June 1976

# radio communication

journal of the Radio Society of Great Britain

# ★ RADCOMEX 76 ★

*It's back!*

## RSGB RADIO COMMUNICATION EXHIBITION 1976

*New venue!*

**Alexandra Palace, London ★ Friday 30 July–Sunday 1 August**

### TIMES OF OPENING

**Friday: 1000 to 2000. Saturday: 1000 to 2000. Sunday: 1000 to 1600.**

In response to ever-increasing demand, the Radio Society of Great Britain has pleasure in re-establishing an old event in the radio amateur calendar, but in a new and larger venue surrounded by pleasant parkland—the Great Hall of Alexandra Palace in north London.

Recognizing that no one should be ignored, it is hoped that there will be something of interest for all members of the family.

### FOR THE RADIO AMATEUR

- RSGB committee members and headquarters staff to handle queries
- RSGB bookstall for the latest and best in amateur radio publications
- BARTG demonstration
- Oscar display
- Raynet stand
- All the usual trade attractions and many more display stands
- Talk-in on GB2VHF and GB3RS

### FOR THE FAMILY

- Eighteen-hole pitch and putt golf course
- Boating lake
- Park trail
- Ski slope
- Rose gardens
- Children's playground
- Creche (in case of inclement weather)
- Free facilities
- Wheelchair facilities for the disabled

**Prices of admission: Adults 40p, Children 20p. Buffets and bars open during exhibition hours**

A reception for overseas visitors is planned for Saturday (details next month).

Alexandra Palace is easily reached by road from the A1, A10, A11, A41 and M1 via the North Circular Road, and there is almost unlimited free parking on the site. Caravaners are also welcome but overnight stays are not permitted under GLC regulations.

London Transport buses pass the door and connect with the London Underground (Piccadilly Line) and British Rail stations at Wood Green.

If an overnight stay is contemplated, contact the Alexandra National Hotel, 330 Seven Sisters Road, London N4, and mention the RSGB Radio Communication Exhibition.

## RSGB NEWS BULLETIN SERVICE

The RSGB news bulletin, callsign GB2RS, is broadcast every Sunday morning on hf and vhf, giving almost complete coverage of the British Isles. Its main purpose is to provide an outlet for amateur radio news items and announcements which, by virtue of their topicality or urgency, cannot wait for the next issue of *Radio Communication*.

The bulletin is prepared early on Thursday morning, and news items, marked "GB2RS news" should reach RSGB HQ by first post that day (telephoned items can also be accepted until 10am). No guarantee can be given of inclusion in part or whole of any item submitted and, once broadcast, items are not usually repeated.

**SCHEDULE**

| Time | MHz | Location and coverage (hf) or beam heading (vhf) of station |
|---|---|---|
| 0930 | 3·6 | G2MI, Bromley, Kent (SE England) |
| 1000 | 3·6 | G8ML, Cheltenham (SW England) |
| | 144·5 | GM3UAG, Ellon, Aberdeenshire (NNW) |
| | 144·5 | G8GGK, Croydon, Surrey (NE) |
| 1015 | 3·6 | GI3GAL, Belfast (N Ireland) |
| | 144·5 | GI3TLT, Bangor, Co Down (N) |
| 1030 | 3·6 | G2CVV, Derby (N Midlands) |
| | 144·5 | G4DCH, Burnham-on-Sea (NW) |
| | 144·5 | GM3UAG, Ellon, Aberdeenshire (SW) |
| | 144·5 | G3PWJ, Brierley Hill (NW) |
| 1045 | 144·5 | G8CDP, Middlesbrough (NW) |
| | 144·5 | G8GGK, Croydon, Surrey (SW) |
| | 144·5 | G8BHQ, Stockport (NNW) |
| 1100 | 3·6 | G5VO, Bridlington (NE England) |
| | 144·5 | G3PWJ, Brierley Hill (SW) |
| 1115 | 3·6 | G3LEQ, Knutsford (NW England) |
| 1130 | 3·6 | GM3EHI, Bellshill, Lanarkshire (S Scotland) |
| 1200 | 3·6 | GM3HGA, Aberdeen (NE Scotland) |

An rtty news bulletin, callsign GB2ATG, is also transmitted every Sunday at 1200 on 3·590MHz and at 1230 and 1245 on 144·6MHz. This bulletin carries items of interest to rtty enthusiasts.

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June 1976 Volume 52 No 6

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ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

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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 Department, **RSGB).**

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

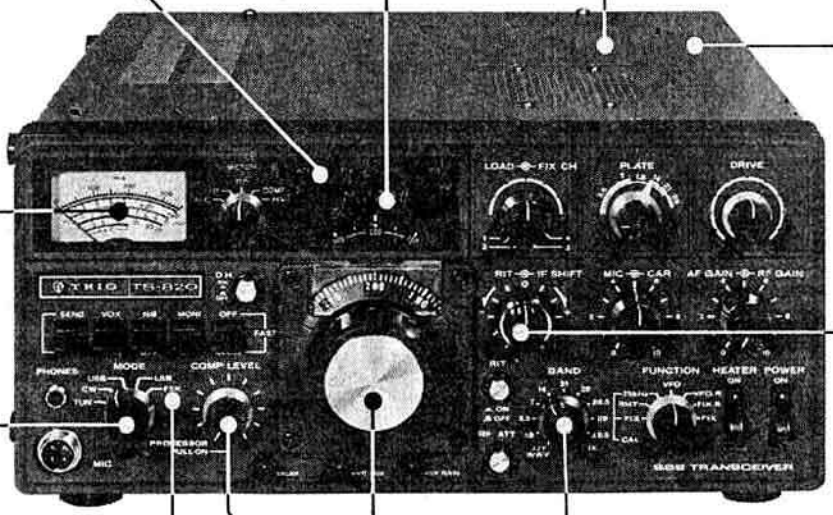


**Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-686 5839 (ADVERTISING ONLY).**

NEW

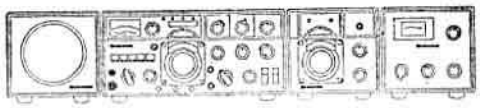
# The DXpert

## An all-new big brother for the TS520
## TS820 from TRIO




The all new TS820 from Trio completes their HF transceiver range. This is the top-of-the-line transceiver which offers a significant advance in design and construction over all others. This is the "DXpert" from Trio.

- Full transceiver operation on all amateur bands from 160-10 metres (28-30MHz) on SSB, CW and RTTY; optional 2 metre transverter; optional external VFO for full split Tx/Rx operation.
- Outstanding performance on both transmitter and receiver due to fully balanced mixing combined with latest PLL techniques.
- First class frequency stability and large signal handling characteristics.
- All new precision dial drive mechanism with unambiguous mechanical readout. Optional digital frequency readout with memory facility.
- Fixed station or mobile operation with a complete line of matched system accessories for building the best possible complete station.
- RF speech processor with fully metered adjustable compression is built-in.
- IF pass band tuning allows the IF to be tuned across a signal without resetting the main dial.
- Five function metering system together with LED monitoring of all important functions gives unparalleled operator control.




This brief advertisement can only touch upon the main details of the TS820. You have to handle it to appreciate its performance. See it soon at your local branch of Lowe Electronics.

**Sole Importers**
**LOWE ELECTRONICS**
**Cavendish Road**
**Matlock, Derbyshire**
**Tel: Matlock 2817/2430**

TRIO

# LOWE ELECTRONICS


## NR-56 FM RECEIVER

This remarkable little receiver gives the 2m FM listener everything he wants at a very reasonable price. Excellent sensitivity, stability and selectivity coupled with a built-in VFO and very effective squelch make it the ideal receiver for both beginner and keen listener. Although the built-in VFO more than covers the entire 2m band, crystal control of FM channels offers many advantages (particularly in mobile operation), so crystals, which are ex-stock, may be fitted for the popular channels and repeaters. It requires 12V dc for operation and is thus an excellent mobile receiver for mounting in the car, boat or caravan as well as for home use.

★ Double filters at 10·7MHz and 455KHz.
★ Dual conversion 10·7MHz/455KHz.
★ Narrow filter fitted for European Market.
★ FET RF stage for high sensitivity.
★ 12V operation.
★ Built-in loudspeaker.
★ Small size 6½" × 6½" × 2".
★ Mobile mount and personal earpiece supplied.
★ Full coverage VFO built in.
★ 11 crystal positions (optional crystals ex-stock).
★ 22 transistors, 1 integrated circuit, 16 diodes.
★ NR-56 £54.00 including VAT. Postage 48p. Crystals £2.61 inc. VAT.

## FS1007P

The home station FM transceiver with everything. ★ Mains or 12V operation ★ 16 channel scanning ★ channel skipping facility ★ priority channel with front panel crystal sockets ★ manual or auto scan ★ switched high/low power ★ switched wide/narrow deviation ★ S meter ★ RF output meter ★ centre zero tuning meter ★ RX fine tuning control ★ built-in SWR bridge ★ built-in digital clock with alarm and auto switch on ★ built-in loudspeaker ★ 10W TX ★ 0·3μV sensitivity ★ superb styling and finish

All this and supplied fitted receive crystals for 145, 145·25, S20, S21, S22, 145·6, 145·8 R3, R4, R5, R6, R7 together with transmit crystals for 145. S20, R6 make the FS1007P the most incredible bargain on the FM market. Backed by the combined reputations of Belcom and Lowe Electronics.

## SHINWA FILTERS

Lowe Electronics present a range of HF and VHF filters suitable (indeed most desirable) for the discerning radio amateur. From the very wide range of filters manufactured by SHINWA, we have selected those which we feel are the most useful in this country.

All the filters are exceptionally well made in high quality housings 30 × 50 × 180mm (1110G is 160 × 310 × 55m) and are terminated in SO239 sockets. They are suitable for a wide range of applications, the 1140 28–30MHz BPF being particularly attractive to transverter users.

The 1110G is the big daddy filter having adjustable bandwidth up to 2MHz wide at any frequency in the range 135–165MHz.

All filters are supplied with an individual calibration curve so that you can see exactly what you are getting, and prices are most reasonable as you can see from our latest list.

| Model | Frequency | Insertion loss | Max. att. | Max. power |
|---|---|---|---|---|
| 1110 | 144–146MHz band pass | 1dB | 50dB | 20W RMS |
| 1110G | 135–165MHz/2MHz band pass tunable | 1dB | 70dB | 100W RMS |
| 1140 | 28–30MHz band pass | 1dB | 60dB | 100W P.E.P. |
| 1006 | 146MHz cut off low pass | 1dB | 50dB | 50W RMS |
| 1005 | 30MHz cut off low pass | 0.7dB | 50dB | 300W P.E.P. |

### SILLY SONNET

*There was a young dealer who lived in a shoe,*
*Had so many agents he didn't know what to do,*
*"ELP" said his partner, "since business has grown,*
*our agent's appointing sub-agents of his own!"* 73 to D. & P. G3PCY

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

**BRANCH OFFICES** 39 Pound Street, Carshalton, Surrey. Tel. 01-669 6822
Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708
27 Cookridge Street, Leeds. Tel. 0532 46 657

**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 Elllsmuir 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

## PRICE LIST, JUNE 1976

| | net price £ | price incl. VAT £ | carr. £ |
|---|---|---|---|
| **TRIO EQUIPMENT** | | | |
| TS900 transceiver & A.C. P.S.U. | 480.00 | 540.00 | 2.50 |
| VFO900 external VFO. for TS900 | 90.00 | 101.25 | 2.50 |
| CW900 CW filter for TS900 | 29.00 | 32.63 | .50 |
| TS820 HF transceiver | 448.00 | 504.00 | 2.50 |
| VFO820 external vfo | 84.00 | 94.50 | 2.50 |
| DG1 digital readout | 88.00 | 99.00 | 2.50 |
| DSI 12V inverter | 28.00 | 31.50 | .62* |
| YG88 cw filter | 24.00 | 27.00 | .21 |
| TS520 transceiver 12Vdc/240Vac | 336.00 | 378.00 | 2.50 |
| SP520 matching loudspeaker | 14.00 | 15.75 | .62* |
| VFO250 external VFO | 64.00 | 72.00 | 2.50 |
| TV502 matching 2m transverter | 120.00 | 135.00 | 2.50 |
| CW520 CW filter | 24.00 | 27.00 | .21 |
| TS700G 2m all mode transceiver | 340.00 | 382.50 | 2.50 |
| VOX-3 matching VOX unit | 16.00 | 18.00 | .66 |
| TR7200G 10W car transceiver | 144.00 | 162.00 | 2.50 |
| VFO30G remote VFO with repeater shift | 68.00 | 76.50 | 2.50 |
| PS5 mains power supply/digital clock unit | 44.00 | 49.50 | 2.50 |
| TR2200 GX 2m handy transceiver | 104.00 | 117.00 | 2.50 |
| VB2200 10W amplifier | 36.00 | 40.50 | .62* |
| Ni-cad battery pack | 9.00 | 9.72 | .30 |
| R599D De-Luxe amateur band receiver | 272.00 | 306.00 | 2.50 |
| S599 matching loudspeaker | 12.80 | 14.40 | .62 |
| T599S De-Luxe transmitter | 272.00 | 306.00 | 2.50 |
| QR666 general coverage receiver | 145.00 | 163.13 | 2.50 |
| QR6FM F.M. tuner supplied separately | 24.00 | 27.00 | .66 |
| Extra charge for fitting and alignment | 5.00 | 5.63 | |
| QR6MK 500kHz crystal marker | 10.00 | 11.25 | .36 |
| Extra charge for fitting | 2.00 | 2.25 | |
| TR7010 2m SSB transceiver | 176.00 | 198.00 | 2.50 |
| PS5 mains power supply/digital clock | 44.00 | 49.50 | 2.50 |
| HC2 ham clock | 12.00 | 13.50 | .48* |
| MC10 hand microphone | 8.00 | 9.00 | .21 |
| MC50 table microphone | 18.00 | 20.25 | .48* |
| LF30A low pass filter | 12.00 | 13.50 | .51 |
| BPF2A 2m band pass filter | 20.00 | 22.50 | .51 |
| TR3200 70cm handy transceiver | 132.00 | 148.50 | 2.50 |
| Ni-cad battery pack | 9.00 | 9.72 | .30 |
| **NIHON DENGYO** | | | |
| Liner 430 70cm SSB transceiver | 258.00 | 290.25 | 2.50 |
| Liner 2 Mk II 2m SSB transceiver | 164.00 | 184.50 | 2.50 |
| LA-106 2m linear amplifier | 178.00 | 200.25 | 2.50 |
| R115E regulated PSU for Liner 2 and Liner 430 | 28.00 | 31.50 | 2.50 |
| **VENUS SLOW SCAN T.V.** | | | |
| SS2 Slow Scan station monitor | 258.00 | 290.25 | 2.50 |
| SS2 Slow Scan station monitor kit | 176.00 | 198.00 | 2.50 |
| C-1 camera | 288.00 | 324.00 | 2.50 |
| **CRYSTALS** | | | |
| We stock I.A.R.U. channels for the equipment which we sel | | | |
| Price per single crystal | 2.14 | 2.40 | .15 |
| Where 2 crystals per channel are required | 2.27 | 2.80 | .15 |

**SEND 30p FOR FULLY ILLUSTRATED LISTS AND CATALOGUE**

| | net price £ | price incl. VAT £ | carr. £ |
|---|---|---|---|
| **V.H.F. MARINE RECEIVERS** | | | |
| ASV 1515 less crystals | 36.00 | 40.50 | .48* |
| Belcom AMR104H scanner less crystal | 72.00 | 81.00 | .75* |
| Seiwa MR-2 pocket monitor less crystals | 44.00 | 49.50 | .51 |
| Seiwa MS-2 pocket scanner less crystals | 48.00 | 54.00 | .51 |
| Crystals for the above receivers | 2.40 | 2.40 | .15 |
| **V.H.F. AMATEUR RECEIVERS** | | | |
| ASV 1515 less crystals | 36.00 | 40.50 | .48* |
| NR-56 tunable 2m FM receiver | 48.00 | 54.00 | .48* |
| Seiwa MR-2 pocket monitor less crystals | 44.00 | 49.50 | .51 |
| Seiwa MS-2 pocket scanner less crystals | 48.00 | 54.00 | .51 |
| Belcom AMR104H scanner less crystals | 72.00 | 81.00 | .75* |
| Crystals for the above receivers | 2.14 | 2.70 | .15 |
| **CATRONICS PRODUCTS** | | | |
| DFM 5V 180MHz digital | 120.37 | 130.00 | 2.50 |
| 500MHz prescaler for above | 25.00 | 27.00 | .24 |
| **MICROWAVE MODULES EQUIPMENT** | | | |
| MMC 70/28 4m converter | 16.00 | 18.00 | Post paid |
| MMC 144/28 LO 2m converter | 17.60 | 19.80 | |
| MMC 432/28 70cm converter | 17.60 | 19.80 | |
| MMC 432/144 70cm converter | 17.60 | 19.80 | |
| MMC 1296/28 23cm converter | 21.60 | 24.30 | |
| MMC 1296/144 23cm converter | 21.60 | 24.30 | |
| MMV 432 70cm tripler | 17.60 | 19.80 | |
| MMV 1296 23cm tripler | 24.00 | 27.00 | |
| MMDO 50 50MHz counter | 61.11 | 66.00 | |
| MMD 500P 500MHz prescaler | 25.00 | 27.00 | |
| MMT 432/28 70cm transverter | 84.00 | 94.50 | |
| **UNIDEN EQUIPMENT** | | | |
| 2020 transceiver | 428.00 | 481.50 | 2.50 |
| 8010 external VFO | 96.00 | 108.00 | 2.50 |
| 8120 matching loudspeaker | 28.00 | 31.50 | .62* |
| **FILTERS** | | | |
| Seiwa 9MHz SSB crystal filter | 12.43 | 13.98 | .15 |
| Carrier crystals for the above filter—each | 1.70 | 1.91 | .15 |
| TRIO LF30A low pass filter | 13.56 | 15.25 | .51 |
| TRIO BPF2A 2m band pass filter | 22.60 | 25.42 | .51 |
| SHINWA 1110 2m band pass filter | 12.20 | 13.72 | .51 |
| SHINWA 1110G 2m band pass filter | 42.00 | 47.25 | .51 |
| SHINWA 1006 2m low pass filter | 10.20 | 11.48 | .51 |
| SHINWA 28MHz transverter band pass filter | 12.20 | 13.72 | .51 |
| SHINWA 1005 H.F. low pass filter | 9.60 | 10.80 | .51 |
| **OSCILLOSCOPES** | | | |
| Scopex 4S6 6MHz single trace | 88.00 | 95.04 | 2.50 |
| Scopex 4D10 10MHz double trace | 125.00 | 135.00 | 2.50 |
| **MARINE MOBILE WHIPS** | | | |
| 'J' Beam 2m 5/8 whip type TAS | 7.65 | 8.61 | 2.50 |
| **V.H.F./U.H.F. MOBILE WHIPS** | | | |
| 'J' Beam 2m 5/8 whip type TAS | 7.65 | 8.61 | 2.50 |
| 70cm 5/8 whip type U3 | 4.75 | 5.34 | .51 |
| 70cm colinear type U4 | 7.10 | 7.99 | .51 |
| 70cm colinear type U5 | 12.30 | 13.84 | .51 |
| Luso 5/8 2m gutter mount | 20.00 | 22.50 | 2.50 |

# LOWE ELECTRONICS

| | net price £ | price incl. VAT £ | carr £ |
|---|---|---|---|
| **V.H.F./U.H.F. ANTENNAS—'J' BEAMS** | | | |
| 5Y/2M | 4.90 | 5.51 | 2.50 |
| 8Y/2M | 6.40 | 7.20 | 2.50 |
| 10Y/2M | 12.60 | 14.18 | 2.50 |
| PBM14/2M | 19.20 | 21.60 | 2.50 |
| 5XY/2M | 9.40 | 10.58 | 2.50 |
| 8XY/2M | 11.70 | 13.16 | 2.50 |
| 10XY/2M | 16.15 | 18.17 | 2.50 |
| Q4/2M | 9.60 | 10.80 | 2.50 |
| Q6/2M | 12.80 | 14.40 | 2.50 |
| D5/2M | 9.00 | 10.13 | 2.50 |
| D8/2M | 12.00 | 13.50 | 2.50 |
| XD/2M | 6.60 | 7.43 | 2.50 |
| UGP/2M | 4.75 | 5.34 | 2.50 |
| MMB48/70cms | 13.90 | 15.64 | 2.50 |
| MBM88/70cms | 18.50 | 20.81 | 2.50 |
| 12XY/70cms | 19.00 | 21.38 | 2.50 |
| **PHASING HARNESSES** | | | |
| PMH/2C 2m for circular polarisation | 3.25 | 3.66 | .51 |
| PMH2/70 2 way for 70 cms | 3.75 | 4.22 | .51 |
| PMH4/70 4 way for 70cms | 7.80 | 8.78 | .51 |
| **H.F. MOBILE ANTENNAS** | | | |
| 'G' Whip tribander helical | 13.53 | 15.22 | 1.00 |
| 'G' Whip multimobile | 16.73 | 18.82 | 1.00 |
| L.F. coils for the above whips | 4.51 | 5.07 | .45 |
| Telescopic whips for the above | 1.22 | 1.37 | .45 |
| Basemount for all 'G' Whips | 1.81 | 2.04 | .45 |
| **RAK ANTENNAS** | | | |
| A-8XL 80m dipole | 10.80 | 12.15 | .62* |
| AL-48DXN 80/40m trap dipole | 22.60 | 25.43 | .75* |
| Midy VN 80m to 10m trap dipole | 36.00 | 40.50 | .87* |
| Listener III SWL antenna | 22.60 | 25.43 | .62* |
| Listener I SWL antenna | 8.48 | 9.54 | .48* |
| HD-26A extendable dipole | 6.00 | 6.75 | .33 |
| **ANTENNAS** | | | |
| **H.F. Beams** | | | |
| Hy-Gain TH2Mk3 | 85.60 | 96.30 | 2.50 |
| TH3Jnr | 87.60 | 98.55 | 2.50 |
| TH3Mk3 | 124.60 | 140.18 | 2.50 |
| TH6DXX (carriage by BRS) | 149.60 | 168.30 | 2.50 |
| **H.F. Quad** | | | |
| Hy-Gain Hyquad 2 element | 138.00 | 155.25 | 2.50 |
| **H.F. Verticals** | | | |
| Hy-Gain 12AVQ | 29.60 | 33.30 | 2.50 |
| 14AVQ/WB | 42.00 | 47.25 | 2.50 |
| 18AVT/WB | 58.60 | 65.93 | 2.50 |
| **Rotators** | | | |
| CDE AR40 | 32.10 | 36.11 | 2.50 |
| CD44 | 67.25 | 75.66 | 2.50 |
| Ham-2 | 103.00 | 115.88 | 2.50 |
| Rotator cable 5-core per metre | .18 | .19 | .03 |
| 8-core per metre | .31 | .33 | .03 |
| 12-core per metre | .22 | .24 | .04 |
| **STATION ACCESSORIES** | | | |
| Morse keys | 6.80 | 7.65 | .51 |
| Katsumi keyers EK108A | 36.00 | 40.50 | .48* |
| Low impedance padded headests | 4.16 | 4.68 | .51 |

| | net price £ | price incl. VAT £ | carr. £ |
|---|---|---|---|
| TRIO MC10 hand microphone | 9.00 | 10.12 | .24 |
| TRIO MC50 dual impedance table microphone | 20.50 | 23.06 | .48* |
| Kuranishi wattmeter/dummy load RW15D | 28.00 | 30.24 | .62* |
| Kuranishi wattmeter/dummy load RW120D | 64.00 | 69.12 | .75* |
| TRIO ham clock HC-2 | 13.56 | 14.64 | .48* |
| Microphone plugs as fitted to TRIO and YAESU equipment (4-pin) | .54 | .61 | .12 |
| Matching sockets for the above | .54 | .61 | .12 |
| Maeden speakers | 2.24 | 2.52 | .36 |
| **ANTENNA ACCESSORIES** | | | |
| Coaxial cable 50 ohms UR43 per metre | .14 | .15 | .02 |
| Coaxial cable 50 ohms UR67 per metre | .35 | .38 | .04 |
| Twin feeder 300 ohms per metre | .06 } pro rata | | .02 |
| Twin feeder 75 ohms per metre | .06 } at 8% | | .02 |
| Twin feeder 75 ohms high power rating per metre | .18 | .19 | .03 |
| Rotator cable 5-core per metre | .18 | .19 | .03 |
| Rotator cable 8-core per metre | .31 | .33 | .03 |
| Rotator cable 12-core heavy duty per metre | .22 | .24 | .04 |
| PL259 plugs | .40 | .43 | .12 |
| Reducers for PL259 plugs | .14 | .15 | .12 |
| SO239 sockets | .40 | .43 | .12 |
| PL259 in-line connectors | .68 | .73 | .12 |
| PL259 angle connectors | .86 | .92 | .12 |
| SWR Meters single meter | 8.80 | 9.50 | .51 |
| SWR Meters, twin meter | 11.30 | 12.20 | .51 |
| Hy-Gain C1 centre dipole insulator | 3.40 | 3.82 | .30 |
| Hy-Gain BN86 Balun | 11.85 | 13.33 | .51 |
| Diamond BU7 75 ohm Balun | 4.80 | 5.40 | .51 |
| RAK CX2(A) coaxial switch | 10.00 | 11.25 | .27 |

**VALVES**

For common valves it pays to shop at one of the large importers who buy in such enormous quantities that they can sell retail at a lower price than we can buy wholesale. We do, however, maintain stocks of the more unusual valves which are used in the equipment we sell, and which you may find some difficulty in obtaining.

| | | | |
|---|---|---|---|
| 6AH6, 6BZ6. 6CB6A, 6CL6, 6U8A, 6BM8, 12BY7A, 6EW6 | .75 | .84 | .21 |
| 6GK6, 12GN7A, 6AW8 | 2.00 | 2.25 | .21 |
| 6JS6C, 6KD6 matched pairs, per pair | 4.75 | 5.34 | .51 |
| 6146B/S2001 each | 4.00 | 4.50 | .36 |
| 6LQ6 matched pairs, per pair | 6.24 | 7.02 | .51 |

* Indicates carriage by parcel post

**Our terms are cash or cheque with order—despatch of stock items is by return. If any item is out of stock, your money is immediately refunded.**

**PART EXCHANGES WELCOME** **EASY TERMS**

**PRICES, UNFORTUNATELY ARE SUBJECT TO CHANGE WITHOUT NOTICE**

**MAIL ORDERS**
**PLEASE ADDRESS ALL MAIL ORDERS DIRECT TO MATLOCK**

## LOWE ELECTRONICS

**119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE**

# Communications Ltd

**YEARS OF PROFESSIONAL EXPERIENCE**

YAESU

# YAESU MUSEN

**2-YEAR GUARANTEE**
**24-HOUR SECURICOR SERVICE**

## FT301S—10W TOP TO TEN TRANSCEIVER. NEW! SAE DETAILS


### THE FT221 EX STOCK

The FT221. USB LSB, AM, FM, CW (with semi break-in and side tone), 2m transceiver offering phase locked VFO of 44 crystal channels, simplex or repeater (600kHz up and down shifts), [with unique "double push" auto tone burst], mains or 12V (3A) operation, excellent selectivity SSB 2·4kHz (1·7:1 S.F.) or FM 12kHz. Front panel adjustable VOX and mic gain, calibrator (1MHz ÷ 10), 1kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero meter, noise blanker, serviceable plug in boards all contained in 11½" (14") × 5" × 11½" 22 lbs, rigid package.

### THE FTV250 EX STOCK

The FTV250 is a solid state 2m transvertor (from 10m) offering a stable 20W P.I.P. (for 3V RMS drive) with low spurious output and high linearity, thanks to: the 5 linear stages (after the FET dual balanced mixer), the closed loop RF derived ALC, and the front panel tuning of both the transmitter and the receiver, by a total of 9 variable capacitance diodes.

The receiver employs a low noise, high gain, Mosfet RF amplifier, adjustable from the front panel, and a FET mixer driven by the 3 stage local oscillator chain.

A large rectangular meter indicates drive voltage and relative power output, whilst 3 LED's show whether HF or 2m (or 4m) is in use.

The unit has built in 12V (2·6A at 10W output) and mains P.S.U. (9 and 12V rails—6 Trs, '3055 series reg.). Measures about 8½" × 6" × 11½", weighs 13lbs., and when driven by Yaesu equipment (with heater link) requires no plugging or unplugging of any interconnected leads at all when band changing.



### THE FRG7 EX STOCK IN TOTTON

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. A spin tuned, phase locked synthesiser provides complete coverage from 500kHz to 30MHz to an accuracy better than 5kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0·5μV for 10dB, S + N/N (SSB)) and stable (within 500Hz for any 30 minutes after warm up) with AM, SSB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required, 8 dry cells are automatically switched in.

**SEE OVERLEAF FOR SELECTION OF MASTS AND TOWERS**

## SOUTH MIDLANDS COMMUNICATIONS LTD

**OSBORNE ROAD, TOTTON**
**SOUTHAMPTON SO4 4DN**
**Osborne Road is off Rumbridge Street**

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

**Cable: Aerial Southampton**
**Telex: 477351 SMCOMM G**
**Tel: (04216) 4830 & 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. **Mervyn Anderson GI3WWY,** N.I. Trandragee 840656.

# South Midlands

**ESTABLISHED 1958—OVER 18**

## ANTENNAS MAKE THE STATION. THERE CAN BE LITTLE DOUBT THAT THE EFFICIENCY OF YOUR STATION IS GOVERNED AS MUCH BY WHAT IS OUTSIDE THE SHACK AS BY ITS CONTENTS

On these two pages we make some suggestions which might help you:

### CUSHCRAFT VHF OMNI (Car. 90p) VAT 12½%

Top the tower or mount on your chimney stack a 2m gain vertical. The Ringo Ranger (ARX2) offers over the conventional ground plane elimination of unsightly radials and 6dB gain from only 9′ 6″ (weighs less than 1½lbl!)

If you prefer horizontal omnis are available for net control, RAEN, SSB mobile etc, etc.

| | | | |
|---|---|---|---|
| ARX2 6dB Ringo Ranger .. | £19.50 | ABW144 2m Big Wheel .. | £14.50 |
| AR2 3dB Ringo Vert .. | £12.00 | ABW12S ABW harness .. | £7.30 |
| AR25 QRO AR2 .. .. | £14.20 | ASQ1 2m Squalo .. .. | £11.75 |
| CX1000 29MHz Ringo .. | £23.20 | ASQ22 Stacked ASQ .. | £24.15 |

### JAYBEAM 70 (4m), 144 (2m), 432 (70) (Car. about £1) VAT 12½%

For general work, with the emphasis on distant mobiles, Oscar etc, crossed yagis are increasingly popular. However, for maximum gain needed to push your signal over the horizon we would suggest long yagis, on 2, such as the 14Y/2M (offered exclusively by SMC) or the MBM88 for 70.

| | | | |
|---|---|---|---|
| D5/2m 5 over 5 slot feed .. | £9.00 | D8/70 8 over 8 slot feed .. | £12.00 |
| D8/2m 8 over 8 slot feed .. | £12.00 | PBM18/70 18 ele Para. .. | £12.50 |
| 5XY/2m 5 element crossed | £9.40 | MBM48/70 48 ele Multi .. | £13.90 |
| 8XY/2m 8 element crossed | £11.70 | MBM88/70 88 ele Multi .. | £18.50 |
| 10XY/2m 10 element cross | £16.15 | 12XY/70 12 ele crossed .. | £19.00 |
| 5Y/2M 5 element yagi .. | £4.90 | 4Y/4m element yagi .. | £7.75 |
| 8Y/2M 8 element yagi .. | £6.40 | PMH2/70 2 way harness .. | £3.75 |
| 10Y/2m 10 ele long yagi .. | £12.60 | PHM2/4m 2 way harness .. | £6.00 |
| 14Y/2m 14 ele long yagi .. | £16.25 | PMH2/C Circ. phasing .. | £3.25 |
| Q4/2m 4 element quad .. | £9.60 | PMH2/2m 2 way harness .. | £4.50 |
| Q6/2m 6 element quad .. | £12.80 | 2010 Rotator automatic .. | £37.50 |
| PBM10/2m 10 ele Para .. | £14.95 | RZ100 Rotator bearing .. | £9.17 |
| PBM14/2m 14 ele Para .. | £19.20 | JBL15/59 2″ Joint sleeve .. | £2.50 |

### SMC TRAPPED DIPOLES (Carriage Paid) VAT 12½%

For those with limited space, or restricted interest the SMC trap dipole offers coverage of 10–80 (160)M in 108ft. Suspended as a 'V' from the tower excellent results on 80 and 40m are obtained.

| | | | |
|---|---|---|---|
| S 500W P.I.P. 14SWG .. | £17.85 | P 500W P.I.P. Cu/Terylene | |
| HP 1K P.I.P. 14SWG .. | £19.75 | braid c/w 75′ feeder etc. .. | £19.75 |

### MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 12½%

Ever popular for HF bands are Triband (10–15–20M) beams such as the TA33 (or for higher powers the Mustang) which at the old price offers outstanding value for money.

| | | | |
|---|---|---|---|
| TA33 3 ele 200W R.M.S. .. | £58.00 | TA32 2 ele. 300W A.M. .. | £40.00 |
| MUSTANG 3 ele 2kW P.I.P. | £75.00 | MUSTANG 2 ele 1kW A.M. | £60.00 |

### GEM QUAD FIBREGLASS QUAD (Carriage £2.00) VAT 12½%

The advantages gained by boomless quad construction are not only mechnical. By the provision of optimum element spacing, on all bands covered, back to front and forward gain are optimised.

| | | | |
|---|---|---|---|
| GQ2E 2 element .. | £95.00 | GQ4E 4 element .. | £198.00 |
| GQ3E 3 element .. | £147.00 | CK1Q 1 ele. Conv .. | £55.00 |

### HY GAIN HF RANGE (Car. £1.00-£2.50) VAT 12½%

The most common approach to the H.F. band beam is the compromise one of a Tribander. The TH3 range being particularly recommended. A more elaborate multi-bander is the mighty TH6DXX which overcomes by a total of 6 elements problems of non-constant spacing. Optimum back to front and gain is offered only by the mono-banders. A 203BA with 4 elements on 20 metres provides a big signal.

Many stations are restricted by space, planners, finance or a temporary location. The 18AVT vertical offers coverage 10–80m with a single slender 25′ self supporting radiator. It is probably the most popular single antenna of its type on sale today.

For greater power handling elimination of traps ultra low radiation angle for good DX without the use of a rotator, the Hy-Tower standing to a total of 50′, entirely self-supporting (occupying only 4 sq. ft of land) is strongly recommended.

| | | | |
|---|---|---|---|
| BN86 1:1 ferrite Balun .. | £11.00 | TH2MKIII 10–20m 2 ele .. | £85.60 |
| 103BA 10m 3 element .. | £39.60 | TH3NJR 10–20m 3 ele .. | £87.60 |
| 153BA 15m 3 element .. | £49.60 | TH3MKIII 10–20m 3 ele .. | £124.60 |
| 203BA 20m 4 element .. | £94.00 | TH6DXX 10–20m 6 ele total | £149.60 |
| 402BA 40m 2 element .. | £133.00 | HY QUAD 10–20m 2 ele .. | £138.00 |
| 18V 10–80 Load Vert. .. | £22.00 | DB1015A 10–15m 3 ele .. | £90.00 |
| 12AVQ 10–20m Trap Vert. | £29.60 | LA1 Lightning arrestor gas | £18.50 |
| 14AVQ 10–40m Trap Vert. | £42.00 | LA2 Lightning arrestor spark | £3.00 |
| 18AVT/WB 10–80m Vert. | £58.60 | HY TOWER 10–80m Vert. | £149.00 |

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

Feeders are the point where amateurs often falsely economise. For ues; mobile a cable with a stranded centre (UR76 etc), for fixed a long unsupported run without a cattenary, or allowing the cable to slap against the mast are taboo, breakages of the centre conductor will arise with disastrous results.

If you are using a 3/16 cable changing to ¼ can be the most cost effective improvement.

UR43 1·6dB @ 10, 4·1 @ 70, 6·5 @ 144, 12·3 @ 432MHz per 100′
RG8/U 0·6dB @ 10, 1·5 @ 70, 2·5 @ 144, 4·7 @ 432MHz per 100′

| | | | |
|---|---|---|---|
| RG8/U 50 ohm Heavy | yd. 33p | UR39 75 ohm Medium | yd. 23p |
| UR57 75 ohm Heavy | yd. 34p | T3278 75 ohm Distribution | yd. 20p |
| 75 ohm Flat twin | yd. 6p | UR43 50 ohm Solid Cent. | yd. 14p |
| 300 ohm Ribbon | yd. 6p | UR76 50 ohm Strand Cent. | yd. 14p |

### COAX PLUGS (p & p extra) VAT 8%

Whilst it is undoutedly true that the UHF, PL259 range leave much to be desired over 200MHz, their mechanical performance is excellent. We offer plugs in standard or P.T.F.E. insulation for ¼″ or (with reducers for) smaller cables, PL259A for specific cable types, nut, 2 or 4 hole fixing sockets and a range of adaptors and convertors. For the discerning BNC, N and C types are stocked. For accessory connections we hold from stock phono plugs, plastic or metal barrelled, jack plugs, ¼″ stereo or mono, mic plugs, power plugs, (for the Yaesu range), and a wide collection of similar ancillaries.

| | | | | | |
|---|---|---|---|---|---|
| PL259 | Standard UHF plug | £0.48 | SO239 | Socket 2 hole | £0.37 |
| PL259 | P.T.F.E. UHF plug | £0.55 | | 'T' adaptor | £1.20 |
| UG175U | Reducers | £0.12 | | Right angle adaptor | £0.90 |
| 258 | Back to Back | £0.80 | | Phono plug/SO239 | £0.55 |

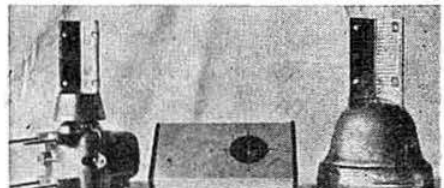
### CDE ROTATORS EX STOCK IN TOTTON FOR FAST DELIVERY (VAT—ROTORS 12½%; CABLE & DELV. 8%).

CARRIAGE (B.R.S) Free. Securicor delivery £1 extra

All rotators supplied complete with appropriate control box and instructions.

| | |
|---|---|
| AR30 (illst. centre and immediate right) | £26.60 |
| AR40 (illst. centre and far right) .. | £34.60 |
| AR33 De-Luxe control AR40 .. .. | £41.25 |
| CD44 (C.B. ill. left) medium duty.. .. | £69.75 |
| Ham 11 (C.B. ill. left) heavy duty.. .. | £105.50 |
| 2010/220 Stolle .. .. .. .. | £37.50 |

Control cable 5 core 18p/yard, 8 core 27p/yard



**FOR FURTHER DETAILS OF THESE ITEMS SEND LARGE S.A.E.**

Access

**PLEASE NOTE—THESE PRICES *DO NOT* INCLUDE VAT (12½% or 8%)**

**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

**YEARS OF PROFESSIONAL EXPERIENCE**

YAESU

## ANTENNAS THE BIGGER THE BETTER!

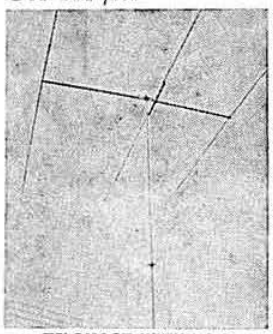
**ON VHF** Consider the improvement a few dB's can bring to your 2m station. If your 99% time distance is 100 miles (for a given signal strength) then an extra *9dB* can push this up by 150 miles giving you *7-fold increase* in workable area. If your antenna is at 20ft 3dB comes from a mere 10ft increase, 6dB if raised to 60ft. (60 miles range). For DX (400 miles) 3dB comes from a 30 to 60ft change (more where the take off is obstructed).

Remember that feeder loss must be added to your receiver noise figure. Pre-amps (and attendant cross-mod) by all means, but remember a change of coax (or baying or stacking antennas) yields a greater receiver improvement and, of course, gives you a higher ERP.

**ON HF** Tune your antennas for best front to back ratio, you will only lose a dB or so in forward gain but the elimination of QRM will be well worthwhile.

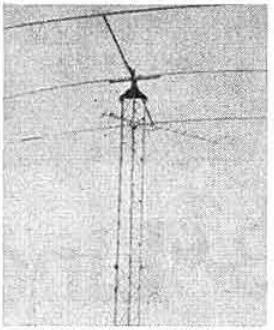
**ON VHF/M** You effectively double your receiver sensitivity and transmit power when using a 5/8 whip (over ¼ wave) and that an even greater improvement is effected with change from a halo to a clover leaf.

**ON HF/M** Try an extenda rod with your G whip to boost your LF mobile signal.



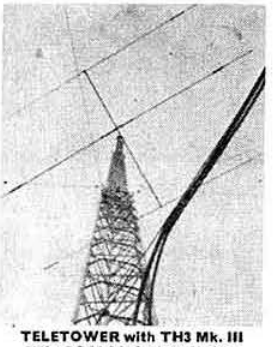
**TELOMAST WITH TA33 TELESCOPIC GALVANISED**

10′ sections without or c/w rigging. Carriage £2.75, ex-stock VAT 8%
30′ **£19.85** or **£39.75** c/w rigging
40′ **£27.50** or **£49.50** c/w rigging
50′ **£34.50** or **£66.75** c/w rigging



**HAMTOWER with TH3 Jnr. SELF SUPPORTING**

Galvanised lattice 10′ sections. Free-standing with climbing steps. Carriage £3.50 ex stock 8% VAT.
30′ c/w base grillage .. **£135.00**
40′ c/w base grillage .. P.O.A.



**TELETOWER with TH3 Mk. III TELESCOPIC GALVANISED**

Carriage and rigging (RX) extra.

| | | | |
|---|---|---|---|
| 42′ | .. .. | £121.00 | (RK £28) |
| 57′ | .. .. | £174.00 | (RK £28) |
| 79′ | .. .. | £224.50 | (RK £49) |
| 101′ | .. .. | £303.50 | (RK £76) |

## VERSATOWERS

**TILTING TELESCOPIC**

**Post — Socket Post — Wall — Base Plate**

British Steel have recently announced yet another price increase of 10 per cent (18 per cent on tube). This will be reflected in our prices as soon as our stocks are exhausted.

Carriage extra (typically £14) + 8% VAT.

| | | | |
|---|---|---|---|
| P25 | £161.59 | P80 | £366.03 |
| P40 | £208.01 | W40 | £162.03 |
| P60 | £246.84 | BP60 | £268.07 |

Most ex stock in Totton

## ALIMASTS

**TELESCOPIC LIGHTWEIGHT**

1·5, 2 or 3m: Quick Lock Sections 13 versions. 6 to 21m from stock. Rigging extra. Carriage £2. VAT 8%

| | | | |
|---|---|---|---|
| 5 × 2m | £24.75 | 4 × 3m | £26.50 |
| 6 × 2m | £32.90 | 5 × 3m | £32.40 |
| 7 × 2m | £38.75 | 6 × 3m | £38.75 |
| 3 × 3m | £20.50 | 7 × 3m | £49.00 |

A lightning arrester, by bleeding static, reduces the chances of a strike considerably (also 5KA surge capability!!). RF distribution in the shack by the old faithful KW, or the new 'coax' slide switches. The continuous in line monitoring of VSWR lets you know of any change in your system immediately.

## COAX SLIDE SWITCHES

Up to: 1kW, 1·5GHz, 0·3dB loss, 1·2:1 VSWR.
50dB isolation. 50 ohm 'N' or 'PL' fittings available.

EX-STOCK P & P 30p, VAT 8% only

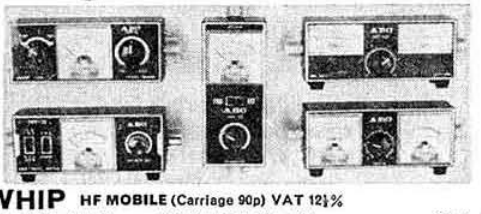
| | | |
|---|---|---|
| TWS 120G | 1 in 2 out Nickle SO239 .. .. | £4.45 |
| TWS 150G | 1 in 5 out Gold SO239 .. .. .. | £9.50 |

## LIGHTNING ARRESTER

Gas discharge (90V strike), 50 ohms, SO239 fittings
Up to: 1·1 : 1 VSWR, 1GHz, 0·2dB loss, 5KA, surge 5A AC.

**Ex-Stock.** Post and packing 20p. VAT 8%
NSK75 Low Price .. .. .. **£7.50**

## AEC METERS Power, SWR and Field Strength (p. & p. 40p. VAT 8% only). EX STOCK



**SWR10** (T.L.H.), 50/75Ω, SWR (±10%), 1·5MHz up. .. .. **£8.15**
**SWR20** (B.L.H.), 50Ω, SWR (±10%), 1·5MHz up. F.S., Power 10 and 100W FSD (±10%) .. .. .. .. .. .. **£9.90**
**SWR40** (centre) 50/75Ω, SWR (±10%), 1·5MHzup. F.S... .. **£7.80**
**SWR50A** (T.R.H.) 50/75Ω, SWR (±5%) 3·5MHz up. Power to 1kW (±20%) .. .. .. .. .. .. .. .. **£9.60**
**SWR50** (B.R.H.) as SWR50A (300μA) but 100μA meters .. .. **£11.20**

## BANTEX VHF WHIPS (Carriage 90p) VAT 12½%

| | | | | | |
|---|---|---|---|---|---|
| B5 | ¼ 145MHz .. | £6.35 | 70½ ¼ 70MHz .. .. .. | £4.00 |
| BGA f.g. | ¼ 2m fibreglass | £8.75 | Trunk Lip Mount .. .. | £5.25 |
| BGA s.s. | ¼ 2m stainless steel | £8.50 | Magnetic Base Mount .. | £8.50 |
| B5U | ¼ 43MHz .. | £5.00 | Standard base unwanted deduct | £0.50 |

The mobile season is with us again. For 2m. ssb a Cushcraft, for FM a ¼ or 5/8 Bantex roof mounted (on the standard or magnetic base). If the mounting is to be lower down use a longer 3dB antenna only.

## G WHIP HF MOBILE (Carriage 90p) VAT 12½%

| | | | |
|---|---|---|---|
| Tribander 10–20m (+LF) .. | £13.53 | LF40, 80 or 160 .. .. | £4.51 |
| Multimobile 10–20m (+MM) | £15.73 | MM40, 80 or 160 .. .. | £4.51 |
| Flexiwhip 10m (+FF) .. | £11.50 | FF15, 20, 40, 80 or 160 .. | £4.67 |
| Basemount ½" hole mount | £2.20 | Telescopic whip for coils | £1.25 |

For HF your choice from the G Whip range. A self selecting Multimobile, a slimline Tribander, or robust Flexiwhip mounted on the standard base or for an adaptor for the American mount.

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# AMATEUR ELECTRONICS UK

## The Sensational ATLAS-210/215X—*LATEST MODELS*


# SEVEN POUNDS OF DYNAMITE!

**200 WATTS P.E.P. INPUT SSB AND CW***

***120 WATTS ON 10 METRES**

**DON'T LET ITS SMALL SIZE FOOL YOU.** The Atlas transceiver is packed full of the most advanced, state-of-the-art engineering, and provides unequalled performance in both transmit and receive modes. There is no other transceiver on the market with as many outstanding superior features, regardless of size.

**COMPLETELY SOLID STATE DESIGN.** 4 I.C.'s, 18 transistors, and 32 diodes. Years of cool, trouble-free operating pleasure. The final transistors are fully protected against infinite SWR and thermal runaway. Even with constant operating they should never need replacement.

**TOTALLY broadbanded.** *No transmitter tuning* or loading controls. No receiver preselector controls. Modern design makes these unnecessary. Instant QSY and band change.

**FREQUENCY COVERAGE:** 1800-2000, (Model 215x only), 3500-4000kHz, 7000 -7500kHz, 14,000-14,500kHz, 21,000-21,500kHz, 28,400-29,400kHz, (Model 210x only). The 10 metre band may be easily owner adjusted on the 210x to cover any 1000kHz portion of the band. Tuning rate is 22kHz per revolution, with 1kHz increments on the dial skirt, (2kHz on 10 metres).

**THE RECEIVER FRONT END DESIGN** results in spectacular performance. Antenna signals are coupled through tuned transformers directly into a double balanced diode mixer, where they are immediately converted to the I.F. frequency. Only one stage of I.F. amplication is employed before signals reach the crystal filter. As a result, intermodulation between strong signals is suppressed to unprecedented low levels; better than 70dB down with 5000 microvolt signals! Overload irom adjacent channel signals is practically non-existent. *If you have not yet operated an Atlas transceiver in a crowded band and compared it with others, you have a real thrill coming!* Ordinary solid state receivers have always been rated as "practically as good as tube designs", even though they usually fall short. Now, Atlas finally provides you with a receiver that is truly superior to tube designs.

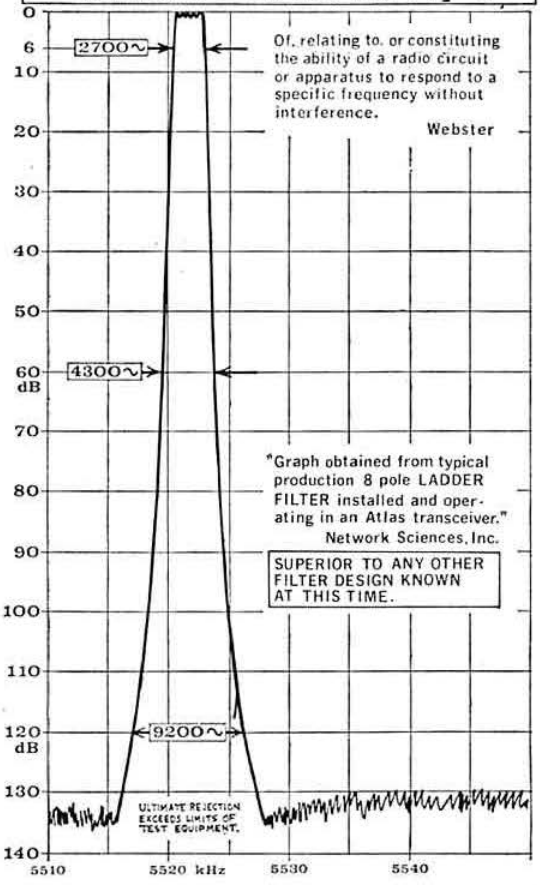
**RECEIVER SENSITIVITY.** The old fashioned R.F. amplifier is no longer necessary. With a low noise figure mixer, followed by a low noise I.F. amplifier, sensitivity specs on the Atlas are as good as the best and better than most receivers having an R.F. amp (¼ microvolt or better on all bands). This will be a little difficult for many to understand and accept, particularly old timers, but it is a proven fact: The Atlas truly has exceptional sensitivity.

**MAXIMUM OPERATING PLEASURE.** The front panel design of the Atlas has full size knobs and tuning dial, in spite of its small overall size. Small size should not sacrifice operating pleasure. Our fingers and hands do not become smaller. You'll find operating the Atlas transceiver a delightful experience.

**MODULAR CONSTRUCTION.** Most of the circuitry is on printed circuit boards. There are three plug-in boards for R.F., I.F., and A.F. circuits which provides easy servicing, when required. All sections are readily accessible.

**CUSTOMER SERVICE SECOND TO NONE.**

ATLAS: Se-lec-tiv-i-ty !!

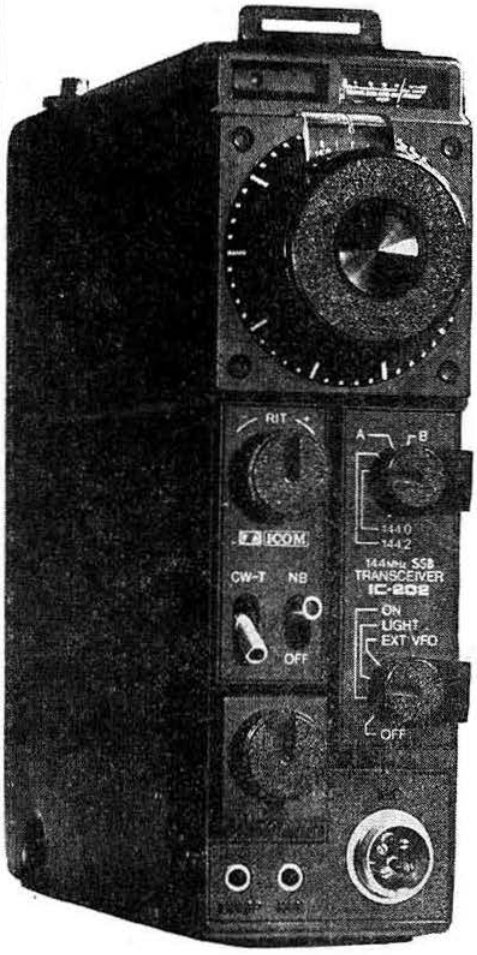


ICOM®
PAUL G3VJF

# THANET

## THE GREAT ARRIVAL ON THE SSB SCENE

**See page xxx for a review of this rig**




## ICOM® IC-202 £161.10 INC.VAT

The IC-202 is a 2 metre SSB/CW transceiver designed to be operable anywhere, like most portables, but with big station features such as a very effective noise blanker, RIT, S & RF meter, and a full 3 watts output. Two built-in crystals in the stable VXO allow operation between 144·0 and 144·4MHz. If you wish to expand the range of the IC-202, Icom have also provided 2 spare crystal sockets for your convenience. With a slight retuning of the IC-202, and installation of a special crystal, you may also work through Oscar.

The aluminium diecast frame provides a very strong yet light housing for the 2 circuit boards and the aluminium sides snap off easily if service is ever necessary or to change the batteries.

The IC-202 operates on 9 inexpensive C cell batteries, or an external 13·8V DC source. We recommend the IC-3PS which not only provides power for the IC-202, but also doubles as a stand and holder for the IC-20L 10 watt linear amplifier.

You can use the built-in whip antenna for portable use or another antenna connects to the external antenna connector on the back of the IC-202.

We feel sure that you will have years of lasting enjoyment from an IC-202, manufactured by the leader in communication equipment: Inoue Communication Equipment Corporation. The signal is as clean as you would expect from ICOM equipment—It won't get you into repeaters unintentionally!

**FEATURES:**

- ★ Power Indicator LED
- ★ S and RF meter
- ★ Dial calibrated in 10kHz increments with a total coverage of 200kHz. The operating frequency is read by adding the frequency shown on the dial to that shown on the crystal switch.
- ★ RIT. Independently swings the receiver frequency by ±3kHz.
- ★ CW or SSB
- ★ Noise Blanker
- ★ 4 position crystal switch
- ★ Built-in speaker with socket for external speaker if required
- ★ External VFO socket.
- ★ Whip antenna and socket for external antenna
- ★ External 13·6V DC input or internal batteries

**ACCESSORIES SUPPLIED:**

Microphone
Microphone Case
Shoulder Strap
Power Supply Plug
Earphone
9 Dry Cells type C
Comprehensive English Handbook

**OPTIONAL EXTRAS:**

Set of rechargeable Ni-Cads £16 (50p post)
Charger £10 (50p post)

Note: Because of reduced voltage you will not get full output on Ni-Cads. IC-3PS Power Supply. IC-20L Linear Amplifier.

**PLEASE NOTE THAT OUR PHONE NUMBER AT HERNE BAY HAS CHANGED**
**IF YOU DON'T WANT TO BUY AN IC7300B (APOLOGIES BILL) THEN PHONE 63859**

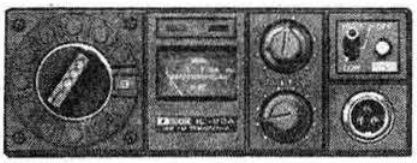
**AGENTS OFFERING THE FULL THANET SERVICE EVENINGS AND WEEKENDS:**
**LONDON**—Terry G8BAM (01-556 9366) **WALES**—Tony GW3FKO (0222 702982) **DEVON**—Bob G3PQH, QTHR
**WEST KENT**—Roger & Bryon (047485 2577) **MIDLANDS**—Tony G8AVH (021 329 2305)
**SCOTLAND**—Ian GM8DOX (078683 3223) **NORTH**—Peter G3TPX (022678 2517)—note Peter also has agents in Hull, Doncaster and Manchester; contact him for details.

# ELECTRONICS

ICOM®
DAVE G4ELP

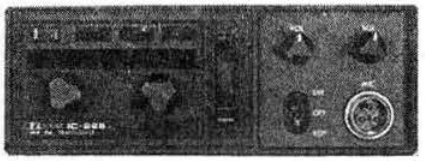
## APART FROM THE FABULOUS IC-202 LOOK AT THE REST OF THE EXCITING ICOM RANGE

SEE ANNOUNCEMENT ON PAGE 467



### ICOM® IC-22A

The 22 channel FM mobile rig with 10 channel fitted—these being the most useful 5 simplex channels and the 5 UK repeater channels. The simplex channels are 145·0, S20, S21, S22 and S23. Due to popular demand we now offer the 11-channel version which is fitted with S24 also, thus giving you a 22 channel rig WHICH IS HALF FULL OF CRYSTALS. This is worth thinking about when you consider that 11 pairs of crystals can cost you £61! There is an automatic CRYSTAL CONTROL-LED tone burst fitted which operates on REPEATER CHANNELS ONLY. Ex stock at time of going to press.



### ICOM® IC-225

An **80m Channel FM** mobile rig with all 80 channels fitted. Uses an excellent phase lock loop system. Channels are at 25kHz spacing which fits in with the UK and continental channel systems giving *all* the UK simplex and repeater frequencies. A *crystal controlled* tone burst is introduced when working repeaters and reverse repeater facility is available on all channels by adding one extra 11·300MHz crystal. Ex-stock at time of going to press. **£250 inc. VAT**

### ICOM® IC-201

The luxury multi-mode rig which was described in full in our advertisement in January, when it was also reviewed in *Radio Communication*. It provides full 2 metre coverage on FM, SSB and CW using its ultra stable VFO. Full facilities for repeater and reverse repeater use at the flick of a switch, built in automatic crystal controlled tone burst fitted by us, full break-in facilities on CW and VOX are but a few of the excellent facilities found on the increasingly popular IC-201. Send for further details or leave a message on our ansafone during the evenings.

**CRYSTALS FOR ICOM—singles £2.70, pairs £4.50, inc. VAT and p.p.**
**(£3.50 and £6.00 for IC-202 and IC-30A)**

### ICOM® IC-30A

**FOR 70 CMS**

**IC-30A**
An excellent 10W rig for the new repeaters on 70cm. Comes with 433·2 fitted. 5 Crystals for the new FM simplex and repeater channels are included in the price and will be supplied when available. **£250 inc. VAT**

**ANTENNA SPECIALISTS!**
2 metre and 70cm mobile aerials in stock. See page 461 for details.

**SPECIAL NOTICE—ICOM IN N.E. ENGLAND**
Our Northern agent, Peter G3TPX, announces an extension of the Thanet service to VHF and UHF operators in TYNE and WEAR, Co. DURHAM, CLEVELAND and N. Yorkshire.

Nick Sheard, G8KLY, will visit the area WEEKLY and arrange demonstrations and deliveries of ICOM equipment. Phone LEEDS (0532) 535143 evenings and weekends for details or contact Peter direct on 022678 2517. Nick will also arrange mini trade fairs for ICOM/THANET in the NE by arrangement. Club secretaries please note.

### ICOM® IC-3PA

The IC-3PA is more than just a power supply. It provides you with a matching piece of equipment and holding bracket to convert your ICOM mobile into a base station. There is an extra forward facing speaker, but most important of all, the IC-3PA has electronic overload protection which acts far faster than a fuse and removes the supply completely. It is simply reset by turning the mains supply off and on again. It is intended to supply 3 Amps at 13·6V with the overload protection set at 4·5A. Both the overload level and output voltages are adjustable using internal pre-sets. Again—ask for a leaflet.

**REVCO** mobile antennas. An excellent range of $\frac{1}{4}\lambda$ antennas with a stainless steel whip and neat loading coil. The magnetic base is a beauty. All aerials are of the hinged mount type. $\frac{1}{4}\lambda$ whip with loading coil and base **£7.00** + £1 carriage. $\frac{1}{4}\lambda$ whip with loading coil and magnetic base and 3·5 metres of cable **£15.00** + £1 carriage, magnetic base alone with 3·5m cable **£9.00** + 75p carriage.

**APPOINTED AGENT FOR ICOM AMATEUR RADIO EQUIPMENT IN THE UNITED KINGDOM**

**NOTE: ALL OUR ADVERTISED PRICES NOW INCLUDE VAT. CARRIAGE IS FREE EXCEPT WHERE STATED.**

**FREE SECURICOR DELIVERY ON ALL TRANSCEIVERS**

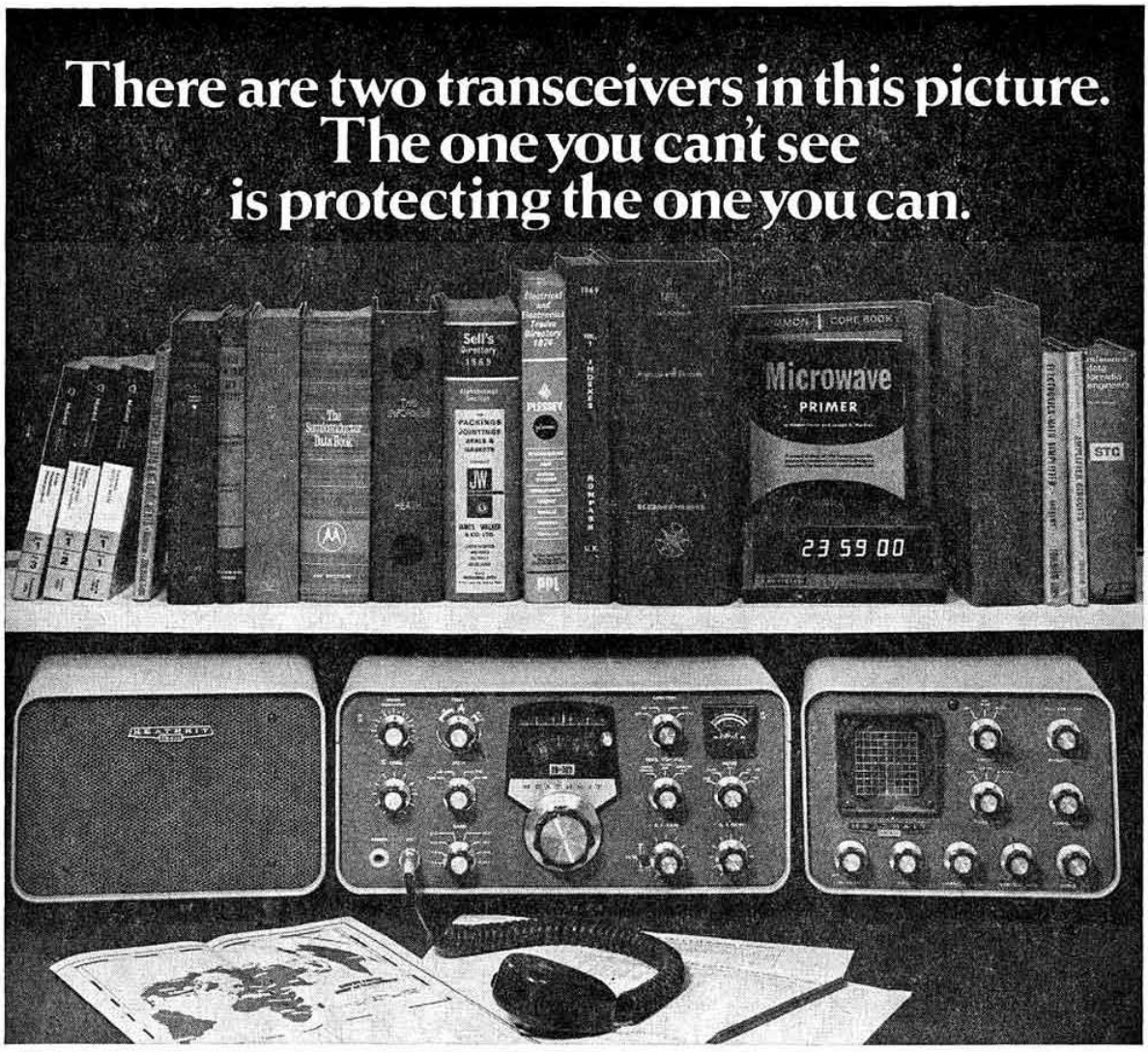
BARCLAYCARD

## THANET ELECTRONICS

**34 Cliff Avenue, Herne Bay, Kent CT6 6LZ. Tel. (02273) 63859**

Access

# There are two transceivers in this picture. The one you can't see is protecting the one you can.




Top shelf, ninth book from the left. The Heathkit GD-39 ultrasonic burglar alarm.

It works by transmitting a silent ultrasonic signal throughout the room. And continuously receiving and monitoring it.

Any movement made by an intruder will then automatically produce a change in the signal. Which can trigger off a lamp, and, thirty seconds later, a remote buzzer (that only you hear—so you can call the police). Or a loud bell, guaranteed to scare the living daylights out of a burglar.

The GD-39 comes to you as a complete kit that can be assembled in only a few hours, with the help of a very easy to follow instruction manual.

And with all that valuable equipment around, it makes a lot of sense.

After all £39.60 is not much to pay for peace of mind.

For full details, send for your Heathkit catalogue today.

Or, if you're 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, Gloucester.

Heath (Gloucester) Limited, Dept. RC-66, Bristol Road, Gloucester, GL2 6EE. Tel: (0452) 29451.

Buzzer and alarm bell are optional extras.

To: Heath (Gloucester) Limited, Dept. RC-66, Gloucester GL2 6EE. Please send me a Heathkit catalogue. I enclose a 10p stamp for postage. HEATHKIT


Name_____

Address_____

_____

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Postcode_____

Monthly budget plan available

# Do you want to know a secret?

Keep it to yourself, won't you, but did YOU know that we have the widest range of VHF and UHF equipment available to meet the most stringent requirements of the discerning amateur radio enthusiast, who is continuously endeavouring to keep his shack up to date without upsetting his bank manager.

It's no secret, though, that we have recently expanded our entire production capacity, enabling us not just to manufacture our standard range of first class VHF/UHF converters and varactor triplers, which have gained world wide acclaim over several years, but to arouse new interest by launching on to the market certain new products such as our 432MHz SSB transverter, 50MHz 6 digit frequency counter and its companion ÷ 10 500MHz prescaler. Even these relatively new products have already earned a valuable reputation both at home and abroad.

This month we are briefly reviewing this wide range, but please do not hesitate to contact us by either post or telephone for any technical details, or to request detailed data sheets for any of the products mentioned below.

## 1296MHz

**MMC1296:** 1296MHz receive converter utilising a hybrid ring mixer, with a matched pair of schottky diodes driving a Mosfet IF amplifier.
IF's: 18–30, 144–146MHz.
Price: £24.30 inc. VAT.

**MMV1296:** 1296MHz varactor tripler. Will accept up to 24 watts of 432MHz drive and achieves 60% efficiency.
Price: £27.00 inc. VAT.

## 144MHz

**MMC144/28:** Single conversion 144MHz receive converter with protected dual gate Mosfets.
Typical gain: 30dB. Noise figure: 2·5dB.
IF's: 12–14, 14–16, 18–20, 24–26, 28–30MHz.
Price: £18.00 inc. VAT.

**MMC144/28LO:** As above unit but has an extra buffer amplifier at 116MHz for use in transverters.
Provides 5mW at 116MHz.
Price: £19.80 inc. VAT.

**MMC144/2:** Double conversion 144MHz receive converter which achieves good image rejection at low intermediate frequencies.
IF's: 2–4, 4–6MHz.
Price: £18.00 inc. VAT.

**MMA144:** Low noise preamplifier with two independent outputs.
Typical gain: 18dB.
Available also for 70 or 136MHz.
Price: £11.70 inc. VAT.

## 70MHz

**MMC70/28:** Receive converter for 70MHz.
Similar to MMC144/28.
IF's: 4–4·7, 14–14·7, 18–18·7, 28–28·7MHz.
Price: £18.00 inc. VAT.

**MMC70/28LO** Similar to MMC144/28LO.
Features buffered local oscillator facility at 42MHz for transverter use.
Price: £19.80 inc. VAT.

## 432MHz

**MMC432:** 432MHz receive converter featuring 2 RF amplifiers and a Mosfet mixer.
Typical gain: 30dB. Noise figure: 3·8dB.
IF's: 14–16, 18–20, 28–30, 144–146MHz.
Price: £19.80 inc. VAT.

**MMV432:** 432MHz varactor tripler. Revised specification allows up to 30 watts of 144MHz drive and achieves 70% efficiency.
Price: £19.80 inc. VAT.

**MMT432:** 432MHz SSB transverter.
Features: 10 watts RMS output power.
30dB receive gain.
3·0dB noise figure.
Aerial changeover achieved by a pin diode switch.
IF's: 28–30, 50–52, 52–54MHz.
Price: £94.50 inc. VAT.

## DIGITAL PRODUCTS

**MMD050:** Six digit 50MHz frequency counter.
Frequency range: 0·45–50MHz.
Input sensitivity: Better than 50mV RMS.
Price: £66.00 inc. VAT.

**MMD500P:** Divide by 10 prescaler to give 500MHz capability when used with **MMD050**.
Fully TTL compatible. Output level is 2·5 volts p.p.
Input sensitivity: Better than 200mV.
Frequency range: 50–500MHz.
Price: £27.00 inc. VAT.

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**Incidentally all of our products are fully guaranteed for 12 months.**

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# RADIO SOCIETY OF GREAT BRITAIN

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

Telephone 01-837 8688

Founded 1913
Incorporated 1926

Member society, International Amateur Radio Union

**PATRON: HRH The Prince Philip, Duke of Edinburgh, KG**

**The national society representing all UK radio amateurs**

Membership is open to all those with an active interest in radio experimentation and communication as a hobby.

Annual membership rates: UK—£8 (including VAT); Unlicensed members under 18 years of age, £3. Overseas—£7.50.

Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

**GENERAL MANAGER AND SECRETARY**
G. R. Jessop, CEng, MIERE, G6JP

**EDITOR**
A. W. Hutchinson

## *CURRENT COMMENT*

### Putting our house in order

In the pages of *Radio Communication* over the past months there have been frequent references to the World Administrative Radio Conference to be held in Geneva in 1979. At this conference the amateur service will be considered in comparison with other users, including broadcasting and the essential services. With the ever-increasing shortage of space in the radio frequency spectrum the delegation representing the amateur service will have a difficult task in justifying the retention of the present amateur bands. Other users will be taking a critical view of the amateur service in an endeavour to increase their own frequency allocation.

It is fortunate that, in general, radio amateurs have a very high standard of operating compared with some of the other services. There does remain, however, a very small minority within our ranks whose operating practice or standard of transmission is not in the best interests of amateur radio.

Anything we can do to improve our image will naturally be to our advantage. In some countries, national societies have successfully organized systems to encourage improved operating practice: specially appointed observers send to the radio amateurs concerned a friendly note of any violation or discrepancy so that the problem may be put right as soon as possible.

Licence irregularities fall into two main categories—technical and operating.

(i) Technical discrepancies may include such items as overmodulation, frequency instability, harmonic radiation and other spurious emissions.

(ii) Operating violations include failing to identify at the prescribed intervals, out of band operating and the deliberate causing of interference.

A suggestion has been made that an Amateur Radio Observation Service be established in the UK, and plans are being made to develop such a system during the next few months so that it will be in full operation in good time for the WARC 1979. While it is inevitable that there will be some who will be against an observation service, most of us will welcome anything which will benefit our hobby. Perhaps the biggest objectors could be our biggest offenders.

*D.M.P.*

# QTC

## amateur radio news

### Club liability insurance

Many clubs and societies do not have adequate insurance to protect them against claims arising from injury to or damage to the property of members of the public. The RSGB reminds members that the consequences of a serious claim can be disastrous for an unincorporated club holding no capital, and these consequences may result in individual members being faced with liabilities quite beyond their means.

There is of course no need for any member to be exposed to such serious liabilities as insurance is readily available at modest cost. The Society's insurers, the Sun Alliance & London Group, 40 Chancery Lane, London WC2A 1JB (attn: Mr P. Davey),will be pleased to give details of a simple insurance scheme which we hope many will consider to be of value.

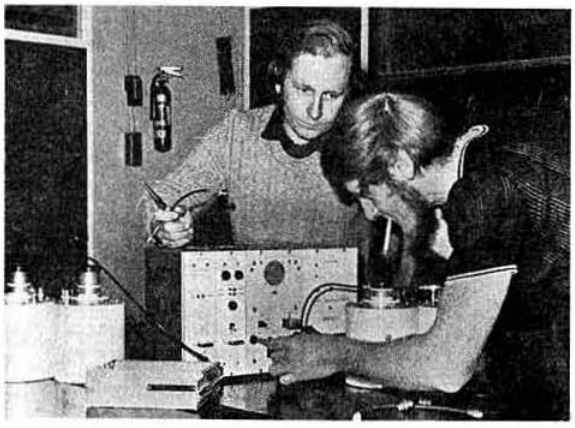
It is recommended that immediate and careful attention be given to this important matter.

### UHF repeater news

A meeting took place between the RSGB and the Home Office on 16 March at which the overall uhf plan was agreed, with some amendments in the London area; both GB3LV and GB3SH are being moved further away from central London in strict compliance with the Repeater Working Group plan. Because of these moves, requested by the Home Office, the final site for GB3SH is not yet known although it is understood that an alternative site has been found. After the submission of the plan, which included 21 new uhf proposals, the GB3CB group had a last-minute site problem, so that, excluding GB3LV and GB3CB but including a new licence for GB3PY, 20 licences were sent to the Society on 7 April. The first of the new repeaters to become operational was GB3CI on 24 April, and this was due to be followed by GB3HR, GB3LV, GB3BD, GB3WS, GB3MR, GB3LL and GB3ST during May.

The Home Office stated that proposals under Phase 2 would be licensed after one year of operation of Phase 1, subject to a high standard of operation by Phase 1 stations. The most likely projected Phase 2 proposals appeared on the uhf planning map published in the April issue of *Radio Communication*, and these and other groups who intend to submit a proposal in Phase 2 should forward all information required by the Society prior to 7 December 1976. A publication entitled *Guide to beacon and repeater licensing* is available on receipt of an sae at RSGB HQ. This is essential reading for groups planning a repeater or beacon.

The phrase "approved in principle", which is used to indicate that the Home Office has agreed to licence a repeater or beacon subject to site clearance and the issuing of a licence, means that the station is acceptable under the rules in force but is just the first step to obtaining a licence.



**GB3CI was built and will be maintained by the Corby Technical College Amateur Radio Group and is sited at the college 470ft asl. It runs 15W erp from two vertical colinear arrays each with 6dB gain. The receiver operates on 434·65MHz and is a simple single-conversion superhet using ICs. The transmitter operates on 433·05MHz, has a crystal oscillator and phase modulation at 13MHz reaching a level of 500mW at 70cm. The main power gain is by a thick-film solid-state module.**

**Transmit/receive isolation is by a four-cavity duplexer. Access to the repeater is by the normal 1,750Hz audio tone. Talk-through time after access is 2min and the callsign in morse is repeated every 8min when the repeater is in continuous use. After a period of 25s with no carrier on the input the repeater automatically closes down.**

**The repeater is here shown being given a final check before installation by Mike Foster, G8AMG, and Chris Stephenson, G4DCD, but many other members of the group were involved in its construction and testing. (*Photo: G3VCQ*).**

### Stolen equipment

Eddystone EC10 Mk2 No 7325 (mods include two extra toggle switches on front panel). Microwave Modules 2m converter 4–6MHz i.f. Information to P. D. Hirons, 8 Hewson Street, Mount Pleasant, Swansea, or to Swansea police.

Beltick 2m fm transceiver, fitted channels S20, 22, R3, R7 with dual tone-burst. Information to G3XSE, QTHR.

### Facts and figures

The Home Office advises that the following numbers of amateur licences were in force at 31 March 1976:

| | | | |
|---|---|---|---|
| Class A | 15,854 | Class B/M | 2,176 |
| Class B | 5,880 | Class F/M | 23 |
| Class A/M | 3,993 | Television | 308 |

The callsign record received from the Home Office dated 30 April 1976 gives the latest callsigns issued in the G4 and G8 series as G4EEF and G8LPF respectively.

### MK Products sstv monitor PCBs

In addition to the boards described in the review of these PCBs in the April issue, MK Products also supply a cabinet which is ready drilled and boards in a wired and tested state. The following up-to-date price list has been supplied by MK Products:

| | |
|---|---|
| Set of six PCBs complete with 20-page instruction booklet | £8.60 |
| Set of PCBs wired and tested ready to drop into a chassis, plus instruction booklet | £42.00 |
| EHT board | £1.10 |
| Low-voltage psu board | £1.50 |
| Chassis and wrap-round, drilled and punched | £8.80 |
| Yellow filter to reduce glare from crt | £1.50 |

All prices include VAT but exclude postage.

# Audio operated squelch

by J. YOUNG, BRS33339*

A SIMPLE way in which to add a squelch facility to an existing receiver is to use the audio output of the receiver to trigger an audio switch. The circuit described below is such a switch, and if it is inserted between the phone-jack and the headphones, modifications to the receiver are unnecessary.

## Circuit description

Bearing in mind that the output of a positive NAND gate will be "high" (logical 1) when any or all inputs are "low" (logical 0) and that the output will be "low" only when *all* inputs are "high", the function of the circuit may easily be understood.

When an input signal drives the base of TR1 positive, the collector current of TR1 increases, pulling the inputs of both gates "low", causing their outputs to go "high". The output of gate 1 turns on the audio switching transistor TR4, while the output of gate 2 turns on TR2. TR2 pulls the other inputs of gate 1 "low", holding the output of gate 1 "high" and the audio switching transistor on. At the same time C2 is charged up via R7.

Should the audio input cease, the collector current of TR1 falls and the output of gate 2 goes "low". The output of gate 1 remains "high" until C2 discharges sufficiently to turn off TR2. This provides the delay necessary to prevent the audio switch from turning off during short pauses in the transmission.

The audio switching transistor TR4, an emitter follower, is reverse-biased in the off state by the voltage developed across D3 and provides isolation of signals up to 500mV. The purpose of C3 is to ensure that TR4 turns off slowly without an annoying click. A good quality capacitor should be used for C3 as any current leakage into the base of TR4 will prevent it from turning off and providing the required degree of isolation.

TR3, ZD1 and R10 make up a 5V regulator to supply the needs of IC1. If it is desired to power the complete unit from a 5V supply, the regulator circuit may be omitted. The collector of TR4 and R13 are then connected to the 5V supply. The supply to the integrated circuit must *not* exceed 5·25V.

The integrated circuit used is a SN7413N dual 4-input NAND Schmitt trigger. It provides a fast turn-on when the input threshold is reached, and without noticeable hysteresis.

## Construction

The circuit was constructed on a piece of Veroboard 2in wide by 4in long, and mounted in an aluminium box. RV1, S1 and the phone-jack were brought out to the front panel. A 14pin DIL socket was used to mount IC1. The only precaution taken was to varnish the underside of the board to prevent the entry of moisture where the tracks had been cut.

* 97 Richmond Avenue, Hillingdon, Uxbridge, Middlesex.

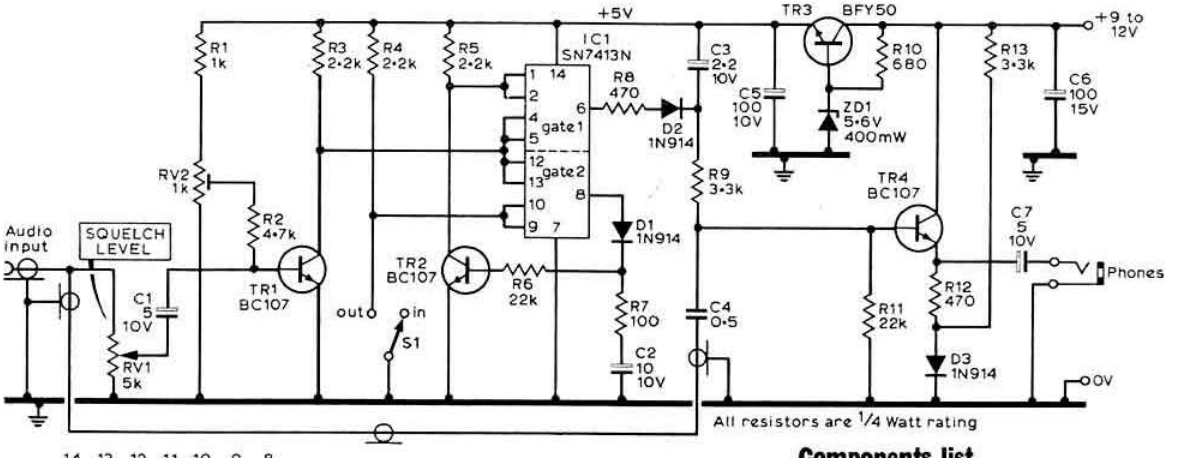



Fig 1. Circuit diagram

## Components list

| | | | |
|---|---|---|---|
| **R1** | 1kΩ ¼W | **C2** | 10μF 10V |
| **R2** | 4·7kΩ ¼W | **C3** | 2·2μF 10V |
| **R3, R4, R5** | 2·2kΩ ¼W | **C4** | 0·5μF |
| **R6, R11** | 22kΩ ¼W | **C5** | 100μF 10V |
| **R7** | 100Ω ¼W | **C6** | 100μF 15V |
| **R8, R12** | 470Ω ¼W | **TR1, TR2, TR4** | BC107 |
| **R9, R13** | 3·3kΩ ¼W | **TR3** | BFY50, 2N3704 |
| **R10** | 680Ω ¼W | **IC1** | SN7413N |
| **RV1** | 5·0kΩ | **D1, D2, D3** | 1N914 |
| **RV2** | 1·0kΩ pre-set | **ZD1** | 5·6V 400mW |
| **C1, C7** | 5μF 10V | | |

### Setting up

Before plugging in IC1, connect a voltmeter between pin 14 of the IC socket and ground (negative). The voltage measured should be 5V.

Plug in the ic and reconnect the voltmeter between pin 6 of the ic socket and ground. Turn RV1 to maximum attenuation (wiper to ground end). Switch S1 to IN. Rotate RV2 until the voltage at pin 6 falls to zero. The closer it can be set to this point, without the voltage rising again, the more sensitive the triggering becomes. Switch S1 to OUT and the voltage at pin 6 will rise again. Return S1 to IN and note that the voltage at pin 6 falls after a short delay. The length of the delay is determined by the value of C2.

Finally, connect the headphones and apply an audio input. Rotate RV1 until the circuit triggers.

### Conclusions

This unit has been in operation at the author's QTH for about six months, during which time it has been used with a number of receivers. Used with a 144MHz fm receiver it does much to relieve operator fatigue. However, its value on the hf amateur bands is a matter for the individual to decide.

The minimum audio voltage needed to trigger the unit has not been measured. It is sufficient to say that it will work at very low headphone levels.

The unit may be constructed in a couple of evenings at a cost of about £1.50. The most expensive item is the SN7413N and this may be purchased for around 30p. □

# oscar news

### Oscar 7 Mode B low-power tests

All users of the 70cm to 2m Mode B transponder of the Oscar 7 satellite are invited to participate in a special three-day low-power (QRP) test which will occur on 16, 17 and 18 June 1976. The test will begin at 0001gmt 16 June when the satellite switches from Mode A to Mode B on Orbit 7245. The final orbit will be No 7282 on Friday 18 June.

All stations using the transponder are urged to run 10W effective radiated power or lower, and those who cannot reduce power to this level are asked not to transmit in the 432MHz uplink passband, since their presence will reduce the effectiveness of the many low-power users who will participate in the QRP test. Signal reports sent should include the erp being used (ie RST569 erp 5W) so that those listening can get an idea of how effective low power can be via Oscar 7 when high-power stations are not appropriating most of the available power.

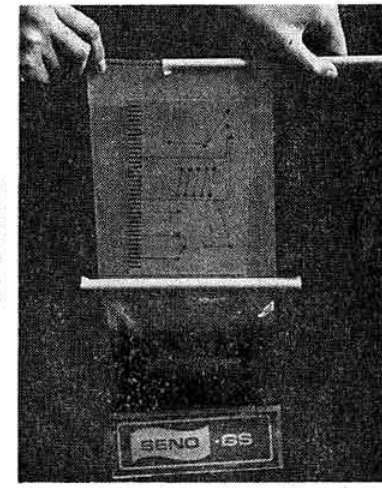
One watt into a 10dB gain aerial system will produce the maximum recommended 10W erp. If an exciter runs 10W or more output, a half-wave dipole will be a big enough aerial to use. However the 10W erp is achieved, the important thing is to run QRP for the three-day test and send the results, with a station description, to AMSAT, PO Box 27, Washington, DC USA.

**Oscar 6** passes in the southern hemisphere are largely in darkness and the battery voltage has dropped to a dangerous level. With immediate effect, only ascending passes on Mondays, Thursdays and Saturdays will be available for use. Do not use the transponder at any other time.

# NEW PRODUCTS

### Seno GS etching system

A new system devised by Decon Laboratories is claimed to solve the safety and convenience problems involved in etching one-off PCBs. The process takes place in a heavy-duty polythene bag with two removable acid-tight seals, one of which separates the etchant from the prepared board. This latter seal is released to commence etching and a visual check on progress can be maintained. When etching is complete the acid is resealed in the container, and the board rinsed and removed for drying. The sealed system is stored in a styrene foam safety box until needed again. Sufficient solution is supplied to etch up to eight Euroboards. When the solution is exhausted, a neutralizing powder supplied with the kit is mixed and the resultant compound is suitable for dustbin disposal.




**Seno GS pcb etching system. The two seals shown ensure clean and safe use of the etching solution**

The Seno GS etching system is available now at a cost of £4 per unit, VAT and postage included. Data sheets are available from Decon Laboratories Ltd, Ellen Street, Portslade, Brighton, Sussex BN4 1EQ. Tel Brighton (0273) 414371.

### Resonant circuits

To save design time and effort, Burns Electronics have designed and manufactured a set of standard resonant circuits covering 85kHz to 205MHz (in 12 assemblies) and using one common printed circuit mounting, six-pin screened assembly. Each consists of a primary tuned winding and a secondary low impedance winding or tap.

A leaflet giving full details of the range of resonant circuits and an applications manual covering the basic theory and practical uses, illustrated by many circuits, is available from the manufacturer. The cost of the manual is 60p post free in the UK. Further information can be obtained from Burns Electronics, 43a Chipstead Valley Road, Coulsdon, Surrey CR3 2RB; tel 01-668 7766. □

# LEARNING ABOUT LOGIC

by P.J. Horwood, G3FRB*

## Part 1. Introduction

THE purpose of these articles is not to explain how integrated circuits are made and how they work, but how to use them.

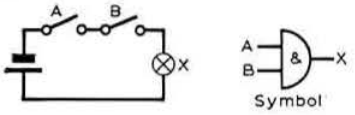
Currently, the commonest and cheapest ics are known as ttl, meaning the basic gate configuration is based on a multi-emitter transistor rather than resistors and transistors (rtl) or diodes and transistors (dtl). However, what follows is equally applicable to all types, and no further mention of the various types will be made until much later in this series when speed of operation and power consumption will be dealt with.

Most textbooks, after dealing with the basic functions of ics, proceed towards their incorporation in calculators and computers, whereas the radio communication technician is much more interested in counters, frequency dividers and frequency synthesizers. It is the intention of this series to take the reader by easy stages to the use of ics in the divide-by-N phase-locked-loop synthesizer.

It is not necessary to consider the physics of transistor action to employ them, neither is it necessary to consider the transistors in an integrated circuit to use it. In fact, it is positively disadvantageous to the initial understanding of logic circuits to get involved in the interior detail of a device which cannot be adjusted or repaired. Later, the reader can find information about loading (fan-out), open collectors, etc in any manufacturer's manual.

### Gates

The logic function of the various gates can be explained by similies with simple dc circuits. Consider the circuit of Fig 1. It is obvious the lamp will be lit only when both switches A and B are closed. If either or both are off, the lamp will be out. This illustrates the function of the AND gate.




| A | B | X |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |

**Fig 1.**

Fig 1 also includes a simple way of showing all the combinations of A, B and X without a lengthy description; this is called a truth-table. The conditions are shown in binary form; a switch is either open (0) or closed (1). Likewise, the lamp is either off (0) or on (1).

A special kind of algebra, known as Boolean algebra, together with binary arithmetic is used in logic circuits and calculations, and a limited amount will be employed in these articles and will be explained as it arises. One should not be put off by this, as it requires simple logical thought! It is interesting to note that Boolean algebra was invented by George Boole early in the last century to solve complex logic problems long before electronics as known today came about.

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A few words about binary arithmetic; it is a very simple system based on powers of two, rather than powers of 10 in the decimal system. Only two numbers are used, 0 and 1, whereas there are 10 values 0 to 9 in the latter.

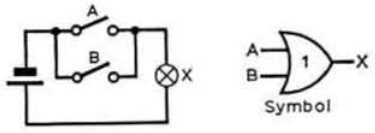
Because of familiarity with the decimal system one does not stop to think that a number such as 247 is made up of successive powers of 10. It could be written as $(7 \times 10^0) + (4 \times 10^1) + (2 \times 10^2)$. This of course equals $7 + 40 + 200$; 247. If the concept of $10^0$ is puzzling it must be explained that any number to the power zero equals 1.

In the same way, a binary number is made up of successive powers of 2. Listed below are some powers of two with their decimal equivalents. The range is infinite and further powers can be generated simply by doubling.

| Binary | $2^6$ | $2^5$ | $2^4$ | $2^3$ | $2^2$ | $2^1$ | $2^0$ |
|---|---|---|---|---|---|---|---|
| Decimal | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

Later, when counting circuits are described, the convenience of the binary system will become fully apparent.

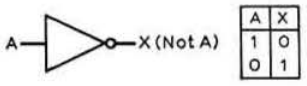
The next type of gate can be illustrated by Fig 2. Here the lamp will be lit if A or B or both are closed. It illustrates the action of an OR gate.




| A | B | X |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 1 |

**Fig 2.**

A further gate can be understood without a simile; it is known as an inverter, or NOT (Fig 3). The convention of writing a bar over a number to indicate its complement will be seen; read as NOT A, or A BAR.

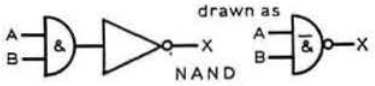



| A | X |
|---|---|
| 1 | 0 |
| 0 | 1 |

**Fig 3.**

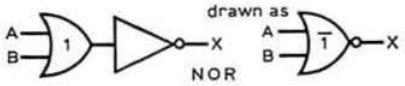
Finally, to the last of the main family of gates, the NAND and NOR.

These are combinations of AND and NOT, and OR and NOT (Figs 4 and 5).



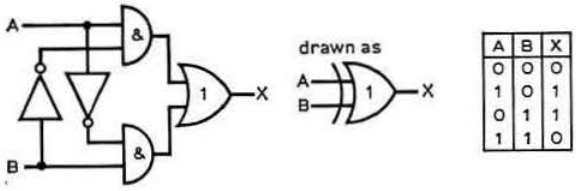

| A | B | X |
|---|---|---|
| 0 | 0 | 1 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |

**Fig 4.**




| A | B | X |
|---|---|---|
| 0 | 0 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 0 |

**Fig 5.**




| A | B | X |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |

Fig 6.

Although we have seen the five basic gates, there is one further development of the OR gate which must be mentioned. The normal OR gate produces a 1 if either *or both* inputs are 1, but there is a need for a device which responds to either input but not to both. This is called an EXCLUSIVE OR. The truth table and the development from AND, OR and NOT gates is shown in Fig 6. The inputs to the AND gates must be either A and NOT B or B and NOT A for the output to change to 1.

In the foregoing descriptions the inputs to the various gates have been limited to two; in practice, ics are available with 2, 3, 4 or more inputs.

## Flip-flops

All the devices so far described respond immediately to the application and removal of a stimulus; in other words, they possess no memory. Nevertheless, from them can be developed the flip-flop which has a rudimentary one. The flip-flop, not to be confused with the multivibrator, has two stable states to either of which it may be switched by a suitable input. Furthermore it remains in that state until another stimulus is received. Like the good soldier, it obeys the last order and remembers it.

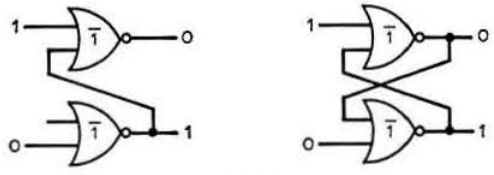



Fig 7.

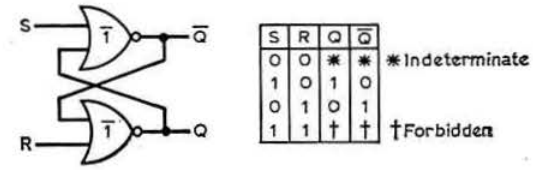
Consider the diagrammatic sequence of Fig 7.

(*a*) If the upper input at present at 1 is removed, the output will not change because it is held at 0 by the output from the lower gate.

(*b*) Because the lower gate input is 0, the uncommitted input can be cross-connected to the upper gate output. There will be no change in the output states. Both inputs can be removed and each gate will be held in its present condition by the cross-connected output from the other gate. If the upper gate input is again made 1, or the lower gate input again made 0, still there will be no change. Only if the lower gate is made 1 will its output become 0; this will enable the upper gate output to become 1, being cross-connected to the lower gate it will hold that gate's output at 0 *even if the lower input is removed.* Both inputs can be removed because it has now flipped to the other self-perpetuating or stable state.

It can be seen there are two stable states, determined by whichever input was last made 1. It is known as a bistable, an alternative name for flip-flop.

The diagram is repeated in Fig 8 with new labels for




| S | R | Q | $\bar{Q}$ | |
|---|---|---|---|---|
| 0 | 0 | * | * | *Indeterminate |
| 1 | 0 | 1 | 0 | |
| 0 | 1 | 0 | 1 | |
| 1 | 1 | † | † | †Forbidden |

Fig 8.

inputs and outputs. The inputs are labelled SET and RESET, meaning a 1 can be set at the Q output by the application of a 1, and Q can be reset to 0 by the application of a 1 to the other input. Note that Q and $\bar{Q}$ are opposite in condition, or complementary. These are the conventional labels for flip-flop outputs. The notes beside the truth-table refer to the conditions marked with a star and a dagger. When a flip-flop is switched on without inputs it cannot be determined whether the Q or $\bar{Q}$ will become 1. The state is indeterminate. The last condition is forbidden because the states of Q and $\bar{Q}$ are in conflict.

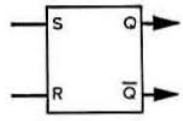



Fig 9.

The standard diagram for an SR flip-flop is shown in Fig 9. Note that the positions of Q and $\bar{Q}$ have been reversed to place Q opposite the SET input.

**Part 2 of this series** will deal with several more complex forms of flip-flop and will progress towards their utilization in counters and dividers. Subsequent parts will explain programming of the basic binary divider to make it divide by decimal numbers, and its use in the phase-locked-loop frequency synthesizer. □

# CATALOGUES RECEIVED

## Doram catalogue

A 12-page leaflet providing details of additions and alterations to the Doram Electronics catalogue is now available. In addition to price reductions (announced before the alteration in the 25 per cent VAT rate) there are a number of new lines. Of particular interest to radio amateurs is the inclusion of a range of modules, transverters and a frequency counter/prescaler manufactured by Microwave Modules.

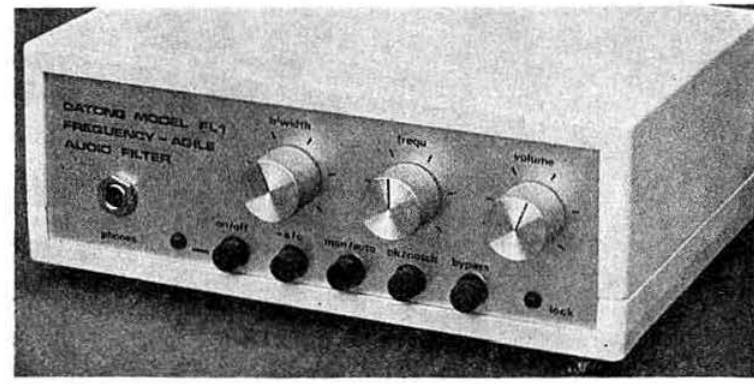
Copies of the catalogue amendment leaflet can be obtained from Doram Electronics Ltd, PO Box TR8, Wellington Bridge Industrial Estate, Wellington Bridge, Leeds LS12 2UF; tel Leeds (0532) 34222.

## Eagle International catalogue

The new Eagle International catalogue comprises 64 pages listing more than 500 different items of which more than 40 are new. A full-colour production, the catalogue is divided into nine sections, each covering a different product, eg hi-fi, audio, headphones, microphones, test equipment. It is available on request from Eagle International, Precision Centre, Heather Park Drive, Wembley, HA0 1SU. □

EQUIPMENT REVIEW

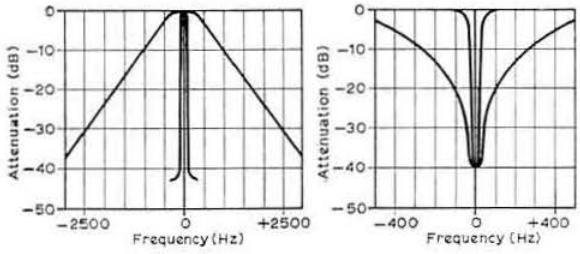
# Datong frequency agile audio filter FL1




by P. J. HORWOOD, G3FRB*

FROM time to time there appear aids to amateur radio operating which become universally accepted standards; for example, the electronic bug key and the rf speech clipper. The Datong frequency agile audio filter deserves to become one of them.

The FL1 is an active filter which may be used as an acceptor or a rejector; its bandwidth is variable from several kilohertz to a few hertz and may be centred anywhere in the audio passband. Fig 1 illustrates typical minimum and maximum bandwidths; responses are shown centred on 2,500Hz. The response curves shown are idealized, the sides are extremely steep and it is very difficult to measure them accurately.




Manufacturer's bandwidths are listed below and were found to be basically accurate.

| | | Max | Min |
|---|---|---|---|
| Passband | −3dB | 1,000Hz | 25Hz |
| | −30dB | 5,000Hz | 140Hz |
| Stopband | −3dB | 800Hz | 20Hz |
| | −20dB | 300Hz | 5Hz |

In practice remarkably small slices of the spectrum can be removed from an audio signal with no noticeable reduction in intelligibility. The peak or notch can be tuned manually through the audio range, or the afc system can be used to allow automatic selection or rejection of a signal. Manual tuning of very narrow bandwidths can be assisted by the selection of a narrow band (100Hz) afc facility.

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## The FL1 on the air

CW operators will find the FL1 a great boon. The reviewer found it an advantage to use the receiver on a wide bandwidth, allowing several signals to appear in the audio passband. Using a moderately narrow acceptor bandwidth the FL1 was tuned across the various signals, selecting them at will and narrowing the bandwidth further, if required, to remove all traces of unwanted signals. AFC can be employed to lock the filter to the wanted signal, the time constant being long enough to span gaps between words. However, on switching to transmit, lock is lost and on returning to receive the afc may lock on some other signal. In this respect the afc facility is of less use than may be initially expected, but it is excellent for other purposes mentioned later.

For the phone operator, unwanted areas of the af spectrum can be rejected to remove "spitch" from adjacent ssb signals. Here the reviewer found it best to employ the filter as an acceptor and to narrow the bandwidth to the minimum consistent with intelligibility. With the passband centred on about 1,500Hz it was remarkable how narrow a bandwidth could be tolerated.

When used as a rejector the FL1 is very good at removing unwanted heterodynes. To artificially produce this condition the bfo was switched on while receiving an a.m. signal; using afc the beat note was virtually inaudible. A rejection of better than 40dB was measured. In fact the filter had to be switched out to convince oneself a beat note really did exist. As the bfo was tuned, the afc tracked with the beat note over a range of more than 300 to 3,000Hz. On the hf bands, interfering continuous tones are relatively rare but the filter on auto-reject made short work of QRM from cw or teletype. In this auto mode the filter can be heard sweeping across the passband every 2s or so, the lock indicator LED lighting approximately 1s after lock is established.

The function of the FL1 can be compared with the Q multiplier, or "selectaject" as older readers may remember it. However, it has the advantage that changing bandwidth does not alter the centre frequency, or vice-versa; plus the greater refinement offered by the auto facility.

Input level from the rx is non-critical; if too low the afc is reluctant to lock, if too high excessive audio distortion may be produced to the extent that the afc attempts to lock on distortion products. The latter condition was not experienced

in practice. The unit incorporates its own power stage producing up to 2W output.

## Construction and appearance, and power supplies

The FL1 is assembled on two PCBs, one above the other; the reviewer was favourably impressed with the quality of construction and components. For instance, the front panel potentiometers are not of the cheap skeleton type found in budget hi-fi equipment. Enclosing the whole, a neat white plastic box fitted with rubber feet supports a front panel carrying essential controls, while the rear panel is provided with DIN sockets for af input, loudspeaker output and external supply. Provision is made to fit a PP9 battery internally; alternatively power may be drawn from an external source of up to 16V, depending on the loudspeaker impedance. Both sources of supply are polarity protected. They may be connected simultaneously; whichever is the highest voltage will switch off the appropriate polarity protection diode and isolate the other supply.

Thus the external supply should normally exceed the voltage of the PP9, which may remain installed for portable or mobile use. Battery state is indicated by a voltage-conscious LED. This switches off at 6·5V as specified, reminding the user to change the battery before it falls to the minimum usable level of 6V. Quiescent supply current was measured as 22mA.

## Conclusions

The only serious criticism which can be levelled at the FL1 is the use of identical 2-pin DIN connectors for loudspeaker output and external supply input. Although the filter itself is unlikely to be damaged, if an external supply were to be inadvertently connected to the speaker socket it could be short-circuited if the filter was in the switched off condition. When so much thought has been spent on the design and construction of the FL1 it is difficult to understand why this inbuilt hazard was tolerated.

Many of today's bolt-on (or plug-in) goodies are more complex than the equipment they supplement. With this in mind the purchase price of £59.38 cannot be deemed to be exorbitant. Datong have a winner here, the reviewer hopes he has given serious operators sufficient reason to consider buying it.

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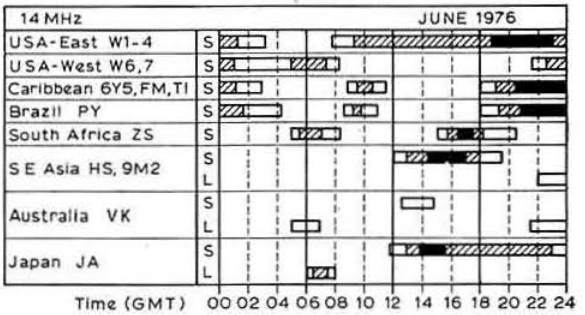
## The manufacturer comments

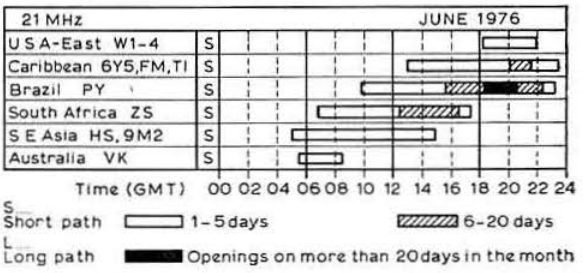
We do not recommend the use of the automatic tuning mode when using the filter in its acceptor mode because the filter will then lock indiscriminately onto any cw signal within the range 300 to 3,000Hz and will jump from one to another at the slightest gap in sending. The effect is amusing to hear but not very practical. The automatic tuning mode is intended for use only when notching out heterodynes in normal applications.

On the other hand, in the manual tuning mode and when the *limited* afc is in action, as it always will be unless –AFC is depressed, the most that the filter can be out of tune on returning to receive is about 80Hz. Therefore in the recommended cw mode the filter can "lock onto some other signal" only if the other signal is *within 80Hz* of the wanted signal. In this fairly rare eventuality one would completely cancel the afc by depressing –AFC.

# Propagation predictions

We regret it has not been possible to include the written predictions this month—*Ed*




## HF propagation study

**Predicted hpfs (MHz × 10) for June 1976**

| gmt = | 00 | 02 | 04 | 06 | 08 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aden | 158 | 144 | 191 | 244 | 239 | 237 | 233 | 238 | 272 | 274 | 211 | 136 | 158 |
| Ascension | 106 | 106 | 106 | 117 | 239 | 234 | 241 | 246 | 257 | 304 | 280 | 191 | 106 |
| Bahrain | 159 | 149 | 194 | 235 | 234 | 230 | 225 | 229 | 256 | 295 | 227 | 153 | 159 |
| Bangkok | 155 | 155 | 194 | 210 | 215 | 211 | 204 | 204 | 216 | 182 | 182 | 157 | 155 |
| Barbados | 182 | 150 | 106 | 131 | 134 | 196 | 220 | 215 | 216 | 224 | 244 | 266 | 182 |
| Bermuda | 181 | 143 | 106 | 100 | 143 | 186 | 205 | 205 | 205 | 205 | 206 | 237 | 181 |
| Bogota | 182 | 150 | 106 | 130 | 133 | 169 | 218 | 211 | 211 | 219 | 232 | 256 | 182 |
| Buenos Aires | 159 | 149 | 135 | 130 | 103 | 143 | 234 | 229 | 234 | 257 | 291 | 233 | 159 |
| Cape Town | 129 | 102 | 96 | 195 | 244 | 244 | 246 | 251 | 276 | 185 | 144 | 138 | 129 |
| Colombo | 129 | 152 | 200 | 233 | 232 | 227 | 220 | 223 | 246 | 169 | 143 | 129 | 129 |
| Cyprus | 153 | 138 | 177 | 218 | 219 | 218 | 214 | 214 | 235 | 272 | 248 | 199 | 153 |
| Dakar | 158 | 138 | 144 | 167 | 239 | 241 | 241 | 246 | 257 | 304 | 317 | 213 | 158 |
| Denver | 180 | 141 | 129 | 105 | 110 | 147 | 166 | 178 | 186 | 180 | 180 | 204 | 180 |
| Fairbanks | 178 | 166 | 166 | 178 | 178 | 185 | 178 | 185 | 178 | 178 | 178 | 178 | 178 |
| Falklands | 125 | 103 | 102 | 106 | 102 | 139 | 223 | 232 | 241 | 272 | 224 | 149 | 125 |
| Gibraltar | 120 | 100 | 89 | 131 | 159 | 159 | 154 | 153 | 157 | 174 | 192 | 161 | 120 |
| Hongkong | 154 | 158 | 183 | 195 | 205 | 204 | 199 | 197 | 206 | 153 | 157 | 168 | 154 |
| Honolulu | 172 | 159 | 159 | 166 | 178 | 191 | 161 | 148 | 180 | 185 | 185 | 178 | 172 |
| Iceland | 82 | 75 | 77 | 97 | 124 | 139 | 147 | 144 | 150 | 141 | 131 | 103 | 82 |
| Jamaica | 181 | 145 | 106 | 130 | 106 | 168 | 208 | 204 | 202 | 204 | 216 | 247 | 181 |
| Lagos | 130 | 130 | 124 | 206 | 243 | 244 | 244 | 251 | 272 | 332 | 256 | 173 | 130 |
| Las Palmas | 166 | 141 | 110 | 169 | 214 | 218 | 214 | 210 | 215 | 239 | 268 | 223 | 166 |
| Lima | 182 | 129 | 110 | 134 | 107 | 114 | 216 | 213 | 221 | 232 | 257 | 271 | 182 |
| Los Angeles | 178 | 148 | 141 | 129 | 105 | 103 | 148 | 173 | 185 | 180 | 186 | 192 | 178 |
| Malta | 134 | 115 | 124 | 164 | 187 | 185 | 181 | 180 | 187 | 215 | 227 | 182 | 134 |
| Mauritius | 106 | 105 | 181 | 244 | 238 | 238 | 238 | 244 | 237 | 152 | 138 | 133 | 106 |
| Mexico | 181 | 143 | 117 | 131 | 117 | 106 | 186 | 197 | 199 | 192 | 199 | 224 | 181 |
| Moscow | 133 | 122 | 158 | 167 | 182 | 181 | 174 | 173 | 174 | 197 | 206 | 176 | 133 |
| Nairobi | 102 | 106 | 168 | 244 | 234 | 241 | 239 | 247 | 279 | 260 | 157 | 107 | 102 |
| New Delhi | 153 | 153 | 199 | 218 | 220 | 216 | 209 | 208 | 229 | 232 | 190 | 161 | 153 |
| New York | 181 | 145 | 111 | 105 | 134 | 172 | 194 | 196 | 197 | 192 | 191 | 208 | 181 |
| Osaka | 167 | 162 | 178 | 180 | 191 | 192 | 192 | 190 | 181 | 164 | 185 | 180 | 167 |
| Perth | 155 | 152 | 200 | 232 | 229 | 225 | 155 | 145 | 133 | 149 | 135 | 119 | 155 |
| Rio de Janeiro | 159 | 144 | 136 | 106 | 105 | 223 | 235 | 232 | 241 | 270 | 296 | 232 | 159 |
| Salisbury | 135 | 107 | 120 | 244 | 243 | 244 | 246 | 253 | 280 | 246 | 148 | 139 | 135 |
| Seychelles | 94 | 107 | 188 | 244 | 228 | 229 | 234 | 242 | 277 | 195 | 110 | 94 | 94 |
| Singapore | 155 | 153 | 199 | 218 | 220 | 216 | 209 | 208 | 158 | 131 | 121 | 98 | 155 |
| Suva (S) | 178 | 166 | 172 | 178 | 185 | 147 | 134 | 120 | 94 | 131 | 178 | 172 | 178 |
| Suva (L) | 169 | 150 | 125 | 164 | 138 | 154 | 141 | 153 | 140 | 135 | 209 | 219 | 169 |
| Sydney (S) | 154 | 158 | 183 | 195 | 204 | 148 | 145 | 134 | 144 | 140 | 128 | 180 | 154 |
| Sydney (L) | 182 | 154 | 112 | 143 | 105 | 105 | 103 | 100 | 101 | 91 | 130 | 199 | 182 |
| Teheran | 155 | 152 | 200 | 233 | 232 | 227 | 220 | 223 | 246 | 290 | 239 | 181 | 155 |
| Vancouver | 172 | 153 | 153 | 166 | 154 | 159 | 166 | 172 | 172 | 180 | 180 | 180 | 172 |
| Wellington (S) | 172 | 166 | 167 | 173 | 164 | 162 | 154 | 154 | 140 | 135 | 186 | 173 | 172 |
| Wellington (L) | 182 | 157 | 131 | 101 | 93 | 92 | 92 | 86 | 79 | 78 | 150 | 197 | 182 |

# technical topics

Pat Hawker, G3VA

JUST occasionally someone says to me "I would like to read *Technical Topics* but it's all rather too technical for me—I learnt my radio in the days of valves". Then I chalk up a failure of communication. For the aim of *TT* is to provide a reasonable balance: items that can be used by the veriest beginner or the oldest old-timer; some by the chap who buys "boxes" but still likes to build his own test gear or aerial tuning units or wire aerials; but also some that report ideas that are only just beginning to be understood, if at all, by the experts. The balance can never be an exact one, but we do seek to provide both simple and sophisticated ideas which are *new*, or a new look at old ideas, or a reminder of ideas that may have been either never seen or forgotten by most readers—not just another variation of what has been published umpteen times before. So if you find a particular item hard going, why not skip on to the next item, rather than giving up altogether. And maybe, later on, you will find time to have another look at the item that seemed so unintelligible the first time around.

## Straight receivers

The other day, picking up the March 1976 issue of *Radio-REF*, my eye was caught by the cover picture of a compact receiver with just three knobs, one prominently labelled "reaction". For reaction (or "regeneration" if we must) still brings back memories to all those who made their first dx contacts with straight O-v-l or l-v-l receivers. How much time and effort we concentrated on achieving a velvet-smooth reaction control free of any threshold effects.

A few years ago it looked as though we might be returning to such simplicity (and low costs) by means of direct-conversion designs; but the modern direct-conversion receiver, though less complex than a good superhet, usually contains many more components than the classical regenerative detector approach.

It is a long time since any "straight" design appeared in *Radio Communication*, though modern designs, based on semiconductors, appear quite regularly in German magazines. For cw operation on the hf bands such receivers can give quite acceptable results; they can also function quite well on ssb (better than they ever did on a.m. stations), though for ssb the direct-conversion homodyne approach is superior.

The French cover picture turned out to be that of a receiver designed by Y. Anatole, F9GY, using two dual-gate MOSFETS as rf amplifier, regenerative detector (Fig 1) plus a conventional af amplifier using two BC109C transistors which, for a total battery consumption of 6mA, provides ample output for headphone reception. F9GY has made his receiver as a monobander for 14,000 to 14,200kHz (another version for 21MHz) but there would be nothing to inhibit the use of bandswitching or plug-in coils (though the coils should be screened to prevent signals leaking past the bandpass input circuit which provides a useful degree of rf selectivity).

Although this design uses a three-gang tuning capacitor (three 12pF sections) there should be little difficulty in alignment if slug-tuned inductors are used; there are, of course, no i.f. transformers or oscillator tracking to worry about, and many users will only want to tune across the cw sections of the bands.

## Magic-eye wide-range gdo

The idea of using a "magic eye" tuning indicator as the indicator for a grid-dip oscillator has a long and respectable history. But there is emerging a generation of amateurs to whom semiconductors have become the "norm" and to whom thermionic devices are no longer associated with measuring and test equipment.

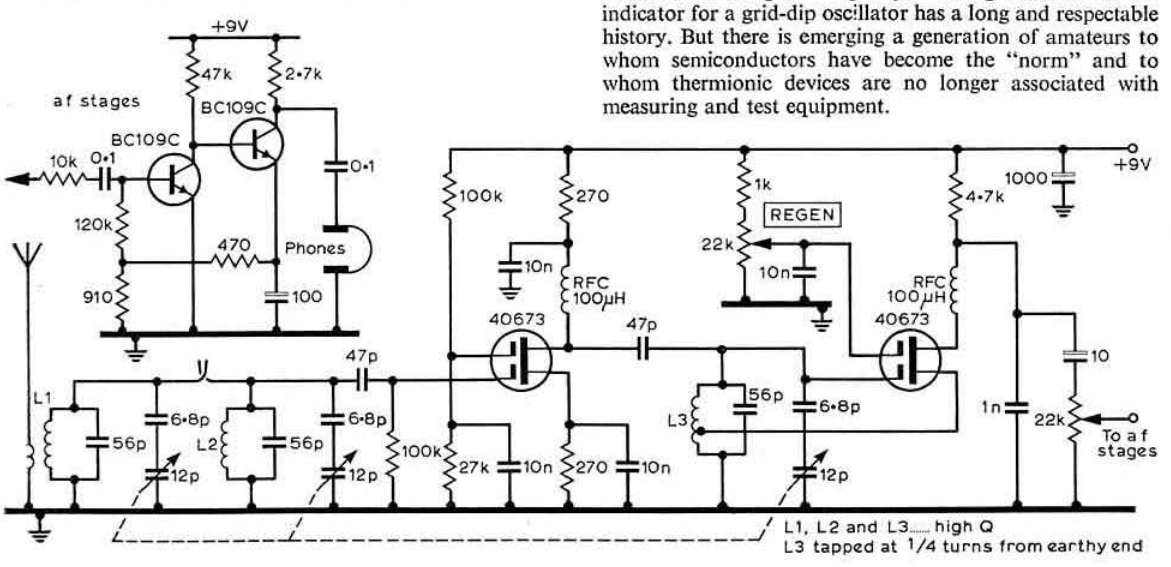



**Fig 1. Front-end of modern "straight" receiver described by F9GY in *Radio-REF*. His design is intended primarily as a monoband cw receiver but could be adapted for plug-in coils. Coils should, however, preferably be shielded to prevent signals leaking past bandpass input circuits**

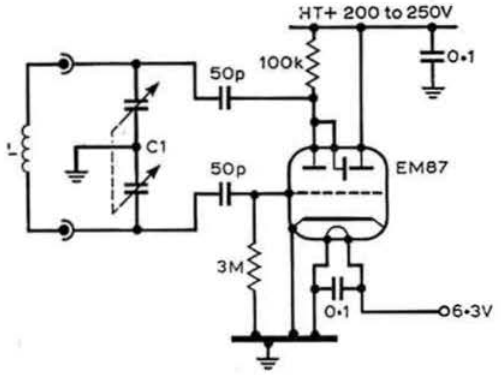



**Fig 2. The wide-range "magic eye" grid dip oscillator described by F. A. S. Sterrenburg in *Radio Electronica*. It is simpler, more compact and more effective than many solid-state dippers although it requires an external 6·3V, 200V power source. Coils (L) as required, the original model uses 11 coils wound on octal tube sockets to cover 60kHz to 160MHz continuously. C1 is Jackson type 0-0 (2 by 176pF)**

So it was with some interest that we recently received a note from F. A. S. Sterrenburg who often contributes to the Dutch magazine *Radio Electronica*, drawing attention to a very simple but effective grid-dipper he described in that periodical (1974, No 2, pp 49-52). He writes:

"The 'magic eye' is not only much cheaper than the combination of meter, amplifier and detector plus rf generator normally employed, but is also more rugged and easier to read. The design shown in Fig 2 reduces the number of components to an absolute minimum. Since solid-state dippers also include a battery and meter they are rarely any smaller or more compact than this EM87 unit which in my case measures 9 by 6 by 4cm. Of course one requires a cable connection to a power supply, but that is less objectionable than one might think.

"In fact when the system was found to work my existing solid-state dipper was immediately scrapped. I found the 'magic eye' dipper to provide the following advantages: (1) despite the rather large tuning capacitor, it was possible to achieve results up to 160MHz without spurious dips (a smaller-value capacitor might be preferable if the unit was required for vhf only); (2) the lowest frequency attainable with a standard 104mH rfc is 60kHz (even lower frequencies could be achieved with a suitable choke if required).

"The incorporation of low-frequency ranges permits the checking of low-frequency crystals (for example FT241 crystals cannot be checked with many dippers), alignment of 450-470kHz i.f. stages, and the lower second or third i.f. sections of such receivers as the BC453 and various National, Hammarlund etc models. In the original article 11 coils on octal valve sockets are specified for the full coverage of 60kHz to 160MHz.

## More on PA0KSB's phase-locked vfo

Recently on 3·5MHz I was more than pleased to receive a call from Klaas Spaargaren, PA0KSB, whose ideas from direct-conversion receivers to a simplified phase-lock-loop vfo have so frequently appeared in *TT*, but with whom this was a first on-air contact. He was busy testing a new 10W transceiver for all bands from 1·8 to 28MHz using a double-balanced mixer front-end. This, he reported, was "really performing fb so can confirm all stories about good behaviour of these mixers". He is currently preparing an article on this rig for *Electron*.

Meanwhile John Hoare, G3PJI, writes to say that he has not seen any follow-up on the PA0KSB phase-locked vhf vfo (*TT* July 1975). He feels that it is worth reminding readers that such designs are potentially of enormous usefulness and capable of working really well. G3PJI is currently using such an approach as an external vfo for a multiband receiver, but he has made a few modifications which he feels may be useful to others. He writes:

"The only difficulty with the published version is that (as mentioned) the vfo must be at least 10 times lower than the other frequencies. My experiments indicate that 12 or more times is better, giving a very firm lock. In fact in a 'lash-up' arrangement I can plug in crystals around 37MHz up to 1MHz apart and the vco follows without ever missing.

"If a crystal within the vco range is selected, the system ignores the vfo, a characteristic that could be of interest, for example, to mobile operators who want a calling-channel plus vfo facility.

"If the vco frequency is below the crystal-oscillator frequency, the circuit works similarly, but the tuning 'sense' has to be inverted: this can easily be achieved by inverting the variable capacitance diode and referring it to earth."

G3PJI mentions that he is using an alternative ic, marked SN76660N, which seems to be more readily available and which functions well in this circuit. Since writing the above notes a further enthusiastic letter on this design has come from Geoff Southgate, G3NPI: his comments next month.

## Mini-rig for 1·8MHz

In *TT* (July 1974) and *ART5* (p186) details were given of a very simple little one-transistor cw/a.m. rig built by G3YUQ and using the low-cost BFY50, 51 or 52 devices as a keyed or modulated crystal oscillator. This can provide up to about 0·5W output of cw from a 9V battery and up to about 1W or a little more with a higher-voltage supply.

Thomas Hall, GM3HBT, is one of those who, as an interesting diversion from his normal operation, has built up this mini-transmitter which he runs on 1,840kHz. However, he has introduced a modification which may well be of interest to other readers who use 70Ω aerial systems (either in the form of a dipole fed by coaxial cable or as a quarter-wave against earth). He writes:

"I have never liked using parallel-tuned circuits in the

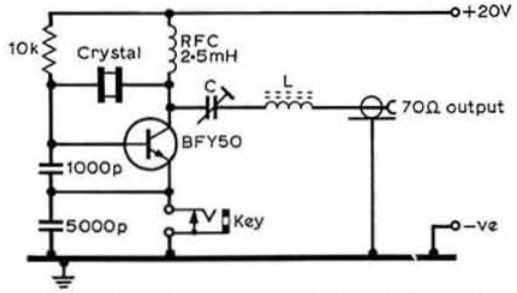



**Fig 3. GM3HBT's modified 1·8MHz mini-transmitter with low-impedance output. Although basically intended for cw it is possible to operate on low-power a.m. by injecting audio into the key socket as described in the original version by G3YUQ. C is 1,250pF trimmer, type TP10. L is 40 turns, 30 swg enam, ⅜in diameter, T-base former**

relatively low-impedance collector circuit of a transistor, finding that it makes efficient matching into low-impedance loads difficult. The use of a series-tuned tank/coupling circuit as shown in Fig 3 simplifies enormously the job of coupling to a 70Ω line without extra aerial tuning units, 'roller-coasters', etc.

"My 70Ω output terminates in a series-tuned atu some 15ft away, feeding a λ/4 aerial. The circuit values have been optimized by experiment and led to my achieving a measured 1·1W output for a dc input of 20V at 110mA.

"This little 'pipsqueak' transmitter has given a very good account of itself from here in Larkhall, Lanarkshire, with RST reports mainly over 559 from as far afield as Inverness to the south coast of England."

## Veroboard—graph paper helps

W. H. Riley, GW3GOC, contributes a useful hint on using graph paper for marking out and wiring up circuits on pieces of Veroboard. He points out that much of the graph paper available in the UK (metrication notwithstanding) is based on 0·1in squares. Such paper coincides precisely with the 0·1in pin-hole spacing of Veroboard: either the centre of each square or the intersections of the horizontal and vertical lines will line up exactly with the Veroboard pin holes.

GW3GOC suggests drawing the wiring diagram on a piece of such graph paper, cut to the size of the piece of board, while having a piece of carbon paper, *carbon side up*, under the graph paper. If this is done one ends up with a circuit lay-out diagram plus, on the back, a reversed diagram.

Then, if one is in the habit of wiring from the copper side of the board, the "top copy" of the diagram can be used; but if, as is usual, one works from the plain (formica) side, the reversed carbon copy drawing can be used as a guide.

Lay the drawing over the Veroboard, insert a few pins through the paper to locate the drawing correctly; then, after carefully checking the drawing and its alignment, insert all the pins and wire up the components.

After wiring, the paper may either be removed or, at least for some applications, left in situ as a handy reference (provided that the conductivity of some inks and some carbon reproductions does not affect operation).

To prove his point, GW3GWO sent along a drawn example, but most readers will have already grasped the idea without visual aid.

## 20V with no transformer

Mobile operators often seek an 18-24V supply in addition to the normal 12V battery in order to allow a transistor pa to be run at full rating. Several inverter units and modifications to achieve this have already been included in *TT*. However, a system described by D. Seigneur, F1VR, in *Radio-REF* (and subsequently in the Swiss *Old Man*, No 3, 1976) is noteworthy in requiring no inverter transformer: Fig 4.

His system consists of a multivibrator oscillator functioning at about 400Hz, followed by a complementary pair (npn/pnp) of power transistors which deliver power alternately. During one period TR3 charges C1 to 12V, while TR4 is "off"; in the following period, TR3 is "off" and TR4 delivers power. The potential at point "A" thus tends towards 24V and the combination D2-C2 maintains this potential.

In a practical arrangement working into load, there will be voltage drops in the transistors, and the output voltage without regulation varies from just under 23V at no load to about

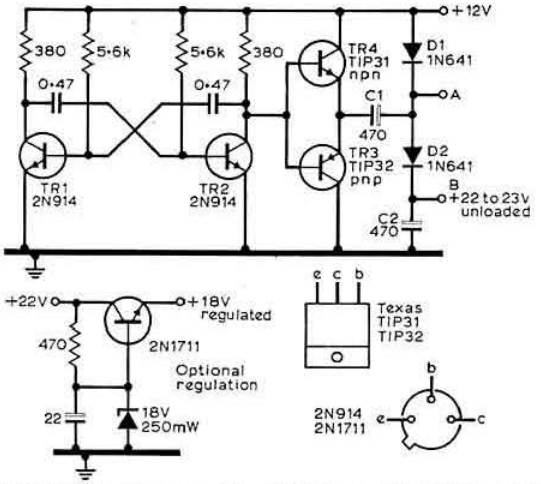



**Fig 4. F1VR's arrangement for obtaining an 18 to 22V dc supply from 12V battery without using a transformer. It provides up to about 250mA at 20V unregulated, or 18V regulated at up to about 170mA**

20V at 250mA. As indicated, a regulator can be added to provide a reasonably steady 18V up to about 170mA.

## Bias for rf power amplifiers

In *Wireless World* (April 1976), C. P. Bartram contributes a "circuit idea" that could be useful to amateurs building transistor linear amplifiers. He notes that many designers use a single forward-biased diode voltage source to bias transistors in Class AB linear mode, requiring careful selection of the diode and making it more difficult to reproduce the design.

Fig 5 provides improved performance as a bias source: typically the arrangement has 1Ω output impedance and ±3% output voltage change for up to ± 2½V input change; it also allows adjustment of the quiescent collector current

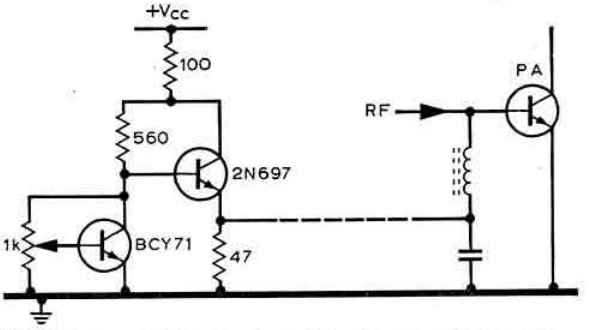



**Fig 5. Improved bias supply system for use with transistor linear rf power amplifiers suggested by C. P. Bartram in *Wireless World***

A pnp silicon transistor (eg BCY71) is used as an amplified diode variable voltage source and a significant degree of thermal stabilization is obtained by mounting this device in thermal contact with the heatsink of the rf power transistor. The emitter follower (eg 2N697) lowers the supply output impedance.

C. P. Bartram notes that the devices shown can be replaced by similar, readily available, devices.

## Linearizing vfo calibration

Several vfo ideas have been described by the Brazilian amateur Jack Perolo in "Considerations for solid state linear VFOs", originally published in *CQ* but spotted recently in *Old Man*, No 4, 1976.

He shows, for instance, that any overdriving of the active device (for example, by using a higher supply potential to increase output) can seriously increase drift. "If more output power from a vfo is needed, one should consider adding amplifiers, properly cascaded, after the vfo, but never even think about overdriving it," he writes. Increasing the voltage applied to a 2·9 to 3·9MHz vfo using a npn bipolar transistor oscillator from 5·2V to 6·7V resulted in a steady drift of 1kHz in 15min (and continuing), whereas under the original conditions drift in this unit, right from switch on, was insignificant (Fig 6).

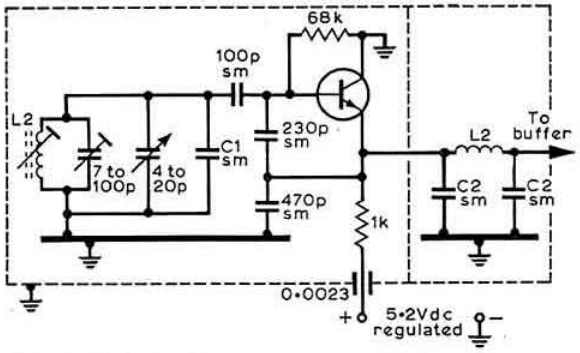



**Fig 6. Typical vfo of type used by Jack Perolo and linearized by careful modification of the variable capacitor**

He also discusses the pros and cons of permeability versus variable-capacitance tuning. In most respects, including size and cost, he comes down in favour of permeability techniques; one exception is that he considers it more difficult to obtain linearity of calibration if the tuning range of a permeability-type vfo is more than about 600kHz.

On the general process of "linearizing" a capacitance-tuned vfo, he advocates careful filing of the plates of the capacitor. "In such a case," he writes, "it is mandatory to use a high-quality variable capacitor of the low torque variety with bearings at both ends. Wide plate spacing is also helpful, as tiny almost invisible burrs from the filing are less likely to short the capacitor. Filing should be done gently, starting from the high-frequency (low capacitance) end, proceeding slowly and using a fine file. After filing, all burrs are removed with steel wool and a brush; then the vfo can be energized and checked against a frequency counter or other reference. Mark with a pencil on the lateral plates where more filing is needed, and start over again. In this way I bring my units to within 1kHz, then I stop filing and adjust finely by slightly bending the rotor lateral plates: this has the advantage of being reversible—filing is not!

"I always set all screws of the vfo with nail lacquer before beginning filing, so nothing will become loose; a small cardboard tray below the capacitor will avoid spreading metal filings around. The complete linearization of a vfo may typically take from five to eight hours, depending on circumstances".

For a permeability-tuned vfo, Jack Perolo believes that series coils are necessary to achieve the correct LC ratio; it is also important to use a coil of high length-to-diameter ratio so that the movement of the tuning slug will not significantly affect the end of the coil which is a source of non-linearity.

When making high-grade vfos it is worth remembering G3PDM's advice that the variable capacitor should be very effectively cleaned, preferably in an ultrasonic bath, just before final assembly. It would seem essential, if filing is adopted, to make sure that no odd metallic fragments are left floating around the capacitor.

## Desoldering those ICs

From *Radio-ZS* (February 1976) comes an ic desoldering tip by ZS5GQ to help cope with the problem of removing 8- or 14-pin dual-in-line devices from printed circuit boards without destroying them. The soldering aid (Fig 7) is described as follows:

"Take a piece of copper tubing with an internal diameter the same as that of the soldering iron (this will usually be about $\frac{1}{8}$ or $\frac{3}{16}$in, and cut off about a 2in length. Slit one end of this tube, for about $\frac{1}{2}$in, and squeeze it to make a tight fit over the tip of the soldering iron. Then flatten the other end of the tubing, using an anvil or similar aid, until a flat surface about 1in long and $\frac{3}{8}$in wide is obtained.

"Next drill 14 holes in the flat section so that they match the configuration of the dual-in-line package. Face off the flat copper end, bend the tubular section so it forms an angle of roughly 45° to vertical, as shown. Place the tubing over the tip of the iron and allow 5 to 10min to heat up. Carefully tin the tip of the tool and place the flat surface onto the ic to be removed so that the holes fall exactly on the 'legs'. Wait a second or two and lift the device off the printed circuit board."

With a little experimenting, ZS5GQ suggests, an add-on tool for an iron may be made to suit almost any ic package.

**Fig 7. ZS5GQ's dual-in-line ic desoldering aid. It can be adapted for other ic packages**

## Quick tips

From *QST*'s "Hinks & Kinks" column we lift a couple of ideas.

(1) Strips cut from plastic bottles make excellent coaxial cable and control cable strapping when used with aluminium tacks or brass screws to resist rusting (paper cutters are better for this job than scissors or snips)—Katashi Nose, KH6IJ.

(2) Nicad batteries that have become lifeless and unable to hold a reasonable charge can be revitalized by placing a pellet of industrial potassium hydroxide (ACS pellets) in each cell bank of batteries, after removing the plugs. The chemical carries the number FW56.11 and sells for about $1 per pound in most areas of the USA—W1CER. (But does anybody know how this is sold in the UK and whether there are any side effects to watch out for?).

# 4-2-70

Martin Dann, G3NHE*

## DX news

We have received from DL7QY details of his recent auroral successes on which we reported briefly last month. During the big opening of 26 March, Claus worked from Berlin his first auroral UA3 stations on 144MHz. These were in locator squares RN, SP, SN and TO, the most distant being UA3SAR in TO29d at a distance of 1,810km. At 1522gmt DL7QY worked I4XCC (GD03d), and later received a report from the Italian station that he had also worked PA0 and DM among the first ever Ar contacts from Italy, as well as hearing GW3NNF. During the subsequent openings of 1 and 3 April DL7QY found signals down on the March event, but worked GM8CMV on 1 April, and GM3VTB and UA3LBO (QO21h) on 3 April.

GD3YEO was unlucky enough to miss much of the 26 March event, but noted that after the fade-out on 144MHz, auroral signals were still audible from SM and OH on 28MHz. On 1 April Richard had his first tone A contact (with GM8CMV) at 1250gmt, and the last station he heard was SM5FVH at 1700gmt.

SM5FVH was the only real dx noted by GW3NNF (Anglesey) during this opening, and Alan worked the Swedish station (in IT25c) at 1625gmt. GW3NNF worked his first station at 1321gmt and was still hearing signals up to 1755gmt. At the outset of the opening the optimum beam heading from Anglesey was 25–30°, moving out to 60° in the middle and back to 25° at the end. During the 26 March opening Alan worked G, GW, DL, F, SP and OK between 1522 and 1833gmt.

## Expeditions

The vhf/uhf summer season would not seem complete without some portable activity from the G8AGU/GM3JFG team, and they do not intend to disappoint us this year. From 7 to 17 June they will be active from GM and possibly northern England. 144MHz will be available, but only as a "source of amusement", the serious activity being on 432MHz and, if the gear is ready, 1·3GHz. The following schedule of operation is planned: 144MHz ssb/cw on a casual basis between 7 and 8.30pm; 432·22MHz ssb, 8.30 to 9.15pm; 432·05MHz cw, 9.15 to 10pm; 1,296·2MHz ssb/cw, plus 432MHz skeds, 10 to 11pm. Morning activity will be decided later. Skeds are welcome, preferably from 10pm onward, but Paul and Iain ask that requests are not left until the last moment (several letters arrived *after* they had left home for the last expedition).

The South Dorset Radio Society will be active from Essex Hill, Alderney, during VHF NFD with the following call-signs: GC3VPF/P (70MHz ssb/cw); GC3SDS/P (144MHz ssb/fm/cw); GC4CNV/P (432MHz ssb/fm/cw); GC3EGV/P (1,296MHz ssb/cw). Expedition organizer G3WAO says that the club hopes to avoid unnecessary wastage and clutter by QSLing via the bureau only if directly requested, or in response to a direct QSL plus sae.

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G3ZXZ and G4ARH will be mounting an expedition to Scotland between 5 and 15 July using 144 and 70MHz ssb and cw. Priority will be given to rare county activity on 70MHz, and suggestions from operators on this band would be welcome by G3ZXZ (QTHR). Activity will be between 6 and 11pm, and the call on both bands will be GM3ZXZ/P. All contacts will receive a QSL card via the bureau, but an sae will bring a direct reply.

Following the success of their holiday/expedition to the Channel Isles last year, the group consisting of G8CUI, G8CTT, G8GGP, G4FAM (ex-G8KNW) and BRS34902 will be repeating the exercise during June. Activity will be on both 144 and 432MHz ssb and the probable timetable of operation will be:

Guernsey, 6–7 June—some operation possible;
Alderney, 8–9 June—6pm onward and possibly some daytime operation;
Sark, 10–13 June—6pm onward and possibly some daytime operation;
Guernsey, 14–20 June—some operation possible.

Although they dislike "rubber stamp" type QSOs, they regretfully ask stations who work them to keep exchanges to a minimum to give as many people as possible a chance. QSLs will only be sent on receipt of the other station's card.

## Seventy centimetres

Despite mediocre conditions for the 432MHz Open Contest on 1/2 May, activity seemed good, and some of the better sited stations were sending serial numbers over the 100 mark towards the end. There was a little Continental activity, and again well-sited stations fared best. ON5UN/P was the most consistent signal in the north, and HB9AMH/P the best dx reported. Harold Meerza, BRS34348, heard nothing further north than G3KMS (YN38a) and G3XDY/P (ZN49j), but recorded G8AGU/P (YL72h) to the west and ON5UN/P, ON5NK/A and several PA0s to the east.

## Two metres

Martin Briscoe, GM8AOB, writes from Fort William in the West Highlands to draw attention to the vhf activity up there. Apart from himself, GM3RFA and GM3WML are active on 144MHz ssb, but as far as they know there are no other 144MHz stations between Kintyre and Cape Wrath (although they would be happy to be contradicted). With the advent of the holiday season bringing mobile and portable stations into the Highlands, GM8AOB promises to monitor 144·3MHz both at home and in his car, and will be pleased to listen out for any station coming into the area.

## Four metres

G3LVP (Benfleet) has been doing a little more analysis into 70MHz activity, and from lists of stations worked during 1975, provided by himself, G3VPS and G3NHE, has come up with a combined total of around the 300 mark. Ken would not like to hazard a guess at the number of stations equipped to operate on 70MHz but suspects that the figure is much higher than the average level of activity would lead one to suspect.

G3LVP found conditions very unstable during the April 70MHz contest, hearing, but not working, G3BW in Cumbria and GM4DMZ/A. He makes a plea for the more remote stations to keep well clear of 70·2MHz during contests, there being too much local activity near this frequency

for weak stations to be heard, let alone worked. He also suggests that it might not be a bad thing if we all spread ourselves out a bit more, instead of crowding into about 40kHz of the band.

## Time-honoured schedule

At the beginning of this year the Tuesday night sked between G5VU of Nottingham (90ft asl) and G6PG on the Norfolk coast (zero feet asl) had reached number 245. The path distance is 100 miles, and basic transmitters have until recently been used at each end, with, at the Nottingham end, only a 4-el aerial in the roof-space of Stan Henton's bungalow.

G5VU now possesses a Liner 2, and because it will not tune below 144·1MHz the Tuesday night schedule has been transferred to 144·11MHz, a point which those who use this sked as an indicator of conditions will wish to note. It reinforces the suggestion made more than once in *4-2-70* that all telegraphy users should consistently tune above 144·1MHz: the amount of activity above that frequency increases weekly, much of it from keyed Liners.

Last year G6PG reached his 50th licensed year, and when asked how he would celebrate the fact he replied that he might go on telephony for the first time in his amateur radio career: his voice has not yet been heard over the air!

## Sporadic-E

One of the best-known specialists in the use of this type of propagation is LZ1AB, Vassil Terziev of Sofia, who must have given quite a few UK vhf amateurs their best 144MHz dx. He hopes to be QRV on 144MHz every day until early August during the present *Es* season. LZ1AB's preferred frequencies for the season will be 144·055MHz for cw and 144·555MHz ssb and fm. Vassil gives special attention to the direction of G and EI and hopes that this year will be even more fruitful than 1975, perhaps even providing a new UK record.

## Awards

Congratulations to G3JXN who, as a result of submitting simultaneous claims for the 432MHz Senior and 1·3GHz Award to add to his existing 144MHz Senior, earns himself Supreme Award No 13. John is now working towards the 70MHz Senior from his west London location, but is finding the going difficult.

**144MHz Senior Transmitting:** No 91, G4AEZ; No 92, G2AMV; No 93, G(GM, GW)4APJ/P; No 94, G8HHI (the first G8H-- to achieve this award); and No 95, G8GHZ.

**144MHz Transmitting:** No 488, GW8CGP.

**144MHz Receiving:** No 31, Norman Henby, BRS28198, of Northiam, whose next target is the 432MHz Receiving Award.

**432MHz Senior Transmitting:** No 27, G3JXN.

**1,296MHz Transmitting:** No 9, G3JXN.

An interesting story of persistence accompanied the 144MHz Senior claim by G8GHZ of Northampton. Despite a good take-off in all other directions, G8GHZ is badly screened to the south and south-west and there appeared to be little chance of working GC. However, a system of finding a clear channel and calling "CQ GC" for 10min during every contest finally paid off after two years of ssb activity when GC3YIZ gave him his 15th country. G8GHZ also offers advice for those wanting a swifter return of QSL cards from Continental stations than the bureau offers. At a cost of 30p a card plus irc can be sent direct, and the address can be found in the *Radio Amateur Call Book (dx listing)* (this should be available in or obtainable by the local reference library).

## Beacon status

| Callsign | Nominal Frequency (MHz) | Status |
|---|---|---|
| GB3SU | 70·695 | Operational |
| GB3SX | 70·685 | Operational |
| GB3GM | — | Not operational, believed defunct |
| GB3GI | 144·137 | Operational |
| GB3VHF | 144·150 | Operational |
| GB3CTC | 144·130 | Operational. Will change to new solid-state transmitter on 144·915 when Home Office notified |
| GB3ANG | 145·950 | Operational. Will change to solid-state transmitter on 144·975 in due course |
| GB3DM | 145·975 | Has been operating on reduced power but now withdrawn for maintenance. Will resume on 144·935 |
| GB3LER | — | Not in use |
| GB3GW | — | Not in use. New proposal being submitted and transmitter under test. Hoped to resume on 144·925 when site found |
| GB3SC | 432·025 | Operational. Will change to 432·89 when Home Office agrees |
| GB3GEC | 432·100 | Not operational. Resumption uncertain, but if so will probably be on 432·85 |
| GB3EM | 432·910 | Operational |
| GB3DD | 1,296·050 | Not operational. Aerial damaged in January gales. Will be reinstalled on new tower (old tower being dismantled) |
| GB3LDN | — | Not operational. Believed defunct |
| GB3WR | 1,296·910 | Licence issued. Awaiting hardware |
| GB3LBH | 10·1GHz | At proposal stage. To be sited at Romford |

G3RKL reports that the 70MHz beacon GB3SU should be radiating more erp after the addition of a second turnstile to the aerial system and the replacement of the indifferent feeder by low-loss coaxial cable. Reports on any difference noted would be appreciated.

## Correspondent required

Des Walsh (EI5CD and ex-G8CEF) of Co Tipperary is actively campaigning for increased vhf/uhf activity in the Republic of Ireland, and hopes to see some well-situated beacons in operation in EI before too long. In the meantime, and in the absence of local activity, Des depends on broadcast signals for propagation pointers. He is very interested in the reception of "over the radio horizon" signals between 40 and 800MHz under varying conditions, and would like to correspond with anyone having similar long distance listening or viewing interests (QTHR).

## Convention 1976

Unfortunately the International VHF Convention at Brunel University took place just too late for the deadline for this issue, but a full report will appear in next month's *Radio Communication*.

**Finally**, the latest date for copy to reach G3NHE for the July issue is 7 June, and for the August issue 7 July.

# microwaves

Dain Evans, G3RPE*

## VHF convention, Munich style

In March the writer was invited to talk at the Bayern Sud VHF Convention, and this provided an opportunity to fulfil a role allotted to the RSGB by IARU—that of sponsoring the 10GHz band within Region 1. The actual lecture/demonstration went well: many of those present were already interested in 10GHz and several had begun to build equipment. It only required a demonstration that there were few frequency stability problems with reasonably well designed equipment, together with an indication of the dx worked by UK stations over optical and ducting paths, to trigger off a most enthusiastic response. By the end of the meeting the first 10GHz beacon had been planned.

The convention had several interesting features. The Saturday afternoon programme had four lectures in two streams, but the main lecture programme consisted of nine lectures given in three streams starting at 9am on the Sunday morning. All were well attended by many of the 300 visitors to the meeting. A valuable feature was that all the lectures were available in a 60-page convention handbook which everyone automatically received. Separate sets of test equipment for bands from 144MHz to 2·3GHz were available and well used throughout the meeting. There was a large display (by our standards anyway) of amateur-built equipment with perhaps the emphasis on portable equipment built within strict *weight* limits. This is used in special contests which seem to be popular in that part of the world: the philosophy certainly generates a different set of technical problems.

## An afc system with wide pull-in bandwidth

The bare bones of an afc system with a locking range much greater than usual is shown in Fig 1. The input signal is fed to a discriminator, the centre frequency of which can be changed by altering the bias applied to the varicap diode C. The dc output from this stage is fed to a threshold conducting circuit consisting of two identical zener diodes (Z1 and Z2) connected back to back and in series with a resistor R. When the dc output signal exceeds a predetermined positive or negative value, a voltage is produced at A which is proportional to the amount by which the output exceeds the diode threshold voltage. This changes the capacitance C and shifts

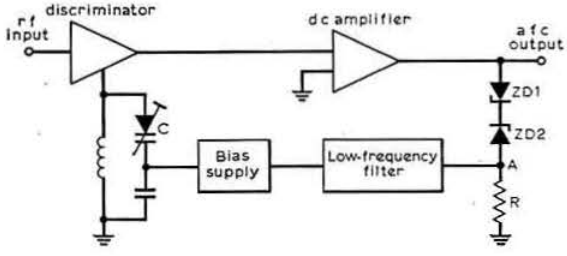


**Fig 1. Schematic circuit of the wide-band afc system**

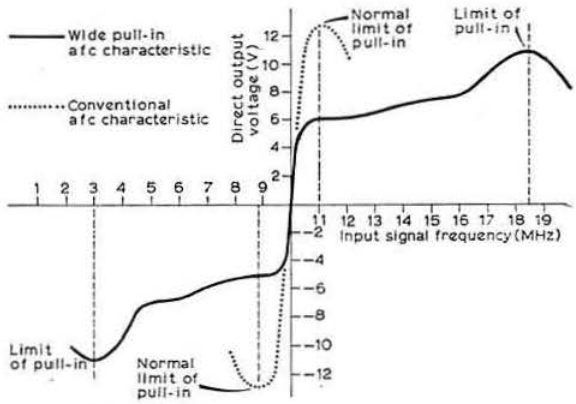


**Fig 2. The wide locking range of the system**

the centre frequency of the discriminator to "chase" the input frequency to bring it back under control.

The wide locking range obtained by this technique is illustrated by Fig 2, which in this case is based on a centre frequency of 10MHz. This technique would seem to be most relevant, and the writer would be happy to pass on details supplied by anyone tempted to get the system working.

## Microwave data sheets

There has been a brisk demand for the data sheets since these were described in the April *Microwaves*. More are in course of preparation and will be publicised when available.

A general request for information on crystal-controlled drivers for the microwave bands has prompted G8ADP to send in details of his approach which seems to be both reliable and reproducible. To generate 128MHz he uses the G8ARV design (*Radio Communication* December 1969, p840), the only modification necessary being to add an extra turn to coils L2 and L3 and substituting a 42·666MHz crystal. The circuit is frequency modulated via the base of TR1. This is followed by a G3XGP amplifier (*Radio Communication* August 1975, p608) which is modified by adding an extra turn to coils L1, L2 and L3. This combination should produce typically 15W at this frequency. In generating 384MHz, he has used the varactor multiplier shown as Fig 5.48 in the third edition of the *VHF/UHF Manual*, although he now prefers a modified Microwave Modules tripler using a BAY96 varactor which is described in Microwave Data Sheet No 7 available via G3JHM.

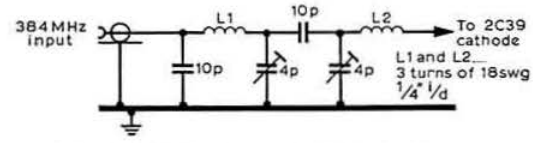


**Fig 3. A 384MHz input circuit to a 2C39 valve**

To generate 1,152MHz, G8ADP has used either a varactor tripler similar to the G8AGN design available as Microwave Data Sheet No. 1, or a 2C39 valve tripler, the dimensions of a suitable cavity for which are given in *Radio Communication* January 1976, p27. A suitable input circuit is shown in Fig 3. The need for high-Q breaks, particularly between varactor stages, is emphasized. □

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

# the month on the air

John Allaway, G3FKM *

ONE of the many interesting aspects of the writer's recent visit to the IARU Region 2 Conference in Florida was meeting friends of many years standing who had previously been merely names and callsigns on the hf bands. The event was a unique opportunity for informal discussion between active amateurs from all over the world (only Africa not being represented), and the ARRL (as host society) is to be very sincerely congratulated on the excellence of the arrangements and also for its helpfulness and hospitality.

It is very possible that, without IARU, there would be little hope for the continuation of amateur radio as we know it now. Since that body depends entirely on subscriptions from member societies (such as RSGB) for its existence every licensed amateur who has a serious interest in the future of the amateur radio service should willingly join his own national society.

Would readers please note that the QSL manager for P29CC ("QTH Corner" March *MOTA*) was incorrectly given as W2HNZ. This should have read W2NHZ.

Eric Trebilcock, very well known as BERS195, is undertaking a world tour this summer, and should be in London in late July and early August.

## Top band news

**160 Metre Activity Period—June 1976**

Daily throughout June and into July from 0000 to 0030 (and later if conditions warrant). The objective of these tests is to make use of the peak north-south paths existing at this time of year. Europeans should transmit in the "dx window"—1,825 to 1,830kHz—and South Americans between 1,800 and 1,808kHz. South Africans will use 1,930 to 1,935kHz. Please keep contacts short if others are waiting, and repeat QSOs should be avoided. It is suggested that after calling CQ one's own frequency is checked first. Previous years have seen very good conditions on some days but these have not been in sequence, so that daily band checks are worthwhile. Please report results to Rolf Rasp, PY1RO, PO Box 51, Rio de Janeiro, RJ, Brasil, and to G3FKM.

## Ex-G Radio Club

The UK secretary, G2FUX, has now received a British licence on behalf of the club with the callsign G4EXG. The club station will be used to contact members of the club and be operated either by G2FUX, or the second operator G8FG (Howard Cunningham—ex 9H1A).

The Ex-G Club net meets every Sunday on 14,347kHz ssb at 1900, and all UK operators are made very welcome if they call in. There is also an Australasian net which meets at 0830 on 14,280kHz on Wednesdays, and the Pacific net at 0500 on 14,346kHz on Saturdays.

Particulars of the club may be obtained from G2FUX, QTHR, or direct from W3HQO, the hon secretary/treasurer.

*10 Knightlow Road, Birmingham B17 8QB.

## DX news

VQ9HCS has now returned to Astove Is following his evacuation after the hurricane of a few months ago. VQ9HS (WN3SHX) operated from Agalega as VQ9HS/3B6 for a few hours on 17 April. Alex, 3B8DA, has had to abandon his projected activity from St Brandon due to a change in his work plans.

The 9L3SL expedition did not reach Turtle Is, but operated from Banana Is. There seems to be a new station on the air from Sao Tome in the form of CR5LB who has been noted on 14MHz ssb around 2200. Those looking for a contact with Zaire might look for 9Q5DM who seems to be heard on Tuesdays and Thursdays between 1700 and 1900 on 21,300kHz. QSLs for contacts with this station after 1 March 1976 should be sent via **WB5OAV.**

Andre Sanders, formerly well known as 5Z4KL, is now G3VLB and living in Cumbria.

In the Pacific area KM6EA is reported as saying that the new radio officer with the US Coast Guard on Kure Is is a licensed amateur. VR1AF has been active and is said to be on Ocean Is. Those still needing a contact with Tuvalu might look for VR8A who is often to be heard on 14,223kHz from 0900, and who has a good signal. FO8DO is looking for European contacts each Saturday at 1600 on 14,240kHz. Jim Smith, ex-G3HSR, should be VR4BJ by the time this reaches readers.

AP2AD has been elected president of the Pakistan ARS and will be in Britain soon. AP2ZR seems to be a new licensee and has been reported on 14 and 21MHz ssb. With the expected departure of 8Q6AB for Sri Lanka, the Maldive Is will become a difficult area to contact.

The special call N21ITU was used by WA2EAH during mid-May. AI4ARU was the callsign of the special station set up by the Dade County RC for the use of delegates attending the Region 2 IARU conference in Miami Beach in mid-April.

Those visiting the USA this month may be interested to know that the YL ISSB Convention is due to take place in Long Island City between 24 and 27 June. Full information is available from W0UUE.

JW4EJ and JW7FD will be on the air from Bear Is for about one year. In the same area JW2CF and JW5NM (who are both located in Svalbard) may be joined by JW8KT for a short time. QSLs for all three stations may be sent via LA5NM (see "QTH Corner").

According to the *West Coast DX Bulletin*, W6YY has recently returned from a visit to SE Asia. He found that full and official licensing in Thailand may be re-instated about the beginning of 1977, but that the four licensed amateurs in Burma (XZ2s AD, KN, TH and SY) are unlikely to be able to get back on the air for quite a long time. It seems that Father Moran, 9N1MM, is now back on the air following some period of inactivity connected with a change in the Nepalese telecommunications authority.

Reg Scarrow, G3WWE (ex-ZD3A, 5N2ABD, MP4BHM, A9X and A9XB) has now returned to the UK and may be reached at the address in "QTH Corner".

Ann Buckby, G4EYL, will be in Gibraltar from 26 June to 10 July. She is planning to be active as ZB2YL on all bands 3·5 to 28MHz, and on 144MHz fm. She will welcome contacts with the UK. ZB30ANV was the callsign used by an exhibition station that commemorated the 30th anniversary of the setting up of the RAF club station ZB2A by G8BI.

## QTH Corner

| | |
|---|---|
| **A6XQ** | A. Clampitt, Box 2943, Dubai, United Arab Emirates. |
| **A9XB** | now R. Scarrow, G3WWE, 6 Guildford Close, Worthing, Sussex BN14 7LR. |
| **AI4ARU** | Evelyn Gauzens, 2780 NW 3rd St, Miami, Fla, 33125, USA. |
| **CR5LB** | Luiz Beirao, Box 147, Sao Tome, Dem Rep of Sao Tome e Principe. |
| **FK0KG** | YASME, Box 2025, Castro Valley, Calif, 94546, USA. |
| **HC1XG/HC8** | via WA6PDE, 6209 Rose St, San Diego, Cal, 92115, USA. |
| **HK0AA** | (17 to 22/6/76) HK3DEU, Al Shalo, Apartado Aereo 584, Bogota, Colombia |
| **P29CC** | via W2NHZ, G. Alfano, 168 Woodland Av, Little Ferry, NJ, 07643, USA. |
| **TA1ZB** | via W5QPX, 101 Rita Blanca Trail, Amarillo, Texas, 79108, USA. |
| **VK9XX** | via WB7ABK, 3049 Doris Ct, Lake Oswego, Oregon, 97034, USA. |
| **VR4DA** | via WB8OFG, 650 W. Lincoln, Birmingham, Mich, 48009, USA. |
| **WA3HUP** | new QTH Mary Crider, RD2 Box 5A, York Haven, Pa, 17370, USA. |
| **XJ0NEH** | VE1FQ, 892 Highway 1, Lower Sackville, NS B4E 1R9, Canada. |
| **ZB2YL** | via R. Buckby, G3VGW, 23 Hazel Drive, Spondon, Derby DE2 7DS. |
| **ZB30ANV** | PO Box 292, Gibraltar. |
| **ZD8PL** | Peter Lee, c/o BBC, Ascension Is. |
| **ZD8RW** | via G8BXU, R. G. Weston, 64 Darvel Down, Netherfield, Battle, Sussex. |
| **ZL1GP/K** | 2 George St, Manurewa, Auckland, New Zealand. |
| **ZL3KK/C** | Greg Walsh, 30 Mure St, Mosgiel, New Zealand. |
| **5N2FAX** | via W1WTE, C. P. Anderson, RFD 2, Barre, Vt, 05641, USA. |
| **ex-5Z4KL** | A. Saunders, Derwent School, Cockermouth, Cumbria, CA13 9HF. |
| **5Z4NG** | via DJ3NG, G. Band, Kunibertskloster gasse 1, 5000 Koeln 1, W Germany. |
| **5Z4QQ** | via K7DVK, 9999 SE French Acres Dr, Portland, Oregon, 97266, USA. |
| **9L3SL** | via W4BAA, D. L. Jones, Box 1, Captiva Is, Fla, 33924, USA. |
| **9M8HG** | H. Gray, PO Box 2242, Kuching, E. Malaysia. |
| **9Y4AC** | via VE7BZC, F. Toplak, 45 Amos St, Kitimat, BC, V8C 1A5, Canada. |
| **9Q5DM** | via WB5OAV, L. McJunkin, 323 State St, Gautier, Miss, 39553, USA. |

**RSGB QSL Bureau, G3MI, Bromley, Kent BR2 7YH**

## Dxpeditions

Geoff Barnes, G3AOS, will be operating G3AOS/W4 fixed, portable etc from locations in Florida during June, July and early August. During ARRL FD he will be at the most southerly point of the USA at Key West. He will be looking for UK contacts, especially on 14 and 21MHz. All contacts will be QSLd.

SP6RT and other Polish operators are hoping to operate from Syria and Iraq some time in the near future (at the time of writing no date was available and this operation could have already taken place). A five-day stay in YK, and a week in YI was planned, and frequencies to be used are given as 3,505, 7,005, 14,005, 21,005 and 28,005kHz (on cw) listening up three to five kilohertz. On phone 3,790, 7,080, 14,195, 21,250 and 28,550kHz are mentioned. The expedition will be helped by the N California DX Foundation, to whom QSLs should be directed.

Clipperton Is is again being mentioned in the rumour section. Several groups are said to be interested in making the attempt.

Lloyd and Iris Colvin appear to have had an unfortunate experience when visiting the New Hebrides. Having been assured by the French Charge d'Affaires in Fiji that no visas were needed they were refused landing permission because they did not have them!

The expedition to St Paul Is, previously mentioned in *MOTA* as being due to be carried out by VE3EGS and others in May or June, was postponed due to work commitments. It may be rearranged for the autumn. The VE1ASJ expedition seems to have encountered difficulty over the inclusion of K1RQE and K1RQF on the licence.

At the time of writing, DL7FT was hoping to be in Iraq between 10 and 20 May, together with DJ0UJ. Operation was to be mostly on 14,025, 14,195, 21,025 and 21,290kHz. In the event of delay this information may still be of value. An sae and IRCs will be required for all QSLs as DL7FT has no outgoing QSL bureau available.

An expedition by LCRA to Serrana Bank is planned for the period 0000 17 June to 1800 22 June. The callsign will be HK0AA, and frequencies to be used are given as: 3,530, 7,030, 14,030, 21,030 and 28,030kHz (cw), (±3kHz), and 3,750, 7,080, 14,195, 21,300 and 28,600kHz on ssb (±5kHz).

## Contests

### All Asian DX Contest

1000 19 June to 1600 20 June (phone).
1000 21 August to 1600 22 August (cw).
Single-operator, single-transmitter, all-band only. Entrants contact Asian stations only and exchange RS/T plus age (lady operators give 00). One point per contact, and non-Asian stations use the number of Asian prefixes worked as a multiplier. The final score is QSO points multiplied by the sum of the multipliers on each band. Logs should give time in gmt, indicate new prefixes, and be on separate sheets for each band. A summary sheet showing scoring and the usual signed declaration should be included. Entries should be sent to: JARL Contest Committee, PO Box 377, Tokyo Central, Japan (include sae and irc for copy of results if required). Note that duplicate contacts will result in disqualification. Logs must reach JARL by 30 September (for phone section) or 30 November (for cw section).

### Venezuelan Independence Contest

0000 3 July to 2400 4 July (phone).
0000 31 July to 2400 1 August (cw).
3·5 to 28MHz. Single-operator single- or multi-band, and multi-operator single- or multi-transmitter sections (only one transmitter per band). Exchange RS/T plus serial QSO number from 001. Each contact counts two points, stations in one's own country may only be worked for multiplier. The multipliers are one for each DXCC country or Venezuelan call area worked on each band. Medals will be awarded to continental leaders, and certificates to those in Europe who work at least 10 YVs plus 10 different countries. Logs must be in gmt and indicate new YV call areas and other multipliers. Use separate sheet for each band, and check for duplicates. Post logs no later than 15 September and 15 October respectively to RCV, PO Box 2285, Caracas 101, Venezuela. Please include summary sheet and signed declaration. $2 or the equivalent in IRCs is requested to cover the cost of the certificate.

## Band reports

Conditions have shown their expected seasonal improvement on the 14MHz band and there has been activity on 28MHz—the special activity day organized by BRS25429 being of special interest. A report will be given in July *MOTA*.

Very many thanks to the following for supplying the information from which this section has been compiled: G2HKU, G3HB, G5JL, G6GH, G3KSH, G3NKQ, GW4BLE, G4CWE, BRSs 17567, 25429, 31, 301 and 36713, As 8312, 8428, 8713, 8890, 8946 and 8961, and G15049. A report was also received from IT9XNM.

Stations listed in italics were using cw—the rest ssb.

**1·8MHz. 0300** *W1AW, W2DEO.* **2100** *I4AMO.* **2300** *ZB2CJ.*

**3·5MHz. 0000** HI8RGD, TJ1EZ, VP9HP, 4Z4DX, 8P6AJ. **0100** PY1ELZ, VP2s ABC, LCT, W7RQ, 9Y4SF. **0500** HK0COP, *VE2AQS/TG9*, YN7R, ZF1MA, VP9HE. **0600** TI9PT, *ZLs.* **2000** OE6DK/YK. **2100** ZS1MH. **2200** A2CJP, CT3AB, PY7HS. **2300** EL7F, TA1ZB, W1-W4, ZB2CJ, ZP5AL.

**7MHz. 0100** *VP2LCG* (QSL to K0KJS). **0500** *KH6AT*, LU, *VE7, W6/W7*, XE1CCW, ZP. **0600** *OX3ZM*, VK2, 3, 4, and 7, YV, ZL2. **0700** ZL3NE. **2100** AP2P. **2300** CT3AF, HK0COP, VU2BX, YVs, ZPs.

**14MHz. 0600** AH3FR, AH6UL, KJ6BZ, ZK1DX. **0700** U0AFX (Wrangel Is). **0800** A35AF, AH3FG, FL8JR, *JT1KAA*, KS6DV/KB6, KL7IFM, KM6EA, KX6BU, *VR1AA*, ZK1CL, 5W1s AB, AU, AX. **0900** AH3FF, FO8EM, VR8A, ZK1DA. **1000** KG6JEE, JA. **1100** JAs, 5W1AB. **1200** FG7AN, VS6, YB. **1300** VK9XI, XX, 9G1GK. **1400** CR9AJ, HS5AKW, VK9XI, *VR4CW*, 9V1, 9M2. **1500** AP2AC, 4S7, 9N1MM, 9M8HB. **1600** FK8BW, UA9VH/JT1, VK9KH, VQ9MHS, W6/W7, DL2GG/YV5. **1700** W3AAC/HZ1, KH6, KL7, TL8AR, 3D6BD. **1800** HS1ALA, VU7GV, ZD9GF. **1900** TR8BA, 5U7AG, 9L3SL. **2000** KL7GRP, PY0UG, VK9XX. **2100** CE, CP, CR5LB, HI50RCD, JA, KL7PI, VP8, ZL4BX. **2200** CE0AE, *HC1XG/HC8*, KG6JEO, VP2KK, ZL. **2300** VE7/VE8.

**21MHz. 0900** FR7BE, HZ1TA, JA, VK9XX, ZS. **1000** JA, TA1ZB, TR8VE, *VU2BK*. **1100** AP2SA, DU, VS6, *9N1MM*. **1200** TA1MB, VQ9s DF, HCS, 5R8AL. **1300** FY0BHI, JA, YB. **1400** A4, A9, FR7AT, HS1AKT, ZS5ZY (ex-GW3ZTH), 9M8HB. **1500** A6XQ, CE, VP8HA. **1600** KC4AAC, ST2SA, ZD7SD, 5N2AAJ, 9L3SL. **1700** HC, HI, PY0UG, VQ9HCS. **1800** CE, VP8HA, 9Q5DM. **1900** CE, PY, *ZD8TM*. **2000** OA.

**28MHz. 1000** ZE, ZS, *3B8MS*, 9J2AB. **1200** ZD7HH, ZE, ZS. **1300** ZS3AV, 9J2WR. **1600** EA8NE, EL7F, PY1ZAE. **1800** CE7BV, CX5CY, LU, PY, Europe. **1900** CE, LU, PY, TU2FH, WA4LWL, Europeans.

Grateful thanks to the editors of the following for information extracted: **Long Skip** (*VE1AL/3*), the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0TO*), **CQ Magazine** (*W1WY*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), and the **29 DX Club Newsletter** (*VK6RV*).

Please send all items for the **July** issue **to reach G3FKM** by **9 June**, and for the **August** issue by **7 July**. □

The Propagation Predictions chart and the HF Propagation Study table appear on p435. *Ed*

# IARU meeting

A conference of the national societies in Region 2 (N and S America) of the IARU was held in Miami, Florida, USA, between 11 and 15 April. The national societies represented at this meeting were:

| | | |
|---|---|---|
| Argentina | Ecuador | Nicaragua |
| Bermuda | Guatemala | Paraguay |
| Bolivia | Honduras | Peru |
| Canada | Jamaica | Trinidad |
| Chile | Mexico | United States |
| Colombia | Netherlands Antilles | Venezuela |
| Dominican Republic | | |

Also attending the conference were officers of IARU Region 1, Louis v d Nadort, PA0LOU, and Roy F. Stevens, G2BVN; Region 3, Michael J. Owen, VK3KI; IARU Headquarters, Noel B. Eaton, VE3CJ, Richard L. Baldwin, W1RU, and David Sumner, K1ZND; representatives of the RSGB, John Allaway, G3FKM (President) and Tim Hughes, G3GVV; the Japan Amateur Radio League, S. Hara, JA1AN (President); the Luxembourg Society, Jean Wolff, LX1JW; USKA (Switzerland), Harry Laett, HB9GA; and the Wireless Institute of Australia, D. Wardlaw, VK3ADW (President).

After an opening plenary session the conference split into three committees to consider the papers presented for discussion and decision. On the fourth day a final plenary session was held to ratify the decisions of the committees and to deal with other business including the election of a new Executive Committee to serve until after WARC 1979. The new committee is:

| | |
|---|---|
| President: | V. C. Clark, W4KFC |
| Vice-President: | P. Seiderman, YV5BPG |
| Secretary: | G. Reusens, OA4AV |
| Treasurer: | P. L. Parker, VP9GO |
| Members: | L. P. Caamano, HI8LC; A. Chanes, CE3ABZ; F. Zarrabe, YN1FI |

Regions 1 and 3 of the IARU have already held conferences to determine the policy for 1979, in addition to dealing with a number of domestic items. Broadly, Region 2 adopted the positions already taken by the meetings of the other regions. There is for the first time a co-ordinated world amateur service approach towards the most important ITU conference of the decade.

During and after the Region 2 conference, officers and directors of the IARU and its three regional organizations discussed in depth the problems facing the amateur service in preparation for WARC 79 and the solutions to those problems. The need for close liaison was recognized and also the avoidance of duplication of effort. The representatives of the regions present were able to prepare a basis for a position paper that could be used as a model by all IARU societies (and others, as appropriate). There will be a meeting in Geneva during the IFRB seminar in September 1976 involving G2BVN, K1ZND, VE3CJ, VK3KI and W4KFC at which the document and relevant matters will be finalized.

There is a great deal of work to be done in preparation for WARC 79, particularly in Africa and Asia, and the IARU will continue to co-ordinate this activity and to remain in close contact with all national societies and their administrations.

* * *

During the discussions in Miami the RSGB was represented by the President, John Allaway, G3FKM, and Tim Hughes, G3GVV, chairman of the Society's IARU Working Group, both of whom attended at no cost to the Society.

*G2BVN*

**Representatives of Commonwealth countries at the recent IARU Region 2 conference in Miami. Front row (l to r): Peter Parker, VP9GO; Charles Tweedie, W1DPL/6Y5; Tim Hughes, G3GVV; David Wardlaw, VK3ADW; Michael Owen, VK3KI; Noel Eaton, VE3CJ. Back row, John Allaway, G3FKM; Nick Percival, 9Y4NP; George Spencer, VE4IM; Ron Hesler, VE1SH; Roy Stevens, G2BVN**

# council proceedings

**A brief report of the Council meeting held on 23 March 1976**

**Present:** Dr E. J. Allaway, (President, in the chair), Lord Wallace of Coslany, Messrs C. H. Parsons (IPP), D. J. Andrews, P. Balestrini, J. O. Brown, D. Byrne, D. S. Evans, R. W. Fisher, W. F. McGonigle, J. R. Petty, D. M. Pratt, W. A. Scarr, A. W. Smith, R. F. Stevens, G. M. C. Stone, C. J. Thomas, D. M. Thomas (members of Council), G. R. Jessop (general manager), A. W. Hutchinson (editor), D. A. Evans (minutes secretary).

The President welcomed Lord Wallace and thanked him for demonstrating his interest in the Society.

An apology for absence was received from Mr R. J. Baker.

**Financial Report**

Mr Brown asked for any comments on the six-month accounts ended 31 December 1975.

In reply to a question by Mr D. Thomas he said that depreciation would remain fixed and the deficiency for the year ending 30 June 1976 would be about £14,000. He added that advertising revenue from *Radio Communication* was in a very healthy state.

**Subscription machinery progress report**

Mr Jessop presented Council with information on the viability of the proposed subscription machinery; he had prepared a diagram showing staff wages now and projected staff wages for the next three years, with and without new subscription machinery. Mr Jessop said that if the Society remained with labour-intensive manual systems it would be necessary to employ more staff to handle the present work and future increases efficiently.

Mr Brown reported that he and the general manager had had a meeting with Barclays Bank when arrangements for the purchase of the IBM32 had been agreed. The proposal was that a subsidiary of Barclays Bank, BEFCO, would purchase the machine and lease it to the Society for a cost of £5,627 per annum for five years. After this the rent would drop to a nominal sum of, say, £1 per year, or purchase could be arranged at a nominal sum. Mr Brown detailed the annual costs, and the introductory costs which would also be written off over a period of five years.

Mr Fisher asked how much money would be involved in leasing and writing off introductory costs over the next five years.

Mr Brown said that the Society would probably go into a negative cash flow situation which would gradually recover towards the end of this year. After further questioning on this matter by Mr D. Thomas, Mr Brown said he would write to all Council members and explain in detail how the Society would be affected financially by the introduction of the data processor.

Mr Jessop said that it was important to make a decision because some small structural alterations would be necessary to house the IBM32; the cost was unknown although Mr Brown had allocated a sum of £3,000 for these alterations.

Mr Parsons asked if the projected costs included a programmer and supervisor on the staff at HQ.

Mr Jessop stressed that there would be no necessity to employ a programmer for the IBM32 and this had been one of its attractions. The machine would be used for day-to-day routine work and if it was necessary to modify or adapt programmes at a later stage these would be done as a modification by the software house which was writing the primary programmes. The main supervision and control of the work undertaken by the IBM32 would come under the accounts department and he had accordingly biased the accountant's salary upwards to include this additional supervisory role.

Mr Parsons said the Society would probably not know the full effect of the subscription increase on its income until the end of the year, and he wished this to be put forward as one of the factors relevant to a decision.

Mr Jessop gave a few facts and figures on the amount of work which had to be done by the subscription and accounts departments at present and concluded that in his opinion the Society could not afford to lose the opportunity to go to modern accounting methods.

Mr Parsons said that every Council member would be asked by some members for justification of these new methods.

Mr Jessop said that probably all the Council members accepted that the Society must move forward to achieve an efficient and cost-effective system of operation. In addition most of the financial facts had now been put to Council and that these financial facts had shown, even using pessimistic figures, that the introduction of data processing would be a financial advantage to the Society.

Mr Stone said that it was his clear understanding that at the last Council meeting it had been decided to go ahead and order the IBM32, subject to further information on costs and with the ability to cancel the order if Council really thought that the project was not necessary. In his opinion the biggest job of all was to sell this new approach to the members and that to do this Council members would need simple cost benefit justification from the Society's Treasurer.

Dr Evans said that he thought the members' response to this new form of operation would be largely affected by the way in which the Society put over the facts to members.

Mr Smith said that a lot of work would have to be put into the introduction of this machine into RSGB HQ and, on past form, he anticipated little thanks from the members assuming that the project was successful, but much criticism should the venture fail or prove needless. However, he said it was important to inform the members now about the project in more detail.

Mr Jessop said that the information published to date had been of an introductory nature to inform members of what the Society was doing in order to improve its systems and reduce long-term costs. This had prompted a certain amount of response from members who clearly did not fully appreciate or understand either the vast amount of work which HQ had to do on a routine basis or what the Society was trying to do for its members. A more detailed article was being prepared for publication in the May issue of *Radio Communication*.

Mr Balestrini said that he felt sure that members would be prepared to be convinced of the importance of the project by reasoned argument.

Mr Jessop said that he agreed with Mr Balestrini but it was important to realize that if the Society tried to conduct itself by continual referendum, particularly in an area which concerned the internal workings at RSGB HQ, the Society would be for ever in trouble and difficulty. Mr Jessop invited all Council members to come to HQ for a period of a few days so that they could fully appreciate the vast amount of routine work which HQ had to do.

Mr Stevens said it was now necessary to answer the vital question on the financial viability of the project.

Mr Brown said that although substantial sums of money would be required both for the *VHF-UHF Manual* and the *Radio Communication Handbook*, the situation had been discussed with the bank manager and there was no particular problem. He added that when all was said and done the figures for the introduction of the data processor showed a profit.

Mr Andrews said that this item on the agenda had in fact been a progress report from the general manager, and Council should not waver in its decision. He said that a lot of work had to be done towards the introduction of the data processing machinery and this could not be done positively if the position were constantly under review.

The President drew Mr Andrews' attention to the fact that the order for the data processor was in fact placed subject to its cancellation by Council before delivery date.

Mr Thomas queried the cash flow situation and asked if the Society could afford to use this machinery.

Mr Stone said that he thought the viability of the Periodicals Publishers' Association contract was most important and asked if the Society could get a formal statement from the Post Office. He would also welcome some further explanatory information from the Treasurer on the cash flow projection figures.

The President asked about running two systems in parallel during the introductory period for the machine, and about staff reduction.

Mr Jessop replied that this had been considered and that it had been decided to use the manual system as a back-up for a period of a few months but that this back-up facility would probably not involve extra staff. In the main the staff reduction would take place extremely quickly after the introduction of the machine.

Mr Scarr said that he did not like to see the Society dithering on such an important matter and urged that a firm decision be made at this meeting.

Mr Petty said that, by and large, he thought that many Council members probably did not understand the full implications of going over to modern machinery from the present system and that it was necessary to provide some further information on this matter so that Council members would be fully in the picture.

Mr Byrne proposed that the Society proceed with the data processing project.

After some discussion it was agreed that:

(i) An article explaining the project in more detail be published in *Radio Communication*.
(ii) HQ should continue the considerable work which was involved in order to integrate the data processing machinery into the Society's operation.
(iii) The subject be further discussed at the next Council meeting and a final decision taken.
(iv) The Treasurer would provide Council members with additional financial information.

**Membership and representation**

Summary of the membership situation, January-March 1976:

| | January | February | March |
|---|---|---|---|
| New members | 180 | 106 | — |
| Resignations | 29 | 36 | 41 |
| Deceased | 9 | 10 | 7 |
| Total membership | 19,105 | 19,771 | 19,721 |

It was resolved:

(i) to accept reduced subscriptions from 18 members.
(ii) to waive the subscriptions of 11 members
(iii) to grant life membership to Mr P. V. Lingham, 9M2PV
(iv) to grant affiliation to Caterham Radio Group, Chelsea College Electronic Society, Downside School Amateur Radio Society, Essex Repeater Group, Horndean & District Amateur Radio Club, Leeds University Union Amateur Radio Society, St Dunstan's Amateur Radio Society (Merseyside) and Sussex Coast Repeater Group.
(v) to approve the appointments of Mr J. R. Compton, G4COM, as area representative for Southampton, and Mr P. F. Jobson, G3HLF, as area representative for North-West Kent.

**Citizens' band**

Mr Jessop said that there seemed to be some activity in certain commercial quarters towards the introduction of a citizens' band and he stressed the importance of the Council having a definite view on the subject should it be asked for an opinion or should a citizens' band ever be postulated for the UK.

Mr Byrne said that he was aware that many short-wave listeners had been told of the possibility of citizens' band and that these rumours should be scotched right from the start.

Mr Parsons said that he felt that the answer to the citizens' band was not in the hands of the RSGB Council.

Mr Stevens said that the Society had produced a statement for *Radio Communication*. He did not think it was possible for a citizens' band to operate within the region 27 to 28MHz as this was used at present for tone controlled devices. In addition there was a problem with the media, as citizens' band operators were always identified as amateurs.

Mr Balestrini said that he thought there was considerable commercial pressure in this area.

**Interference Committee**

The President reported a conversation with Mr Swinnerton, chairman of the Interference Committee, concerning the need for new members and a Council representative on the Committee.

Mr Andrews said that he had subsequently agreed to join the Interference Committee to give it representation at Council level. There were three meetings planned for this year.

**Committee minutes**

Council accepted the minutes of the following committee meetings: Telecommunications Liaison (8.1.76 and 26.2.76), Raynet (10.1.76 and 6.3.76), Repeater Working Group (10.1.76 and 7.2.76), Mobile & Exhibition (13.1.76 and 10.2.76), Education (24.1.76), VHF Contests (29.1.76), HF Contests (5.2.76), Membership & Representation (19.2.76), VHF (10.2.76).

The Society had been invited to a meeting with the Home Office to discuss UK frequency planning and amateur requirements in preparation for WARC 79.

Mr Stevens said in reply to a question by Mr Stone that to his knowledge there would be no support in Europe for a band in the 220MHz region, despite its being a prime band advocated by IARU Region 1.

It was reported that the Home Office was making progress on a composite amateur licence, and would shortly be ready to discuss a draft with the Society. Such a licence may be issued for a period of several years and contain authorization for special usage such as mobile, portable etc without the necessity of additional licences.

# your opinion

## Proposed purchase of a data processor

*Following publication of the March issue of* Radio Communication *several letters dealing with the proposal to purchase a data processor were addressed to the editor for publication. In addition, numerous other letters on the same subject were received by the general manager and Council members and all were replied to individually.*

*Publication of the letters to the editor was deferred until after publication of the May issue in which "The case for a data processor" was published, to allow the writers to amend or withdraw their letters after reading this detailed "case". One letter was withdrawn and all the other letters appear below.*

4 March 1976

Sir—The item on the editorial page (March 1976) re purchase of a mini-computer, has finally convinced me that the RSGB is run along the same lines as local and national government, when it comes to spending the taxpayers/members money.

Allowing for inflation, I realise subscriptions must increase, but must they do so with so little apparent attempt at economies.

A recent issue stated that the President elect had offered to forgo the Presidential installation for reasons of economy. This was vetoed by the committee. As only 200 attended from a circulation figure of 19,000, can a one per cent attendance figure justify the expense? The only benefit is a possible increase in membership, which I cannot believe materialised from this social occasion.

Now it is proposed to splurge £25k on a mini-computer to clean up, among other things, the membership records. Computers are only as accurate as the information fed into them and if HQ are incapable of reasonable office work, how could a computer help.

With regard to payments to other than employees, ie Council members etc, for out of pocket expenses and the like, it may not be "fair" but it is well known that if no payments at all are made to elected representatives, there would nevertheless be no shortage of candidates for the positions.

No doubt there are also other places where economies could be made.

I do not say the RSGB should be run on a shoestring but it makes me wonder what the next increase in subscriptions will be, providing of course, there are enough members paying £8 pa, left to pay it. I have, incidentally, renewed my subscription which is due in June.

P. J. Tew, G3MEJ

7 March 1976

Sir—I would like to say that I support the Society's move to acquire some data processing equipment. The speedy availability of information which computers bring about will certainly be of great assistance to the Society in today's economic climate, where money must be used as skilfully as possible.

Introduction of a computer will, hopefully, bring to an end the sending of *Rad Com* to people who are no longer members of the Society, and ensure that subscriptions are paid promptly.

Ian R. Brothwell, G4EAN

8 March 1976

Sir—I see from the March 1976 issue of *Radio Communication* that an order has been placed for an IBM32 data processing machine at an approximate cost of £25,000. While I accept that the Society's members have vested the mandate to manage in the Council and the Finance & Staff Committee, the proposed expenditure raises a number of questions that should be resolved before the six-month cancellation period has elapsed. Perhaps it would be possible for the Society to publish an explanatory article on the subject. In the meantime I submit the following questions for general consideration:

1. What is the computer to be used for?
2. What is the total cost of installation?
3. What alternative methods of acquiring a computer have been considered, since capital is not readily available?

Mr J. O. Brown, G3DVV, Hon Treasurer, states that the Society can save money with the computer and that there will be a vast

improvement in membership records. It is also understood that the proposed IBM32 has a capability in excess of present requirements. What concerns me is that the purchase of the computer may have been proposed solely on the grounds of producing an automated invoicing and subscription-tracking system, with the possibility of using spare capability at some time in the future. If this was the prime objective then surely a more economic and flexible solution would be to acquire a terminal on a low monthly rental basis and buy computer time from a bureau as and when needed?

Total installation and operational costs can vary enormously from the basic cost of the computer. I should like to know, therefore, whether the £25,000 includes not only the cost of the computer but also the software applications package that enables the unique processing of Society business, the transcription of existing data into computer compatible input, the training and salary for operating personnel, a maintenance agreement, and a realistic provision for possible system expansion?

Mr Brown has also highlighted the problem of paying for the computer. I question whether or not the Society should even contemplate the outright purchase of a computer system at this stage. Clearly, the Society is conscious of its cash flow situation and it would seem prudent to consider a leasing arrangement, with a possible termination or purchase option after, say, a 12-month period of evaluation. Indeed, the leasing of a terminal and the purchase of time-shared bureau services may prove to be a better operational and financial solution altogether.

Finally, and I suspect like the majority of members, I find myself short of detailed Society information to make really helpful criticism or positive proposals. However, the intended expenditure of £25,000 did prompt an analysis of the Society's accounts as presented in the November 1975 issue. In simple terms, I view the present situation as follows:

| | | | |
|---|---|---|---|
| **INCOME:** | | | |
| Subscriptions | ≙ £76,000 | | |
| Publication sales | ≙ £11,000 | | |
| | | | ≙ £87,000 |
| **EXPENDITURE:** | | | |
| Staff salaries | ≙ £34,000 | | |
| Other expenditure | ≙ £18,000 | | |
| | | ≙ £52,000 | |
| *Rad Com* costs | ≙ £76,000 | | |
| (Including salaries) | | | |
| Advertising revenue | ≙ +£25,000 | | |
| | | ≙ £51,000 | |
| Meetings etc | | ≙ £5,000 | |
| | | | ≙ £108,000 |
| **BALANCE:** | | | |
| Income less expenditure | ≙ −£21,000 | | |
| Plus 1974 credit | ≙ +£8,000 | | |
| | | | ≙ −£13,000 (1975 Deficit) |

Assuming that the Society's objectives are: (a) to survive, and (b) offer benefits to its members, then top priority must be given to reducing the 1975 deficit of £13,000. Three basic courses of action suggest themselves:

(1) increase income;
(2) reduce expenditure;
(3) do (1) and (2) simultaneously.

Increased income could be obtained by actively selling publications outside the inherently limited markets of the swl and licensed amateur. To reduce expenditure one cannot help but note the high labour element which makes up more than £34,000 of the £108,000 expenditure. The questions that have to be asked are: Does the Society need to employ as many people as it does? Do all employees work efficiently (working hard and enthusiastically is not necessarily the same)? How many people does the Society employ?

To conclude, I was interested to find that by applying simple marginal analysis techniques it can be shown that an 11 per cent increase in income (+£9,570) and an 11 per cent decrease in salaries (£3,740 saved) more than makes up the £13,000 deficit. Perhaps this is the type of data processing that should be the Society's current priority!

Peter Neale, G3UHN

12 March 1976

Sir—Reference the proposed purchase of a data processor—"Current Comment", *Rad Com*, March 1976—Mr Brown is dead right about the raising of the members' eyebrows, and the tone of his paragraph suggests that he personally is somewhat less than dedicated to the idea of such extravagance with money which is not there. The bit about doing the homework and that the figures "appear" to say that the device can save money in the future is prophetic. I can think of one or two people I know who have been involved with computers and the like in relatively small organizations and they have not been too enthusiastic about the cost side of things.

You may record this letter therefore as a protest against the proposed spending of around £25,000 at a time when the Society would appear to be in financial difficulties, and when subscription rates have been increased to a figure which I fear will lead to a perhaps significant numbers of resignations in the next year or so.

J. K. Robinson

9 April 1976

Sir—Reference "Current Comment", March 1976, I notice the final paragraph reads, "which will leave time for further debate and careful thought".

Has the Finance & Staff Committee paid particular attention and satisfactorily costed the following items:

(1) Labour and materials on programming, system analysis and verification. These can account for a considerable sum of money being spent before the computer can function at all.
(2) Labour and materials involved in input and updating input; generally speaking the latter runs away with an abnormal amount of labour in excess of other and slower mechanical systems.
(3) Has the use of other companies' computers on a hired basis been considered in depth. I would expect that computable programmes already exist which could cope with the RSGB membership record problem.
(4) The annual cost for electricity, maintenance and servicing is frequently undercosted.
(5) Computing technology is advancing at a brisk pace, would it not be advisable to hire time on other companies' machines for a period of, say, three years, by which time the merits of buying would be more evident.
(6) From a recent *Times* article on British Airways it seems they are tending to move away from IBM machines, and recent comment in the press has raised some interesting points on the merits of ICL machines. Have the latter been approached to see if they have anything to offer comparable with the IBM machine.
(7) Has the second-hand market been investigated thoroughly.
(8) Has the use of a simple mechanical system using punched cards and geared to a printer been investigated.

K. J. Coll, G8KJC

9 April 1976

Sir—I did mean to write to you after the comment in the March issue on the Society's intention to put in a System/32.

This is a very wise decision and the Society is to be congratulated on its forward-thinking.

Perhaps I am the only radio amateur owning a System/32 in my business. It was the first to be delivered in Scotland in early September 1975. It is the large edition (155 line printer; 9meg disk and 14k processor).

This is the first real "hardware" which I have possessed but it follows some years of experience in using a terminal into a large computer and much of my work being done by a bureau in Telford (owned by another radio amateur who is well known to you and I believe currently advising on your installation!)

System/32 was installed after lengthy staff training sessions and has not been without its teething troubles. By the end of December 1975 we were certainly "in business" with our System/32 and I can only say now that all our applications are operating highly satisfactorily in every respect.

C. O'Hara, CA, ATII, GM4BOM

*From Southampton University ARS* 29 April 1976

Sir—We, the undersigned, would like to express our amazement at the announcement in March 1976 *Radio Communication* ("Current Comment") that Council has ordered £25,000 worth of data processing equipment without any previous reference to the membership of the Society. Furthermore, the article appearing in the May issue has not completely clarified the situation.

The substance of the case put forward in these articles appears to be as follows:

(1) During the repayment period of five years the cost of the system will be £12,000 per annum, to be set against a saving of £16,000 pa.
(2) The service to members will be "vastly improved": for instance members will always receive their subscription reminder and copies of *Radio Communication*, changes of address will be

promptly recorded and subscription records will be kept up to date. The present system is inadequate in these respects.

(3) Book sales are currently handled inefficiently.

Examining these points we see that:

(1) The immediate saving of £4,000 pa is conditional on

(a) the postal rebate for pre-sorted *RadComs* remaining at the present rate;

(b) the projected staff cuts actually being realized.

We are also unable to reconcile the stated suitability of the machine (which is no larger than the average office desk) with the £3,000 estimate for structural alterations to headquarters.

(2) It appears that the present records system is capable of considerable improvement within its present framework; it seems odd that six clerical staff (Fig 2, p332) are required to deal with 75-85 subscriptions per day.

Despite this, we would question the premise that the membership requires a vastly improved service. In the experience of the members of this society only a slight improvement is needed to give a completely satisfactory service—the occasional inaccurate address or lost magazine is not considered serious and could surely be remedied by improvements to the present system.

(3) As regards book sales, the use of data processing is generally accepted as the best solution, but this service could be provided by a bureau.

Further to the issues listed above, we would like to question the apparently paramount necessity for instant read-out capability, which appears to be the main selling point of an in-house data processor. Weekly batch processing (as by a bureau) would be adequate for all normal operations. With queries dealt with by post, transit delays would nullify advantages gained by rapid access, while telephone queries generally require only an assurance that action will be taken.

Dealing with subscription records is not a true data processing problem as nearly all the operations in, say, a subscription renewal are data entry, not processing. Letters have to be opened and read, and decisions made as to validity of payment whether or not a computer is used. The difference in time between marking an index card and typing an entry on a keyboard is insignificant.

If the final decision after due consultation with the membership is that a data processor is to be purchased we would suggest that attention is given to the second user market (no mention of this is made in the aforementioned articles). Small systems are available at reduced cost and with equivalent installation and backup service facilities.

There are several viable alternative systems available and we are surprised that a system commonly accepted to be one of the least cost effective has been chosen. We would like to see published details of the other systems considered and the reasons for rejecting them. £21,000 will buy a true mini-computer capable of supporting both the RPG business language (used on the System/32) and other languages more suited to mathematical operations, thus enabling extra facilities such as contest scoring, scientific analyses etc to be made available.

We feel that, with a project of this magnitude, it is imperative that all the arguments from both sides be publicised in *Radio Communication*. To this end we request Council to postpone the delivery date for six months to permit a full and unbiased discussion of the purchase to take place.

C. J. Bryant, G3WIE; D. C. Davies, G4CEN; M. Hearn, G4AMI; T. D. N. Williams, G3YOZ; A. D. S. Benham, G8FSL; C. W. Debney, G3ZYW; F. W. Baldry, G8IOP; A. V. George, G4ESZ; M. W. Bayes, G4DZC; J. A. Spicer, G8LJU; R. G. Taylor, BRS35936.

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## OTHER LETTERS RECEIVED

The Editor
*Radio Communication*

Sir—Being an "itinerant" member of the RSGB, it is not very often that I experience the luxury of a few days at home. However, it is Easter, and a long weekend from Norway has allowed me to catch up on my reading of the last four issues of *Radio Communication*.

Although the programme planned for my foreseeable future precludes any possibility of my enjoying the privileges afforded me by the terms of my licence, I hope sincerely that the day is not too far distant when, once again, I can enjoy amateur radio. It is my considered opinion, however, that without the continuing strength of the RSGB there might be somewhat less amateur radio to enjoy, and many of our privileges could be lost to us in a very short time.

I would like, therefore, to follow the admirable example shown by G6XM, G5UM and G4DJI, and I enclose my cheque for £25 as a donation towards helping the Society out of its present financial difficulties. As an old-timer, I know and appreciate what the Society has done for us in the past. Without it, an extremely bleak future lies ahead.

A. G. Fowler, GM8SV

The Editor,
*Radio Communication*

Sir—Let me be one of Jack Hum's "1,000 members" ("Your Opinion"—April) to do a little to help the Society's financial position.

I return herewith the fee which I received from you recently for the publication of an article in March *Radio Communication*. The challenge and satisfaction of writing for publication is recompense in itself, so please accept the cheque with my best wishes.

Thomas Hall, GM3HBT

The Editor
*Radio Communication*

Sir—I heartily endorse G5UM's remarks, "Your Opinion" April.

I accept his challenge and enclose a cheque for £10 as a donation to the Society in the hope that it will stimulate 999 other members to do likewise.

What about it, chaps? It is only about 20 packets of fags, which will not do you any good anyway.

M. V. Rubeck, G4DMO

The General Manager
*RSGB*

Dear George—Following Jack Hum's suggestion in the current issue of "The Bull"; sorry, I still prefer its old name, I am enclosing a cheque for £10 to help our worthy Society.

Jack (J. Lees), G2IO

The General Manager
RSGB

Sir—Please find enclosed a completed bankers order for my annual subscription.

Please also find a cheque for £25 which I enclose as a "vote of confidence" in the work that the radio amateurs' "trade union" is doing for all radio amateurs. Keep it up!

S. C. Craddock, G8AGR

The General Manager
RSGB

Sir—I have recently become active in amateur radio after a break of about 20 years. I joined the RSGB a few months ago and bought a s/h KW202. I have always had my RAE but am working on the morse in what little spare time I have, hoping to get my licence before too long.

Things have changed a lot in 20 years—it becomes so much more obvious when you have an almost complete break, than when you are active and see things changing slowly. Anyway—to the purpose of this letter.

First I must congratulate the Society on a really first-class journal. I belong to a good few organizations, large and small; being an electronics engineer by profession I read a cross-section of material from the "comic strip" electronics magazine to the pure professional journals. However, nowhere have I found such an excellent balance between all that can go into a journal. I am most impressed; it is a great credit to all concerned and to the Society as a reflection of its "status" (for want of the right word that eludes me!).

Second, I am very much encouraged in my short while of listening round the bands to find a group of people who set off their hobby and themselves in, to me, an extremely good way. It is really heartening to find a group of people who still believe in good manners and acting as gentlemen—this does not get across exactly what I mean, but you must understand. It is a pleasure and honour to be a member of the Society with such people, and I look forward very much to my contacts when I get on the air. (I am 35 incidentally—to put things in perspective.)

I realize the value of the Society's work and am sorry to understand it has financial problems. I hope many people will be stimulated to send in something to enable the Society to maintain its high standards and to represent the true amateur on the important (but expensive) fronts that are so essential. Hence I enclose a small contribution.

My best wishes to all the Society staff to continue the excellent work they are obviously doing.

John Ford, BRS36618

# contest news

## 3·5MHz Field Day 1976 rules

Members who believe that field days imply low power operation with simple equipment are invited to take part in this year's event. Noisy generators, legions of operators and enormous skyhooks are not permitted so that even the one-man entry should have a good chance.With the change in date there is even the possibility of good weather.

**1. The general rules for RSGB hf contests,** published in the January 1976 issue of *Radio Communication,* apply.

**2. When.** 0900gmt to 1600gmt Sunday 18 July 1976.

**3. Eligible entrants.** Multi-operator and single-operator entries will be accepted. A maximum of two operators per station is allowed.

**4. Contacts.** CW (A1) only in the 3·5–3·6MHz band. It is suggested that operations are confined to the region 3·510–3·550MHz.

**5. Exchanges.** Exchange RST, serial number commencing with 001 and location. The location must be defined by a place name.

**6. Scoring.** 15 points for a contact with a portable or mobile station, five points for a contact with a fixed station.

**7. Power.** The maximum power input to the pa stage must not exceed 10W. The power for all parts of the station must be derived from dry batteries, accumulators, or "natural" sources, eg solar cells or wind generators. The practice of "float" charging from petrol or diesel generators is not permitted.

**8. Aerials.** No part of the aerial is to be more than 35ft above the ground.

**9. Logs.** Column (5) to be headed "Callsign of operator"; column (6) "Location of station contacted".

**10. Award.** The Houston-Fergus Trophy will be awarded to the entrant with the highest checked score.

**11. Entries** must be addressed to the RSGB HF Contests Committee, c/o A. M. Smith, 21 Hamsey Green Gardens, Warlingham, Surrey CR3 9RS.

## Summer 1·8MHz Contest rules

**1. The general rules for RSGB hf contests,** published in the January 1976 issue of *Radio Communication*, will apply.

**2. When.** 2000gmt Saturday 26 June to 0100gmt Sunday 27 June.

**3. Eligible entrants.** All radio amateurs licensed to use 1·8MHz. Multi-operator or single-operator entries will be accepted. There will be two sections:

(a) British Isles stations (single or multi-operator).
(b) Overseas stations (single or multi-operator).

**4. Contacts.** CW (A1) only in the 1·8-2MHz band. County code (three letters) as published in the January 1976 issue of *Radio Communication* must be sent by all British Isles entrants after the report/serial number. Overseas entrants will only send report/serial number.

**5. Scoring.**

(a) British Isles stations. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county, and for the first contact with each new country outside the British Isles.
(b) Overseas stations. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county.

**6. Logs.** Column 5 to be headed "Code received". The county code as sent must be shown on the top of each log sheet. Entries must be addressed to the RSGB HF Contests Committee, c/o R. L. Glaisher, 279 Addiscombe Road, Croydon, CR0 7HY.

**7. Awards.** The winner, second and third placed entrants in each section will receive a certificate of merit.

## 144MHz QRP Contest rules

**0900-1700gmt 25 July 1976**

All entries and checklogs to: VHF Contests Committee, c/o G8ACJ, "Easedale", Woodway, Merrow, Guildford, Surrey GU1 2TF.

The following general rules, published in the January issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11–22.

The power input to the final stage of the transmitter shall not exceed 1W dc or 2·67W p.e.p.

## Contests calendar

| | |
|---|---|
| **6 June** | DF Qualifying Event South Manchester (Rules in April issue) |
| **12-13 June** | HF NFD (Rules in March issue) |
| **19-20 June** | Microwave (Rules in May issue) |
| **20 June** | RSGB Region 1 VHF (Rules in May issue) |
| **20 June** | DF Qualifying Event Chelmsford (Rules in June issue) |
| **26-27 June** | Summer 1·8MHz (Rules in June issue) |
| **3-4 July** | VHF NFD & Listeners (Rules in March issue) |
| **11 July** | DF Qualifying Event Coventry |
| **18 July** | 3·5MHz FD (Rules in June issue) |
| **18 July** | DF Qualifying Event Oxford |
| **25 July** | 144MHz QRP (Rules in June issue) |
| **1 August** | DF Qualifying Event Salisbury |
| **7-8 August** | 70MHz Portable & Listeners (Trophy) |
| **22 August** | DF Qualifying Event Slade |
| **4-5 September** | 144MHz Open & Listeners (Trophy) |
| **4-5 September** | SSB FD (Rules in May issue) |
| **12 September** | DF Final High Wycombe |
| **2-3 October** | UHF/SHF (Rules in May issue) |
| **9-10 October** | 21/28MHz (Rules in May issue) |
| **16-17 October** | 7MHz CW (Rules in July issue) |
| **24 October** | 70MHz Fixed |
| **Oct-Nov** | 432MHz Cumulatives |
| **6-7 November** | 144MHz CW |
| **6-7 November** | 7MHz Phone |
| **13-14 November** | Second 1·8MHz |
| **5 December** | 144MHz Fixed |

## 1975 UHF Open Contest results

Quite a good entry for this contest as usual, but a greater number of entries for the middle frequencies would have been appreciated. The VHF Contests Committee received a letter from Tom Holbert, GM3DXJ, stating that there were five GM stations out during the contest, but they had problems in keeping their dishes aligned due to very high winds.

Certificates will go to winners and runners-up in each band, and to G3PMH/A, the overall leader. *G4CUT*

**432MHz BAND**

| Posn | Callsign | Points | QSOs | Cnty | Best dx | Km | Aerial |
|---|---|---|---|---|---|---|---|
| 1 | G8AYN/P | 94,500 | 84 | HPH | F1BUT | 835 | MB88 |
| 2 | G3PMH/A | 47,305 | 66 | HFD | DC9KK/P | 518 | ? |
| 3 | G3JXN | 41,005 | 52 | LDN | DK3IKA | 550 | MB46 |
| 4 | G4DKN/P | 22,785 | 27 | SRY | F2TU/P | 625 | P18 |
| 5 | G3COJ | 20,025 | 20 | BKS | DC9KK/P | 553 | P14 |
| 6 | G3JQA/P | 22,020 | 29 | SFD | PA0FWS | 533 | MB46 |
| 7 | G3NHE | 18,395 | 23 | YSS | ON5FF/P | 418 | MB46 |
| 8 | G4BWG | 17,015 | 34 | LDN | PA0JOU/P | 450 | P18 |
| 9 | G8DCA | 14,715 | 17 | SXW | DJ9DL/A | 500 | MB46 |
| 10 | G8AZA | 13,190 | 12 | YSN | G8AYN/P | 377 | P18 |
| 11 | GW8BXJ/A | 12,550 | 18 | GWT | F9FT/P | 566 | MB46 |
| 12 | G6XM | 10,780 | 17 | WLT | F9FT/P | 500 | MB46 |
| 13 | G5DF | 10,525 | 25 | BKS | ON5FF/P | 320 | MB46 |
| 14 | G8ATD/P | 8,410 | 17 | BFD | PA0VV | 320 | MB92 |
| 15 | G3XDY/A | 8,060 | 10 | SFK | G8AZA | 263 | MB46 |
| 16 | G5UM | 6,530 | 10 | LEC | ON5FF/P | 475 | P14 |

**1·3GHz BAND**

| Posn | Callsign | Points | QSOs | Cnty | Best dx | Km | Aerial |
|---|---|---|---|---|---|---|---|
| 1 | G3PMH/A | 56,150 | 24 | HFD | G3FYX | 189 | ? |
| 2 | G3RCV/P | 33,975 | 15 | HPH | G3ZYC | 234 | Quad lp |
| 3 | G3JXN | 30,025 | 16 | LDN | G3NHE | 210 | P34 |
| 4 | G3NHE | 20,475 | 10 | YSS | G3WDG/P | 223 | P34 |
| 5 | G6XM | 17,525 | 9 | WLT | G3JXN | 103 | 2 x Quad lp |
| 6 | GW8BXJ/P | 14,825 | 8 | GWT | G3COJ | 163 | Quad lp |
| 7 | G3COJ | 13,500 | 8 | BKS | GW8BXJ/P | 163 | Quad lp |
| 8 | G3FYX | 12,525 | 5 | AVN | G3PMH/A | 183 | Y27 |
| 9 | G3JQA/P | 10,825 | 5 | SFD | G3PMH/A | 180 | 2 x Quad lp |
| 10 | G4DKN/P | 8,550 | 7 | SPY | G6XM | 77 | 2 x 18p |
| 11 | G5DF | 4,125 | 5 | BKS | G6XM | 65 | P21 |
| 12 | G8ATD/P | 2,200 | 3 | BFD | G3JXN | 45 | 4ft dish |
| 13 | G8BKR | 160 | 2 | AVN | G8AII | 19 | 8 slot |

**10GHz BAND**

| Posn | Callsign | Points | QSOs | Cnty | Best dx | Km | Aerial |
|---|---|---|---|---|---|---|---|
| 1 | G3KSU/P | 56,700 | 8 | IOW | G3VPF/P | 88 | 10in dish |
| 2 | GW4BRS/P | 19,700 | 2 | GWT | G8FGD/P | 97 | 4ft dish |
| 3 | G5HD/P | 8,200 | 1 | WLT | G3KSU/P | 82 | 4ft dish |
| 4 | G8BDJ/P | 5,000 | 1 | WSX | G3KSU/P | 50 | 10in dish |
| 5 | G3WJG | 600 | 1 | BKS | G3THQ/P | 6·5 | 4ft dish |
| | G3THQ/P | 600 | 1 | HFD | G3WJG | 6·5 | 10in dish |
| 7 | G8BCO/P | 100 | 1 | SRY | G8ECO/P | 1 | Horn |

**2·3GHz BAND**

| Callsign | Points | Cnty | Best dx | Km | Aerial |
|---|---|---|---|---|---|
| G3RCV/P | 2,850 | HPH | G3WDG/P | 57 | 2ft 6in dish |

**5·8GHz BAND**

| Callsign | Points | Cnty | Best dx | Km | Aerial |
|---|---|---|---|---|---|
| G3THQ/P | 100 | BKS | G3WJG | 1·6 | 20dB horn |
| G3WJG | 100 | BKS | G3THQ/P | 1·6 | 4ft dish |

## DF Qualifying Event Chelmsford

**Date:** 20 June 1976.
**Map:** OS Sheet 168 Colchester and the Blackwater.
**Assembly:** 1300bst for start at 1320bst.
**Location:** Layer Breton Heath outside Hare and Hounds public house NGR 944187 approximately five miles south-west of Colchester.

Intending competitors requiring tea are asked to notify Mr M. P. Hawkins, 24 St Cyrus Road, Colchester, Essex (tel 0206 42453) not later than 11 June 1976.

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The March 144MHz Open Contest results, the First 1·8MHz Contest results and the 7MHz Contest rules have been held over because of lack of space—*Ed*

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# Mobile rallies calendar

**13 June** Elvaston Castle Mobile Rally, Elvaston Castle Country Park, five miles south-east of Derby on the B5010. Talk-in stations from 10am, G3EEO/P on 160m a.m. and ssb, G3ZBI/P on 2m fm S20, ssb on 144·3MHz. The Royal Signals ARS station G4RS will be operating demonstration stations. Bring and buy stalls, grand prize draw, children's rides, sideshows. No charge for entrance to the rally, but car parking costs 20p, coaches 80p. Details from P. Neal, G3WFU.

**13 June** Goole & D ARS Rally, High School, Booth Ferry Road, Goole. Trade stands, entertainment.

**20 June** HMS *Mercury* Mobile Rally.

**20 June** Mobile Rally, Castlewellan Forest Park, Co Down. Details from GI4EMS, 59 Donaghadee Road, Millisle, Co Down.

**27 June** Longleat Mobile Rally, Longleat House, Longleat, nr Warminster, Wilts. Talk-in stations operational on 160, 80 and 2m, 1,920, 3,775kHz and 145·50MHz plus vfo (callsigns to be announced later). Rally opens 10am. Walking df hunt starting at 3pm on 160m, all members of the family can take part. All the usual attractions. No charge for entrance to the rally, but visitors must pay for entrance to Longleat Park. Car parking available. Overnight camping from 6pm, Saturday 26 June. Details from G3ULJ, QTHR.

**4 July** Upton Mobile Rally, The Hill Junior High School, Upton-on-Severn. Talk-in on 2m fm and ssb, G3GJL and G8JC. Trade stands, model aircraft, model steam train, bring and buy, children's games and fancy dress competition, strawberry picking and good canteen. Further details from G3TQD, QTHR.

**18 July** Cornish Radio Amateur Club Rally, Cornwall Technical College, Camborne (venue to be confirmed). Details from G3NKE, QTHR.

**18 July** Anglian Mobile Rally, Stanway School, Colchester.

**7 August** Air Day at HMS *Daedalus*, Lee-on-the-Solent, Hampshire. Talk-in on 2 and 160. Details from G3JMG, QTHR.

**15 August** Derby & D ARS Rally, Rykneld Schools, Derby. Details from G3FGY, QTHR.

**15 August** Pembroke RSGBG Mobile Rally, Regency Hall, Saundersfoot. Rally opens 10am. Talk-in on all bands and modes, mainly 2m fm S20, S22, etc, and ssb 144·300MHz. Free car parking and refreshments at nominal charges. The hall is a few minutes' walk from the beach. Details from GW3XJQ, QTHR.

**22 August** Preston & ARS Mobile Rally, Walton-le-Dale County Secondary School, Preston.

**29 August** Torbay ARS Rally. Newton Abbot Rugby Ground. Details from G3GDW, QTHR.

**19 September** Peterborough Mobile Rally, Walton Secondary Modern School, Mountsteven Avenue, Peterborough. Talk-in on 160 and 2m. Details from G3EEL.

**26 September** Harlow & D ARS Rally. Venue as last year. Details from G3WUX, G8JXU, G3YDI, QTHR.

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# Special event stations

**GB3MGW, 30 May-13 June**
This station will be operational during the Mintlaw, Aberdeenshire, Gala Week. Special QSLs via GM3PIP.

**GB2FES, 5 June**
Operational during the Leyland Festival, Worden Park, Worden Lane, Leyland, Preston, Lancs. The festival commences at midday and continues until about 10.30pm. Three stations will be operated from about 10am on 2 and 80m and the hf bands. No specific talk-in station will be set up but assistance will be given if required. QSL cards will be sent to all contacts. To comply with insurance restrictions the organizers ask that only the stated operators operate the station, and request amateurs attending the event not to ask to do so. The festival is held in a 40-acre park. Entrance fee is 25p. Mobiles visiting the festival are advised to keep out of Leyland town centre from 11am–2pm as a procession will be passing through at that time. Details from G4BEE, QTHR.

**GB3LAS, 12 June**
The Lucas Amateur Radio Group will be operational from Moor Lane, Birmingham, on the occasion of the 45th Lucas Annual Sports Day, on 160m-10m and 2m, from 0010 to 1700.

**GB3SRC, 18-21 June**
Operational during the Silverthorn Radio Club's annual field weekend, Carrols Farm, Chingford. Active on most bands 160–2m.

**GB3GWC, 19-26 June**
Operational during open week activities at George Watson's College, Colinton Road, Edinburgh, on 2m and the hf bands. Details from GM8IQR, QTHR.

**GB2USA, 19 June-6 July**
This station will be operational on all hf bands from Washington, Tyne & Wear, in connection with the United States Bicentennial Celebrations, which that town is marking with week-long celebrations. In 1183 the family of William de Hertburn acquired a house in the village known as Veiss-tsing-tun, a Saxon name signifying the house and homeland of Veiss, and changed the family name to that of the place where they lived, which became Washington. It was from a younger son of that family that George Washington was descended. Special QSL cards will be sent.

**GB2CHI, 3 July**
This station will be operated by members of the Chichester & D ARS during the annual Chichester Gala Day, mainly on 80m.

**GB3WSF, 3 July**
Wildernesse School Fete, Sevenoaks. Active mostly on 80 and 20m. Special QSL cards. Usual family entertainments. Visitors welcome. Details from G4DYF, QTHR.

**GB2JRS, 3 July**
Operational at Joseph Rowntree School, New Earswick, by York Amateur Radio Society.

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# Looking ahead

**30 July-1 August**—RSGB Radio Communication Exhibition, Alexandra Palace, London.
**26 September**—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent.
**16-17 October**—JOTA 1976. JOTA Scout camp and radio teach-in at HMS *Mercury*.
**28-30 October**—ARRA Exhibition, Granby Halls, Leicester.

# 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 alternate issues 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 50p (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. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

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.

**Post to: MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE.**

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## FOR SALE

**Liner 2,** good cond, mic, mobile bracket, manual, £100 ono. Willing to exchange for 2m linear amp or JR310 or similar rx. G8IZN, QTHR. Tel 01-594 2471.

**Trio TS510 80–10m tx/rx** with PS510 ac psu, mic and handbook, fitted with outputs for transverter, £180 ono. G4EML (ex G8IJY, QTHR). Tel Ripley (Surrey) 2472 after 6pm weekdays.

**FR50B 80–10m rx,** exc cond, full 28–30 coverage, WWV, xtal calibrator, in maker's box, £70 ono. *Wanted:* Talkbox for summer, TR2200G, KP202 or similar. G4EPI (ex G8KBX, QTHR). Tel 0277 226146.

**Liner 2,** PA3 fitted, £125. Cambridge as FM10B, S0, S20, S21, R5, R6, R7 fitted, £60, less xtals £40. Pye base tx, mod for fm, with psu 6–40pa, etc, £15. G8HWZ, QTHR. Tel 021-355 1470.

**Drake SPR4,** broadcast and amateur band xtals, AL4 loop aerial, mains dc power leads, £275. Codar PR30 rf preselector, 1·5-30MHz, Codar RQ10Q multiplier filter, pair, £9. Alis, 7 Hillside Avenue, Wembley, London. Tel 01-902 4358 evenings.

**Racal RA17,** perf cond and alignment, comp with sideband adaptor and handbook, £280, no offers please. *Wanted:* GEC, dash mount h/b mobile or Pye Westminster and Pye mobile test equipment. Gearbox assembly for Creed Mod 75 two speed. J. D. Woolliss, 51 Weelsby Road, Grimsby, Sth Humberside. Tel 0472-78209.

**FT500 tx/rx,** similar to FT560, good cond, £160. G4DUE, 18a Spencer Close, Potton, Sandy, Beds. Tel 0767 260552.

**Storno Viscount fm mobile,** suitable for 4m conversion, less control box and lead, £8. G8FUT, QTHR. Tel Taunton 5094 evenings.

**Yaesu FR101 digital deluxe,** £360. FT401B, £315. CW filter, XF-31C, £12. SP401B spkr, £12. All new and boxed. Anglian 2500 linear 2kW, £190. BC221, as new, £30. PBM 14/2m, new, boxed, £17. *Wanted:* Drake L4B. Taylor. Tel 0202 50400.

**Heathkit HW12** with mains psu, Shure 201 mic, spare valves, spkr recently checked over by Heaths, £85 ono. Buyer collects. Park Air 2m tx, nearest offer to £30 considered. Bill Trenchard, 34 Monmouth Street, Bridgwater, Somerset TA6 5E7.

**Superb dx QTH in central Sussex,** six miles from Haywards Heath, London 47min, detached house, three double bedrooms, large lounge, kitchen/breakfast room, oil central heating, integrated garage, greenhouse and sheds in garden of ¾ acre, 3-band quad on 60ft Versatower and 80ft mast for lf aerials, £24,000. Chris Page, G4BUE, QTHR. Tel Newick 2394.

**H/B valve voltmeter,** ranges include 2·5-500V dc 2·5-250V ac, with 6in meter, £12 ono. G4CQZ, QTHR. Tel 0727 57967 after 6pm weekdays.

**Jaybeam 48-el 70cm aerial,** £10, Microwave Modules 70cm converter, i.f. 12-14MHz, £12. G3FNV, QTHR. Tel Chester 35357.

**Trio TR2200G,** fitted S20, S21, S22, R5, R7, R7 input, two months old, £95. Liner 2 with preamp, etc, £125. G8GMF, QTHR. Tel 01-863 9553.

**Liner 2 with mains psu,** £130. Constant voltage transformer, 230V, 250W, £12. 4½ × 4 200μA meter, £3.80. GW8HDH, QTHR. Tel 0792 22287 after 6pm.

**KW201 rx,** 160–10m, extra xtals, vgc, £110. Trio TS500 remote vfo, covers 12·24-12·84MHz, as new, £20. Clayton. Tel Medway 361606 after 7pm.

**500V 150mA** in rack mounting case, £2. Marconi 4m a.m. tx/rx, rx needs aligning, £1. Top band a.m./cw tx, 807 pa, £2. Buyer collects or arranges carr. G3YQV, QTHR.

**Yaesu FT220** 144-146MHz tx/rx, ssb, fm, cw, 10W, £220 ono. G8JAY, QTHR.

**Comp Heathkit station,** SB301 rx, exc cond, SB600 spkr comp with spare valves, £100. SB401 tx, exc cond, spare valves, £100. SB610 scope, spare valves, £30. G3SUS, QTHR. Tel Romford 63007.

**IC22A,** as new, little used, boxed, 10ch tone burst, £140. G3TSO, 11 The Oval, Henlow, Beds.

**Liner 2** with PA3 preamp fitted, recently serviced by supplier, £110. G8KFJ, QTHR. Tel 0632 858905.

**2m TXs,** 522 fm/a.m. vxo xtals mic psu, £15. Ranger tx fm rx fixed, 12V psu, mains psu, £10. BCC69D, 12V psu, 6ch, £10. Heath filter (cw) SBA301-2, £20. PR510 amps Stern stereo preamp, Mullard CRTs, £25. Mini super r/c model aircraft engine, £25. G4BPW, QTHR. Tel 0283 813395.

**R216 ac psu,** wkg, £7 ono. Heath dc psu HP13, wkg, £15 ono. Would exchange for hf tx or 2m equipment, anything considered. Will split. Would consider AT5 tx and psu. Sixth former—limited cash. McIlroy, Mill Street, Ballymena, N Ireland BT43 5AA. Tel Ballymena 3284.

**KW103 power/swr meter,** virtually new and with instructions, perf cond, £13 plus postage. Slightly mod Joymatch atu, works well but might benefit from slight attention, £2 plus postage. G4CKA, QTHR. Tel Macclesfield 25154.

**Synthesized flexibility.** Independent tx/rx selectors, 5kHz intervals 144-146MHz, HW202 tx/rx, mic, etc, £185 ono. Teletype 35 printer, comp on floor stand, £30. Turntables, Garrard LAB50, BSR128R, mag psu, offers. Any exchange deals considered, especially hf rx or tx/rx. G8ITJ, QTHR. Tel Maidenhead 27460.

**Versatower 60.** TA33 W/40 meter conversion. 80–10 Hustler mobile aerial. FT101B. FV101. FL2100B. Offers invited. G5BGM, QTHR.

**FL50B/FR50B,** full 2MHz on 10m, mint, with manuals. Matching 500W linear h/b. Swop for FT200/250 with psu, any cond considered, wkg or not, or why? Details of cond please. JR310, mint, £65. G4DXX, QTHR. Tel Carnforth (Lancs) 4274 after 7pm.

**FT501 and psu,** £350. FL2000B, £180. Trio VFO-5D, plugs into FT501, £30. 2m linear 2 × 4CX250B, heavy duty psu, offers. 70cm tripler, £10. 70cm converter, 28MHz, £10. Hamgear preselector, £5. G4DAW, 479 Wellingborough Road, Northampton. Tel Northampton 714821 anytime.

**"Short Wave Magazine" 1953-75,** *RadCom* 1950-52, 62–75, £2 per volume or offer. 620V 200mA 375V 250mA 5V6A, £5. 350V 250mA, plus lots heaters, £3. Swinging and smoothing chokes. Collect/arrange carr. G2HLU, QTHR. Tel Reading 61622.

**Heath HW202 on S0,** S20 and 145·2, mobile mounts, tone burst, £85. Liner 2, preamp, Pye mic, comp with all spares, as original, £115. Two VCR97 CRTs, one base and shield, £3.50. G8JAI, QTHR.

**AR88D,** original S-meter/spkr, £55. Heath HW32A, HP13A, £80. Heath Cotswold, £15. Mosley Elan, £35. 2m 6 over 6, £6. BC221 xtal, £8.10·7 - MHz filters, £3. Exc cond. AVO 8 Mk2, new, £30. *Wanted:* 500mA swinging choke. G3LDI, QTHR. Tel Wymondham 603463.

**Solid State Modules 2m converter,** i.f. 28–30MHz, £10. Hi-gain 18V vertical, 80–10m, £12. B40 rx, bandspread coils, £20. DX40U + VF1U, £25. G3ZPD, QTHR. Tel Chesterfield 72440.

**R444 rx,** 36MHz–1GHz. Tunable converters 1–10·5GHz. Army rx, £8.50. AVO-8 meter, £4.50. Coaxial relay, £1. Mains psu 12V 2A, headphones, rf meters, 80Ω dummy load, 20μA meter. 3 navigation charts, £1.50 each. Sig gen, 2–400MHz. Wright, 249 Sandy Lane, Hindley, Wigan. Tel Wigan 55948.

**Entire shack contents for sale.** Tx/rx, equipment rack, HRO plus coils, many other items, parts and spares, all to be sold for cash transactions only. Buyers collect. Doug Muir, 190 Blythway, Welwyn Garden City, Herts. Tel Welwyn Garden City 30241.

**Teleprinter 7E (page printer),** good cond, comp with psu, £22. Buyer collects. G4EKE, QTHR. Tel Ferndown (Dorset) 77945.

**Trio TL911 linear,** £160. Yaesu FR50B rx, £65. Yaesu SP401 spkr, £8. Joystick and tuner, £10. Hamgear PM2 preselector, £10. All in near-new cond. Carr extra. G3ZZS, QTHR. Tel Plymouth 31707.

**KW2000,** part of comp 2m station, inc h/b transverter, using QQVO6-40 Microwave Modules converter, built to professional standards in 19in cabinet. 10-el 2m, 15-el 70cm aerials. Crown rotator with redesigned control unit, 2in mast, £185 ono. Will split. G8BJO, QTHR.

**5in oscilloscope,** rack mounting with separate psu, ex-AWRE and superbly built, but heavy so buyer must collect, £25. D. Weatherston. Tel 01-441 2328.

**2m Europa B** with CPS10 psu, £97. 14-el Parabeam, £7.50. £100 the lot. Collect or carr extra. *Wanted:* Airflow bases and chimneys for 4CX250B. G3GHB, QTHR. Tel Inkberrow 792582 after 7pm.

**4X250B sockets and chimney,** new. ACOS22 table mic. PSU, 12V dc in, 600V 100mA plus 250V 240mA out. Telefunken tape recorder, type 75. Avometer model 9. 813 valve. *RSGB Bulletin,* 1961-7. Offers. G3HRO, QTHR. Tel 01-460 7660.

**FT101 Mk1,** less than 20 hrs use, perf cond, £180. Tel 01-804 5249.

**Triangular steel freestanding radio mast,** 40ft high, as new, delivery possible, £80. G8AWM, QTHR. Tel Epsom 28229.

**HRO "MX" rx,** 50kHz–30MHz in 8 coils, mains psu, £25. Buyer collects. 40 Turnpike Road, Newbury, Berks. Tel Newbury 40750.

**Dentsu Seiki DA1 el-keyer,** mint, £10.50. Bauer single keying paddle, brand new and unused, £5. G73 (WZ50B) sig gen wavemeter 100kHz to 25MHz, charts, xtal check metered calibrated attenuator, signal output exc, £10 plus carr. G3XJJ, QTHR. Tel 716196.

**Eddystone S750** with S-meter and spkr, £45. Codar CR70A, mod incl fm detector, with PR30X, spkr, Q-mult, £20. Class D wavemeter, 6V ac, handbook, spare valve, £5. Buyer collect these items. DL6HA 2m converter, unboxed, 28MHz i.f., £7. G3ZMD, QTHR. Tel 0582 25115.

**Coaxial relay,** heavy duty, "N" type sockets on aerial and transmit sides, BNC on receive side, coil 115V dc, used, £12. SM6CKU, Box 257, S-43401 Kungsbacka, Sweden.

**Trio 9R59DS rx,** complete with spkr, preselector, manual, etc, good cond, £45 ono. Buyer collects if possible. 106 Sandling Lane, Maidstone, Kent. Tel Maidstone 63674.

**H/B version ARAC 102** 2 + 10m all mode mosfet rx, using modules AR10, AA1, AD4, plus MMC 144/28(LO). Calibrated dial in Amitron case, 12V, very sensitive. *Wanted:* 888A, JR310, FR50B, 38.666MHz HC6/U xtal. G8HLJ, QTHR. Tel 051-653 0767.

**FT101E tx/rx,** SP101 spkr, cw filter, perf cond, little used, save £57 on new price, £470. G3PDL. Tel 06527 335.

**Solartron CD1014·2 scope,** compact, dual beam, vgc, £35. Liner 2 with preamp, £120. Microwave Modules 2m tx, £15. Pye Lynx tv camera and vidicons, no lens, £18. Heathkit HW100 + mains psu, £130. Eddystone EC10 Mk2, £50. MM 2m converter, 4-6MHz i.f., £10. MM 70cm converter, 14-16MHz i.f., £10. Lambda 20V 3·1A power supply, 2 off, £10 each. G8EII, QTHR. Tel Hitchin (0462) 55634.

**SB303 rx,** £175 ono. AM10B 6ch, fitted 145MHz 12½kHz spacing, copy manual, £30 ono. Price, 184 Woolton Road, Liverpool L19 5NF. Tel 051-427 1931.

**Liner 2,** £140 ono. FRDX500 fitted with 2m converter and fm discriminator, £140 ono. Both together £250 or swop for good FT220. P. Milsom, 9 East Street, Chickerell, Weymouth, Dorset.

**AVO model HR2, £8.** Advance audio generator J2B, £8. Advance 77 RMS millivoltmeter, £8. All exc. Other lf test gear on offer, some requiring attention. SAE for appointment or further particulars. Newton, 7 Little Pynchons, Harlow, Essex.

**Hammarlund HQ170A rx,** in good wkg order, with manual, Heathkit code oscillator, £70. G. Evans, 41 Bryn Street, Newtown, Powys.

**70cm ssb transverter** by Microwave Modules, brand new, £75 G3NSM, QTHR. Tel 0865 (Oxford) 56321.

**12·5kHz h/b Cambridge AM10B,** as new, comp, £75. Storno Viscount, comp, 5ch, 2m, mods, inbuilt preamp, £30. Low/high mic transformers, 50p. Mod UMI, £2. QRO mod tapped, £5. G3USC. Tel Crewkerne 2633 daytime.

**KW2000,** £105. AVO 7, £8. E300 Honda, £75. Dentsu autokey, 110V, £11. 11AC alternator negative, £11. 8V BZ match, £7. 19 variometer, £1.50. 40ft aluminium pole, sections £7. Roller coaster, £1.50. AVO oscillator, £6. Small tape recorder, £4.50. Buyer collects. G3OAB. Tel Birmingham 747 8489.

**Heathkit HW17A,** £32. Kris Corp 600W linear amp, 10m, offers. Both good cond with manuals. G4AOE, QTHR.

**KW Vespa Mk2** with ac psu and Shure 201 mic. KW201 rx, £190 ono. GI3ZKT, QTHR.

**Trio 7200G,** 6 months old, xtals for R3, R5 to R7, 145, S20 to S24, £115. MM 70cm tripler, unused, £18. MM 70MHz converter, 28–30MHz i.f., £10. MBM 68–70cm beam, £12. G3RPD, QTHR. Tel Matlock 55556.

**Three morse records with books,** good cond, £2.50. G8KKW. Tel 054-33 2169.

**Trio 7200G,** £110 ono. VFO, £45. Microwave Modules 432/144 converter BNC sockets, £16. FT2F xtals, 144·600, £2. H/B cavity filter, £4. 70cm tripler, £8. Xtal-controlled 160m ssb tx, £10. *Wanted:* Microwave components, why? G8FGD, QTHR. Tel 0272 562984.

**Going QRT, selling everything.** FT200, FP200, all xtals for 10m, £175. FR400SDX, £180. 70cm 2m microwave transverters, converters, beams, test gear, etc. Items too numerous to mention. SAE to GM3EOJ, QTHR. Tel 0224 321406.

**Liner 2 with preamp,** comp with mobile mount, mic, etc, vgc, £125. Jaybeam D8/2m 8 over 8 slot-fed Yagi, £6. G8JJB, QTHR. Tel Thurton (Norwich) 213.

**New A63-200X 25in ctv tube,** unused, good s/h dual-standard Decca ctv panels, decoder, l.o.p., frame and line, convergance, i.f. scan coils, tuner, mains xfmr, De Gauss coil, crt shield, tripler, £100 the lot, £80 the crt, ono. Mullard electronic valve tester with cards, £20 ono. 3 low-band Rangers, unmodded, £7 each. 51ft Telo-tower, six months old, vgc, £75 ono. Will deliver crt or tower within 30 mile radius. G3UPV, QTHR. Tel Chapmanslade 418 before 9.15am.

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**C-MOS tone burst board,** 1,750Hz, 400m sec, frequency and o/p adjustable, £3. 2m mosfet converter, 10m i.f., in case, £12. 2m mosfet preamp board, £4.50, in case, £5.50. G4EBI, QTHR.

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**Standard C146A hand portable,** 5ch fitted, nicads and charger, £99. Tel 02403 21573.

**Lafayette HA600A gen cov rx,** 150kHz-30MHz, with amateur bands bandspread control, 12/240V operation, £35. GM4DTH, 89 Trinity Road, Edinburgh EH5 3JX.

**MM tx,** 2m, a.m., mic, 5 xtals, 144·151, 145·000, 145·350, 145·424, 145·590, 5W, £22. TE15 Tradipper, £12. G. Thompson, G8KLI, 49 Widney Avenue, Birmingham B29 6QE.

**HW100 tx/rx,** new 6146s, prof built, inc psu/spkr, fb cond, £140. Part built G6JP linear, 4 × TT21 cabinet, psu, fan, components and reprint, £25. G4AKD. Tel Cambridge 46107.

**Collins 51J3-4 rx,** 0·5-30·5MHz, 30 wave band, manual, little use since aligned, £250. Seen working anytime. Catherall, Tryfan, Rosemary Lane, Rossett, Wrexham, Clwyd. Tel Rossett 570738.

**LM2 (modulated version BC221),** original calibration charts, mains operated, £20. Class D wavemeter, mains operated, £5. Buyer collects or pays carr. G3KDR, Southern Wood, Petertavy, Tavistock. Tel Marytavy 663 evenings or Tavistock 4605 working hours.

**Pye Ranger PTC2207V** high band transistor converter and modulator QQVO6-40A, final 25W rf out, with all controls, cables and manual, £12, no offers. H. Hull, 12 Gillway Lane, Tamworth, Staffs. Tel Tam 68576 after 3.30pm.

**KW2000A ac psu,** Q mult, £140. CR150, built in psu, £20. G3XSF, QTHR. Tel Halifax 60438.

**HW101,** £125. HP2, 3A, £25. CW filter for HW101, £20. Xtals 3,579·545 (9 off), HC6U-style 10XJ, 8,053·13 and 8,064·55kHz, 75p each. HC6U 8081 (2 off), 8,019·556 and 2,400kHz, £1 each. All carr extra. Harris, 13 Trenchard Road, Locking, Weston-super-Mare, Avon.

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**Motorcycle Pye Cambridge** tuned to 145MHz, £30. G3YIS. Tel 01-697 2136.

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**Good price paid** for Royal Signals *Handbook of Line Communications.* N. Lewis, G4EPM, 218 Sheringham Avenue, London E12 6HH. Tel 01-432 2523 weekdays, 01-478 8672 evenings or weekends.

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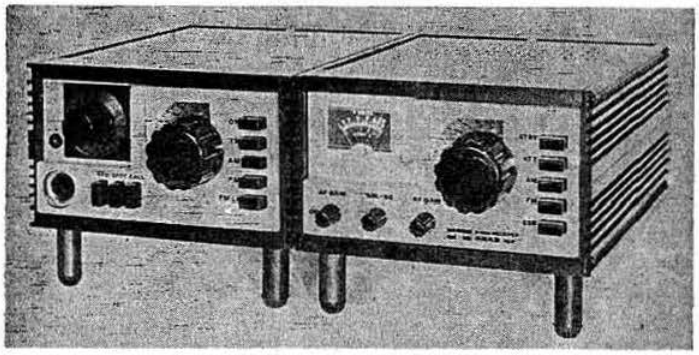

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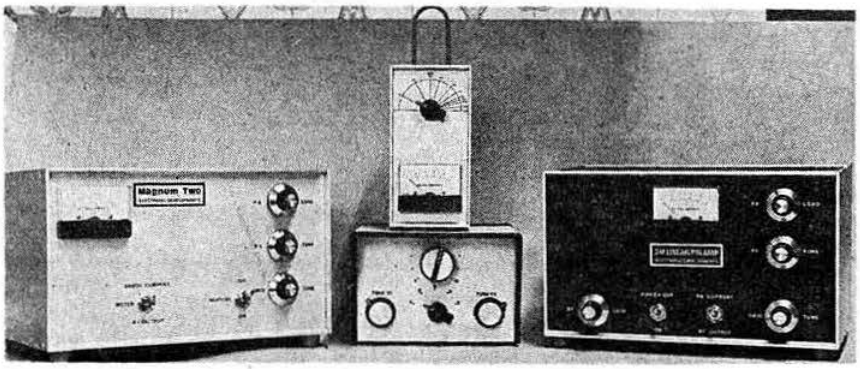


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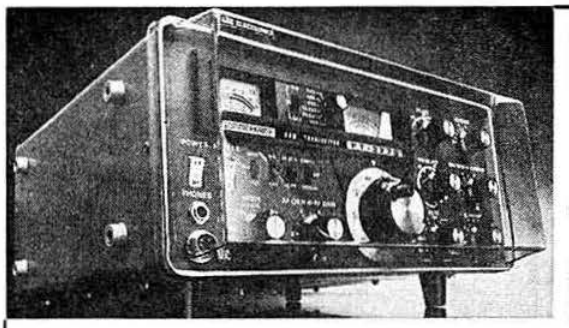

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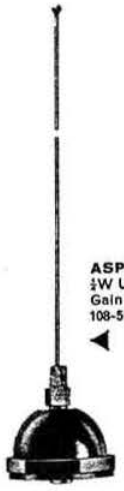
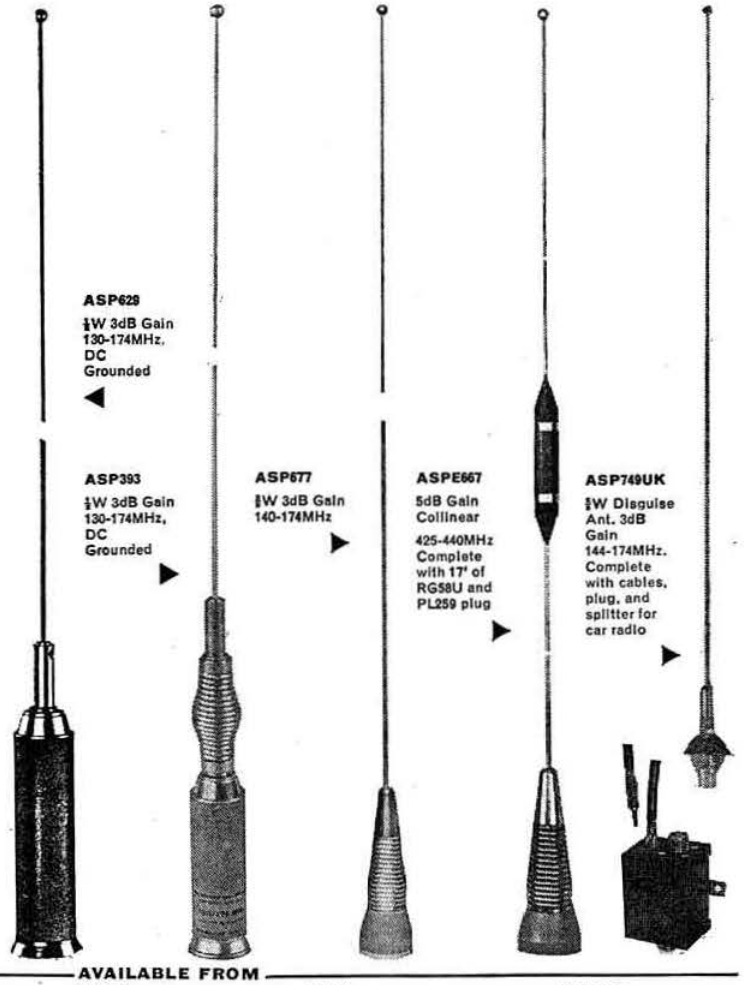


**ASP201**
½W Unity Gain
108-512MHz



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**ASP393**
½W 3dB Gain
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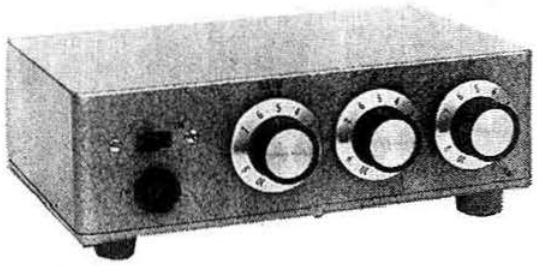

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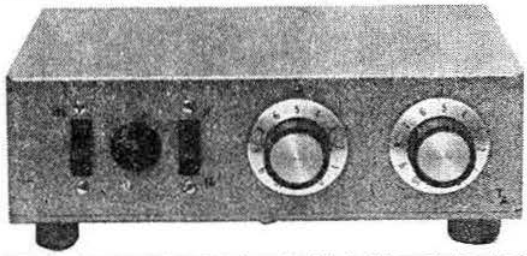

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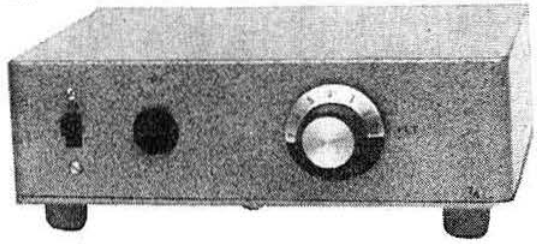

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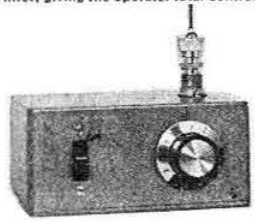

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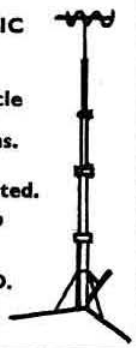

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