1875 | 18·1906 | 18·1938 | 18·2000 |
| Rx | 15·0028 | 15·0056 | 15·0083 | 14·9778 | 14·9806 | 14·9833 | 14·9889 |
| Rx | 45·0083 | 45·0167 | 45·0250 | 44·9333 | 44·9417 | 44·9500 | 44·9667 |
| Rx | 52·1417 | 52·1500 | 52·1583 | 52·0667 | 52·0750 | 52·0833 | 52·1000 |

| HC6/U | R5 | R6 | R7 | S20 | S21 | S22 |
|---|---|---|---|---|---|---|
| Tx | 4·03125 | 4·03194 | 4·03264 | 4·04167 | 4·04236 | 4·04306 |
| Tx | 8·06250 | 8·06389 | 8·06528 | 8·08333 | 8·08472 | 8·08611 |
| Rx | 10·3764 | 10·3782 | 10·3800 | 10·3604 | 10·3621 | 10·3639 |
| Rx | 45·0083 | 45·0167 | 45·0250 | 44·9333 | 44·9417 | 44·9500 |

40·5000 for Cambridge tunable conversion (*Rad. Comm Dec.* 1974)

**£2.50** each including p & p SAE for lists

Your crystals sent promptly by First Class Post

## HARTLEY CRYSTALS

**Green Lane, Milford, Godalming, Surrey GU8 5BG**

# Essex Telecomms

**Distributors for GEC-Marconi mobile radio equipment. VHF AM and FM mobiles, hand portables and base stations, together with base and mobile aerials, no hole boot mounts, etc. In stock now, 145MHz colinear vertical base aerials. 6dB over ½wave. Band width ± 1MHz 50 ohm feed impedance. £20 plus VAT plus carriage.**

**ESSEX TELECOMMUNICATIONS LTD.**
**Unit 8, Co-ordinated Industrial Estate, Claydons Lane, Rayleigh, Essex SS7 7UP.**

**G3MVV** Rayleigh (03742) 79674 or 79883. **G3WCO**

**Semiconductors:** Uhf power ZTX327 50p, 2N5642 £8, 2N5641 £4, **40965** £1.20, 2N4427 60p, 2N3866 **65p**, 2N5913 (2W) £1.80, 2N3375 (3W) £3.00, **2N5016** (15W) £9. **VHF power** 2N5180 25p, 2N5189 £1.10, 2N3553 £1.40, BLY33 £1.40, **PT3500** £1.10, 2N3632 £3, 2N5102 £6.20, 40292 £3.60, 40282 £5, 2N5590 £5.50, 2N5591 £9. **Rx front end** 2N3478 25p, fet's 3N201 80p, 40673 55p, 40841 60p. **General purpose** BC167A 10p, BC168B 10p, 2N3904 10p, 2N3906 15p, BC147 10p, OC35 15p, 2N708 10p, OC200 20p, OC202 20p, 2N3055 30p, 2N3764 80, 2N987 25p, BAX13 5p, OA47 5p. **Integrated circuits** MC1596G £2, CA3011 65p, CA3014 80p, CA3018 60p, SL620C £2, CA3089E £1.80, TAA263 70p, MC1550G 50p. SL630C £2.10. **Resistors** ¼W 10Ω to 1M (E12) 2 of each value £1, any 1p each. SO239 sockets (MFB) 40p, PL259 plugs (MFB), right angle 40p. **Crystal filters** 10·7MHz ± 3·75kHz or ± 7·5kHz 3dB ± 12·5kHz 90dB £13. Miniature R.F. chokes 5p. 90 MHz Crystals £3.50. Full data on any item 20p. QQVO6-40A £7.
1 c/o Reed Relay Type RS12 or RH12 £1. Coil Former with Core (4MM) 5p.

**Mail order only with cash. All items new. P & P 15p. Add 8% VAT. please**

## T. PARR

**60 Culver Lane, Earley, Reading, Berks.**
**RG6 1DY**

## PRINTED CIRCUIT MODULES

**TONE BURST GENERATOR.** Select either 1700/1750. Size 45 × 55mm nom. **£3.90.**

**FM DETECTOR.** For use between 400kHz and 1·6MHz. State frequency when ordering. Size 50 × 50mm nom. **£4.45.**

**PRODUCT DET.** For use up to 10·7MHz. Requires Bfo injection. Size 50 × 50mm nom. **£4.30.**

All inclusive P & P, etc. CWO. SAE enquiries.

## LYE COMMUNICATIONS

**238 Stamford Road, Brierley Hill, West Midlands, DY5 2QE.**

## A BETTER FT101

VK "Blob" double balanced second mixer module makes old FT.101's better than new. Similar to FR.101 mixer. Full gen + mods for improved VOX, etc.

**G3LLL, HOLDINGS LTD.,**
**39/41 Mincing Lane, Blackburn BB2 2AF. Tel: 59595/6**

# CLASSIFIED ADVERTISEMENTS

**Private** advertisements **8p** per word, minimum **£1.20.**
**Trade** advertisements: **15p** per word, minimum **£1.50.**
**Box numbers 35p extra** to wordage or minimum
10% series discount for 12 consecutive insertions of the same copy, pre-paid.
**Semi-display** (boxed) 1″ single column **£6.00.**
1½″ single column **£9.00.**
(Series discounts will be quoted for 6 and 12 insertions).
Please write clearly. No responsibility can be accepted for errors.

Latest date for acceptance—4th of preceding month.
**All Classified advertisements must be prepaid.**
Copy and remittance to:
ADVERTISEMENT SECTION,
RADIO SOCIETY OF GREAT BRITAIN,
35 DOUGHTY STREET, LONDON WC1N 2AE.

## FOR SALE

**QSL CARDS**—new range, sae for samples. Bailey & Co., 35 Whitecross Road, Weston-super-Mare, Avon.

**HW32A** with xtal calibrator, HP23 power unit, SB600 speaker, PTT mike, £50. G3TAI, 37 Manor Road, Wokingham, Berks. Wokingham 783114.

**QUALITY QSL CARDS.** Rush orders welcome. SAE for samples. Compalith Printing Services, 115 Promenade, Cheltenham, Glos. GL50 INW.

**"G" WHIP MULTIMOBILE 71** with extra coils for 40, 80; Extendarod, base, holdall, cost £32. Offers invited or w.h.y. Box 146 RSGB.

**QSL CARDS** GPO approved log books. 5p s.a.e. for samples. Also headed notepaper. Elm Tree Press, Looe, Cornwall, PL13 1JT.

**2m FM MOBILES.** "Viscount" aligned/crystalled 145·5MHz with control box and microphone £28 + £2 p&p or collect. 4m sets also available at £20. G8AKA, Reading 332582.

**MICROPHONE BARGAINS**—VAT and post paid. Shure 444, £13.99. Acos insert—2 for £1.75. G3LLL, Holdings, 39/41 Mincing Lane, Blackburn BB2 2AF. Tel: 59595/6.

**FR101 and FT101.** Get them at Holdings, the RF Clipper people, Blackburn.

## SITUATION VACANT

**WANTED SEPTEMBER** Instructor Radio/TV (practical) contact Tutor In Charge. Paddington Institute. 01-286 7792 (6-9pm).

## WANTED

**TRANSCEIVER** FT101/TS520 preferred, but any other types considered, any condition. Cash waiting G4DIH, Burton-on-Trent 64000.

**CASH PAID** for FT200/250 Transceivers, also KW2000's. Customers waiting. TMP Electronic Supplies, Tel: Pontybodkin 846 (035287).

## MISCELLANEOUS

**PATENTS and TRADE MARKS**—Booklet on request. Kings Patent Agency Ltd (B. T. King, Mem RSGB, Reg Pat Agent).—146A Queen Victoria Street, London EC.4. Tel: 01-248 6161. Telex: 883805. Established 1886.

**TRANSISTORS** PT4166A TO5 type 1 watt out at 175MHz @ 45p, BC107 @ 6p, NKT162 @ 3p, Anodized heatsinks for two TO5 or TO39 @ 10p. **DISC CERAMIC CAPACITORS** 8, 10, 12, 560pF, 1nF, 3n3 @ 1p, 10nF @ 1½p, 20nF, 47nF, 100nF @ 2p. **POLYSTYRENE CAPACITORS** 2·7, 5, 6·2, 8·2, 10, 15, 22, 27, 33, 47, 68, 75, 100, 150, 180, 250, 320, 390, 430, 470pF @ 1½p, 820, 1000, 1200, 1500, 1700, 2375, 3900pF @ 2p. **TUBULAR CERAMIC CAPACITORS** 0·4, 0·5, 1·5, 3·6, 3·9, 4·7, 5·6, 7·5, 8·2, 9·1, 11, 13, 16, 390, 1500pF @ 1p. **POLYESTER & POLYCARBONATE CAPACITORS** 1n2, 2n2, 400V. 10nF, 22nF, 250V @ 1½p, 22nF, 160V. 33nF 400V. @ 2p, 1nF, 4n7, 1000V. 1nF, 22nF, 400V @ 2½p, 150nF, 250V. 470nF, 680nF, 100V @ 2½p, 220nF, 250V @ 3p. **FEEDTHROUGH CAPACITORS** 22pF nut fixing @ 2½p. 100pF solder in (small) @ 1p. **TRIMMERS** Tubular ceramic solder in 2pF @ 1½p, Oxley air spaced trimmers 10mm sq two types max cap = 10pF and 14·5pF @ 5p. **ELECTROLYTIC CAPACITORS** 2·5µF 16V, 4µF 40V, 4µF 64V, 8µF 4V, 32µF 4V, 32µF 6V3, 100µF 4V, 100µF 6V4, 125µF 4V @ 3p. 64µF 40V, 125µF 16V, 330µF 63V, 400µF 4V, 1000µF 4V @ 4½p. **PAPER CAPS** 40µF 150V @ 15p. **COIL FORMERS** with cores 5mm dia × 10mm long @ 2p. **SILVER PLATED COPPER WIRE** 20swg 10p per yard. **MONOLITHIC CERAMIC PLATE CAPACITORS** 4·7, 5·6, 22, 39, 47, 180pF and 10nF 50V @ 1½p. **PHILIPS. BEEHIVE TRIMMERS** 8pF and 30pF @ 5p. **HC6/U XTAL HOLDERS** @ 5p. **NIXIE VALVE HOLDERS** (B13B) @ 10p. **TEN TURN POTS BOURNS** (5kΩ) @ 80p. 5 pin **DIN SOCKETS** (180°) @ 5p. **DIODES** OA81 10 for 20p. BAX13 10 for 25p. **GPO JACK SOCKETS** @ 5p. **BC107 TRANSISTORS** (Ex new equip) 25 for 70p, 100 for £2.50. "C" and "N" type plugs/sockets etc. @ 15p.

**Orders to**
**D. G. PHILLIPS, 16 BACK LANE,**
**STOCK, INGATESTONE, ESSEX CM4 9DG**

*Post & packing 5p under £1, 10p over £1.* Make cheques, etc., payable to D. G. Phillips.

## NEW! PAMPER YOUR SHACK

**Horstman 1kW Fan Heater**
Ideal for shacks and greenhouses
★ Super efficient with variable control
★ Keeps you cool in summer, warm in winter
★ Measures only 6in × 6in × 6½in

Complete with 12 month guarantee for only
**£10.99,** including VAT and post

Terms: CWO from **N. R. PERROTT**
**1 Melbury Grange, Mavelstone Road, Bromley BR12SZ**

## 50Hz INVERTER/CHARGER TRANSFORMERS

Specially Bifilar wound for 24V push-pull transistor operation: taps 110, 210, 230, 250V, varnish dipped, universal mounting frames, cont. rating full power

300W **£15.85** 500W **£18.55**

Driver transformer, Bifilar prim and sec. and cct to drive: **£2.20.** All prices include VAT and p & p. Mail order only, with cash please. Discount for Clubs.

**DAVID CUTTER ENGINEERING**
30 Parkfield Cresc. Eastcote Middlesex, HA4 ORE.

**CABLES**

**Multicore Screened:** 4 core, **8p** per metre—8 core, **10p** per m—20 core, **12p** per m—Coax, UR95, **3p** per m—Cx4001, **4p** per m—UR70, **5p** per m—UR43, **6p** per m—UR67 (thick, low loss type), **15p** per m—UR76, **6p** per m—All 50 ohms except UR70 which is 75 ohms. **Twin screen Microphone, 5p** per m—**Mains 3 core** pvc 3a, **5p** per m—ditto, 5a, **8p** per m—**Equipment wires,** 14/0076 and single strand, 0·5mm, **all at 30p** per pack of 25m, various colours. **Bargain Box** mixed of the above, **£2, post 60p.**
All above plus post, please include enough; SAE for samples of any and for 5 page lists
**W. H. WESTLAKE, CLAWTON, HOLSWORTHY, DEVON**

**C. G. JAMES ELECTRONICS G3VVB**
**Staines Road, Feltham, Middx.**

Prototype and Production Metalwork. Specialists to the Electronics Industry. Panels, chassis and sheet metal details. Machining in all metals and plastics. Plant list on application.

**Tel. 01-570 3127** **OS Ref TQ 113748**

**NEW COMPONENTS AT LOW COST**

Wirewound Resistors: 10 watt **7p**, 8 watt **6p**, 6 watt **5p**
Ceramic Capacitors: 500V Tubular **2½p**, 500V Discs **2p**
Feedthru Capacitors: 500V 1000pF Solder in Only **2p**

Most values available. Many other items. SAE for full lists to:

**John Balls**
Buckingham House, 260/261 Southtown Road, Gt. Yarmouth, Norfolk

## INDEX TO ADVERTISERS



## MEMBERS' AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc.**
- **Do not forget 40p remittance plus wrapper.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current callbook is correct. BRS and A members will, of course, have to provide their name and address.

I enclose cheque/PO for **40p** to cover the cost of this advertisement.

Signed .....

Date .....

# B. BAMBER ELECTRONICS

**5 STATION RD., LITTLEPORT, CAMBS, CB6 1QE**

**TEL: ELY (0353) 860185 (TUESDAY-SATURDAY)**

**TERMS OF BUSINESS: CASH WITH ORDER MINIMUM ORDER OF £1.00.**
**ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY)**
EXPORT ENQUIRIES WELCOME
*CALLERS WELCOME TUESDAY–SATURDAY*
Please enclose stamped addresesd envelope with ALL Enquiries

**PLEASE ADD 25% VAT**

## ELECTROLYTIC CAPACITOR PACKS

4·7mfd at 6·3V, **5 for 25p.**
22mfd at 6·3V, **5 for 30p.**
100mfd at 6·3V, **5 for 35p.**
220mfd at 6·3V, **5 for 40p.**
330mfd at 6·3V, **5 for 40p.**
470mfd at 6·3V, **5 for 45p.**
3300mfd at 6·3V, **5 for 95p.**

33mfd at 25V, **5 for 40p.**
47mfd at 25V, **5 for 40p.**
100mfd at 25V, **5 for 45p.**
220mfd at 25V, **5 for 50p.**
330mfd at 25V, **5 for 75p.**
470mfd at 25V, **5 for 95p.**
1000mfd at 25V, **5 for 95p.**

1mfd at 10V, **10 for 25p.**
33mfd at 10V, **5 for 30p.**
100mfd at 10V, **5 for 40p.**
220mfd at 10V, **5 for 40p.**
330mfd at 10V, **5 for 45p.**
470mfd at 10V, **5 for 60p.**
3300mfd at 10V, **5 for 95p.**

3·3mfd at 35V, **6 for 30p.**
10mfd at 35V, **5 for 40p.**
33mfd at 35V, **5 for 40p.**
47mfd at 35V, **5 for 45p.**
100mfd at 35V, **5 for 60p.**
220mfd at 35V, **5 for 75p.**
330mfd at 35V, **5 for 95p.**

2·2mfd at 50V, **10 for 40p.**
22mfd at 50V, **5 for 40p.**
33mfd at 50V, **5 for 45p.**
330mfd at 50V, **5 for 95p.**

33mfd at 16V, **5 for 35p.**
330mfd at 16V, **5 for 60p.**
1000mfd at 16V, **5 for 95p.**

64mfd at 64V, **5 for 65p.**
1mfd at 100V, **10 for 25p.**
0·0015mfd min disc ceramics **20 for 20p.**
390pf tantalum at 500V, **10 for 30p.**

## HANDI-PACKS

R/S Midget 3 pole, 4 way, rotary switches, **40p each.**
Silicon rubber sleeving, 25yds for **25p.**
Xtal ovens, 80°c or 10°c, state which, **35p each.**
Bases for xtal ovens, HC6U or 2×HC25U, state which, **10p each.**
Bandpass filters 27·5-30MHz, RT type, **50p each.**
Valveholders, mixed bag of **10 for 50p.**
Mixed bag of grommets, **50p.**
Arrow 10A, 250V black plastic rocker switches, **4 for 50p.**

16-DIL IC Sockets, **4 for 50p.**
Miniature microswitches, with roller spring, **2 for 50p.**
Eddystone 3146P black knobs, 2¼" dia., **25p each.**
Lead suppressors (10 k ohm) for mobile plug leads, **4 for 50p.**
Mixed washers, per pack **15p.**
5A Mains circuit breakers, **75p each.**
Hash filters (for mobile supply leads), **2 for 40p.**
Heavy duty 15-way turret tag-strips, **5 for 30p.**
Speed nuts, per pack, **20p.**
Miniature earphones with min. jack plug, **2 for 50p.**
Coils on ½" dia. 1½" long paxolin formers, **5 for 20p.**
1 Meg. lin pots ½" plastic spindle, **2 for 50p.**
50k ohm lin. pots, ½" plastic spindle, **40p each.**
1-7pf ceramic tubular trimmers. **10 for 25p.**
3 pin DIN plugs, **4 for 50p.**
3pin min. mains plug and socket, **40p set.**
Springs, 1" long × $\frac{7}{16}$ dia, per pack, **25p.**
LF chokes on ½" × 2" cores, **5 for 20p.**
TV plugs (metal type) **6 for 50p.**
TV sockets (metal type) **5 for 50p.**
TV line connectors (back-to-back skt) **5 for 50p.**
TO3 transistor insulator sets, **10 for 50p.**
TO3 transistor insulator sets, **10 for 50p.**
Mixed electrolytics, large bag **£1.00.**
PC Board Withdrawal Handles, mixed cols **8 for 50p.**
Solder, 20SWG, 60/40 alloy, approx. 9yds **25p.**
OA81 Diodes, **15 for 25p.**
OC200 Transistors, **6 for 50p.**
Perspex Coil Formers, 1½" × ½in. dia., **5 for 25p.**
Turret Tags, $\frac{1}{16}$in. dia., **25p pack.**
Rotary Switches, min. 4 pole 2 way, **2 for 50p.**
Telephone Type Earpiece Insert, **50p.**
Reeds (for reed relays) Single-pole make, **5 for 30p.**
Mullard Tubular Ceramic Trimmers, 1-18pf, **6 for 50p.** (as featured In Rad. Comm. Jan. p. 25).
ICs, some coded, 14DIL type, untested, mixed, **20 for 25p.**

IF Cans ½in. square, suitable for rewind, **6 for 30p.**
Small Neons, **6 for 25p.**
24V Min. Reed Relays, encapsulated single-pole make, **2 for 50p.**
24V 2·8W Lamps, MES type, **6 for 20p.**
Chassis Tags, **25p pack.**
Cable Clips, for nailing cable, **15p pack.**
Miniature Slider Switches, 2 pole, 2 way, **5 for 50p.**
BSY95A Transistors, **6 for 50p.**
6·3V 0·3A Capless Lamps, **10 for 25p.**
PNP Audio Type TO5 Transistors, **12 for 25p.**
Black Plastic Knobs, ¼in. Dia., ¼in. spindle, **4 for 50p.**
Ring Magnets, 7mm inside dia. **20 for 50p.**

## PLUGS & SOCKETS

25-Way ISEP Plugs and Sockets **40p** set (1 plug + 1 skt) Plugs and sockets sold separately at **25p** each.
Din Skts 5pin, 270 deg. **4 for 50p.**
Din Speaker Skts, 2-pin, **4 for 50p.**
Standard Jack Plugs, ¼in. **4 for 50p.**
Andrews 44AN Free Skts (N-type) for FH4/50B or FHJ4/50B cable **£1.00 each.**
Bulgin Round Free Skts, 3 pin, for mains input on test equipment, etc. **25p each.**
SO239 Back To Back Sockets **£1.25 each.**
BNC Insulated Sockets (single hole type) **65p each.**

## VALVES

**QQVO3/10** (ex equipment) **75p each.**
**2C39A** (ex equipment) **£1.00 each.**
**QQVO2/6** (ex equipment) **£1.00 each.**
**4CX250B** (ex equipment) **£2.10 each.**
**4X250B** (ex equipment) **£1.50 each.**
**DET-22** (ex equipment) **2 for £1.00.**
**EF80** (new) **25p. EZ81** (new) **25p.**

**EDGEWISE METERS,** 50 microamp FSD, centre zero, but can be left hand zero'd, display area 1¼in. × ¾in., smart modern appearance **£1.50 each.**

**PLESSEY ELECTROLYTICS**
10,000 mfd at 63V, size 115×51mm.
**75p each.** (Qty discount available)

**HIGH GRADE ELECTROLYTICS-**
6800mfd at 25V, with screw terminals, complete with capacitor clip for vertical mounting **50p each,** discount on qty.

**PL259 PLUGS** (PTFE) Brand new **50p each,** or **5 for £2.25.**
Reducers for above **15p each.**
**SO239 SOCKETS** (PTFE) Brand new, (4 hole fixing type) **50p each,** or **5 for £2.25.**

**SPERRY 7-SEGMENT P.G.D. DISPLAYS,** digit height 0·3in red, with decimal points, 150V to 200V (nominal 180V) operation. These are the high-volt industrial type, and therefore brighter than normal displays. All brand new. AT THE BARGAIN PRICE OF 50p PER DIGIT. TYPE332 (two digits in one mount) **£1.00 each.** TYPE333 (three digits on one mount) **£1.50.** (Sorry, no single digit available.) Note, these are less than a quarter of manufacturers recommended price.

**DRIVER ICs** for above displays, SPERRY DD700, (16-dil), **50p each.**

**DATA** covering L.E.D. displays and DD700 driver I.C. **30p.**

**INTEGRATED CIRCUIT AUDIO AMPLIFIERS, TBA800,** rated 5W (sorry, no data), **£1.00 each**

**PYE MF TRANSMITTERS.** 2 × 5B254Ms in final, VFO 340 to 540kHz (can be modded upward), 2 × 5B254Ms in Modulator, cw/mcw (can be modded for AM), units complete, but no PSUs, (Supplied with circuits of TX and PSU) brand new, boxed, Sorry, sold out.

**HIGH QUALITY SPEAKERS.** 8½in. × 6in. elliptical, 2in. deep, 4 ohms, inverse magnet, rated up to 10W. **£1.50 each,** or **2 for £2.75.** (Quantity discount available.)

**MAGNETIC DEVICES PROGRAMMERS,** contains 9 microswitches with 9 adjustable drums for period switching (needs slow motion motor to drive drum) many switching applications **£1.00 each.**

**AS ABOVE** but 15 switch units **£1.50 each.**

**TWIN HEAVY DUTY CABLE-** PVC covered, 50/0·25mm, **15p** per metre, or **£10.20** per 100 metre reel.

**CURLY LEADS,** 4-core telephone-type, 18in. closed, approx. 5ft extended, **2 for 20p.**

**STUD RECTIFIERS, BYX42/300,** 300V at 10A, **30p each,** or **4 for £1.00.**

**TRANSISTOR HEATSINKS,** to take 2×TO18 transistors, screw in clamps. Block size 1in.×½in.×½in. with 2 holes for mounting, **3 for 50p.**

**INTEGRATED-CIRCUIT TEST CLIPS,** by AP Inc, gold plated clip-on type, brand new, individually boxed. SORRY SOLD OUT.

**MODERN TELEPHONES,** with dial, standard type, **£2.75 each.**

## ELECTRONIC IGNITION *FOR YOUR MOBILE!*

Cut petrol costs by up to 15%. Instal Electronic Ignition in your car in minutes. Reduces petrol consumption, increases overall performance. Prolongs contact-breakers and spark-plug life. Makes starting so much easier. Each unit (British manufacture) tested and guaranteed for 2 years/50,000 miles. IMPORTANT: STATE POSITIVE EARTH or NEGATIVE EARTH when ordering. **£11.80** + VAT **(94p)** Post Paid.

**VARIABLE STABILISED PSU,** solid state, 240V AC input, output 0-24V DC at 500mA + 32v at 50mA (approx.) Size 7½" × 4" × 2½" (voltage controlled by external 5k ohm pot) (less 5k ohm pot) **£5.00 each.** 5k ohm pots, 3 turn, for above **75p each.**

## MAINS TRANSFORMERS

All 240V Input, voltage quoted approx. RMS.
(*Please quote Type no only when ordering*)
**TYPE 10/2** 10-0-10V at 2A, **£1.50.**
**TYPE 16/6** 16V at 6A, 45V at 100mA, **£4.00.**
**TYPE 18/2** 18v at 2A **£1.65.**
**TYPE 28/4** 28V at 4A, 125V at 500mA, **£4.00.**
**TYPE 129** 400V at 20mA, 200V at 10mA, 6·3V at 500mA, **£1.25.**
**TYPE 72703** 400V at 10mA, 200V at 5mA, 6·3V at 400mA, **£1.25.**
**TYPE 70462** 250-0-250V, 50-0-50V, 6·3V, **£1.75.**
**TYPE 125BS** approx. 125V at 30mA, **65p.**

**MAINS ISOLATING TRANSFORMER,** 375VA, tapped primary, 240V output, new, **£6.00.**

**MAINS ISOLATING TRANSFORMER,** (ex equip.), in metal cases, totally enclosed, tapped mains input, 110-240V etc., output 240V at 3A+12V at 0·5A, **£11.00.**

**AS ABOVE,** output 240V at 12A+12V at 3A+22V at 2·5A, **£27.50.**

**RADIOSPARES 500-WATT AUTO TRANSFORMER,** 100/110/150/200/220/240/250V tapped input and output, step up or step down facility, ex new equip. **£6.00.**

# RSGB PUBLICATIONS

## Technical books

| | |
|---|---|
| Amateur Radio Awards | £1·60 |
| Amateur Radio Techniques (5th ed.) | £2·35 |
| Guide to Amateur Radio (16th ed.) | £1·10 |
| Morse Code for the Radio Amateur | 45p |
| NBFM Manual | £1·10 |
| RSGB Amateur Radio Call Book 1975 | £1·25 |
| Radio Amateurs' Examination Manual | £1·00 |
| Radio Amateurs' Examination Revision Notes (Out of print) | |
| Radio Communication Handbook (Out of print) | |
| Radio Data Reference Book (3rd ed.) | £1·30 |
| Service Valve and Semiconductor Equivalents | 45p |
| Teleprinter Handbook | £5·60 |
| Test Equipment for the Radio Amateur | £2·20 |
| TVI Manual | £1·05 |
| UHF/VHF Manual (Out of print) | |
| World at their Fingertips (Paperback) | 90p |
| " " " " (De-Luxe) | £1·60 |

## Maps and charts

| | |
|---|---|
| Countries List | 10p |
| Great Circle DX Map (in tube) | 85p |
| QRA Locator Map (Western Europe) (in tube) | 65p |
| QRA Locator Map (Western Europe (on card) | 25p |
| RSGB Amateur Radio Prefixes (World) Map | 35p |

## Members' sundries

| | |
|---|---|
| Lapel badge (RSGB or RAEN emblem, pin fitting) | 30p |
| Tie (Maroon or Blue) | £1·40 |
| *Radio Communication* Easi-binder | £1·70 |
| *Ham Radio* magazine binder | £1·70 |
| Car window sticker (RSGB or RAEN) (self-adhesive) | 15p |
| Members' headed notepaper (50 sheets) quarto | 60p |
| " " " " " octavo | 40p |
| *Radio Communication* bound volumes, 1971-4 | £3·60 |

## Log books

| | |
|---|---|
| RSGB Standard Log | 80p |
| RSGB Receiving Station Log | 60p |
| Mobile Mini-Log | 40p |
| RSGB De-Luxe Log | £1·55 |

# USA PUBLICATIONS

## American Radio Relay League

| | |
|---|---|
| Antenna Book (13th ed.) | £2·00 |
| Course in Radio Fundamentals | £1·30 |
| FM and Repeaters for the radio amateur | £1·75 |
| Hints and Kinks | 75p |
| Radio Amateurs' Handbook (Paperback) | £3·60 |
| Radio Amateur's Handbook (Hardback) (Out of stock) | £4·50 |
| Radio Amateur's Operating Manual | £1·05 |
| Single Sideband for the Radio Amateur | £1·80 |
| Understanding Amateur Radio | £1·80 |
| VHF Manual | £1·80 |
| Specialized Communication Techniques | £1·90 |

## CQ (Cowan Publishing Corporation)

| | |
|---|---|
| Antenna Handbook Vol 1 | £1·95 |
| RTTY A-Z | £2·45 |
| RTTY Handbook | £2·00 |
| Shop and Shack Shortcuts | £2·00 |

## Radio Publications Inc

| | |
|---|---|
| Beam Antenna Handbook | £2·35 |
| Better Short Wave Reception (3rd ed.) | £1·95 |
| Cubical Quad Antennas | £1·95 |
| Simple, Low-cost Wire Antennas | £2·35 |

## Radio Amateur Callbook Inc

| | |
|---|---|
| American Callbook (USA listings) 1975 | £6·10 |
| American Callbook (DX listings) 1975 | £5·60 |

## Magazine subscriptions

| | |
|---|---|
| *QST* (including ARRL membership) (Per annum) | £4·60 |
| *CQ* (Per annum) | £3·75 |
| *73* (Per annum) | £3·90 |
| *Ham Radio* (Per annum) (Includes air delivery) | £4·30 |

Subscriptions and changes of address for *Ham Radio Magazine* should be sent to : Ham Radio Magazine (UK), PO Box 63, Harrow, Middlesex HA3 6HJ.

Subscriptions for all other magazines listed should be sent to RSGB, 35 Doughty Street, London WC1N 2AE.

USA publications are normally in stock, but when out of stock and deliveries are not expected within four weeks orders will be retained until stocks are available.

# MORSE INSTRUCTION AIDS

| | |
|---|---|
| G3HSC Rhythm Method of Morse Tuition— | |
| Complete Course (two 3-speed lp records and one ep record plus books) | £4·95† |
| Beginner's Course (one 3-speed lp record and one ep record plus books) | £3·65† |
| Beginner's lp (0-15 wpm) plus book | £3·05† |
| Advanced lp (9-42 wpm) plus book | £3·05† |
| Three-speed simulated PO test 7in ds ep record | £1·00† |

† *Overseas orders: add £1.*

# OTHER PUBLICATIONS

| | |
|---|---|
| Basic Theory & Application of Transistors | £1·40 |
| Ham Notebook | £1·95 |
| World Radio-TV Handbook (1975 ed.) | £3·90 |

**TERMS:** Cash with order. Stamps and book tokens cannot be accepted. Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". When ordering please write your name and address clearly in block capitals at the top of the order. Giro A/C No 533 5256.

All items listed on this page may be purchased by callers at RSGB headquarters at the above prices, less postage and packing, subject to stock being available. Counter service 9.15am-5.15pm, Monday to Friday.

**Prices include postage and packing. Air mail rates for overseas orders quoted on application.**

**VAT is included where applicable.**

## RSGB Publications Section, 35 Doughty Street, London WC1N 2AE

**Telephone 01-837 8688**

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by The Garden City Press Limited, Letchworth, Hertfordshire SG6 1JS

# A. J. H. ELECTRONICS (G8AQN)

Proprietor: A. J. HIBBERD Tel: RUGBY daytime 6473, evening 71066

**Terms of Business** Cash with order, Mail order only, or Callers by appointment. S.A.E. with enquiries

**Postage Charge** 25p on Rs and Cs, 30p on others

**Please add 15% to all prices to cover new VAT charges**

**Official orders accepted on a strict monthly basis.**

**10·7MHz FM IF AMPLIFIERS** line up 2N3823 mixer (approx. 26MHz) into 10·7MHz crystal filter, 7kHz at 6dB, CA3028A IF amp. CA3014 IF amp and limiter and detector, a 10·7MHz crystal is used in the discriminator, supplied with circuit, these are brand new untested board and will require alignment, will make an ideal basis for a 2m or 70cm FM receiver, size only 6" × 1½", **£7.00** each.

**TRANSISTOR PA UNIT,** PT4166C, driver PT4166E PA giving 6 watts RF output, 3 BA110 diodes in electronic aerial switching unit, into aerial filter with BNC socket output, although these were made for AM modulation they will make an ideal output stage for an AM/FM Tx for two meters, drive required to give full output, approx ½ watt, size 6½" × 1½" × 2½" deep, supplied brand new, will require realigning for two metres. We have no circuits at present but these should be available in a few days, price **£8.50** each.

**TRANSISTOR TRANSMITTER DRIVER BOARDS** to suit our 6 watt PA unit this includes crystal oscillator (36MHz) output 145MHz 250mW, with circuit, **£5.50**, 70MHz version, **£3.50.**

**THREE CHANNEL OSCILLATOR** board to suit above, takes HC25U 36MHz crystals, with circuit, **£2.00.**

**PYE POCKETFONE PF1** Tx units tested and working less batteries **£10.00** each.

**PYE POCKETFONE PF1** carrying cases with leather strap these are rexine covered metal boxes with lift up lid chrome trim and royal blue interior size 7¾ × 5¼ × 1¾" these can be used for a variety of things including case for small portable rig, new **£2.00** each, two for **£3.75.**

**PYE COMPACT** leather carrying cases with leather strap, new **£2.00** each, two for **£3.75.**

**455KHz** FM IF amplifier boards for FM10D, FM10B, FM25B, U10B, etc. new unused **£3.50** each. FM audio boards for same models unused **£1.50** the pair for **£4.50.**

**455KHz** AM IF amplifier boards for AM10D, AM10B, AM25T, etc. new unused **£4.00** each, audio boards to suit unused **£2.00** or the pair for **£5.50.**

**PYE FM CAMBRIDGE/VANGUARD RF** boards part No 276250/32 88-108MHz with NPN transistors new **£3.50** each.

**PYE AM CAMBRIDGE/VANGUARD RF** boards part No 276250/8 54-68MHz with PNP transistors can be altered to cover 68-88MHz **£4.00** each.

**PYE FM MIC. INSERTS** 300 ohms imp, type 4103F **50p** each.

**PYE COILS** suitable for rewinding as replacements in Cambridge/Vanguard RF boards with core **5p** each, cores only **1p** each, cores for Cambridge/Vanguard Tx coils (fine thread) **1p** each

**PAINTON** 18 way plugs and sockets suitable for Cambridge and Vanguard control cables new in sealed packets **90p** each **£1.70** pair.

**PYE** VHF PA Tank units to suit QQVO3/20A, or QQVO6/40A includes AE filter OK for 145MHz **£1.00** each.

**PYE SERVICE MANUALS** we have a number for obsolete equipments from Walkie-phone to Vanguards SAE with your wants we may be able to help.

**PYE HANDSETS** to suit most Pye equipments, new **£4.00** each.

**PYE** 455KHz IF filters for Cambridge, Vanguard and Base station etc, 50KHz channel spacing type new **75p** each.

**10.7MHz CRYSTAL FILTERS** made by ITT, type 455/LQU/901N, ±10kHz at 1·5dB, stop band attenuation 80dB at 21kHz (25kHz channel spacing), imp. 2·5k in par. 25pf, new **£3.50** each. Size 1½" × 1" × ½".

**10·7MHz CRYSTAL FILTERS ITT445/LQU/901T** ±7½KHz at 3db, approx 1k ohm in and out imp. new unused **£3.50** each, size 1½" × ½".

**10.7MHz CRYSTAL FILTERS ITT923A** ±16KHz at 6db, approx 2k ohm in and out imp. **£1.50** each, size 1½" × ½" × ½". Ex equip.

**10.7MHz CRYSTAL FILTER ITT 923K,** ±6kHz at 6dB stop band attenuation, 55dB at 20kHz, imp. 910 ohm in par. with 20pf (20kHz channel spacing). Size 1½" × ½" × ½" new **£3.50** each.

**10.7MHz CRYSTAL FILTER** made by Toyocom type 10M-5B-1, ±7½kHz at 6dB, ±12kHz at 60dB, ripple less than 2dB, insertion loss less than 5dB, supplied complete with miniature input and output matching transformers, circuit diagram and data, imp. 3K ohm, this would make an ideal filter for the Low Electronics VHF monitor receiver. Size ½" long, ½" high × ½" deep. **£4.00** each.

**21·4MHz CRYSTAL FILTERS** 1k in and out imp. no other gen. **£1.75.**

**10·7MHz RADIOTELEPHONE** marker oscillators size only 3½" × 1½" × 1½" can be used on any equipment with 10·7MHz IFs setting crystals on channel **£7.85** each.

**¼ WAVE MOBILE AERIALS** 23½" stainless steel whip section OK from 120-170MHz type ASP201 new **£1.25.**

**REVCO HIGH GAIN AERIALS** for 145MHz mobile, **£6.50** each.

**UR43 COAX CABLE** to suit above aerials, **12p** metre.

**UR57** heavy duty **CO-AX 25p** per metre + 60p per 25 metres and under for post. (75 ohm).

**CO-AX LEADS** 4½ ft long with 75 ohm plug each end, **£1.00** each, two for **£1.80.**

**BNC** single hole fixing sockets, **50p** each.

**ELECTRONIQUES SLOW MOTION DIALS** type SMD2 MK3, 6-1 and 36-1 reduction with clear moulded front size 6½" × 4" supplied with two pointers and spare scale, ideal for VFOs, receivers etc. **£3.25** each.

**400mW NEWMARKET AMPLIFIERS** type PC2 15 ohm imp output input 1k ohm new boxed **£1.50.**

**METERS 100 MICROAMP FSD** 2½" × 2½" made by Ernest Turner dial calibrated 0-15 and marked (RF detector and battery volts) modern type with clear moulded front with grey trim brand new **£2.75** each. 2 for **£5.00.**

**EDGEWISE METERS** 100 microamp FSD display area 1½" × 3/16", depth from mounting flange 1, ½", scale calibrated 0-100, made by Ernest Turner and not to be confused with cheap tuning meters new boxed bargain at **£2.25.**

**SILVER ZINC RECHARGEABLE** 12 volt batteries rated at 160 m/ah these consist of two standard 12v 80 m/ah units connected in series parallel and housed in a plastic container 2½" × 1½" × ½" the batteries can be removed without damage by cutting one end off the case, these were made for the ITT Starfone, battery type No ST 12B160 new unused **£2.50** two for **£4.50.**

**18pf MULLARD TUBULAR TRIMMERS 10p** each, 6 for **50p**, 10 for **75p.**

**CERAMIC TRIMMERS,** ½" dia. two types available 2-8pf and 4-20pf, PC mounting, **6p** each.

**MINIATURE OXLEY AIR SPACED TRIMMERS** 1-10pf ½" sq. **15p** each 10 for **£1.25.**

**MINIATURE SPLIT STATOR TYPE TRIMMERS** ½" × ½" base 10pf per section **30p.**

**700 MFD** 200 vw Electrolytics ideal to put in series for linear PSU etc, new recent manufacture **£1.35** per ten p/p 30p per ten.

**RCA VHF/UHF POWER TRANSISTOR** marked 61387 this is a selected version of an RCA 40941, 1 watt output at 400MHz (10dB gain) with 28 volts on collector. 1 watt output at 175MHz (17dB gain), OK for 70cm capstan type construction. **£1.50** each.

**RCA VHF/UHF POWER TRANSISTOR** marked 61385 this is a selected version of a RCA 2N5914, 2 watt output at 470MHz (7dB gain) with 12 volts on collector, requires 0·4 watt drive for full output, 1 watt of drive will give 5 watts RF output at 145MHz. **£2.00** each, capstan type construction.

**BA111 VARICAP DIODES 20p** each.

**HP 5082-2800 HOT CARRIER DIODES** ideal for UHF/VHF mixer etc. **50p** each or 4 for **£1.70.**

**ORP61** photoconductive cells, brand new, Mullard, **35p** each.

**BLY36** RF VHF power transistors 12v DC 13 watts RF output at 175MHz for 4 watts drive with copy of circuit **£2.50** each brand new unused.

**FT243 CRYSTAL HOLDERS 5p** each.

**MINIATURE RF CHOKES**, 1 microhenry and 100 microhenry, **10p** each.

**PVC COVERED WIRE** 2/25 SWG twin 500 metre reels new unused "one snag" these have ½" of insulation removed every 6" but ideal for many uses **£2.00** + 50p post.

**ITT 6800 MFD** 25 vw electrolytics with mounting clip screw terminals high quality capacitor insulated can **28p each.**

**PYE INDUSTRIAL LYNX CAMERAS** in waterproof housings, remote controlled, P.O.A.

## 59 Waverley Road, The Kent, Rugby, Warwickshire.


**IF UNDELIVERED** Return to:— RSGB, 35 DOUGHTY ST LONDON WC1N 2AE

**IF UNDELIVERED** Return to:— RSGB, 35 DOUGHTY ST LONDON WC1N 2AE