June 1979

# radio communication

journal of the Radio Society of Great Britain

## Reviewed in this issue—THE FT7 HF TRANSCEIVER

# TRIO IN SOUTH LONDON
# CATRONICS FOR TRIO
# TRADE UP TO TRIO AT CATRONICS

## TS520S
**160m–10m TRANSCEIVER**

**TS520S Brief Specification**

| | |
|---|---|
| Frequency range: | 160m to 10m Amateur Bands |
| Mode: | CW, USB, LSB |
| RF Input Power SSB: | 200 watts PEP |
| CW: | 160 watts DC |
| RX sensitivity: | 10dB S/N at 0·25μV |
| Price: | **£530** |
| or | **£647** with dig. readout DG5 |

**THE CENTRE FOR**

## TS700S
**ALL MODE PAR EXCELLENCE**

**TS700S Brief Specification**

| | |
|---|---|
| Frequency range: | 144–146MHz |
| Mode: | USB, LSB, CW, AM, FM |
| Power output AM: | 3 watts |
| SSB, FW, CW: | 10 watts |
| RX sensitivity FM: | 0·4μV for 20dB quieting |
| SSB, CW: | 0·25μV for 10dB S/N |
| AM: | 1·0μV for 10dB S/N |
| Price: | **£537** |

**Catronics**

**The message we are trying to say is that Catronics Ltd is now an authorised Trio dealer with the full service and spares organisation backed by Lowe Electronics Ltd**

**COME TO**


### SECOND HAND EQUIPMENT

We always have a selection of used equipment in stock, currently as follows:

| | |
|---|---|
| TR2200GX | **£125** |
| TR3200 | **£135** |
| Palm 11 | **£115** |
| SE600 | **£260** |
| Multi 11 | **£140** |
| Swan 500 | **£310** |
| Liner 2 | **£100** |
| C828 | **£105** |
| FRdx400 | **£180** |

## TS120V
**MULTUM IN PARVO**

**TS120 Brief Specification**

| | |
|---|---|
| Frequency Range: | 80m to 10m Amateur Bands |
| Mode: | CW, USB, LSB |
| RF Power output: | 10W PEP |
| RX sensitivity: | 10dB S/N at 0·25μV |
| Power requirements: | Max. 4A at 13·8V DC |
| Price: | **£399** |

**AMATEUR RADIO**

## TR3200
**PEAK PORTABLE PERFORMANCE**

**TR3200 Brief Specification**

| | |
|---|---|
| Frequency range: | 432–436MHz |
| Channel spacing: | 25kHz |
| Repeater shift: | −600kHz |
| Power output: | 2W (HI) or 0·4W (LO) |
| RX sensitivity: | 1·0μV for 20dB S/N |
| Tone burst: | 1750Hz tuning fork (Automatic) |
| Price: | **£186** inc. charger |

We are 300 yards from Wallington Railway Station (London Bridge or Victoria). Frequent buses from Croydon and Sutton. Three large car parks within 100 yards. **Hire purchase facilities available on all equipment. Credit cards accepted.** Mail orders—normally dealt with on day of receipt. Securicor delivery arranged. All prices include VAT at 12½%.

**CATRONICS LTD, DEPT. 906, COMMUNICATIONS HOUSE,**
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Shop/showroom open Monday–Friday: 9.00–5.30, closed for lunch: 12.45–1.45. Saturdays: 9.00–1.00.

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# radio communication

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ICOM®

# HOW ABOUT GOING /M . . .

## THE LEADER BASE STATION

### IC-211E

Fast becoming one of the most popular base station rigs because of its superb performance and advanced technology, the IC-211E leads the field in 2M base stations. With a full synthesizer which employs state of the art technology it provides all you want for full coverage on FM USB, LSB or CW on 2 metres with that extra bit of quality for which ICOM are so renowned, plus the chance to use the latest digital technology and even drive it from your home computer if you wish!

**Less VAT = £481.78** **With VAT = £542**

## THE MOBILES

The IC-245E is probably the only multi-mode mobile on the market. Of course, it can also be used as a base station, and many own one for just this purpose. It employs all the same technology as the IC-211E, and is in fact virtually the same electronically with the exceptions that it only operates on USB, FM and CW and does not have VOX and sidetone or full seven digit readout. As with the 211 you have access, via a multi-way plug on the back, to the LSI synthesizer for connection of a keypad, computer or other bit of home-brewed logic.

**Less VAT = £354.67** **With VAT = £399**

**IC-245E**
**NOW £399 inc.**

**IC-240**
**NOW £189 inc.**

The IC-240 is the ideal mobile rig for most people. Apart from the fact that it is quite a lot cheaper than most, it is, in fact, more suitable than many to use in the car while driving (and let's face it, it is under those conditions that most mobiles are used). It can be operated with ease without taking your eyes off the road and provides up to 22 channels (which is more than you are likely to need). Being synthesized, of course, there are no crystals to buy for extra channels. Full repeat, reverse repeat and automatic tone burst plus a low power facility are selectable from the front panel. By adding a 'Superscan' at a later date you can obtain full scanning facilities over the whole band at a VERY competitive price.

The IC-240 is a superbly built and very reliable piece of equipment as witnessed by the many thousands in use. All Icom equipment is built to a very high standard and the IC-240 is no exception. It has an excellently sensitive receiver and a very clean transmitter and will give you hours of headache-free pleasurable use—so why not get one now before the price goes up again!

| | | |
|---|---|---|
| **240 Alone** | **Less VAT = £168.00** | **With VAT = £189.00** |
| **With Superscan** | **Less VAT = £230.22** | **With VAT = £259.00** |
| | **(while stocks last)** | |

**IC-280E**
**NOW £245 inc.**

**★ WITH SCANNER £255**

As usual, ICOM have kept ahead with technology and have produced their revolutionary new IC-280E which uses a microprocessor to produce frequencies throughout the 2m band at the ideal 25kHz spacing required today. The IC-280 has the ideal advantage of being separable into two parts for easy mounting into today's cars which so often forget to leave space for a rig. The removable front panel, with all controls, is only 3" deep and will fit in any convenient spot—in the glove pocket, on the dash or even on the sun visor! The main part of the set can be mounted anywhere within 4 feet—or even further in many cases—under the passenger's seat is quite handy! Display is of frequency on an LED readout and there are three memories for your favourite channels. These are not cleared when the set is switched off as long as it is left connected to the car battery.

**Less VAT = £217.78** **With VAT = £245**

**AGENTS (PHONE FIRST—All evenings and weekends only, except Norfolk and Burnley)**
**Scotland**—Jack GM8GEC (031-665 2420) **Norfolk**—Ted G3FEW (05088 632)
**Wales**—Tony GW3FKO (0222 702982) **Burnley**—(0282 38481) **Midlands**—Tony G8AVH (021-329 2305)
**North West**—Gordon G3LEQ (Knutsford (0565) 4040) **Yorkshire**—Peter G3TPX (022678 2517)

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**FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS**
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BARCLAYCARD VISA

# THANET ELECTRONICS

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

Access

ICOM®

# . . . OR /P FOR THE SUMMER?

**IC-215**
**£159 inc.**

The IC-215 is getting more and more popular also as it combines the advantages of a portable, which can be operated anywhere, with the ability to double as a low power base station by virtue of its 3 Watts of output and SO239 antenna connecter on the back. Of course there are facilities to operate it from an external power supply, and if it is fitted with Ni-Cads you can arrange to trickle charge these at the same time. The batteries used are of a sensible size being C type (or UII) instead of the 'penlight' batteries used by most of its competitors. This gives at least three times the operating power when you are away from home which you will appreciate if ever you have run out of battery in the middle of a QSO! It comes already crystalled up for 12 channels, S20, S22 and all the repeater channels 0 to 9. We think the extra power and larger batteries far outweigh the advantages of having the extra channels produced from a synthesizer.
Less VAT=£141.33 With VAT=£159

**IC-202**
**£199 inc.**

ICOM's range of sideband portables has been recently expanded. The well known and tested IC-202E has now been improved in the form of the IC-202S which has lower side band fitted also and provides sidetone on CW. The receiver has been hotted up making it even more suitable for use as a base station, either barefoot or as a prime mover. The new IC-402 is the 70cm version of the 202S giving the same facilities as its 2m cousin over the range 432-435·2 MHz. Both use a very stable VXO circuit, to give fully tuneable coverage of the band in 200kHz segments and both have extremely clean signals so that using them to drive a linear to the full legal limit presents no problems. We are very impressed with both the 202S and the 402.
The IC-202E was good . . . these are even better!

| | | |
|---|---|---|
| IC-202S | Less VAT=£176.89 | With VAT=£199 |
| IC-402 | Less VAT=£256 | With VAT=288 |

**IC-402**

## OR IF YOU WANT A HAND-HELD—
## HOW ABOUT THE AR-240?

**IC-202**

AR-240

Although not made by ICOM, we decided to take this exciting new little hand held into stock because it fills the need for a really good portable where size is of prime importance. It has an amazing performance with a truly excellent receiver. A synthesizer is used, with decade switch read out to cover the range 144–148MHz in 5kHz steps and 600kHz repeater shifts and a tone burst are built in. It comes with NiCads, a charger and a telescopic whip antenna—though if you want to make things even neater then you can use the ICOM FA1 flexible helical in place of this. At £195 inc VAT we think this is really good value for money.

**AVAILABLE NOW DIRECT FROM HERNE BAY**
**Less VAT=£173.33 WITH VAT=£195**

### 240 Channelizer

**We have now a new mod. for the IC-240 which gives 80 Channels, displayed as channel numbers selected on thumbwheel switches.**

**Kit £36 inc VAT**

**Phone—or put a message on the ansafone for further details**

**ALSO AVAILABLE FROM OUR SHOP IN HERNE BAY**

**MICROWAVE MODULES** **ANTENNA SPECIALISTS**

**J-BEAM** **YAESU MUSEN** **FDK**

**HP AND PART EXCHANGE WELCOMED**

# WATERS & STANTON ELECTRONICS

## LOOK! 12½kHz or 25kHz +25 watts


## FDK MULTI-700E

**£229 inc. VAT & delivery**

What can one say about a transceiver that has proved to be so perfect in design. Truly a concept that looks to the future as well as the present. Its powerful 25 watts ensures better coverage than its competitors and its 25kHz stepped frequency synthesizer means no more xtals to buy. And to match its powerful output two receiver RF stages are provided that typically give about ·3uv or better for 20db NQ. Reliable repeater operation is ensured by a crystal controlled tone burst and a pre-wired 600kHz shift. Listening on the input of the repeater or reverse repeater operation is obtainable at the flick of a single switch and the 25 watts output is continually variable down to 1 watt. A remarkable transceiver at a remarkable price—little wonder more and more people are saying, "I'm using a Multi-700E at this end, O.M." And one final point, it also tunes in 12½kHz steps and with the specially designed receiver filter 12½kHz operations is immediately possible. **IN STOCK NOW—ORDER TODAY.**

## NEW MULTI-3000 2m ALL MODE TRANSCEIVER


The Multi-3000 is the new 2 metre all mode transceiver to leave the FDK factory. It features 15 watts of FM/SSB/CW with a host of features that keeps it in the forefront of value-for-money VHF transceivers. A demonstration model is available at our premises in Hockley and deliveries are expected May/June.
The design retains the switch selected synthesizer which can be used for FM to select any channel quickly and accurately. The synthesizer tunes in 10kHz steps and a separate control inserts the 5kHz digit as necessary. Complete coverage from 144 to 148MHz is provided and the three separate knobs for 1MHz, 100kHz and 10kHz digits make QSYing extremely rapid.

FDK's dual vfo facility is retained employing a separate flywheel drive with direct digital readout. Thus the switched synthesizer may be left on ones favourite FM channel and the vfo used to tune around the band. In the FM mode two tuning rates can be selected. The "rate of tuning" switch gives either 10kHz or 1kHz steps. The former for rapid QSYing and the latter for final tuning to the desired frequency exactly on any 1kHz multiple. On SSB and CW the same tuning control gives steps of either 1kHz or 100Hz. In this mode the digital display reads accurately to the nearest 100Hz. Tuning has never been easier! And that's not all. A memory button enables one to lock the last frequency (even down to 100Hz on SSB) and then carry on tuning around the band. At any time the memory button can be pressed to return to the original stored frequency and pressing it again returns you to the frequency you had just QSY'd from. In all, 3 frequencies can be stored, one on the switched synthesizer and 2 on the manual digital dial. Furthermore the memory is not lost when the equipment is disconnected from the supply cord.

Repeater operation is taken care of by a pre-wired 600kHz shift and this also operates an automatic crystal controlled tone burst.

All the usual features you are likely to need are also included: tone-burst defeat, VOX, Mic gain, AF and RF gain, noise blanker, receiver incremental tuning, fast and slow AGC, High/Lower power switch, squelch, also internal pre-sets for VOX gain, delay and anti-vox. The power supply is designed for 240 volts AC or 12 volts DC operation and projected price is **£519** inclusive of VAT. Another superb piece of engineering at a very reasonable price—FDK of course.
**£519** inc. VAT & delivery—available end of June.

# WATERS & STANTON ELECTRONICS

## DenTron GLA–1000

**IN STOCK NOW**

**10–80m 1200W LINEAR**

**LOW COST, SMALL SIZE, BUT . . .**

**. . . BIG VOICE** **£289 inc VAT**

**DELIVERY FREE IN UK**


This beautiful HF linear covers 80 to 10 metres and has its own built-in 117/234V power supply. Its diminutive size means less table space needed but without sacrificing power capability. Weighing in at just 24 pounds it measures only H.5$\frac{7}{8}$" × W.11" × D.11" with room to spare inside. An almost silent fan ensures cool running whilst the little power house generates 1200 watts input on SSB or 1kW DC for CW. RF drive required is approx. 80 watts and the amplifier can be instantly switched in or out of circuit. Comprehensive metering monitors HF volts, PA current and output RF voltage. Altogether a linear we can thoroughly recommend at a price you can afford—just **£289** delivered.

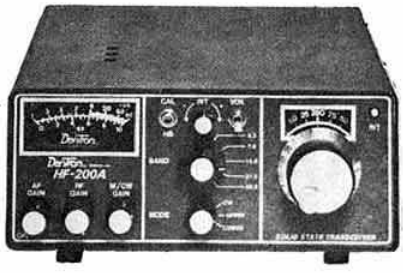
**NOTE: First shipment exhausted. Next shipment June**

## DenTron NEW HF–200A

**DELIVERY MAY**

**80–10m 200W TRANSCEIVER**

Prov. Price **£399** Inc. VAT & del.




MATCHING AC PSU AVAILABLE

A natural development from DenTron had to be the birth of a transceiver. Small, compact and powerful—it's simply that! Measuring only 4" high × 10" wide it makes both ideal fixed or portable stations with its 200 watts input capability. Simplicity coupled with performance was the formula—that's why you won't find a single tuning control on the front panel, apart from the VFO. Simply select the band and operate. Its nominal 13·6 V DC supply requirement draws 750 m/a on receive with full audio output and 20 amps on voice peaks or CW. A matching AC power supply is also available for both 234 volts and 117 volts and a remote VFO is also being produced. So if you're the kind of operator who wants less in the way of gadgetry and more in the way of performance per £ take a closer look at the HF200A – we have a feeling you'll like what you see!

## MIZUHO–2M SSB/CW Hand-Held

**IN STOCK NOW**


**Fitted 144·20–144·40MHz**

**£165 inc VAT & delivery anywhere in UK.**

**THIS RIG GETS TO PLACES OTHER RIGS CAN'T REACH!**

There is no denying that for local cross town chats and nets, FM has a lot of advantages. Maybe you've been licensed a few months and thinking of working a lot of DX—and yes, you've found that on FM it is just a little difficult—well, how about trying SSB. With a watt of SSB and a single yagi antenna you'll be amazed how far you can reach. And when those "DX lifts" come along you'll be in there with more than a chance! What better way to get in amongst the DX than purchase an SB2M. At £165 you'll find it impossible to beat for value. This really does form the basis for both a fun packed portable station or a compact base station—if you can't afford to trade in your FM rig for an all-mode rig how about an SB2M—think about it—there's quite a big saving! And remember Spring is just around the corner. With a set of HP7 cells loaded in the rig, the 1 watt output is the economical way to sit on top of the local hills or climb up into the mountains and create your own DX pile-up!

**FDK PALM II**

**NOTE: 70cm version should be available in summer.**


**THE MIGHTY MIDGET**

**£139.95**

**inc. VAT**

**2M FM**

SIZE: 6" × 2½" × 1¾"

WEIGHT: 1lb 3oz

**COMPARE ITS VALUE**
**COMPARE ITS FEATURES**

- ★ Cigar lighter plug
- ★ External DC cord
- ★ Over one watt output
- ★ AC charger included
- ★ 6 channel capability
- ★ Simplex or ±600kHz switch
- ★ BNC aerial socket
- ★ Flexible whip supplied
- ★ S/20/22 supplied
- ★ Extra channels cost £2.90!
- ★ Xtal controlled tone-burst
- ★ Ni-cad battery pack supplied
- ★ High quality condenser microphone

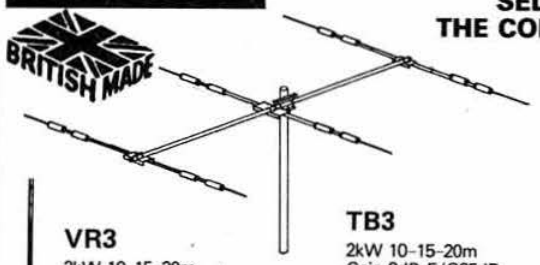
# WATERS & STANTON ELECTRONICS

## THE BEST OF BRITISH!

COMPARE THE PRICES
COMPARE THE QUALITY

## Jaybeam Limited

**NEW HF RANGE**

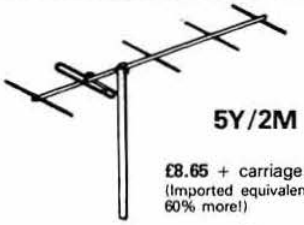


**VR3**
2kW 10-15-20m
DC short circuit
SO239 socket
Weight 2.7kg.
Height 13ft 9ins.
Price **£38** inc. VAT

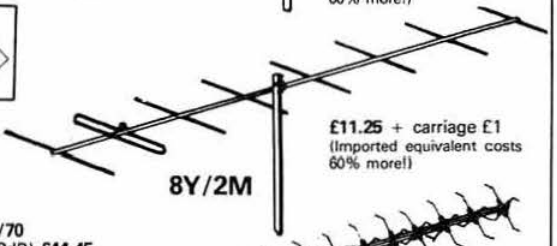
**TB3**
2kW 10-15-20m
Gain 8dB F/G25dB
Price **£151** inc VAT
Boom length 14ft.
Boom dia. 2ins.
Turning dia. 29½ft.
Total weight 17.3kg.

**JUST A SMALL SELECTION OF THE COMPLETE RANGE**

**VHF**

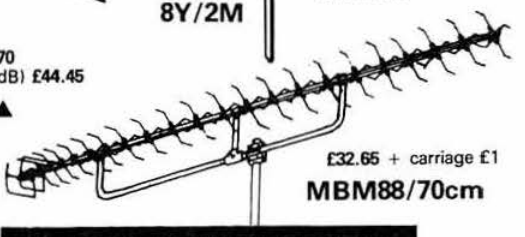


**5Y/2M**
**£8.65** + carriage £1
(Imported equivalent costs 60% more!)



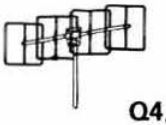
**8Y/2M**
**£11.25** + carriage £1
(Imported equivalent costs 60% more!)

C8/70
(7·8dB) **£44.45**

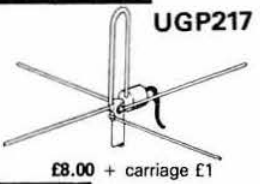


**£32.65** + carriage £1
**MBM88/70cm**

**QUADS & GROUNDPLANES**



**Q4/2M**
**£18.70** + carriage £1



**UGP217**
**£8.00** + carriage £1

**ROTATORS—THE BEST**

JAYBEAM KR400 supports ½ ton costs **£95** inc. VAT.
*AN ABSOLUTE BARGAIN!*

JAYBEAM 9502 ideal for VHF, **£50** (only needs 3 core cable).
£1.50 carriage

## WHY WE RECOMMEND Jaybeam Limited

Jaybeam Ltd. are one of the largest communications aerial manufacturers in the UK. Amateur radio operators throughout the World recognise the name as synonomous with high quality engineering and professionals recognise the products as the lifeline between land, sea and air communications links. With the vast backing of many years experience, we are indeed lucky that Jaybeam Ltd. antennas are a home product. It is not often we can say "buy British" but unless you want to send your cash on a one way ticket abroad, there is no reason to consider any other make.

Imported products cost more because they are low value bulk items bearing a relatively high freight charge and import duty—in fact you can pay up to 60% more for an imported 2 metre antenna that is no better technically or mechanically than the British Jaybeam equivalent. Beware of exaggerated claims generated in the advertising dept.—Jaybeams are tried and tested and have the financial backing to give you both spares and technical backup—fly the flag, buy British, buy Jaybeam.

## SUMMER SUPER SAVING DEAL

Simply clip out the coupon below for your free copy of the 34 page Jaybeam handbook with prices, gain figures, polar diagrams, etc., plus technical data sheets on rotators, HF antennas, masts, tubing and our super low carriage deal and send to: WATERS & STANTON ELECTRONICS (JAYBEAM SPECIAL OFFER) 31 SPA ROAD, HOCKLEY, ESSEX.

**Jaybeam Limited**

FREE ANTENNA HANDBOOK COUPON

NAME.....

ADDRESS.....

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# WATERS & STANTON ELECTRONICS

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Yes, we do run one of the most efficient services in the UK. Just look at our stock! Either send us your cheque or PO adding carriage if shown in brackets, or telephone your Barclaycard or Access number. We'll get the goods to you by the quickest route. Heavy items by Securicor and smaller packages by parcel post. All sent at *our* risk and, of course, guaranteed. It pays to deal with an established company like ours—try us and see.

**YAESU**

| | |
|---|---|
| FRG7 General Coverage Receiver | £210.00 (N/C) |
| FRG7000 Digital deluxe receiver | £367.00 (N/C) |
| SP101 Matching speaker | £21.25 (N/C) |
| YO100 Monitor scope | £156.00 (N/C) |
| FT301 160-10m Solid state | £579 (N/C) |
| FP301 AC PSU | £110 (N/C) |
| FT901DE 160-10m digital transceiver | £785.00 (N/C) |
| FT901DM 160-10m digital transceiver | £960.00 (N/C) |
| FT7 80-10m 10w transceiver | £299.00 (N/C) |
| FT7B 80-10m 50w transceiver | £421.75 (N/C) |
| FP12 12 amp PSU | £72.75 (N/C) |
| FT202R 2m hand-held (3 ch's) | £99.00 (N/C) |
| NC1 AC charging hod. | £18.50 (N/C) |
| YM24 Ext. mic/speaker | £16.25 (N/C) |
| FT227Rx 2m 10w transceiver | £239.50 (N/C) |
| FT225RD 2m All modes digital | £599.00 (N/C) |
| FL2100B 1200 watt 80-10m linear | £349.00 (N/C) |
| FT101Z 160-10m transceiver | £562.00 (N/C) |
| FT101ZD 160-10m transceiver | £646.00 (N/C) |

**LOWE RECEIVER**

| | |
|---|---|
| SRX30 0-5-30MHz AM/SSB/CW | £175 (N/C) |

**ICOM (NOTE NEW PRICES!)**

| | |
|---|---|
| IC215E 2mFM 3 watt 12 chs | £159.00 (N/C) |
| IC202S 2m SSB 3 watt portable | £199.00 (N/C) |
| IC240 2m 22 ch's 10 watts | £179.00 (N/C) |
| IC280E 2m FM 80 ch's 10 watts | £245.00 (N/C) |
| IC211E 2m All mode transceiver | £559.00 (N/C) |

**MICROWAVE MODULES**

| | |
|---|---|
| MMT 432/28-S transverter | £133.80 (N/C) |
| MMT 432/144-R transverter | £169.80 (N/C) |
| MMT 144/28 transverter | £88.80 (N/C) |
| MMC 144/2-4; 4-6 or 28-30 IF | £20.25 (N/C) |
| MMC 144/28 LO converter | £22.50 (N/C) |
| MMC 70/28 converter | £20.25 (N/C) |
| MMC 70/28 LO converter | £22.50 (N/C) |
| MMC 432/28 S converter | £29.90 (N/C) |
| MMC 432/144 S converter | £29.90 (N/C) |
| MMC 1296/144 or 28 converter | £31.50 (N/C) |
| MMC 28/144 10m up converter | £20.25 (N/C) |
| MMD 050/500mHz counter | £69.00 (N/C) |
| MMA 144 2m pre-amp | £14.60 (N/C) |
| MMD 500P 500mHz pre-scaler | £27.00 (N/C) |
| MMV 1296 varactor tripler | £33.75 (N/C) |
| MML 144/100w linear amplifier | £139.50 (N/C) |
| MML 432/100w linear amplifier | £247.50 (N/C) |
| MML 144/25W | £44 (N/C) |

**SEM**

| | |
|---|---|
| Europa "C" 2 metre transverter | £112.50 (1.00) |
| CPS10 AC PSU | £56.25 (1.00) |
| 2m converters | £20.25 (N/C) |
| 70cms converters | £22.50 (N/C) |
| 2m pre-amp | £12.50 (N/C) |
| * 2m auto switching pre-amp | £19.00 (N/C) |
| 70cms auto switching pre-amp | £21.95 (N/C) |
| 2m PA3 pre-amp | £6.80 (N/C) |
| 70cm PA3 pre-amp | £9.00 (N/C) |
| 2m 48 watt linear/pre-amp | £59.60 (0.75) |

*fitted SO 239 sockets

| | |
|---|---|
| HF auto pre-amp 2-40mHz | £14.63 (N/C) |
| HF pre-amp 2-40mHz | £10.69 (N/C) |
| HF Z-MATCH ATU 80-10m | £39.40 (1.00) |

**VHF MONITOR Rx's**

| | |
|---|---|
| TM56B 12v/240 AC auto scan 10 ch's | £104.00 (N/C) |
| TM56B Marine model | £113.00 (N/C) |
| SR9 12v DC Amateur model | £59.00 (N/C) |
| Extra xtals | £2.40 (N/C) |

**FDK**

| | |
|---|---|
| Multi 2700 2m All mode | £499.00 (N/C) |
| Multi 800D 2m 25 watts | £289.00 (N/C) |
| Multi 700E 2m 25 watts | £229.00 (N/C) |
| Multi Palm II 2m hand-held special package | £139.95 (N/C) |
| Multi U11 70cms Autoscan | £299.00 (N/C) |
| M-11/Q16 xtals £4.90 Palm II xtals £2.90 | |
| Multi-Palmsizer 2m synthesised 40 channel hand-held | £149 (N/C) |

**DENTRON**

| | |
|---|---|
| MLA 2500 160-10m 2Kw linear | £695.00 (N/C) |
| MT3000A 3Kw 160-10m tuner | £275.00 (N/C) |
| MT2000A 3Kw 160-10m tuner | £175.00 (N/C) |
| 160-10AT Supertuner 1Kw | £99.00 (N/C) |
| JR Monitor 160-10m tuner 300w | £59.00 (N/C) |
| W-2 160-10m PEP/SWR meter | £59.00 (N/C) |
| 160-10m "open-wire" doublet | £22.00 (N/C) |
| 1Kw 80-10m linear 240v GLA 1000 (March/April) | £289.00 (N/C) |

**AR**

| | |
|---|---|
| AR240 Synthesised hand-portable | £195.00 (N/C) |

**MIZUHO**

| | |
|---|---|
| 2m SSB 1 watt portable | £165.00 (N/C) |
| Extra xtals | £3.00 |

**NAIGAI**

| | |
|---|---|
| 2200 2m 500w PIP linear | £481.00 (N/C) |

**ADONIS MICROPHONES**

| | |
|---|---|
| AM802G Compressor - 3 outputs | £59.00 (N/C) |
| AM502G Compressor - 1 output | £39.00 (N/C) |

**ASP MOBILE ANTENNAS**

| | |
|---|---|
| 201 - 2m ¼ wave | £2.95 (1.00) |
| 2009 - 2m 5/8th wave | £7.95 (1.00) |
| 677 - 2m 5/8th wave deluxe | £14.75 (1.00) |
| 462-70cms colinear | £7.95 (1.00) |
| 667 - 70cms colinear deluxe | £17.50 (1.00) |
| Magnetic base and cable | £8.50 (1.00) |
| "No-hole" boot mounts | £3.50 (0.50) |

**HF ANTENNAS**

| | |
|---|---|
| HQ-1 20-15-10m mini-quad | £94.50 (2.50) |
| C4 20-15-10m vertical | £41.50 (2.00) |
| Mosley 20-15-10m mini-beam 600w | £89.00 (2.00) |
| Mosley 2Kw version | £120.00 (2.00) |
| TA32 600 watts 20-15-10m | £72.00 (2.00) |
| TA33 600 watts 20-15-10m | £106.00 (2.50) |
| Mustang 2Kw 20-15-10m | £132.00 (2.50) |
| Hy-gain 12 AVQ 20-15-10m | £42.20 (2.00) |
| Hy-gain 14 AVQ 40-10m | £59.00 (2.00) |
| Hy-gain 18 AVT/WB 80-10m | £85.50 (2.25) |
| Mosley TD3JR 20-15-10m dipole | £25.80 (1.00) |
| Mosley RD5 SWL ham dipole | £30.35 (1.00) |
| EL-40X 80-40 Mini dipole | £39.00 (1.00) |
| HF5 5 band vertical | £49.00 (1.00) |

**VHF ANTENNAS (JAYBEAM)**

| | |
|---|---|
| 4Y/4M 4el yagi | £14.65 (2.00) |
| C5/2M 5db colinear | £34.90 (2.00) |
| 5Y/2M 5el yagi | £8.65 (1.25) |
| 8Y/2M 8el yagi | £11.25 (1.50) |
| 10Y/2M 10el yagi | £24.20 (2.00) |
| PBM10/2M 10el parabeam | £29.25 (2.00) |
| PBM14/2M 14el parabeam | £35.55 (2.50) |
| 5XY/2M X'd 5 element | £18.00 (1.50) |
| 8XY/2M X'd 8 element | £22.50 (2.00) |
| 10XY/2M X'd 10 element | £29.80 (2.00) |
| Q4/2M 4el quad | £18.70 (1.50) |
| Q6/2M 6el quad | £24.75 (2.00) |
| D5/2M 5 over 5 | £15.50 (1.50) |
| D8/2M 8 over 8 | £20.70 (2.00) |
| SVMK vertical Kit | £5.65 (1.00) |
| UGP/2 Ground plane | £8.00 (1.00) |
| HO/2M 2m halo | £3.60 (0.50) |
| HM/2M Above with 24" mast | £4.40 (0.75) |
| C8/70cm 8db colinear | £44.45 (2.50) |
| D8/70cm 8 over 8 | £17.45 (1.50) |
| PBM18/70 18 el parabeam | £21.00 (1.50) |
| MBM/48 70 el Multibeam | £24.50 (2.00) |
| MBM88/70 88 el Multibeam | £32.65 (2.00) |
| 8XY/70 8 el X'd yagi | £27.10 (1.50) |
| 12XY/70 12 el X'd yagi | £33.50 (2.00) |
| D15/1296 15 over 15 | £26.35 (1.50) |

**ACCESSORIES**

| | |
|---|---|
| 9502 rotator | £50.00 (1.75) |
| KR400 rotator | £95.00 (2.00) |
| AR40 rotator | £53.40 (1.50) |
| Stolle 2030 rotator | £54.00 (1.50) |
| Stolle 2010 rotator | £48.95 (1.50) |
| CDE44 rotator | £106.75 (2.00) |
| HAM-M MkIII rotator | £156.00 (2.00) |
| Shure 444 microphone | £25.95 (0.75) |
| Shure 201 microphone | £11.25 (0.50) |
| Shure 526T microphone | £31.50 (0.75) |
| Hand morse key | £9.50 (0.50) |
| EK121 Electronic "Bug" | £29.95 (0.75) |
| 50ohm balun | £10.95 (0.50) |
| UR67 per metre | £0.58 (0.02) |
| UR43 per metre | £0.21 (0.01) |
| 5 core cable per metre | £0.28 (0.01) |
| HP3A high pass filter | £2.95 (N/C) |
| Drake low pass filter | £18.00 (0.50) |
| TV1 ferrite rings | £0.30 (0.08) |
| Plastic antenna insulators | £0.25 (0.05) |
| Twin SWR meters 3-150mHz | £12.50 (0.50) |

**HILOMAST LTD**

| | |
|---|---|
| PNAM-1 Telescopes to 9m | £239.00 (14.00) |
| PNAM-2 Telescopes to 14¼m | £293.00 (15.00) |
| SAE for details | |

**All prices include VAT**
**Carrier costs shown in brackets**

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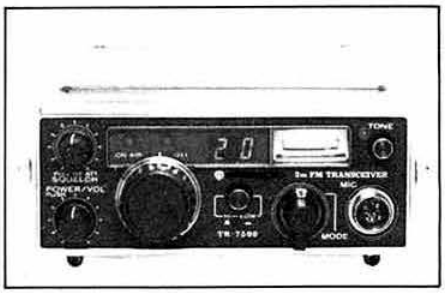
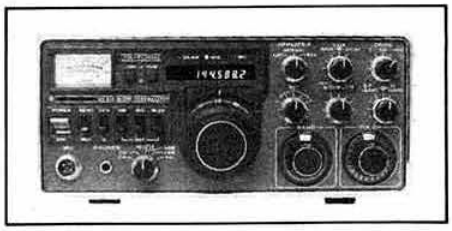
# LOWE ELECTRONICS Ltd



## TRIO TR7500 The sensible one, £235 inc. VAT

The TR7500 gives you the ultimate FM mobile rig. Full band coverage 144-146MHz in 80 channels at 25kHz spacing—and no programming or crystals due to the use of an advanced synthesiser. Dial indication is commonsense itself; if you want S20, simply turn the dial to 20; R7, turn to 7, no need to remember complicated frequency plans. If you are operating on a repeater and you wish to listen on the input frequency or operate reverse repeater, simply touch one switch; there is no knob twiddling involved. Should you need a 1·6MHz shift—that's also available on the synthesiser—but remember, you may qualify for the WACS Award (worked all cop shops!).

Potent performance in a package not much larger than the TR-2200 with 15–18 Watts transmitter output and better than 0·2$\mu$V sensitivity together with the unparalleled Trio quality and attention to detail make the TR7500 the *sensible* man's choice.

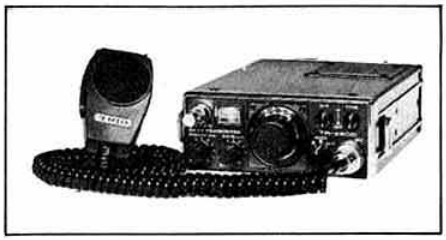


## TRIO TS700S £537 inc VAT

This is the ultimate TS700 with every possible extra. Full 2 metre coverage on VFO or 22 crystal controlled channels with digital readout on all modes to 100 Hz using the Trio exclusive easy on the eyes readout rubes. Built-in Vox and break-in CW with keyed sidetone. Low power facility for all modes in case you don't need the full 15–18 Watts normally given by the TS700S. Better than ever receiver performance, particularly in strong signal handling when compared to other equipment, and a built-in switched RF preamplifier. Automatic tone burst with repeater and reverse repeater shifts for no fuss use of 2 metre repeaters.

The remote VFO700S offers for the first time in a VHF rig the facility of splitting transmit and receive frequencies by any amount and also operation on two different transceive frequencies at the touch of a switch (invaluable for monitoring net frequencies or OSCAR checking). The VFO will also give VFO control of the TR7010 with a small adaptor unit.

All in all the TS700S is the best, so see it soon at your nearest stockist; you will not be disappointed.



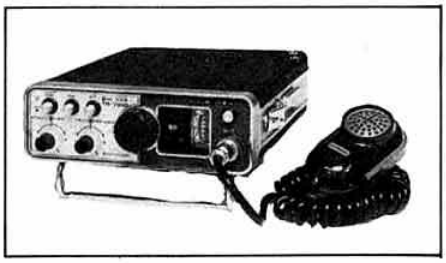
## TRIO TR2300 £195 inc VAT

The TR2300 is a remarkable package which combines all the advantages of a portable station with those of a sophisticated mobile set. With the TR2300, you get full band coverage from 144–146MHz in fully synthesized 25kHz channels together with 600kHz repeater shift (and reverse repeater if required) with automatic 1750Hz tone burst.

The dial is directly calibrated in frequency and has switched illumination for ease of use at night.

The transmitter puts out a very clean signal at a power in excess of one watt, and the receiver is very sensitive, in fact better than many big rigs. The external power and external antenna sockets allow one to use it as a fixed station when desired.

The TR2300 is amazingly small, much smaller than its predecessor the TR2200GX and uses a more sophisticated case design and modular construction making a really rugged rig. It comes complete with carrying case, shoulder strap, battery charger, external power cord, etc. Needless to say, you don't need any crystals!



## TRIO TR7010 £189 inc VAT

Work real DX with ease on 2 metre SSB and CW. The TR7010 combines a high performance receiver with a 10 Watt transmitter and provides mobile or fixed station capability at low cost. Supplied ready to operate from 144·1–144·34MHz, the TR7010 covers all CW, SSB and beacon activity. 48 channels with 5kHz spacing plus VXO and RIT provide continuous coverage. Operation in other parts of the 2 metre band can be carried out by a simple crystal change and no re-alignment is required.

Single conversion using an IF of 10·7MHz with a first class crystal filter gives outstanding selectivity. Wide range amplifed AGC and newly developed FET devices in the RF and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals. The single conversion transmitter using fully balanced mixers generates a beautifully clean signal with crisp audio quality.

Join the SSB gang and work real DX. Send for full details now.

## TRIO TR3200 £185 inc VAT

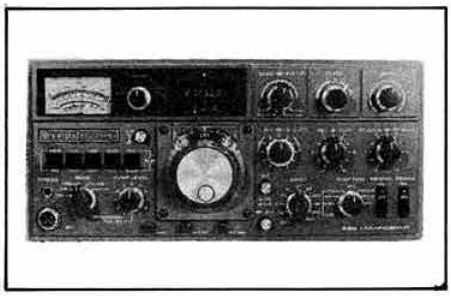
70cm FM repeaters are now so numerous and so efficient that it's almost possible to go anywhere in the country and still be within range of one. As many operators are finding, you don't need high power to be successful, and the TR3200 70cm portable/mobile rig provides the perfect solution to the search for a go-anywhere rig.

The TR3200 power output is two watts or more, switchable to 400mW, it has a really good receiver, a high gain $\frac{1}{4}$ whip antenna and top performance under all conditions. Use it portable on the internal battery pack or mobile using an external antenna and power from the car. Supplied with three channels fitted, carrying case, shoulder strap and all accessories, the TR3200 is the complete 70cm FM answer.

Drop us a line and ask for full details, or better still, come along and see the TR3200 and all the Trio range in comfort.

**SEND 50p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK**
**PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION**

# LOWE ELECTRONICS Ltd



## TRIO TS820S £814 inc VAT

You can always tell who's running a TS820S. Its superb quality stands out from all the other rigs on the band...and when the QRM gets heavy, the TS820S's RF speech processor utilising fast acting 455KHz compression, will get the message through. RF negative feedback is applied from the PA to the driver to give unbeatable linearity, and 3rd order intermodulation products are better than 35dB down. Operating on all bands from 160–10 metres, the TS820S gives you 200W PEP input on transmit and 0·2 microvolt for 10dB S-N ratio on receive. The TS820S is known for its superb selectivity and its IF shift or passband tuning system easily copes with the heavy QRM. That's why the TS820S is the DXer's choice.

For the true measure of the TS820S, you must simply see it and use it. It's on show at all authorised Trio dealers and if you want complete information, simply send a S.A.E. to Matlock marked "TS820 info".

## TRIO TS520S £530 inc VAT

The logical development of the TS520, one of the world's most popular transceivers now includes full 6 band coverage 160–10 metres with all the performance, reliability and quality we expect from Trio. An outstanding receiver with high sensitivity (0·2 uV for 10dB S/N ratio on all bands) together with an equally excellent transmitter make the TS520S the best value for money rig around.

As a TS520S owner, you go on the air with a sense of pride and confidence. Thousands of these precision built transceivers are in use all over the world—in amateur shacks, field day sites, in DX and contest winning stations and no other rig offers you the performance, dependability, versatility and value that is built in to every TS520S.

See it soon and send for full details today.

**Matching accessories:** DG-5 digital readout/counter, AT-200 antenna coupler/power meter and, of course, the TL-922 2kW linear.

## TRIO TS120V £399 inc VAT

Measuring only 9½" × 3¼" × 9¼"—which is about the size of a packet of cornflakes, the TS120V can best be described as a miniature TS820. The rig covers all bands 80–10 metres—and all of 10 metres 28–30MHz so it's ideal for transverter driving, has digital readout built in, vox, break-in CW, RIT, noise blanker and the unique Trio passband tuning system used in the 820. The power output is 10W and a matching linear will be along shortly.

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

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

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

## THE ALL-NEW VHF/UHF RIG

# TS770

## DUAL-BAND, ALL-MODE 2m–70cm

For personal attention on the SOUTH COAST contact JOHN, G3JYG; for equally helpful advice in SCOTLAND contact SIM, GM3SAN. We now stock the PET 2001 series computer at new low prices. SIM, GM3SAN is particularly clever in this area, so why not contact him if you're in SCOTLAND. He'll be glad to help.

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**FOR FULL LIST OF AUTHORISED DEALERS AND AGENTS SEE NEXT PAGE**

## DIODES/ZENERS

| QTY. | | | | |
|---|---|---|---|---|
| | 1N914 | 100v | 10mA | .05 |
| | 1N4005 | 600v | 1A | .08 |
| | 1N4007 | 1000v | 1A | .15 |
| | 1N4148 | 75v | 10mA | .05 |
| | 1N4733 | 5.1v | 1 W Zenner | .25 |
| | 1N4749 | 24v | 1W | .25 |
| | 1N753A | 6.2v | 500 mW Zener | .25 |
| | 1N758A | 10v | " | .25 |
| | 1N759A | 12v | " | .25 |
| | 1N5243 | 13v | " | .25 |
| | 1N5244B | 14v | " | .25 |
| | 1N5245B | 15v | " | .25 |
| | 1N5349 | 12v | 3W | .25 |

## SOCKETS/BRIDGES

| QTY. | | | | | |
|---|---|---|---|---|---|
| | 8-pin | pcb | .16 | ww | .35 |
| | 14-pin | pcb | .20 | ww | .40 |
| | 16-pin | pcb | .25 | ww | .45 |
| | 18-pin | pcb | .30 | ww | .95 |
| | 20-pin | pcb | .35 | ww | 1.05 |
| | 22-pin | pcb | .40 | ww | 1.15 |
| | 24-pin | pcb | .45 | ww | 1.25 |
| | 28-pin | pcb | .50 | ww | 1.35 |
| | 40-pin | pcb | .55 | ww | 1.45 |
| | Molex pins | .01 | To-3 Sockets | | .35 |
| | 2 Amp Bridge | | 100-prv | | .95 |
| | 25 Amp Bridge | | 200-prv | | 1.50 |

## TRANSISTORS, LEDS, etc.

| QTY. | | | |
|---|---|---|---|
| | 2N2222M | (2N2222 Plastic .10) | .15 |
| | 2N2222A | | .19 |
| | 2N2907A | PNP | .19 |
| | 2N3906 | PNP (Plastic) | .19 |
| | 2N3904 | NPN (Plastic) | .19 |
| | 2N3054 | NPN | .55 |
| | 2N3055 | NPN 15A 60v | .60 |
| | T1P125 | PNP Darlington | 1.95 |
| | LED Green, | Red, Clear, Yellow | .19 |
| | D.L.747 | 7 seg 5/8" High com-anode | 1.95 |
| | MAN72 | 7 seg com-anode (Red) | 1.25 |
| | MAN3610 | 7 seg com-anode (Orange) | 1.25 |
| | MAN82A | 7 seg com-anode (Yellow) | 1.25 |
| | MAN74 | 7 seg com-cathode (Red) | 1.50 |
| | FND359 | 7 seg com-cathode (Red) | 1.25 |

## 9000 SERIES

| QTY. | | QTY. | |
|---|---|---|---|
| 9301 | .85 | 9322 | .65 |
| 9309 | .50 | 9601 | .30 |
| | | 9602 | .45 |

## MICRO's, RAMS, CPU's, E-PROMS

| QTY. | |
|---|---|
| 8T13 | 2.50 |
| 8T23 | 2.50 |
| 8T24 | 3.00 |
| 8T97 | 1.75 |
| 74S188 | 3.00 |
| 1488 | 1.25 |
| 1489 | 1.25 |
| 1702A | 4.50 |
| AM 9050 | 4.00 |
| ICM 7207 | 6.95 |
| ICM 7208 | 13.95 |
| MPS 6520 | 10.00 |
| MM 5314 | 4.00 |
| MM 5316 | 4.50 |
| MM 5387 | 3.50 |
| MM 5369 | 2.95 |
| TR 1602B | 3.95 |
| UPD 414 | 4.95 |
| Z 80 A | 22.50 |
| Z 80 | 17.50 |
| Z 80 P10 | 10.50 |
| 2102 | 1.45 |
| 2102L | 1.75 |
| 2107B-4 | 4.95 |
| 2114 | 9.50 |
| 2513 | 6.25 |
| 2708 | 11.50 |
| 2716 D.S. | 34.00 |
| 2716 (5v) | 69.00 |
| 2758 (5v) | 26.95 |
| 3242 | 10.50 |
| 4116 | 11.50 |
| 6800 | 13.95 |
| 6850 | 7.95 |
| 8080 | 7.50 |
| 8085 | 22.50 |
| 8212 | 2.75 |
| 8214 | 4.95 |
| 8216 | 3.50 |
| 8224 | 4.25 |
| 8228 | 6.00 |
| 8251 | 7.50 |
| 8253 | 18.50 |
| 8255 | 8.50 |
| TMS 4044 | 9.95 |

## C MOS

| QTY. | | QTY. | | QTY. | | QTY. | |
|---|---|---|---|---|---|---|---|
| 4000 | .15 | 4017 | .75 | 4034 | 2.45 | 4069/74C04 | .45 |
| 4001 | .20 | 4018 | .75 | 4035 | .75 | 4071 | .25 |
| 4002 | .25 | 4019 | .35 | 4037 | 1.80 | 4081 | .30 |
| 4004 | 3.95 | 4020 | .85 | 4040 | .75 | 4082 | .30 |
| 4006 | .95 | 4021 | .75 | 4041 | .69 | 4507 | .95 |
| 4007 | .25 | 4022 | .75 | 4042 | .65 | 4511 | .95 |
| 4008 | .75 | 4023 | .25 | 4043 | .50 | 4512 | 1.50 |
| 4009 | .35 | 4024 | .75 | 4044 | .65 | 4515 | 2.95 |
| 4010 | .35 | 4025 | .25 | 4046 | 1.25 | 4519 | .85 |
| 4011 | .30 | 4026 | 1.95 | 4047 | 2.50 | 4522 | 1.10 |
| 4012 | .25 | 4027 | .35 | 4048 | 1.25 | 4526 | .95 |
| 4013 | .40 | 4028 | .75 | 4049 | .65 | 4528 | 1.10 |
| 4014 | .75 | 4029 | 1.15 | 4050 | .45 | 4529 | .95 |
| 4015 | .75 | 4030 | .30 | 4052 | .75 | MC14409 | 14.50 |
| 4016 | .35 | 4033 | 1.50 | 4053 | .95 | MC14419 | 4.85 |
| | | | | 4066 | .75 | 74C151 | 2.50 |

## – T T L –

4-1-79

| QTY. | | QTY. | | QTY. | | QTY. | |
|---|---|---|---|---|---|---|---|
| 7400 | .20 | 7492 | .45 | 74H20 | .25 | 74LS76 | .70 |
| 7401 | .20 | 7493 | .35 | 74H21 | .25 | 74LS86 | .95 |
| 7402 | .20 | 7494 | .75 | 74H22 | .40 | 74LS90 | .85 |
| 7403 | .20 | 7495 | .60 | 74H30 | .30 | 74LS93 | .85 |
| 7404 | .20 | 7496 | .80 | 74H40 | .35 | 74LS96 | 2.00 |
| 7405 | .35 | 74100 | 1.15 | 74H50 | .30 | 74LS107 | .90 |
| 7406 | .25 | 74107 | .35 | 74H51 | .30 | 74LS109 | 1.50 |
| 7407 | .55 | 74121 | .35 | 74H52 | .20 | 74LS123 | 1.95 |
| 7408 | .20 | 74122 | .55 | 74H53 | .25 | 74LS138 | 2.00 |
| 7409 | .25 | 74123 | .55 | 74H55 | .25 | 74LS151 | .95 |
| 7410 | .20 | 74125 | .45 | 74H72 | .35 | 74LS153 | 1.15 |
| 7411 | .25 | 74126 | .45 | 74H74 | .35 | 74LS157 | 1.15 |
| 7412 | .25 | 74132 | .75 | 74H101 | .95 | 74LS160 | 1.15 |
| 7413 | .45 | 74141 | .90 | 74H103 | .55 | 74LS164 | 2.90 |
| 7414 | .75 | 74150 | .85 | 74H106 | 1.15 | 74LS193 | 2.00 |
| 7416 | .25 | 74151 | .95 | 74L00 | .30 | 74LS195 | 1.15 |
| 7417 | .40 | 74153 | .95 | 74L02 | .30 | 74LS244 | 2.90 |
| 7420 | .25 | 74154 | 1.15 | 74L03 | .35 | 74LS259 | 1.50 |
| 7426 | .25 | 74156 | .70 | 74L04 | .40 | 74LS298 | 1.50 |
| 7427 | .25 | 74157 | .65 | 74L10 | .30 | 74LS367 | 1.95 |
| 7430 | .20 | 74161/9316 | .75 | 74L20 | .45 | 74LS368 | 1.25 |
| 7432 | .30 | 74163 | .85 | 74L30 | .55 | 74LS373 | 2.50 |
| 7437 | .20 | 74164 | .75 | 74L47 | 1.95 | 74S00 | .45 |
| 7438 | .30 | 74165 | 1.10 | 74L51 | .65 | 74S02 | .45 |
| 7440 | .20 | 74166 | 1.75 | 74L55 | .85 | 74S03 | .35 |
| 7441 | 1.15 | 74175 | .90 | 74L72 | .65 | 74S04 | .35 |
| 7442 | .55 | 74176 | .95 | 74L73 | .70 | 74S05 | .45 |
| 7443 | .45 | 74177 | 1.10 | 74L74 | .75 | 74S08 | .45 |
| 7444 | .45 | 74180 | .95 | 74L75 | 1.05 | 74S10 | .45 |
| 7445 | .75 | 74181 | 2.25 | 74L85 | 2.00 | 74S11 | .45 |
| 7446 | .70 | 74182 | .75 | 74L93 | .75 | 74S20 | .35 |
| 7447 | .70 | 74190 | 1.25 | 74L123 | 1.95 | 74S22 | .55 |
| 7448 | .50 | 74191 | 1.25 | 74LS00 | .40 | 74S40 | .30 |
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| 7451 | .25 | 74193 | .85 | 74LS02 | .45 | 74S51 | .35 |
| 7453 | .20 | 74194 | .95 | 74LS03 | .45 | 74S64 | .15 |
| 7454 | .25 | 74195 | .55 | 74LS04 | .45 | 74S74 | .70 |
| 7460 | .40 | 74196 | .95 | 74LS05 | .45 | 74S112 | .60 |
| 7470 | .45 | 74197 | .95 | 74LS08 | .45 | 74S114 | .85 |
| 7472 | .40 | 74198 | 1.45 | 74LS09 | .45 | 74S133 | .85 |
| 7473 | .25 | 74221 | 1.50 | 74LS10 | .45 | 74S140 | .75 |
| 7474 | .30 | 74298 | 1.50 | 74LS11 | .45 | 74S151 | .95 |
| 7475 | .35 | 74367 | 1.35 | 74LS20 | .45 | 74S153 | .95 |
| 7476 | .40 | 75491 | .65 | 74LS21 | .45 | 74S157 | .98 |
| 7480 | .75 | 75492 | .65 | 74LS22 | .45 | 74S158 | .80 |
| 7481 | .85 | 74H00 | .20 | 74LS32 | .50 | 74S194 | 1.50 |
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| LM301 | .45 | LM320T15 | 1.65 | 78L12 | .75 |
| LM308 | .65 | LM323K | 5.95 | 78L15 | .75 |
| LM309H | .85 | LM324 | 1.25 | 78M05 | .75 |
| LM309 (340K-5) | 1.50 | LM339 | .75 | LM380 (8-14 Pin) | 1.19 |
| LM310 | .85 | 7805 (340T5) | 1.15 | LM709 (8-14 Pin) | .45 |
| LM311 (8-14 Pin) | .75 | LM340T12 | .95 | LM711 | .45 |
| LM318 | 1.50 | LM340T15 | .95 | LM723 | .40 |
| LM320H6 | .79 | LM340T18 | .95 | LM725 | 2.50 |
| LM320H15 | .79 | LM340T24 | .95 | LM739 | 1.50 |
| LM320H24 | .79 | LM340K12 | 1.25 | LM741 (8-14) | .45 |
| 7905 (LM320K5) | 1.65 | LM340K15 | 1.25 | LM747 | 1.10 |
| LM320K12 | 1.65 | LM340K18 | 1.25 | LM1307 | 1.75 |
| LM320K15 | 1.65 | LM340K24 | 1.25 | LM1458 | .65 |
| | | | | LM3900 | .95 |
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| TS 520S 1·8-28MHz SSB Tcvr. 200w PEP | £575.00 |
| SM 220 Monitorscope | £251.00 |
| TS 700S 2m all mode dig. Tcvr. | £637.00 |
| TR 7010 2m CW/SSB Tcvr. 10w output | £189.00 |
| TR 7200G 2m FM mobile Tcvr. 10w fitted 10ch | £189.00 |
| TR 7400A 2m FM mobile Tcvr. 800ch | £365.00 |
| TR 7500 2m FM mobile Tcvr. 10w. PLL 80 FM ch | £235.00 |
| TR 2300 2m FM portable Tcvr. PLL 80 FM ch | £210.00 |
| TR 8300 70cm FM mobile 10w Tcvr. fitted 4ch | £267.00 |
| TR-3200 70cm Tcvr. fitted 3ch. | £198.00 |
| R-300 General coverage Receiver | £185.00 |

The above are **some** of the main Trio units—we also stock the accessories, oscilloscopes, etc.

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| AR-30 | £46.13 |
| AR-40 | £53.44 |
| CD-44 | £106.88 |
| HAM-3 | £156.38 |
| BIG-TALK | £89.44 |
| TAIL-TWISTER | £241.88 |

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| UR-76 52ohms per metre | £0.20 |
| T3234 52ohms per metre | £0.55 |
| UR-70 75ohms per metre | £0.20 |
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| PT-2 FET Transceiver preamp. 10-160m | £67.50 |

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| 101-33 Senior Code Course. 33rpm Record | £5.40 |
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| 103-33 Advanced Code Course. 33rpm Record | £2.80 |
| 103-T Advanced Code Course. Cassette | £3.78 |
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| 400 Dynamic Hand Microphone. 'Buckeye' | £5.85 |
| 565 M6 Hand Microphone FET amplified. 'Mariner' | £31.50 |
| D104-M Hand Microphone D104 FET amp 4-wire | £24.30 |
| D104-M6 Hand Microphone D104 FET amp. 6-wire | £28.35 |
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| 10Y/2M 10 element folded dipole yagi | £24.58 |
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| D5/2M Double 5 slot-fed yagi | £15.77 |
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| SVMK/2M Mounting kit | £5.62 |
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| CPF1259-7 PL-259 quick-dis. male for UR-43/76 | £1.08 |
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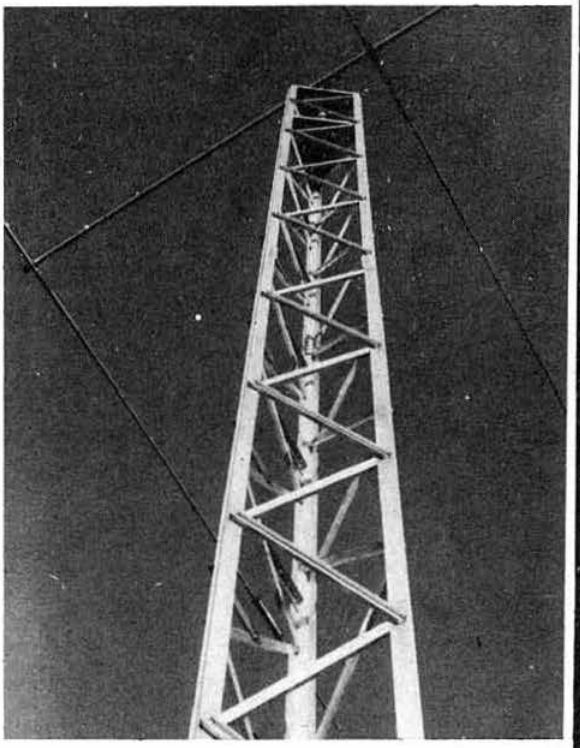

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**FROM NORTH.** Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds. veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.
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| | 344 | SPRUNG BASE : 60–120MHz | | £5.55 |
| $\frac{5}{8}\lambda$ | 440 | STANDARD BASE | 145MHz | £3.50 |
| | 330 | SWIVEL BASE | 145MHz | £4.45 |
| | 341 | SPRUNG BASE | 145MHz | £6.65 |
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| 057 | 127cm TAPERED: $\frac{1}{2}$, $\frac{5}{8}$, $+\frac{1}{4}$ 70MHz | £1.95 |
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(Mag. Mount & Assemblies c/w 4·5m Coax)

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| | 095 | FIBREGLASS MOUNT TO SO239 | £2.10 |
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(Mounts fit all standard cable assemblies)

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|---|---|---|
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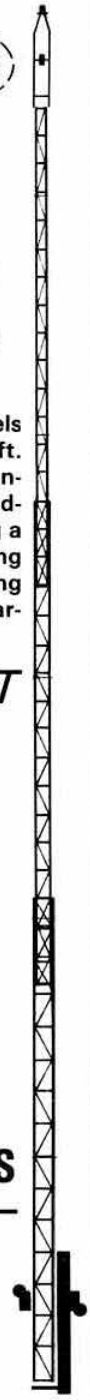

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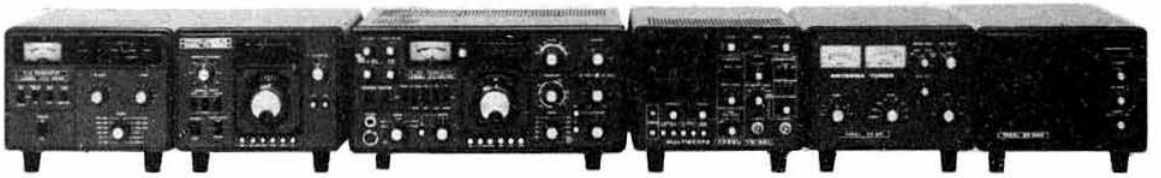

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Incorporated 1926 — Amateur Radio Union


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| **Zone F:** | Region 15 |
| **Zone G:** | Regions 12, 13 and 14 |

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# CURRENT COMMENT

## Technical & Publications Committee

### "Steve" steps down

There is a well-known truism that if you want a job done well you ask a busy man to do it. There can be few better testimonials to this belief than the 20 years of service given by Roy Stevens, G2BVN, as chairman of the Technical & Publications Committee: service not just to the *Society* but to *you* as members.

This year, with the heavy burden of the World Administrative Radio Conference very much on his broad shoulders, "Steve" has stepped down as chairman of the committee, although he remains secretary of IARU Region 1, a Council member, and the Society's Telecommunications Liaison Officer. Each *one* of these four important and key positions calls for energy, knowledge, diplomacy and a dedicated approach to amateur radio. To have held all four *simultaneously* over a number of years is perhaps an indication of the energy expended on our behalf by this remarkably able man. To have done so while remaining a very active and extremely successful "Honours Roll" dxer is mind-boggling.

As all who have worked alongside him will testify, Roy Stevens is not the sort of office-holder who is content to take the credit while leaving the difficult tasks to others; nor is he ever afraid to tackle a job that others would hurriedly leave to the "experts". Steve indeed is a notable example of one of those true "amateur" amateurs (being by profession neither an electronics engineer nor a publisher) who are always prepared to spend time and effort in learning the skills of the "professionals"—the hard way, by practising and exercising them.

His remarkable record in building up the list and reputation of the Society's publications and in ensuring their sale overseas as well as in the UK would be the envy of any professional publisher. His committee, it is true, inherited the early successes of the Society's Handbook and the *Guide to Amateur Radio*, but very little else; the *RSGB Bulletin* was then struggling in the difficult post-war period and had a circulation of under 9,000. Since it pulled in very little advertising, there must, to most people, have appeared little chance of expanding it into the well-established and substantial journal it is today. The Society's Council, not without reason, was cautious; it had learned the hard way that technical publishing is not an infallible gold-mine, and there was the increasing problem that the more experienced of its authors and editors were seldom available for additional spare-time work.

To overcome such problems, Roy Stevens has for these many years worked constantly behind the scenes: encouraging those with practical ideas; chiding those who failed to deliver their copy on time; or fighting tenaciously on their behalf when the delays were coming from editors, printers or distributors; recognizing always that difficulties are bound to occur, but overcoming them in a quiet, pragmatic way. "Publishing is the art of the possible" is a phrase well known in the publishing profession but seldom fully understood by others. Roy Stevens understood it from the beginning. He recognized that books and journals must be good, but must also be sellable, and cannot always be perfect. Above all, he recognized that books are no use to anyone until they are actually available and at reasonable cost.

When others failed or were forced to drop out, Roy Stevens has always been prepared to sit down with pen, paste and scissors and produce good copy. There have been times, for example in the period immediately before the appointment of the Society's present editor, when it was possible to find him at RSGB headquarters surrounded by proofs and busy putting together *Radio Communication*, and doing it with such expertise that very few, if any, members ever knew that for a period our journal had suddenly found itself without formal editorial staff.

The Society and its members owe him an enormous debt of gratitude.

*G3VA*

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### WARC 79

Accompanying the announcement by the Home Office, reproduced on page 408 of the May issue of *Radio Communication*, were two volumes containing the detailed UK proposals. The proposals covering Article N7, the frequency allocations, amount to 128 pages, about half of the first volume. These proposals are summarized below, and the table also shows the present UK allocation and the allocation for Region 1 which appears in the Radio Regulations. It should be borne in mind that there are some national allocations, eg 70 and 1,325MHz in the UK, which do not appear in the Radio Regulations.

| Existing UK band (MHz) | ITU Region band (MHz) | UK proposal to WARC (MHz) | Status† |
|---|---|---|---|
| 1·8–2·0 | Footnote only | 1·809–1·914 | E |
| 3·5–3·8 | 3·5–3·8 | 3·615–3·700 | E |
| | | 3·700–3·900 | S |
| 7·0–7·1 | 7·0–7·1 | 7·0–7·1 | E* |
| Nil | Nil | 10·1–10·2 | E |
| 14·0–14·35 | 14·0–14·35 | 14·0–14·35 | E* |
| Nil | Nil | 18·568–18·768 | E |
| 21·0–21·45 | 21·0–21·45 | 21·0–21·45 | E* |
| Nil | Nil | 24·0–24·3 | E |
| 28·0–29·7 | 28·0–29·7 | 28·0–29·7 | E* |
| 70·025–70·7 | See above | | |
| 144–146 | 144–146 | 144–146 | E* |
| 430–440 | 430–440 | 430–440 | P* |
| 1,215–1,325 | 1,215–1,300 | 1,240–1,300 | S |
| 2,300–2,450 | 2,300–2,450 | 2,300–2,450 | S* |
| 3,400–3,475 | Footnote only | 3,400–3,475 (in UK) | S |
| 5,650–5,850 | 5,650–5,850 | 5,650–5,850 | S |
| (GHz) | (GHz) | (GHz) | |
| 10·0–10·5 | 10·0–10·5 | 10·0–10·5 | S* |
| 24·0–24·25 | 24·0–24·25 | 24·0–24·25 | E/S* |
| Nil | Nil | 40·5–41·0 | S* |
| Nil | Nil | 49·5–50·0 | S* |
| Nil | Nil | 71·0–76·0 | S* |
| Nil | Nil | 160–165 | P* |

*In these bands the amateur satellite service has an allocation (or one is proposed) being either whole or part of the amateur service allocation.
†Status: E—exclusive, P—primary, S—secondary.

It will be noted that the UK has proposed three new hf bands and four new microwave bands, while 1,215–1,240MHz has been lost to the radiolocation and radio navigation satellite service. There are amateur exclusive bands proposed at 1·8 and 3·6MHz, and with new allocations proposed for the broadcasting service the intruders will have no reason to remain in the 7·0–7·1MHz band.

It is hoped that these proposals can attract sufficient support from other ITU member nations to be accepted by the World Administrative Radio Conference, which commences on 24 September 1979 at Geneva.

*G2BVN*

# QTC
## amateur radio news

### Interference to GB3LO

On 19 April, at Camberwell Magistrates Court, Stephen Bushell, of Camberley, Surrey, was found guilty under Section 1/1 and Section 13 of the Wireless Telegraphy Act of offences which resulted in deliberate interference to the Crystal Palace repeater GB3LO.

The Home Office alleged that the offences took place in February 1978, and that music and obscene language were transmitted on the input frequency of the repeater.

Bushell was fined £100 for transmitting without a licence, £200 for causing deliberate interference, and was ordered to pay £30 witnesses costs, £75 costs, and £50 towards his legal aid costs; a total of £455. He was given 28 days in which to pay.

A second defendant, John Jenkins, who was present in the vehicle with Bushell when the offences were committed, was also fined and ordered to pay the same amounts, although he had failed to appear at the court for any of the three hearings. Jenkins was given 14 days in which to pay.

It is interesting to note that all of the work in detecting the offenders, including bringing the police into the matter, was carried out by local amateurs.

### Callsigns and phonetics

Paragraph 9 [3] of the amateur licence sets out the conditions under which phonetics may be used. Note [m] appended to the licence reproduces the phonetic alphabet from Appendix 16 of the ITU Radio Regulations. It recommends that this phonetic alphabet should be used.

Official monitoring of amateur allocations has confirmed that a number of stations are using phonetics which do not conform with para 9 [3] of the licence. If this practice by a small minority does not cease then it is likely that the Home Office will *insist* on the use of the ITU phonetic alphabet. This would then be yet another example of the introduction of regulation because of the inability of a small number of operators to conform to an entirely reasonable licence condition.

### Maritime mobile licence

The Home Office has agreed that where an amateur station is installed in a vessel owned by the amateur himself, and vhf only is voluntarily fitted in the vessel, no inspection need be made prior to the issue of a licence and that the fee will in future be reduced to £6.40. This does not affect the amateur maritime stations on company-owned vessels where radio is installed on a compulsory basis, where the fee will remain at £16.70 to cover the inspection costs.

### IARU Region 1

A meeting of the IARU Region 1 Executive Committee was held between 28 and 30 April at Maidenhead, Berkshire. Those attending were: L.v.d. Nadort, PA0LOU (chairman); W. Nietyksza, SP5FM (vice-chairman); R. F. Stevens, G2BVN (secretary); K. W. Strom, SM6CPI (treasurer); and Dr J. Rottger, DJ3KR; H. Walcott-Benjamin, EL2BA, and J. Znidarsic, YU3AA (members).

Also taking part in the meeting were Mr N. B. Eaton, VE3CJ, president of the IARU, Carl Smith, W0BWJ, and C. Eric Godsmark, all members of the IARU WARC team. The major subject under discussion was the final preparation for WARC. In addition to supplying members of the WARC team, Region 1 will be making a substantial financial contribution towards the costs of IARU representation.

### 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: Accident Dept), 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 careful attention be given to this important matter.

### Region 2 representatives' meeting

A meeting of RSGB Region 2 area representatives, affiliated society representatives and representatives of other amateur radio clubs in Region 2 will take place at the White Rose RS, Moortown Rugby Football Club, Moss Valley, Alwoodley, Leeds 17, on Saturday 16 June commencing at 2pm.

The purpose of the meeting is to discuss the forthcoming Region 2 ORM and other regional matters with the Region 2 representative, G4DAX, from whom further details can be obtained; tel Goathland 333.

### Post Office pirated

The Post Office Telecommunications South Central ARS callsign G4DJF, which is used only on hf, is being pirated on 144MHz; the other club callsign, G8LTR being the only one used on vhf. At present, particulars of G4DJF are withheld from the *Call Book* listing, but in future these will be shown in the same way as those of G8LTR.

The pirate can be assured that if misuse of the callsign continues, the Post Office will catch and prosecute the culprit.

### SMC 21st anniversary

South Midlands Communications Ltd will celebrate its 21st anniversary with Unicom 21, to be held at Sunbury-on-Thames on 22–23 June. Among the features will be a talk on WARC 79 organized by the RSGB, and an RSGB bookstall.

Full details of this event will be found in the SMC advertisement in this issue.

### South Manchester RC lecture

All radio amateurs will be welcome to a lecture to be given at the Sale Moor Community Centre, Norris Road, Sale, Cheshire, on 15 June. The lecture, to be given by M. Yonge, of Dolby Laboratories, will be entitled "The Dolby noise reduction systems".

Tickets will be required and may be obtained free of charge by sending an sae to the secretary of the South Manchester RC, Mr W. L. Seddon, G3VIW, 12 Barwell Road, Sale.

# Improving the FT101

by H. LEEMING, FSERT, TEng(CEI), G3LLL, technical director, Holdings Photo Audio Centre

THE FT101 has lost nothing in popularity over the years, the only snag being, along with that of other Japanese equipment, its present high price. Where a new unit cannot be purchased, many people are looking at the possibility of improving the receive and transmit performance of older FT101s, and Holdings feel that they can claim that their clipper is unique in being a single add-on unit which helps both.

Having sold hundreds of units world-wide, they have now decided to introduce a do-it-yourself version in the hope that those who beg, borrow or buy components elsewhere will be outweighed by those who give them their custom. The kit is priced as low as is possible to appeal to the technically competent, and hence the price does not include free after-sales service. They do, however, offer a repair service, for a fixed charge, on complete kits which have been purchased from them, providing that the kits are sent to them complete with leads and an octal plug, and that the standard of construction is at least reasonable.

## Principles of rf clipping

In rf speech processing, clipping is carried out after the audio frequencies have been converted to a number of radio frequencies. As with any clipping process, harmonic distortion occurs at multiples of the fundamental frequency, which in the FT101 is 3·18MHz. Distortion products at 6·36MHz, 9·54MHz etc, are easily filtered out, leaving the audio clipped but free from harmonic distortion. While rf clipping is inherently free from harmonic distortion, excessive content of low audio frequencies can still result in intermodulation distortion, and for this reason Holdings advise that a microphone with a tailored response, such as the Shure 444, is used *with any speech processor.*

## Circuit description (Figs 1, 2)

On transmit, the double sideband suppressed carrier signal from the FT101 is applied to TR1, amplified slightly, and then converted to ssb by the ssb filter. As with any ssb signal, each voice frequency then represents one (and only one) radio frequency, and this signal is further amplified by TR2 and TR3. As the microphone gain is advanced, the signal eventually becomes strong enough for the peaks to be clipped by the second set of clipping diodes. TR3 has a gain of about 8 to 10dB, so that if the microphone gain is advanced to give a total of around 20dB of clipping, this is shared by the two sets of diodes, ensuring that neither of the stages can be overloaded. TR4 provides isolation from the clipping diodes, and passes the signal back to the transmitter via the output control. The clipped signal is then processed by the transceiver's ssb filter, thus ensuring that any out-of-channel intermodulation products are removed, giving a clean signal free from splatter.

On receive the signal path is the same, but the gain is reduced and the output control is disconnected. This is achieved by wiring the clipper to the FT101 transmit/receive switching circuits, resulting in 13V being applied to pin 7 in the transmit mode only. The receive gain can be adjusted by RV1 to suit the operator's preference. Concern has been expressed in some quarters that the clipping diodes are still in circuit on receive, but this is of no consequence as only a colossal local signal could cause them to conduct. In any case, as they follow the ssb filter this would not matter. The extra gain provided by the clipper is within the automatic gain control loop, which results in better agc action. The FT101 therefore has less tendency to overload on strong local signals when the clipper is fitted.

The unit, while suitable for all the latest FT101s, was originally designed to go with the FT101 Mk2 which was rather short of gain, and here the improvement on receive is extremely noticeable. Several users have commented that they would consider the unit worth the cost for the improved receive performance alone when used with this model. The FT101B, E and EE have, of course, improved gain and selectivity when compared with the Mk2, and here the difference in receive performance is less noticeable. It is still worthwhile, however, when one considers that hardly any extra components are used in achieving it, and that the overload problem is reduced. Some FT101E users have considered it worth their while disconnecting Yaesu's clipper and fitting Holdings'.

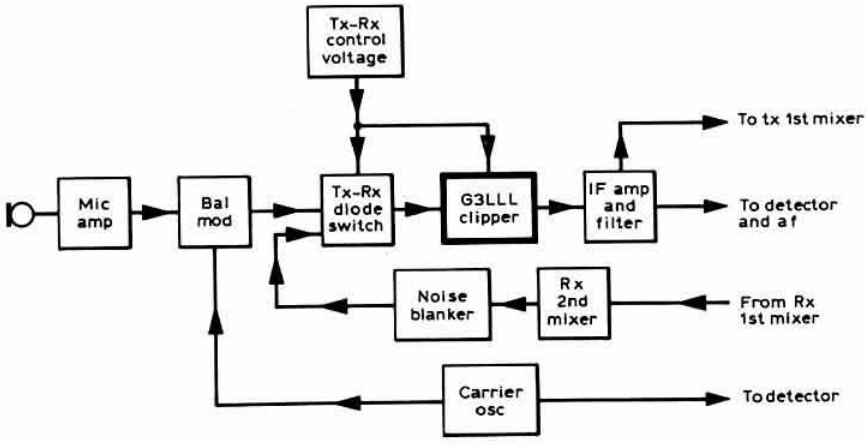



**Fig 1. Simplified block diagram of FT101 with clipper**

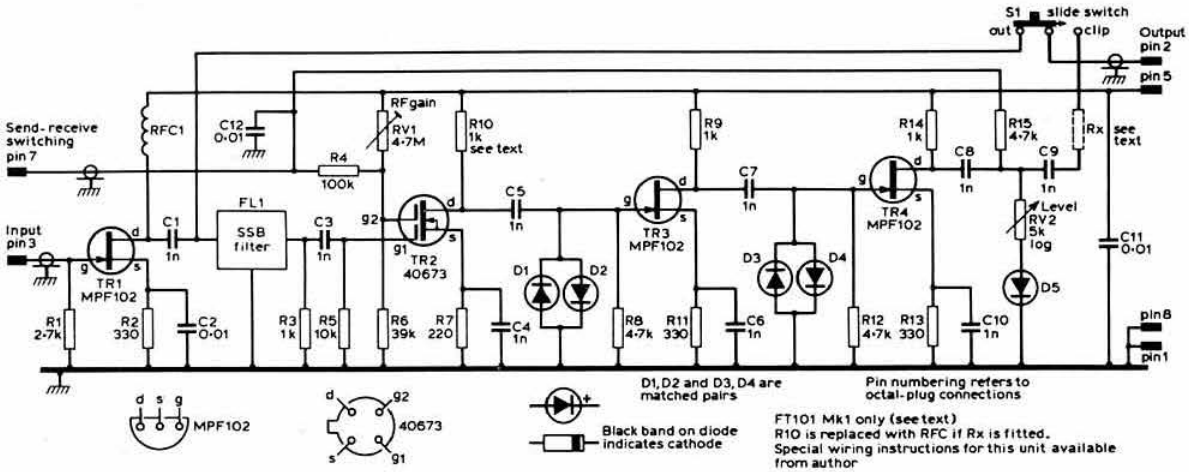



Fig 2. Circuit diagram. See note at bottom right for FT101 Mk1

## Components

The most critical part is the ssb filter, which must match that in the FT101, and normally a Yaesu XF30A or XF32A will suffice. On occasions Holdings have found that the filter in the clipper has been at the opposite end of its frequency tolerance to that in the FT101, and this results in a slight restriction of audio response, especially on receive. To guard against this they have filters specially made 100Hz wider than normal as, while this does not detract from the improved selectivity which cascoding the clipper and the FT101's filter achieves, it does

### Components list

| | |
|---|---|
| **R1** | 2·7kΩ |
| **R2, 11, 13** | 330Ω |
| **R3, 9, 10, 14** | 1kΩ |
| **R4** | 100kΩ |
| **R5** | 10kΩ |
| **R6** | 39kΩ |
| **R7** | 220Ω |
| **R8, 12, 15** | 4·7kΩ |
| **RV1** | 4·7MΩ preset |
| **RV2** | 5kΩ preset |
| **RFC1** | 1MH |
| **C1, 3–10** | 1nF disc |
| **C2, 11, 12** | 0·01μF disc |
| **TR1, 3, 4** | MPF102 |
| **TR2** | 40673 |
| **D1–5** | OA47, IB40, AA143 or similar |
| **FL1** | SSB filter, 6-pole |
| **S1** | Slide switch |

**Extra components for FT101 Mk 1** (See Fig 2 and text) 1·8kΩ resistor (Rx), RFC in place of R10, 1nF capacitor.

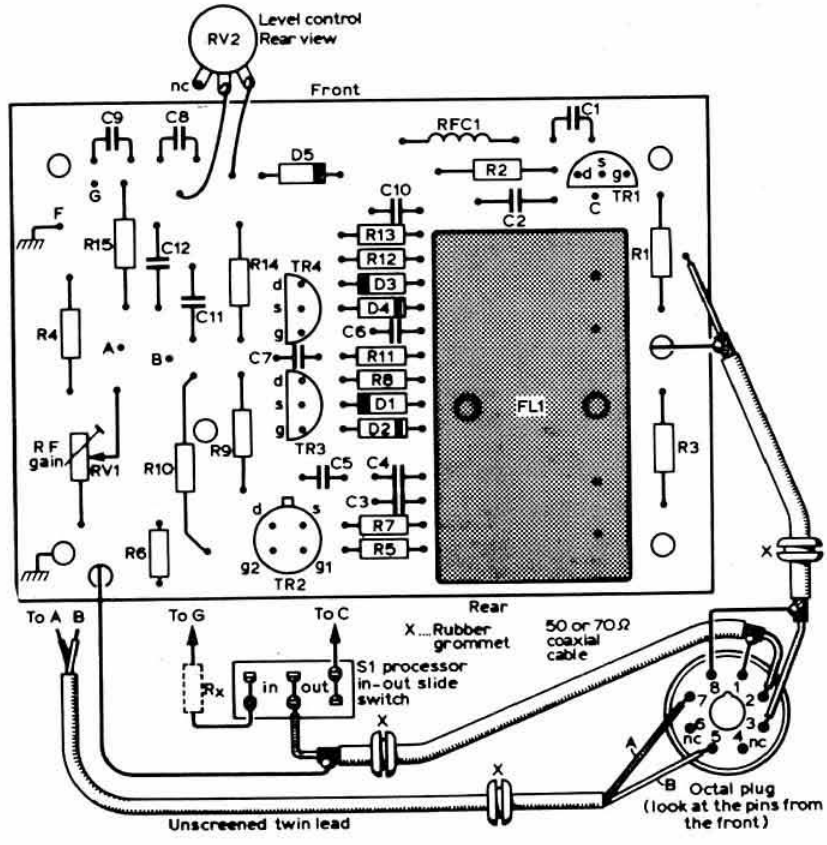



Fig 3. Component side layout. Rx not needed except for FT101 Mk1. R2, 7, 11, 13 may be replaced by 270Ω resistors. Third connection on RV1 not soldered but bent underneath. Cables laced or taped together should not exceed 18in in length

give a little more elbow room for manufacturing tolerances. The diodes used are high conductance gold-bonded germanium types, and can be OA47, IB40, AA143 or anything else similar. While they specify a 40673 and MPF102 fets, almost any dual-gate fet will substitute for the former, and provided that due account is taken of any alterations of the connections, most rf type N-channel fets (ie 2N3819) will do in place of the latter.

## Layout

The gain of individual stages is low, but at 3·18MHz care must still be taken to keep the input away from the output to avoid oscillation, or unclipped signals from "jumping" the processor. For this reason external mounting of the processor is recommended, certainly for the initial trials. Even Yaesu had trouble with signals going round instead of through the internal processor with early models of the FT101E Mk2. The step-by-step instructions refer to Holdings' do-it-yourself kit but should be of help to anyone wishing to "go it alone".

## Assembly (Figs 3 to 5)

**Note regarding diodes.** Five diodes are needed, and these should be checked for forward resistance on the low ohms range of a test meter. Matching is not particularly critical, and it should always be possible to select two pairs of diodes matched so that each diode in the pair has forward resistance matched to within 15 per cent; the odd one out being used in the diode switch position. Diodes are soon affected by heat, and hence it is as well to re-test them after the complete circuit board has been wired.

1. Fit and solder components to pcb as shown in layout diagram, using heat shunts where appropriate; this being very important when installing the dual-gate fet and the diodes. *Note:* Rx is fitted and R10 is replaced by RFC on FT101 Mk1 version only (one without 160M marked on front panel). If filter is difficult to fit, do not force it but enlarge holes slightly. Check after soldering that solder has not run down pins of ssb filter and short-circuited them. Input of filter should read open ciruit, and output 1kΩ when measured in circuit.
2. Mop up any excess solder using "solder wick" or a length of braid cut from coaxial cable, and examine circuit with magnifying glass to ensure that there are no short-circuits or dry joints.
3. Check that the fixing holes in the circuit supplied line up with those in the cabinet—if not, drill suitable holes in cabinet.
4. Cleanse paint from around holes in the bottom of the cabinet to ensure good electrical connection, and insert long 6BA screws through bottom of cabinet, retaining them in place by fitting the self-adhesive felt feet.
5. Make up and solder leads to octal plug; fit rubber grommets, and solder other ends to A, B, H and ground at points shown.
6. Wire leads to G, C, D and E.
7. Fit spacers to 6BA nuts and, if necessary, cut excess length off pins of crystal filter, making sure that no point on circuit can possibly short-circuit to metal cabinet.
8. Install circuit board in cabinet; wire and fix switch, potentiometer and knob.
9. Re-check wiring, and measure resistance from pins 5 and 7 to chassis (it should be more than 100Ω) to ensure there are no short-circuits which could damage the FT101.
10. Modify FT101 and fit clipper as described below, setting R8 to give one or two S-points of gain—do not set it too high or it will bring up the noise.
11. Screw clipper to lid or underside of FT101 and attach cabinet top using self-tapping screws with plain washers.

## Wiring the FT101

(**Note.** The following instructions refer to all FT101s which were factory fitted with 1·8MHz, have 160M marked on the range switch, and have the noise blanker circuitry separate from the i.f. board. The original FT101 has to be wired differently; and instructions for this unit are available from the author upon receipt of an sae.)

1. First check that the FT101 is in perfect order. That the S-meter indicates about S9+5 when tuned to 14·2MHz calibration point, and that full drive is available on all bands.
2. Completely disconnect the FT101 from mains, antenna, earth and all other equipment, and place on bench upside down. Connect wire between metal of soldering iron and the chassis of the FT101*.
3. Remove bottom cover and screws holding speaker mounting plate, lift away speaker and plate, being careful not to pull leads.
4. Disconnect wire from pin 15 on underside i.f. board socket (PB1183).
5. Connect low-capacity low-loss 75Ω coaxial cable supplied between pin 15 on i.f. board and pin 2 on vfo socket.
6. Connect lead which previously went to pin 15 via similar screened lead to pin 3 on vfo socket.
7. Earth braids of both screened leads to pins 1 and 8 of vfo socket.

*This is good advice when working on any transistorized equipment, as quite apart from the safety aspect, transistors and fets are soon destroyed if any mains leakage occurs via the internal capacitance of the mains transformer, mains suppressor capacitors, or soldering iron.

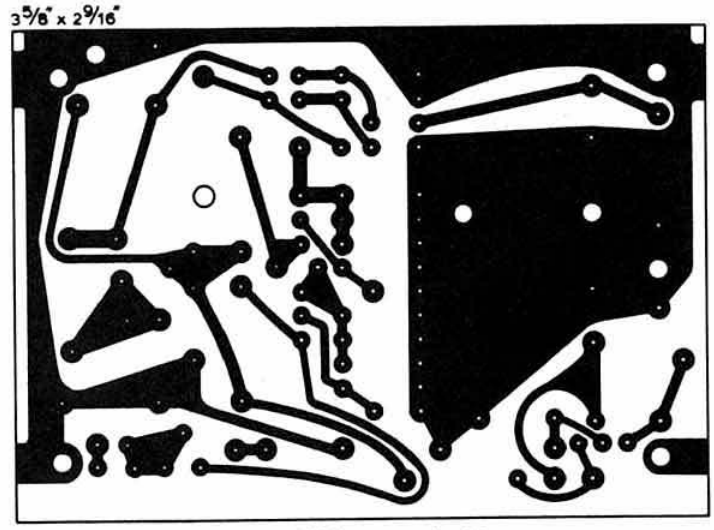



**Fig 4. PCB layout, underside**

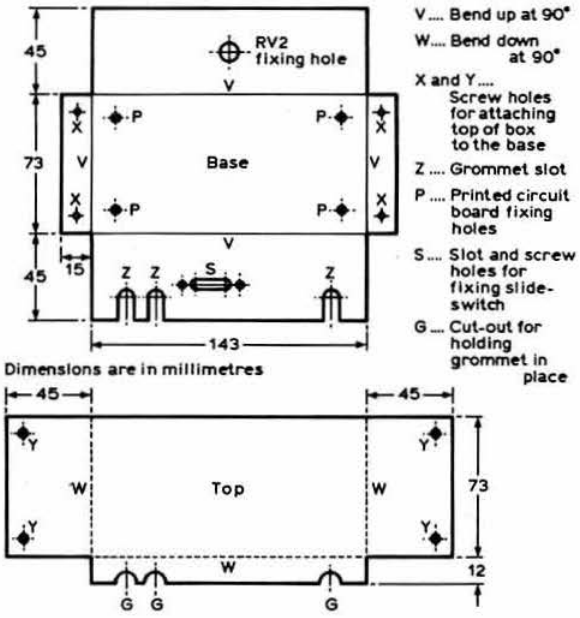



Fig 5. Suggested metal box construction

8. Wire pin 7 of vfo socket to pin 13 on underside mixer unit socket (PB1180), using unscreened wire and leaving existing connection on mixer unit in place. (With B and EE models also disconnect and insulate unused wire already connected to pin 7.)
9. Reassemble.

**Note.** Location of circuit boards shown in FT101 manual, pin numbers referred to are indicated on underside of sockets.

## Testing the wiring

Plug octal plug with short between pins 2 and 3 into vfo socket and confirm that transceiver operates as normal.

## Transmitting instructions

It is not necessary to have a room full of test equipment to set up a processor—try it the Holdings' way first!

Fit clipper and tune up for maximum output as described in the Yaesu manual. Set clipper output control to minimum and microphone gain at 3. While whistling loudly into microphone, advance clipper output control clockwise until maximum pa current is obtained. If above 320mA, turn clipper output control anti-clockwise until pa current falls to 300mA. If peak pa current is below 320mA, turn clipper output control anti-clockwise until peak current obtained is reduced by about 20mA. Now speak normally into microphone, switch to alc, and note that the alc does not operate appreciably. If alc is still operating, turn clipper output control down further until alc meter is below one half of green scale. The more the alc meter moves, the less clipping will be achieved.

It is important to realize that the p.e.p. input of the FT101 is controlled by the clipper output control, and the amount of clipping is controlled by the microphone gain control. Experience and reports from other stations will indicate where to set these, but for a start set the microphone gain at about 1 to 1½ for normal work, and at around positions 3 to 5 for dx contacts. Always keep the clipper output control at the minimum setting possible, and peak the output with the preselector control.

**Important.** If very high levels of clipping are used, watch the pa current. Do not drag out words, and take a breath occasionally! Make sure that over any 15s period the pa meter spends at least as much time below 200mA as it does above it. Used sensibly, an FT101 fitted with a blower and a clipper will run cooler than the standard transmitter without the blower. Do not use any clipper without a blower.

## Audio gain

For maximum transmit audio sensitivity, the setting of TC6 (directly under the alc pot on PB1184) should be checked. While "ahing" very quietly into the microphone, adjust this capacitor for maximum rf into a dummy load with clipper connected but switched out.

## Fault tracing

FET characteristics and, hence, voltages vary considerably. With the FT101 switched to transmit, the source voltage on the fets should be between 0·3 and 1·5V. With ht from the FT101 around 14·5V, drain voltages of fets fed via 1kΩ resistors should be 1 to 6V *less* than ht voltage. In receive mode, with RV1 fully clockwise, gain should be 1 to 2 S-points, and, with RV1 a few degrees short of fully anti-clockwise, about 5 S-points. Do not set RV1 fully anti-clockwise or this will saturate the fet and reduce transmit and receive gain. In the transmit modes stage, gain is approximately as follows: TR1 equals 2, TR2 equals 4 to 6, TR3 equals 3, TR4 equals 2.

If a stage seems faulty and no test equipment is available, remove the fet and connect a 1,000pF capacitor between drain and gate; the clipper should then work with reduced gain. If the unit is dead, check that input is wired to pin 3 and output to pin 2, and that they are not reversed. If output control does not function, check that there are +13V on pin 7, and point B in the transmit mode, and around 0·2 to 0·3V across the switching diode at point E.

Full workshop service is available on completed units which have been reasonably built, but due to the low price of the kit this is chargeable.

## Expected results

Speech processors of any kind only help when signals are weak, hence if a signal is 5 and 9 plus on 3·5MHz it will be better to switch off the processor. The real improvement in receive and transmit performance comes when signals are below S4 on 14, 21 and 28MHz, when an improvement in readability of the transmit signal, at least equivalent to any linear amplifier operating within the legal UK power limits, should be obtained.

## Additional notes

### Carrier frequency

It has been noted that some FT101s are slightly short of high frequencies in the audio response, especially on receive. If hf response is short on either or both sidebands, proceed as follows: remove antenna and switch to receive on required sideband. Note pitch of "hiss" and adjust usb or lsb trimmer (clearly marked on PB1184) until pitch of the hiss increases slightly. Now reconnect antenna and try tuning in at least 10

different ssb stations on the sideband being adjusted. With correct carrier adjustment the average station will then be received with correct audio balance. Note that when using the clipper, correct adjustment is more critical on receive than on transmit.

**Poor quality signal**

Speech processors seem to amplify the shortcomings of microphones, and certainly in the author's opinion the standard FT101 microphone, while perhaps ideal with the Japanese voice, does not give the best results with the deeper European voices. The modified Shure 444 microphone gives superb results, but for something cheaper try removing the Yaesu insert and transformer from the hand microphone and fit a crystal insert. The gold coloured Acos microphone 43/3 is highly recommended, and while it is no longer manufactured it can sometimes be "obtained" at local club meetings.

## Local/distance switch for Shure 444 microphone

When using a radio frequency clipper, great improvement can be made supplying a signal which has strongly emphasized high frequencies. The Shure 444 microphone greatly helps in this direction, but in poor propagation conditions extra bass cut gives an even greater improvement. When using the 444 microphone and FT101, the manual switch on the microphone is not required as vox/ptt switching can be done on the transceiver.

To modify, remove ptt connections from vox switch on underside of microphone and short-circuit them together; wire capacitor of about 1,000pF across now unused vox switch; cut black audio lead which appears from microphone cable, and connect the two cut ends to either side of capacitor mounted on vox switch.

The vox switch is now set to normal, and the microphone will perform normally. When set to VOX, all the frequencies below about 1·5kHz are rolled off by 6dB per octave. The output of the microphone falls in the bass cut position, so microphone gains must be advanced by about half as much again as normal.

## Cost of kit

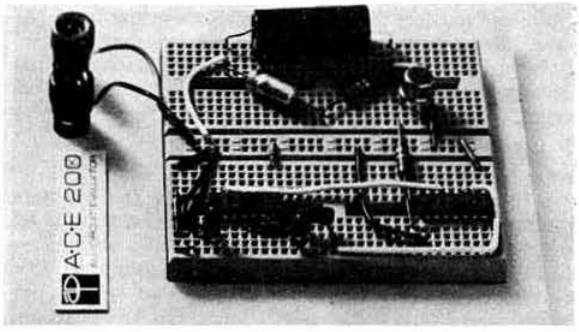
The complete kit costs £31, including VAT, from Holdings Photo Audio Centre, Mincing Lane, Darwen Street, Blackburn BB2 2AF. In addition to the items shown in the components list, the kit contains a metal cabinet and printed circuit board in addition to necessary plugs, cable, screws etc. A front panel is only available with factory-made clippers. □

# NEW PRODUCTS

## Lektrokit ACE200K circuit evaluator

The ACE200K breadboard kit has 728 solderless, plug-in tie points and has the capacity to accept up to eight 16-pin d.i.p.s. It will also accept all d.i.p. sizes, TO-5s and discrete components with leads up to 0·032in diameter. Measuring $4\frac{9}{16}$ by $5\frac{9}{16}$ in, the baseboard supports the breadboard modules. It also allows the fixing of two sturdy heavy-duty terminals for power connections. The universal matrix of 728 plug-in tie points includes 136 separate five-tie-point terminals, and two distribution buses each consisting of six connected four-tie-point terminals.

The Lektrokit ACE200K is ideal for building prototype electronic circuits, and comes complete with full instructions. Further information from: Lektrokit Ltd, Sutton Industrial Park, London Road, Earley, Reading, Berks RG6 1AZ.



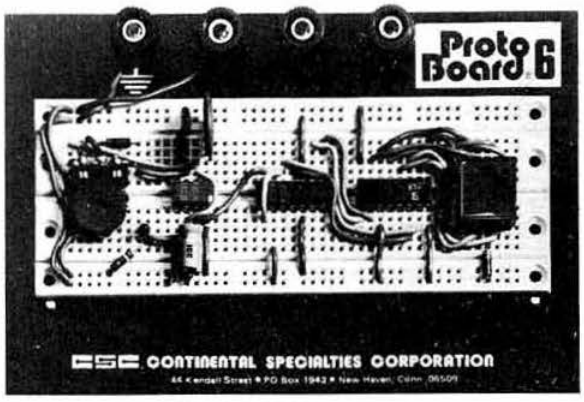

The ACE all-circuit evaluator

## Continental Specialties PB6 breadboard

For those interested in getting their feet wet in solderless breadboarding without wringing their wallets dry, Continental Specialties Corporation recommends its PB-6 Proto-Board® kit, as a low cost (£9.20) way of quickly learning and appreciating the advantages of the solderless breadboarding approach.

The PB-6 Proto-Board kit comes complete with a pre-assembled breadboarding socket, two pre-assembled solderless bus strips, four five-way binding posts, a metal ground base plate, non-marring feet and all required hardware. When complete, its 630 tie-points permit flexible configurations of as many as six 14-pin d.i.p. ics. Following the easy assembly instructions enclosed, using only pliers and a screwdriver, assembly time for the PB-6 is less than 10min.

Further information from Continental Specialties Corporation (UK) Ltd, Shire Hill Industrial Estate, Saffron Walden, Essex. Tel 0799 21682.




The CSC PB-6 Proto-Board

EQUIPMENT REVIEW

# The Yaesu FT7 hf transceiver


by I. H. CROWTHER, G3KLF*

WHEN the reviewer ordered his Yaesu FT7 in April 1978, very little information about it was available, apart from the fact that it was a 10W ssb/cw transceiver working directly from 12V dc, designed for mobile use on the 3·5 to 28MHz bands. First impressions, subsequently confirmed, were of delight when the FT7 was revealed to be physically all that was expected; a very sturdy dark-grey case 3in high, 9in wide and 11in deep, complete with mobile mounting bracket, small accessories and microphone. The whole cabinet can be rested on a tilt-up foot arrangement to present the front panel conveniently to the user.

The controls are all easily operated and clearly marked. The tuning mechanism is superb, with a clear 1kHz resolution on a linear 500kHz scale. Inset into the tuning dial the letters CLAR/FIX indicate which facility is in use. The pa current/S-meter is easy to read and is illuminated. Plug-in boards are used extensively for ease of servicing. A feature of the FT7 is the single knob tune-up facility, made possible by an all-solid-state pa unit and lpf in the final rf amplifier stage.

The specification shows the transmitter to be basically a 10W rf output unit, covering 3·5–28MHz with ssb and cw capability. On the receive side, a single conversion plus a pre-mixer is reasonably conventional, with an added bonus that the rf stage uses a dual-gate mosfet followed by a hot carrier Schottky diode mixer. Spurious emissions from the transmitter are quoted at better than −40dB, and receiver sensitivity 0·25μV for 10dB s/n, providing some 3W audio output.

The reviewer began his tests by connecting the FT7 to a 25W dummy load and switching on the 100kHz built-in calibrator labelled MARK. The calibrator is interesting as it employs a 12·6MHz crystal which is divided down by ttl to give 100kHz calibration pips of constant amplitudes on all bands covered.

The FT7 was switched from 3·5 to 28MHz. Note that on the 28MHz section the 10B crystal only is fitted, and three extra crystals have to be purchased to cover the full 28MHz band. The desired crystal replaces the 10B crystal, as only one 28MHz position is provided on the front panel bandswitch, and only one crystal holder is available inside the cabinet. Thus, to operate 28 to 28·5MHz the top cover must be removed (two screws) and the 10A crystal inserted.

*7 Snowcroft, Capel-St-Mary, Ipswich, Suffolk.

The S-meter readings noted after peaking the tune knob, and setting rf gain to maximum were:

| Band | Reading | |
|---|---|---|
| 3·5MHz | 9 | +15dB |
| 7MHz | 9 | +30dB |
| 14MHz | 9 | +27dB |
| 21MHz | 9 | +25dB |
| 28MHz | 9 | +25dB |

This was very satisfactory, and a pleasant change from many receivers where the markers tend to disappear as higher frequencies are tuned. Next, the hf signal generator was connected and the bands were checked for sensitivity and signal/noise; 10dB s/n was obtained on all bands for 0·5μV pd.

Testing the transmitter followed, with a commercial 25W 50Ω absorption wattmeter again used to absorb the rf output. The FT7 was connected to a 13·8V dc supply, switched to the cw position, and keyed. The FT7 employs automatic key-operated t/r on cw, with a variable delay on return to receive. The tuning was peaked and the process repeated for the remaining bands. Power output obtained was:

| Band | Output (W) | PA current (A) |
|---|---|---|
| 3·5MHz | 15·5 | 3·0 |
| 7MHz | 15·5 | 3·5 |
| 14MHz | 14·0 | 3·7 |
| 21MHz | 14·2 | 3·5 |
| 28MHz | 11·5 | 3·7 |

Note: pa current is for pa transistor and driver combined; therefore, pa current is actually 0·5A below that indicated on the meter.

The manual describes at length the alc technique employed to protect the pa transistors, and this is worthy of special notice. In effect, a directional wattmeter is housed in the FT7 pa section, measuring forward and reflected power to the load. Forward power is sampled and rectified to feed back via a level setting potentiometer (accessible through the rear panel). The transmitter output is therefore presetable to the desired level by adjustment of the alc potentiometer. Reflected power is also sampled simultaneously and is fed back to the same point as forward power. The reflected power, therefore, also reduces the transmitter output: in theory this should protect the pa against mismatch.

It was decided at this stage to check the alc setting according to the method outlined in the manual. The check is easily carried out as only a 1:1 swr into the load is required.

Following the instructions to the letter for setting alc allowed the transmitter to supply power to the load as follows:

| Band | Output (W) | Ipa (A) |
|---|---|---|
| 3·5MHz | 25 | 4·0 |
| 7MHz | 25 | 3·8 |
| 14MHz | 23 | 3·8 |
| 21MHz | 23 | 3·5 |
| 28MHz | 20 | 3·8 |

This allows the alc to just operate on speech peaks, as is usual. The waveform was clean and undistorted. So it seemed that the reviewer had bought a 25W transceiver, not 10W as advertised. The specification for the output devices was checked and this indicated that 25W was the correct ssb or cw output for a 13·8V supply.

This was at such variance with the 10W figure quoted in the specification, that Yaesu were contacted by letter and asked to comment. They replied by return of post that this sort of figure was perfectly ok into a dummy load, and that they used the alc to reduce the power to around 12 to 15W in the factory to protect the pa when working into an indifferent antenna such as might be found on a mobile installation. At first this sounded sensible, and the transmitter power was accordingly reduced to 15W output. The manual does, in fact, stress that antennas or atus should be pretuned to 50Ω with another transmitter prior to connecting the FT7.

On reflection though, it seemed that there was a degree of confusion between alc derived from forward power, and alc from reflected power. Yaesu seemed to be saying that forward derived alc was being used to protect the pa from mismatch, when in fact this would appear to be the function of reverse alc. Experiments into a mismatched load showed that less forward power reduced forward power alc, thus causing the output to rise towards the previously mentioned 25W to the point where reverse power derived alc came into action and reduced pa drive and rf output. Therefore, the pa settled down at an intermediate level which was determined by the degree of mismatch.

This in itself is acceptable, once understood, although it could be sudden death to the pa if the mismatch were very large, ie atu on wrong band or far off tune. In practice this can cause the meter to go to fsd before the tuning is peaked. This serves to emphasize to other users that Yaesu mean what they say about only transmitting into a matched antenna.

In the reviewer's opinion there is actually no harm in setting the alc as per the manual, which results in 25W in the load. The pa transistors are within limits and no heating is noticed

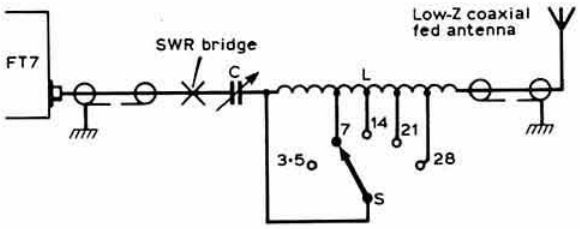
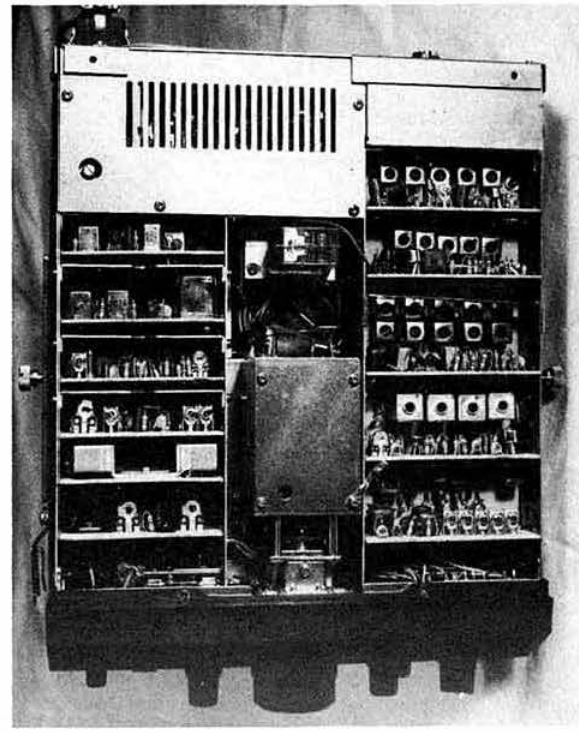



**Fig 1. ATU circuit diagram for coaxial trap dipole. C: 50pF air-spaced variable; plate spacing of 1mm satisfactory. S: low-loss ceramic five-way single pole rotary. L: 3·5cm outside diameter, 8cm long, wound 6t/cm 22swg bare tinned copper, tapped in from capacitor (depending on whether cw or ssb end of band is preferred) 3 to 5t for 3·5MHz, 7t for 7MHz, 25t for 14MHz, 40t for 21MHz, 46t for 28MHz. Note that C must be isolated from chassis on both sides with, for preference, a paxolin or nylon drive shaft to minimise hand capacitance**



Interior view of the FT7

around the case vents. If an antenna is mismatched, reverse power derived alc will reduce pa drive and hence rf output. However, Yaesu recommend that forward alc be used to reduce power to 12–15W if continuous carrier is contemplated.

The transmitter was checked for spurious emissions using a spectrum analyser with the following results:

| Band | Ref dB | Harmonic (dB down) | | | |
|---|---|---|---|---|---|
| | | 2nd | 3rd | 4th | 5th |
| 3·5MHz | 0 | 32 | 50 | 40 | > 60 |
| 7MHz | 0 | 35 | 35 | 45 | 35 |
| 14MHz | 0 | > 60 | 43 | 50 | 45 |
| 21MHz | 0 | > 60 | 40 | 40 | > 60 |
| 28MHz | 0 | 58 | > 60 | > 60 | > 60 |

On 28MHz two spurii were noted: −50dB at 30MHz and −55dB at 21MHz.

An atu was then connected between the transmitter and load. The following table indicates the improvement in unwanted harmonics etc:

| Band | Ref dB | Harmonic (dB down) | | | |
|---|---|---|---|---|---|
| | | 2nd | 3rd | 4th | 5th |
| 3·5MHz | 0 | > 60 | > 60 | > 60 | > 60 |
| 7MHz | 0 | 50 | > 60 | > 60 | > 60 |
| 14MHz | 0 | 40 | > 60 | > 60 | > 60 |
| 21MHz | 0 | > 60 | > 60 | > 60 | > 60 |
| 28MHz | 0 | > 60 | > 60 | > 60 | > 60 |

Obviously the atu is worthwhile considering if a pure transmitted signal is the objective. The circuit of the atu used by the reviewer to match his FT7 to the coaxial-fed trap dipole used for all bands 3·5 to 28MHz is shown in Fig 1. It will match the FT7 to any low impedance antenna presenting a feed impedance in the range 20 to 300Ω. It was found necessary to use two tapping points for 3·5MHz in order to bring the swr to a minimum anywhere in that band.

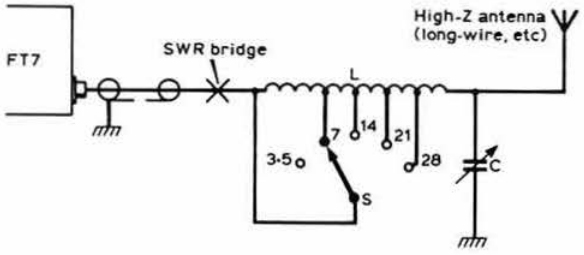



**Fig 2. ATU circuit diagram for end-fed high impedance antenna. Note that tapping points will give fewer turns for any band in this configuration**

Without the atu, the trap dipole only drew full power from the FT7 at its resonant point for each band, where it presents an swr of about 1·5 to 1. Away from the resonant point, the swr increased to a worse case of 3:1 on 3·5MHz, and the alc circuit in the FT7 reduced power output to less than half.

However, with the atu in circuit, and an swr bridge, a 1:1 swr could be obtained anywhere on any band, thus greatly increasing the capability of the antenna and securing the full output power from the FT7.

For anyone using an end-fed high impedence antenna, the same atu can be reconnected (and new tap points found by experiment), as shown in Fig 2.

An atu is recommended at all times, as −30dB is another way of saying 1mW/W. Thus, for 25W on 3·5MHz there will be 25mW second harmonic, and a glance at the results, using this sort of power level by a QRP station, should serve to remind the user that his harmonic will radiate quite well!

The pa tank is an lpf not bpf, and the existence of a subharmonic on 28MHz was noted. The transmitter has no vox, and Yaesu justify this by explaining that it could cause difficulties by spurious operation while mobile; this point is valid, although the option would have been worthwhile, if only for fixed station use.

USB and lsb are selected on all bands by a front panel switch, and the standard Yaesu technique of using a crystal offset by 800Hz from the carrier crystal frequency is employed for cw working. It is here that a major operating anomaly was discovered. During a QSO with a friend on 3·5MHz using his FT101E on ssb, it was decided to change to cw to obtain reports on the FT7 keying characteristic. On both stations switching to cw, it was noticed that the FT101E had to be tuned with the irt about 1·5kHz away from the original frequency to receive a 1kHz beat note from the FT7.

Careful reading of both manuals revealed that the FT7 used lsb for cw reception, and the FT101E usb. As the cw crystal in each case is displaced about 800Hz to 1kHz from the appropriate sideband crystal, it follows, for 3·5MHz only, that the FT101 and FT7 are not compatible for single frequency cw working. It was necessary to switch on the FT7 clarifier and off-set the receiver about 1·5kHz before working cw to the FT101E. This is a great inconvenience, as the unclarified offset is outside the bandpass of the FT101 cw filter.

This problem does not arise on any other band, as the other sideband crystal is used for reception of cw by the FT7, and thus the two equipments can work single frequency cw without any clarifier adjustment. Once understood, this does not present a great problem, but it could cost many dx QSOs on 3·5MHz if neglected.

A further related point disclosed itself while attempting to calibrate the dial and check the transmitter frequency. The manual instructs that the marker should be tuned for zero beat and the dial adjusted for the exact frequency. This is fine on ssb, but the reviewer chose to carry out this technique on 7MHz cw—only to find that the transmitter was 800Hz out of band! It is important that on cw the marker is tuned for a 1kHz note, not zero beat, if the user does not want to call "CQ" just below 7MHz!

CW keying is rather special. The key enables a flip-flop, thus ensuring perfect shaping of the cw waveform. The keying line is +8V at 400μA, and is easily compatible with electronic keys.

The receiver was tested on air. Selectivity seemed a good compromise between ssb and cw. An outboard audio filter would sharpen the response for those preferring keyhole operation. The reviewer prefers to hear a little of the adjacent activity, and was well pleased with the bandwidth of 2kHz.

To check cross-mode, the FT7 was used on 7MHz after dark. CW and ssb were resolved without difficulty and with good rejection of broadcast stations.

Side-tone is fixed in frequency at about 800Hz, variable in level by an internal potentiometer. Side-band suppression exceeds specification, as does carrier suppression (−60dB). On-air quality reports were exceptionally good. Stability is better than specification, and drift is hardly noticeable when compared with the marker oscillator.

The FT7 at a special offer price of £299 incl VAT represents good value at today's prices, giving excellent communication in compact space, with good design and pleasing appearance. □

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# NEW PRODUCT

## Albol SB15M portable oscilloscope

The new SB15M lightweight portable oscilloscope from Albol Electronic is claimed by the makers to be exceedingly cost-effective for a professional/amateur instrument. They say that the bandwidth goes up to 15MHz within 3dB limits, and nine ranges of deflection give, with an accuracy of five per cent, from 10mV to 20V/cm on the 45 by 60mm measuring area of the crt. Input impedance is 1MΩ ±three per cent in parallel with 30pF, and the input voltage maximum is 400.

The time-base can be free-running or triggered, and is displayed on 19 calibrated ranges from 0·5s/cm to 0·5μs/cm. Synchronization can be either internal or external, with the ac mode giving 20Hz to 1MHz, and the hf mode 1 to 15MHz. Trigger sensitivity is said to be 0·5cm of the display on "internal", or 0·5V p-p on "external".

Bandwidth of the X amplifier, within 3dB, goes from dc to 3MHz, with an input impedance of 1MΩ in parallel with 45pF. The X deflection coefficient varies from 0·3 to 1·5V/cm. An attractive feature of this truly portable 'scope is that it can operate from 220 to 240V mains (using the optional adapter) at 50 to 400Hz, with a power consumption of 40VA, or else from internal 1·5V cells giving 12V dc (rated then at 27W).

The width of the SB15M is 150mm, depth 340mm, and height 280mm, and it weighs 7·6kg. Price is £150 plus VAT. Further information from Albol Electronic & Mechanical Products Ltd, 3 Crown Buildings, Crown Street, London SE5 0JR. Tel 01-703 2311.

# Measurement of antenna radiation resistance and reactance

by J. BAZLEY, G3HCT*

*At his installation as RSGB President for 1979, the author of this article stressed the need for more simple articles to be submitted for publication in* Radio Communication. *This article is intended to lead the way and show what he had in mind.*

HAVE readers ever found it difficult to feed an experimental antenna satisfactorily or to find an explanation for the high swr on a feedline? If so, the information needed is the radiation resistance and reactance values (R or ±jX) either at the antenna or at the input end of the feedline. In the latter case, if the length of line is known then the values can be plotted on a Smith's Chart to give the R±jX at the antenna. For those amateurs who are unfamiliar with these charts and their uses, articles describing them were published in *Radio Communication* in January and December 1977. Alternatively, one can make the feedline an electrical half-wave so that the value at the antenna will be repeated at the input end of the feedline.

Very simply, if one wishes the antenna to be resonant one is aiming for 0jX, so if the measurement is positive the antenna is too long, and, conversely, if the reading is negative the antenna is too short. Armed with this information, together with the radiation resistance, the design of matching networks is relatively simple.

*Brooklands, Ullenhall, Solihull, W Midlands B95 5NW

## Components list

| | | | |
|---|---|---|---|
| R1 | 5×220Ω 1W carbon | C1,2,3,5,6 | 0·001μF disc ceramic |
| R2 | 12Ω 2W carbon | C4 3·5MHz | 1,000pF silver mica |
| R3,5,6 7,8 | 1·5MΩ 0·5W carbon | 7MHz | 560pF silver mica |
| R4 | 50Ω 2W carbon | 14MHz | 390pF silver mica |
| | | 21MHz | 180pF silver mica |
| | | 28MHz | 100pF silver mica |
| D1,2,3,4,5 | OA90 | | |
| S1 | 1-pole 5-way rotary | | |
| Sockets | 2 off PL259 coaxial | | |
| Terminal tag strips | 3 off 5-way, centre earth | | |
| Insulation terminals | 1 red, 1 black | | |

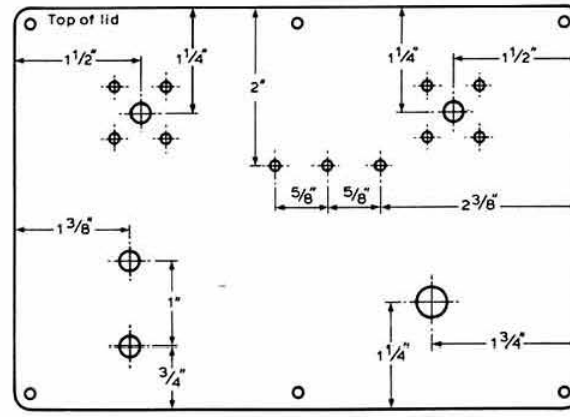



Fig 2. Drilling plan of die-cast box lid

Laboratory instruments are very expensive, but the antenna bridge to be described is simple and cheap to build and will provide sufficiently accurate measurements for most amateur purposes. It is not the author's intention in this article to give a technical explanation of how the unit operates, but rather to describe its construction and use. The unit was described in *QST* June 1965, and a technical explanation is given in that article.

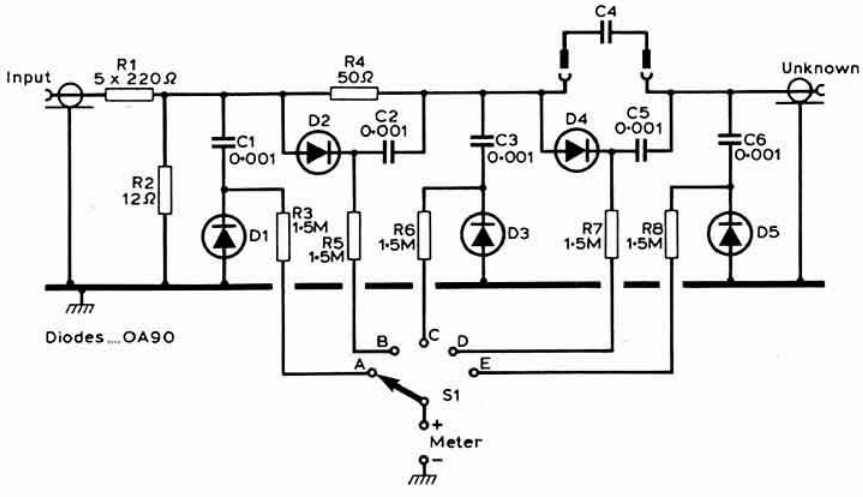



Fig 1. Circuit diagram of the bridge

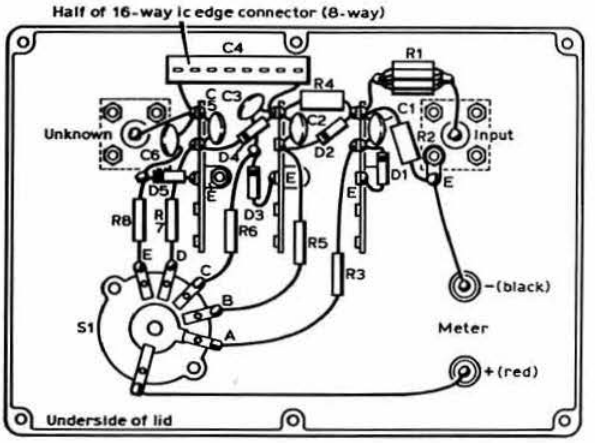



Fig 3. Component layout on underside of lid

The antenna bridge (Fig 1) was built in a die-cast aluminium box 6·75 by 4·75 by 2·25in, with the components mounted on the lid (Figs 2, 3). The socket to take C4 (which must be changed for each band) was made by cutting a 16-way ic edge connector in half (Fig 4), but 8-way connectors are also available.

## Measurement procedure

1. Insert the appropriate capacitor (C4) in the socket.
2. Connect the transmitter to INPUT and the antenna or unknown to the UNKNOWN socket.
3. Connect a vtvm to the meter terminals set to the 1·5V range, and with S1 in position B adjust the transmitter for 0·5V.

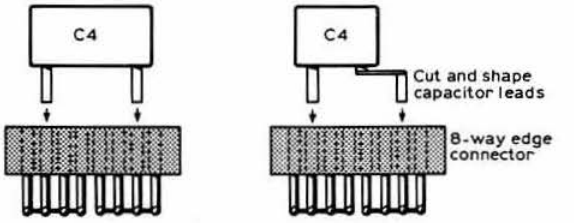



Fig 4. Leads of C4 to be cut and shaped as shown to plug into edge connector

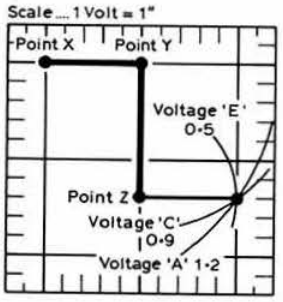



Fig 5. Intersecting areas of voltage

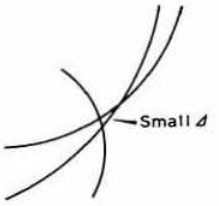



Fig 6. A "triangular" intersection

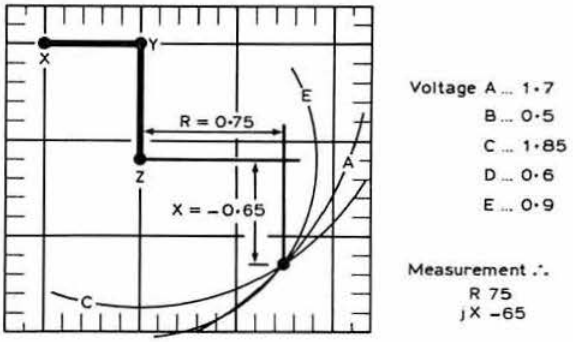



Fig 7. Measurement of reactance and radiation resistance

(Read this as 50Ω. One can use any other voltage scale and adjust the transmitter for 5 or 50V).

4. Quickly record the voltages at switch positions A, C, D and E, and finally check that position B is still 0·5V.
5. On a piece of graph paper (Fig 5), mark an origin point X, and draw a horizontal line from this to point Y; this represents voltage B. From point Y draw a vertical line to point Z (using the same unit scale); this represents voltage D.

Using point X as the centre, draw an arc corresponding to voltage A; using point Y as the centre, draw an arc corresponding to voltage C; and using point Z as the centre, draw an arc corresponding to voltage E.

6. The three arcs should intersect in a common point, but occasionally a *small* "triangle" will be formed (Fig 6) and the centre of this should be taken as the common point. Draw a horizontal line from point Z, and then draw a vertical line from the arc intersection to cross the horizontal line (Fig 7).

Measure the distance along the horizontal line from Z to where it meets the vertical line; this will give the radiation resistance. Measure the vertical line from the arc intersection to the horizontal line, this will give reactance. Remember, above the horizontal from point Z is positive jX, while below it is negative jX (Fig 8).

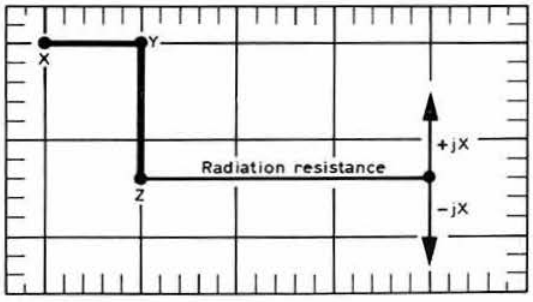
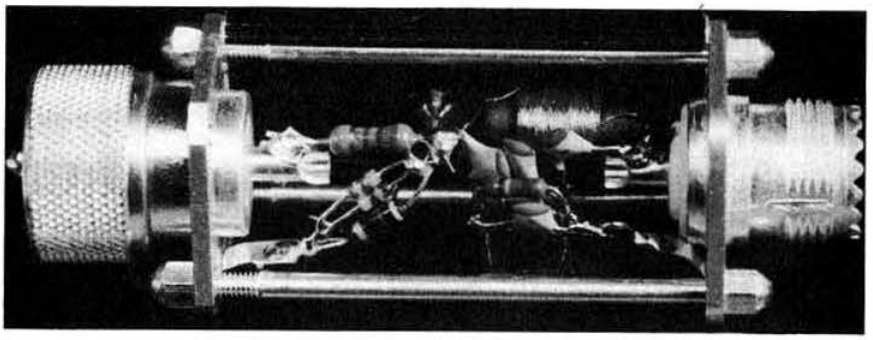



Fig 8. Positive and negative reactance above and below point Z respectively

It seems complicated but is very simple to do after one or two trial runs. With swr above 3 to 1, the angles of the diagram may be rather narrow, introducing an error in measurement. At a voltage below 0·25V the diodes give a square law reading not consistent with higher readings. □

# A compact prescaler for vhf



The complete prescaler with cover removed

by B. L. WEDZICHA, PhD, G8KJA*

NUMEROUS amateur vhf prescalers for digital frequency meters have been designed around the MC10116P and MC10231P ecl integrated circuits. However, they suffer from the disadvantage that the MC10231P is a dual D flip-flop, which allows a maximum division ratio of four. Therefore, a modification to frequency meter timebase, or the addition of further frequency dividers, is necessary in order to provide direct display of frequency.

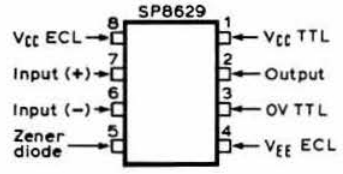



Fig 1. Pin connections to SP8629 prescaler ic

The simple solution to this problem, described below, uses the economical and readily-available SP8629 ic in an eight-pin dil package as the active element. The SP8629 has a fixed division ratio of 100 and a minimum guaranteed toggle frequency of 150MHz (typically 200MHz). The count-down sequence is said to reduce the presence of fm i.f. harmonics. An on-chip input amplifier is provided, allowing both single-ended or differential mode connection, giving a sensitivity of 200 and 100mV respectively. The prescaler is intended for sampling a signal line during transmission, and sensitivity with single-ended connection was considered adequate. The output of the device is similar to the LS series ttl, and the power supply requirement is 5·2 ±0·52V with a typical supply current demand of some 30mA. Additionally a zener diode (6·3V) connection is available for use in a simple stabilized power supply if required. The pin connections are shown in Fig 1 and the circuit of the prescaler in Fig 2.

Two earth and Vcc connections are provided, one for the ecl and one for the ttl circuitry. Connecting these in parallel creates no problems. In addition to providing the basic requirements for the integrated circuit, an input attenuator and a diode limiter are connected in the signal line, and a 100kΩ resistor is connected between the unused input (pin 6) and earth to prevent oscillations under no signal conditions, albeit with some slight loss in sensitivity. Also, provision is made to use the coaxial signal connection to the frequency meter for the dc supply. Since at 1·4MHz the impedance of a 2·5mH choke is some 22kΩ, this is considered to afford adequate isolation with 10nF for decoupling. Although the output of the SP8629 is ttl compatible, capacitor coupling is required in this configuration. The input stage of the frequency meter had a sensitivity of 50mV and was modified as shown.

The only precautions required in construction are consistent with good vhf practice, ie to reduce stray capacitance and provide a good earth plane. The latter is an "in-line" module case

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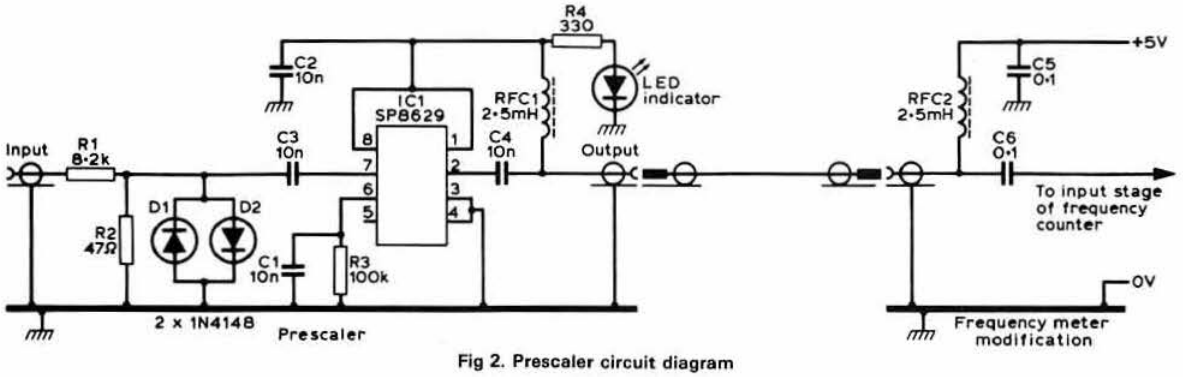



Fig 2. Prescaler circuit diagram

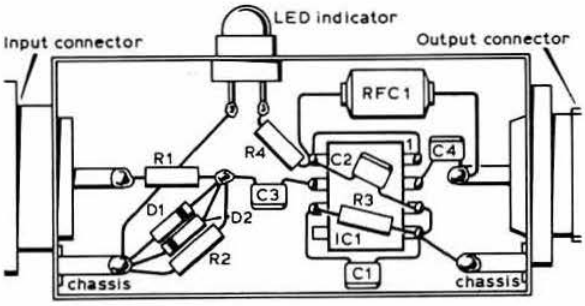



Fig 3. Layout of prescaler

(available from RS Components) fitted with uhf series connectors and measuring 2·5 by 2·5 by 5cm. The integrated circuit is attached to one side of the case with a drop of Araldite adhesive, and the components are connected directly to the pins as shown in the layout, Fig 3.

When the prescaler was connected to sample a 50Ω feeder by means of a uhf series T-adapter, no significant degradation in swr was observed and the unit was found to operate satisfactorily, with a 2W transmitter as the source. No damage was sustained when the load was open-circuited under these conditions.

The prescaler was also found to operate satisfactorily down to the minimum toggle frequency of 10MHz for sinusoidal inputs. □

# A multi-band dipole for the hf bands

by W. FARRAR, G3ESP*

AFTER a lengthy period with little activity, the author's interest was reawakened following the purchase of a Yaesu FT7 QRP mobile rig. Results in the /M mode were promising, but the advent of autumn caused a search for a suitable fixed-station antenna to fit within the author's small plot, and this led to the construction of the multiband dipole to be described. The antenna consists of three dipoles in parallel, permitting operation on four bands from 7 to 28MHz. While it is by no means novel, it is described in order to give one man's method of assembly, and also to show that it really does work.

The three dipoles are precisely cut for median frequencies in the 14, 21 and 28MHz bands. The 14 and 28MHz sections are $\lambda/2$ dipoles. For 21MHz a $3\lambda/2$ dipole is used, which serves as an approximate $\lambda/2$ dipole on 7MHz also, although it resonates at about 6·85MHz. The FT7 is broad-band fixed-tuned in the transmitter output and designed for a 50Ω load, so a 10m length of 50Ω coaxial cable is used to feed the antenna directly from the outlet of the transceiver.

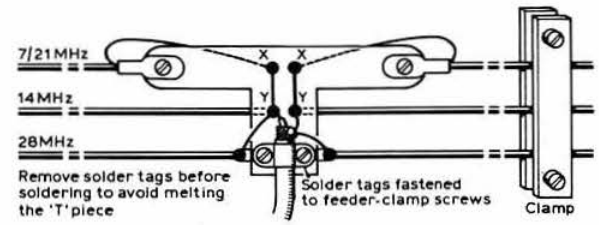



Fig 1. Detail of connections to the T-piece, and of the clamps

*1 Barnsley Road, Ackworth, Pontefract, West Yorkshire.

**Overall lengths of the three antennas**

| Frequency (MHz) | End-to-end length Metric | Imperial |
|---|---|---|
| 14·200 | 10·03m | 32ft 11in |
| 21·300 | 20·77m | 68ft 1in |
| 28·750 | 4·96m | 16ft 3in |

Construction is not difficult. The feedpoint has a polypropylene T-piece, with some small holes drilled in it at X and Y (Fig 1). The top, and longest, wire (7/21MHz dipole) is of 14swg or 2mm hard-drawn copper, to take the strain. This has a couple of porcelain egg insulators at each end. The centre (14MHz) dipole uses pvc-insulated flex, to avoid possible contact with the top and bottom wires. The bottom (28MHz) dipole is again hard-drawn copper, to give more rigidity to the system. At about 60cm (2ft) intervals, the wires are clamped together by insulating strips bolted together. Perspex would be ideal but, in its absence, the author used strips of 3mm plywood, cut and drilled, and soaked in molten candle-wax for a while. (Old hands will recall the old open-wire 600Ω feeder spreaders.)

The antenna is fixed at one end to a Post Office telephone pole about 7m high, with PO permission. (It may not generally be known that one can obtain permission to hang a wire antenna from a convenient telephone pole, provided that it is not on land to which the public has a right of access.) The other end is attached by a length of rope to the end of the ridge of the bungalow, which is about 4m above ground. The centre of the antenna is no more than 6m above ground. The wires run in an ENE/WSW direction.

In spite of the lack of height, the antenna works very well. In just over four weeks (November–December 1978), using the 14, 21 and 28MHz bands, all six continents were worked on ssb, including Brazil, South Africa, Algeria, Europe, USA, Canada, Siberia, Israel, Pakistan and Australia, with the meagre 10W output of the FT7.

If a simple antenna for dx is all that is required, use the dimensions given in the table; for other frequencies, use proportions. For example, for a cw operator with a median frequency of 14·050MHz, the length required is $10{\cdot}03 \times \frac{(14{\cdot}175)}{(14{\cdot}050)} = 10{\cdot}12$m, ie 9cm longer. No doubt it would be better further off the ground, but the results show that with flea-power and no beam, one is definitely not restricted to the locals. The antenna would, of course, also be ideal for swl use. □

# technical topics

Pat Hawker, G3VA

DURING the course of preparing monthly copy for *TT*, I skim through a pretty large number of magazines and journals from many parts of the world: amateur, hobby and professional. Such browsing can be, and often is, a real pleasure, particularly when one suddenly finds that somebody, somewhere, seems to have come up with an idea that solves a real problem in amateur radio.

## Systems behaviour

On the other hand, some sessions prove depressing; there really are times when one comes away from the library with the feeling that there are so many thousands of pages to be filled each month that the editors have fallen back on projects and research that are either elegant (or not so elegant) variations of well-worn themes, or reflect a theoretical or else purely commercial outlook that just is not going to help the average amateur or provide him with any real operational advantage. For instance, while modern digital techniques can do many useful things—can sense, can control, can encode or decode, can display with accuracy and unlimited endurance—it does not always seem sensible for authors to encourage amateurs to strive to replace basic operating skills with "smart" electronics.

The wonderful human brain may not be so fast as a microprocessor or as instantly accessible as some electronic memories, but it is (at least for the present) significantly more flexible and adaptable. Then again, while for professional applications there may be good economic reasons (and sometimes bad economic reasons) for attempting to "de-skill" radio operating, it seems odd that members of a hobby dedicated in part to "self-training" should tend to devote so much innovative effort to substituting electronic hardware for personal skills *unless it can be shown that the change also genuinely improves system performance in a manner appropriate to amateur communication.*

## Automatic decoding of morse

Recently there has been considerable space devoted to systems which can automatically decode cw and display the message either on a video display unit or on an led matrix. For example, *Popular Electronics* (March and April 1979) presents full constructional details of a "Morse-A-Word" system which can display up to eight characters simultaneously on a "moving" led display. It is introduced as follows: "Now you can literally sit back and read messages sent in international morse even if you don't know the code."

This is certainly an ingenious system (block outline in Fig 1) and would be attractive for exhibition stations, etc, to allow spectators to follow what is happening, or as a training aid. But am I being old-fashioned if I suggest that for most amateurs and would-be amateurs, the time and money might be better spent in learning morse or improving their copying ability? Indeed the *Popular Electronics* article sets out the reason why: "It should be mentioned at the outset that the reliable conversion of morse code radio signals into alphanumeric characters is not easy. Signal fading, atmospheric and man-made noise, and human errors present major difficulties. No device can perfectly decode all received signals all of the time." I would suggest that the "device" that comes nearest to the ultimate is still, at low speeds, the human operator.

Even now, not all designers recognize that operators use an information input that differs from what theory alone might suggest. Contrary to popular belief, it is not always advantageous even to strive to exclude *all* extraneous signals. The "stereocode" signal-processing approach, for example, making use of the still imperfectly understood "cocktail party effect", is a better example of a good systems behaviour approach than the many designs one still finds in the journals based on the regeneration of cw signals in receivers, using some form of Schmitt trigger. The regeneration approach, admittedly, can result in a clean signal of immaculate signal-to-noise ratio, but only in the absence of any other signals of comparable magnitude. Similarly the *very* sharp audio filter is not particularly well-suited to the complex ear/brain sub-system, and a low-pass filter such as that shown later in Fig 8 may prove more effective. Very few ultra-sharp filters can beat an experienced ear!

Innovation can still be genuinely useful, but we do not want amateur radio ever to follow some aspects of the present hi-fi scene. A recent letter in *Hi-fi News* complained of the continuous barrage of material aimed at the consumer, urging him to up-grade his equipment, and adding: "Once one owns a

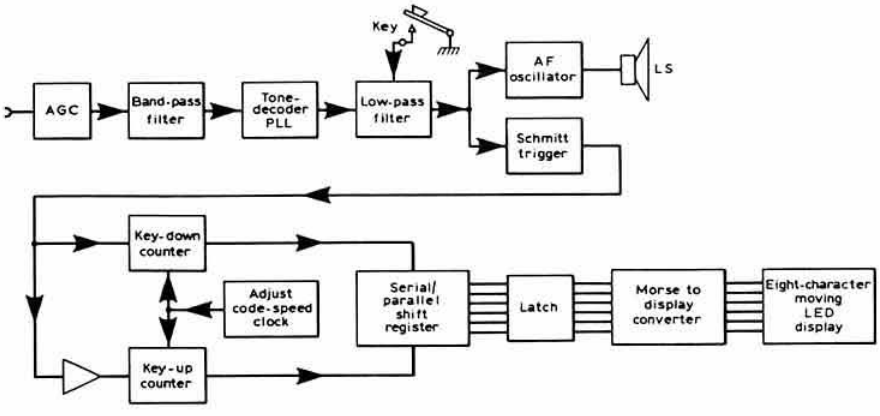



**Fig 1. Basic outline of the "Morse-A-Word" unit described in *Popular Electronics*, providing automatic decoding of morse signals in the form of a moving led display of up to eight characters simultaneously. Clearly an ingenious system with useful applications—but *not* as a permanent substitute for learning the code!**

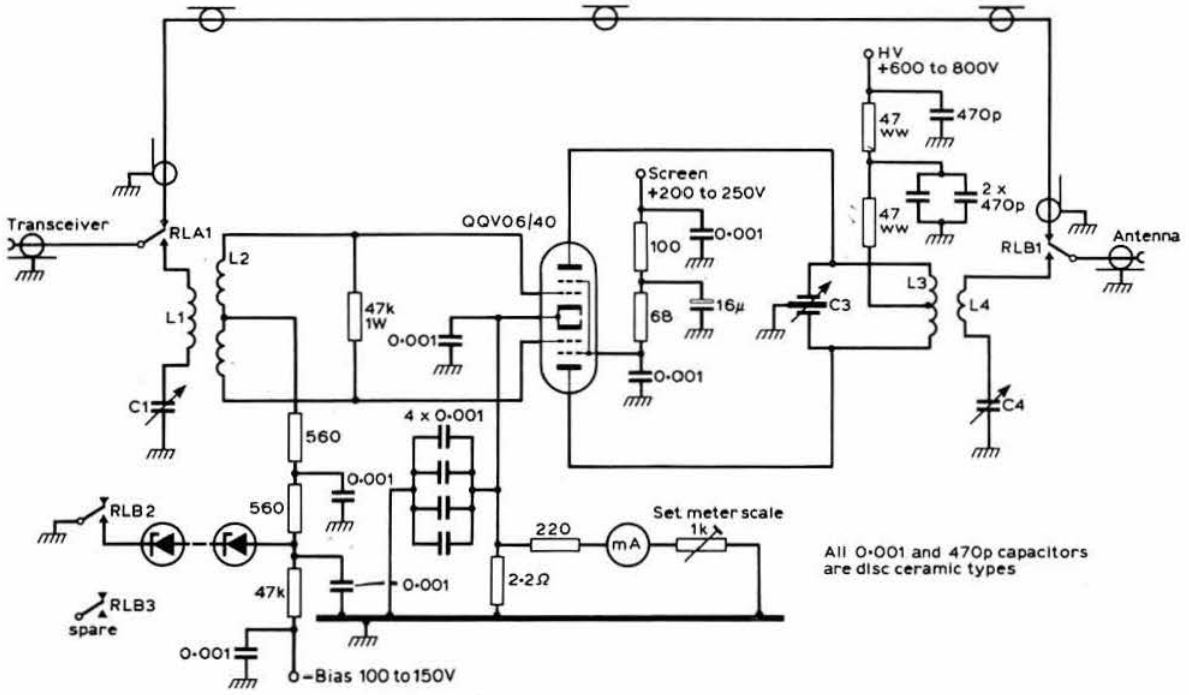



**Fig 2. VK3AUI's 144MHz linear amplifier for use with solid-state transceivers such as the IC202. Coil data: L1 1t, 16swg; L2 4t 16swg, 16mm diameter; L3 4t 10swg, centre-tapped, 18mm diameter; L4 1t, 16swg. Variable capacitors: C1 25pF max; C3 8+8pF max; C4 30pF max. Parasitic suppression and a grid tuning capacitor (split stator) would be required for 50 or 70MHz operation**

system of compatible components of high performance, any further striving for improvement by climbing the 'top end' ladder is hard to justify . . . I can think of no other area of entertainment, hobby or recreation, where the law of diminishing returns is so apparent as in the hi-fi industry."

## 144MHz valve linear

Rather jokingly we recently suggested, in discussing the problem of the heavy-current 15–20A power supplies needed for some of the high-power solid-state amplifiers, that an alternative solution could still be found in the use of a valve amplifier where, although the potentials may be in the order of hundreds of volts, at least the current can be measured in milliamps.

It was therefore appropriate to find in *Amateur Radio (March 1979, pp10–11)* a description by Gil Sones, VK3AUI, of a 144MHz linear amplifier for use with solid-state transceivers such as the IC202 (he also describes how it can be used on 50MHz with the IC502). This uses a single QQVO6/40 (QQEO6/40), a type of valve in the junk boxes of many amateurs with those a.m. rigs that are now out of fashion: Fig 2.

The circuit arrangement is conventional; the bias is stabilized by zener diodes, selected to provide 24–36V bias to give an idling current of about 30mA. The 200–250V power supply must provide reasonably stable screen voltage. VK3AUI does not show lay-out details but advises: "The amplifier must be built with absolutely minimum-length leads to maintain stability. The cathode by-pass is made by paralleling several disc

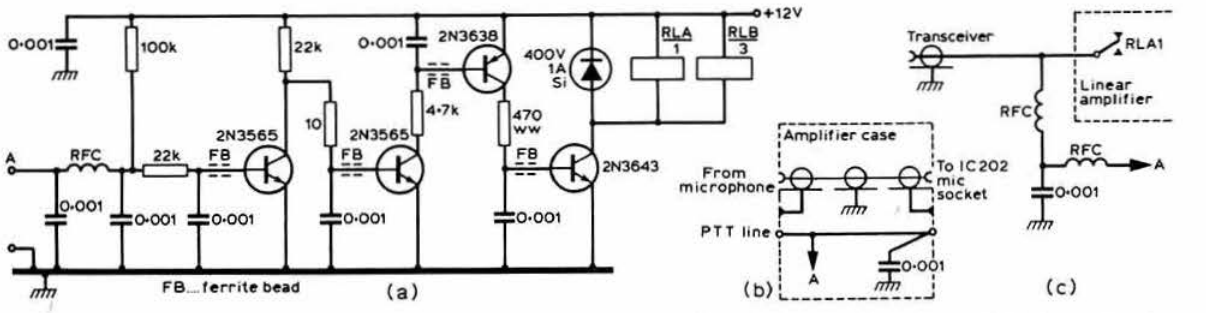



**Fig 3. (a) Push-to-talk relay driver to suit IC202; (b) using ptt line actuation; (c) alternatively, using coaxial line actuation**

ceramic capacitors to obtain a low-impedance by-pass. The valve should be mounted so that the metal disc inside is level with the chassis. This is a requirement for tube shielding and self neutralizing." VK3AUI uses coaxial relays for antenna change-over but points out that any low-loss rf switching relay could be used, although it should be appreciated that rf losses or mismatches in these components may reduce receiver sensitivity.

The IC202 provides a dc output voltage on the coaxial output connector's inner conductor during "receive", and zero during "transmit", as part of the send-receive diode antenna switching control system. This voltage can be used to control the linear amplifier by means of a relay driver; alternatively this can be used with push-to-talk control (Fig 3). VK3AUI also notes that for highest sensitivity, the IC202 really needs a low-noise pre-amplifier but that this may complicate the switching and could result in cross-modulation unless care is taken. The prototype 144MHz amplifier was built using printed circuit laminate soldered together to form a combined box and chassis; he considers this to be an easy method of construction, providing readily solderable earth planes, allowing earth leads to be kept very short, and making for good shielding. The pcb used in this way can be of the cheap surplus "moulded mud" variety as the dielectric properties are unimportant.

## More on the vertically-polarized UA3IAR quad

In the April *TT*, Les Moxon, G6XN, indicated that he believed that the gain and performance of UA3IAR-type one-pole octahedral wire arrays could be significantly improved by re-arranging the feed to provide vertical rather than horizontal polarization, so putting the current maxima where they do the most good. At the time those notes were compiled, however, he had not actually tried out the idea in practice. His latest report, based on experimental work, does in fact confirm that a very significant improvement *can* be achieved in this way. There still remains experimental work to be done on the question of switching the feed to "turn" the beam to each of the four quadrants, but it is becoming ever more clear that this basic "one-pole quad", which does not require any tubing, framework, boom or spider, really does seem to be the answer to the amateur who is looking for a low-cost and effective "fixed", "reversible" or "switch-rotatable" array which can be supported from a single wooden pole, garden or roof-mounted—always provided that there is sufficient area for the four "guy wires" that are needed to keep the array in shape.

In implementing the vertically-polarized array, Les Moxon has incorporated a number of ideas that were put forward some 10 years ago by Dr Werner Boldt, DJ4VM ("A new multiband quad antenna" initially in *DL-QTC* but in an English version in *Ham Radio* August 1969, pp41-45). This is an article which is still well worth studying in its own right, as DJ4VM, like G6XN, is a firm advocate of multiband loops rather than nested separate loops. In reporting his work on the octahedral array, G6XN writes:

"I have now tried out the use of vertical polarization to achieve the objectives, but with none of the disadvantages, of the original UA3IAR arrangement. The array I am using at the moment provides triband operation of 17ft square loops along the lines of the DJ4VM quad which is derived from the Lazy-H array. Fig 4 shows what each loop looks like when shifted round to provide vertical-polarized signals. The ends could be joined, but in principle this makes no difference electrically, and leaving them unjoined is easier and may slightly reduce

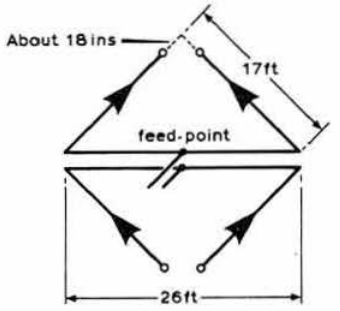



**Fig 4. Basic vertically-polarized loop derived from DJ4VM's "Lazy-H" form of multiband quad antenna. Current direction arrows are valid for 14, 21 and 28MHz. Resonant open-wire stub connected to feed-point**

dielectric losses in the mast. I have brought the ends of the two loops close together, top and bottom, so that the top half of the quad serves also as the top part of the guy-wire system. Except for the different method of feeding, the arrangement *looks* very much like the bi-square antenna shown in Fig 2 of the January *TT*. The important difference is that the array is tri-band and unidirectional! Unfortunately for full quadrant switching to provide omnidirectional operation, one needs a much more complicated switching arrangement, or two beams at right-angles on the same mast.

"With a 17ft loop, one has on 28MHz the full gain of a bi-square plus reflector (some 7-8dB), and on 14MHz one approaches normal quad performance (around 6dB reference dipole) although this will be slightly degraded unless one takes steps to equalize the currents. I have in fact come up against the overcoupling problem (see "A neutralized VK2ABQ mini-beam" in *TT* February 1977, pp 126-7) albeit in a much less extreme form. This is capable of being corrected by driving both elements, though neutralization also works. By adjusting the angle between guy wires one can have any desired spacing, but a very interesting point is the way the effective spacing automatically decreases with increasing frequency, without one having to do anything about it, such as using 'Heath Robinson' pulleys (*TT* April). On 28MHz the centres of the current loops move to the centres of the sides so that the mean spacing is exactly *half* the spacing between the corners. Admittedly the effective mean spacing on 14MHz is less than the spacing of the

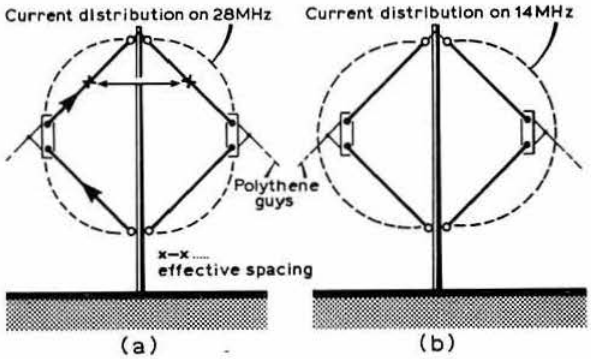



**Fig 5. Loop erected in the single-pole form showing current distribution on 28 and 14MHz and indicating how the effective spacing is automatically reduced on 28MHz. Feeder arrangement not shown**

corners so that the compensation is not perfect, but it is good enough.

"Fig 5 shows the array end-on but with the feeder omitted. With 50° between the loops the current ratio in dry weather is 1·6 on 14MHz, 1·0 on 21MHz and about 0·8 to 0·9 on 28MHz, but on 14MHz there is a drop to 1·1 in wet weather, accompanied by a change of some 10in in the required stub length; this indicates there is an insulation problem which I shall need to investigate later and which I am sure will not prove insuperable.

"The resonant stub reaches down to ground level where it could be matched into any kind of feeder. I use 600Ω line, and the length from the feed-point to shorting-bar works out at about 46ft for 21 and 28MHz, and 56ft for 14MHz. With a lower antenna, 23ft for 14 and 21MHz, and 31ft for 28MHz, would represent a better option where these points are within easy reach.

"If beam rotation is to be achieved by using two quads mounted at right angles, it will be necessary to throw the one not in use out of resonance by means of suitable stub short-circuiting. The loop size is not critical, and I believe that anything from about 15ft to 21ft sides would be suitable for tri-band operation, but there is one important point that needs watching for the 'two at right-angles' case. In Fig 6, if the electrical length *abcde* is an odd number of half-wavelengths it remains resonant whatever one does at the lower end of the stub which is connected to *c*. Even with my dimensions there just *might* be trouble on 21MHz. This could probably be overcome by series capacitors at *c*, these would have little effect on 14 or 28MHz since *c* is a low-current point on these bands.

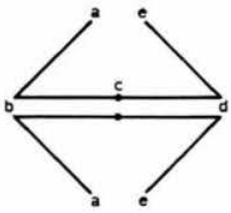



**Fig 6. A problem may arise if *abcde* adds up to an odd number of half-waves, since it remains resonant whatever one does at the lower end of a stub connected to *c***

"Lots of other options remain to be investigated. I would like to try Zepp feed at the lower ends (Fig 7) rather as suggested in the April *TT*. Again, multibanding is feasible with linear resonators *if* one can alter the stub length. Structurally this should be easier, lighter and neater, but I am not sure if it would be possible to achieve multi-directional (as opposed to bi-directional) switching, since the switching has to be done at a point of high voltage which must be well-insulated and kept well away from any wet wood.

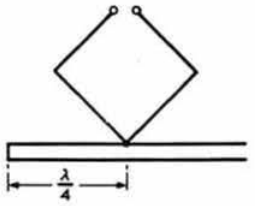



**Fig 7. Balun-type Zepp feed is a possibility not yet tried by G6XN**

"I am indebted to VK4TM for making the Lazy-H suggestion, but this 'rang a bell' and caused me to unearth the 1969 article by DJ4VM who has clearly got in first with the idea. A reversible beam for 7 to 21MHz would be an obvious possibility using a loop size of about 26ft. Bandwidth would be narrow on 7MHz, but then 7MHz is a narrow band! Extension to 28MHz could be achieved with the help of linear resonators, although performance would be degraded by non-optimum spacing, unless one added a third element which could be used for 14 to 28MHz. There are lots of other possibilities for us all to pursue."

## The hazard of corroded cadmium

A recent *Tomorrow's World* television programme and many other reports in the media have drawn attention to the potential risks of cadmium poisoning, for example in the vicinity of zinc smelting plants. Much less well known is the health hazard arising from the possibility of inhaling or ingesting the "woolly" white powder (cadmium salts of organic acids) which sometimes appears as a deposit on cadmium-plated metalwork (screw heads, switches etc) in electronic equipment. It is therefore advisable to take reasonable precautions to remove any such deposits which are due to corrosion and which tend to occur in equipment that is inadequately ventilated so that heat generated in the unit may cause fatty acids, as found in transformer impregnation and sometimes in the coatings of printed circuit boards, to migrate to any cadmium-plated metalwork.

Cadmium corrosion can be removed provided that the following safety procedure is followed carefully:

Never attempt to blow away the white powder, for instance by using an air jet. Use disposable plastic gloves and open and deal with the equipment in a well-ventilated area. Then, using a swab damped with water, wipe away all corrosion products in the affected area, changing the swab after each wipe in order to prevent any spreading of the powder. Afterwards the used swabs and gloves should be placed in a plastic bag and burnt in an incinerator. Make sure the treated surfaces are clean and dry, and then apply varnish to the area.

## Good companion cw monitor

In *Break-in* (October 1978) Trevor King, ZL2AKW, describes a "good companion" cw monitor intended for use with transmitters and transceivers (such as the Atlas) which do not provide side-tone. It is an rf-derived oscillator which requires no connections into the transmitter cabinet: see Fig 8. ZL2AKW makes no claim for originality, since a basically similar unit has appeared in old ARRL handbooks, but he has

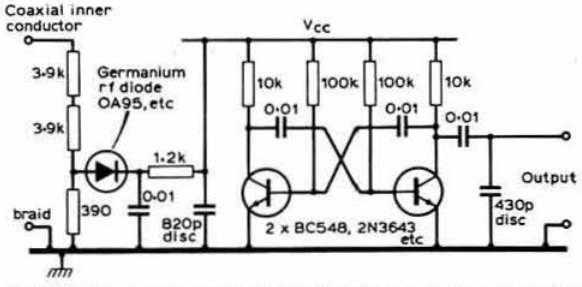



**Fig 8. The "good companion" rf-actuated cw monitor which also provides indication of changes in power levels**

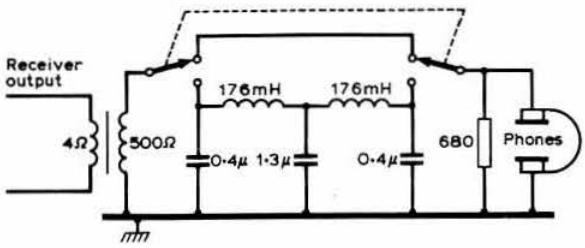



Fig 9. Low-pass audio filter for cw reception on receivers fitted only with ssb filters and using four 88mH toroids

found it very useful, particularly as a significant change of output power of the transmitter causes the side-tone note and output to change so that it also gives warning of antenna or transmitter malfunctioning (and can be used as a sensitive indicator of power output for white-stick operators).

A few milliwatts of rf output can be taken from a coaxial feeder or connection to the antenna tuning unit, rectified and used to provide dc power for a multivibrator af oscillator. Almost any low-cost transistors of the same type can be used, and ZL2AKW reports that his unit functions for power output levels of from 15 to 200W; other power levels simply involve increasing or decreasing the value of the 3·9kΩ resistors, aiming at providing between about 1 and 6V to the multivibrator. The unit can be tested initially with a dc source such as the ohms range of a multi-testmeter or small battery. It is important to use disc bypass capacitors on the Vcc and output lines of the device to prevent rf from destroying the transistors. Audio output will supply headphones or can be fed to a small amplifier if loudspeaker operation is required. The original units were assembled on small printed circuit boards.

Another useful add-on accessory for use with receivers or transceivers not fitted with a cw filter is a passive low-pass filter (Fig 9) which, it is claimed, is less likely to produce migraine headaches than a sharply-peaked filter. The 176mH toroid inductors are made by using two of the readily-available 88mH units in series. Taken in conjunction with the usual af characteristics of a receiver, it results in a bandpass overall response about 300Hz wide at −3dB points and with little tendency to produce ringing. The idea comes from *73 Magazine* (February 1979).

## Safe distances and rf

Eric Letts, G3RXJ, notes the recent references in *TT* to the explosives and flammable substances hazard arising from nearby operation of radio transmitters (eg "Dynamite and rf" item in December 1978), and feels that attention should be drawn to British Standard "BS 4992: 1974—Guide to protection against ignition and detonation initiated by radio frequency radiation". This gives useful advice and data for determining safe distances, including worst-case situations, for frequencies between 3kHz and 100GHz. He feels that the conclusions of this BSI publication should be quoted, as they are pertinent to amateur radio operation: "The electromagnetic environment is becoming increasingly severe, with proliferation of transmitting sources and the exploitation of new techniques. The potential hazards of radiation induced ignition and detonation are no less real because they depend on the coincidence of transient phenomena, each of which may have a low probability of occurrence!"

One day, as G3RXJ points out, everything will be absolutely right and somebody will get it absolutely wrong, at the same instant, and **boom!** It should also perhaps be mentioned that work at the University of Bradford, since the publication of the BSI standard, has emphasized that the risks are real and *could*, for example, arise with high-power amateur mobile operation (*TT* February 1976). It is important to note that power levels are in terms of output power multiplied by antenna gain. A table of single-source safe distances calculated for flammable substances, applying to petroleum spirit and propane, is given on page 17 of the British Standard, as follows:

| Equipment | Frequency | Max transmitted power | Safe distance |
|---|---|---|---|
| Mobile radio | Any | 100W | No hazard, provided no direct contact is made with antenna* |
| Mobile radio | Any | 100-500W | 5m |
| VHF portable | 30-300MHz | 5kW | 30m |
| UHF movable | 300MHz | 50kW | 20m |

* But see *TT* report on University of Bradford work.

G3RXJ points out that this indicates the need, for example, for amateurs operating "mobile static" to watch out for the odd motorist refilling his tank. It has, of course, been pointed out before now that no mobile operation should take place in the immediate vicinity of petrol pumps etc, and this point was made strongly in the reference to the University of Bradford reports. As G3RXJ says: "Amateurs must not relax vigilance and awareness just because it never seems to happen."

## Setting up a K2RIW linear

From D. Stuart Jones, GW3XYW, comes some useful advice to anyone setting up a K2RIW 432MHz linear, with the general principles possibly applicable to many other high power amplifiers. He writes:

"After constructing a K2RIW linear amplifier it is a fortunate amateur who finds when first switching on that both anode and grid circuits resonate exactly as required. One way of setting up the amplifier needs only a 5-10W source of 432MHz rf (and this will normally be available in order to drive the linear) and a small bulb. Proceed as follows:

(a) Remove all supplies to the linear, making absolutely sure that the eht is *off*.

(b) Touch-solder the central tip of a small bulb (eg 24V, 20-40mA rating) to a corner of the anode plate on the hot end (ie the far side from the valves which must be plugged into their sockets). The flange (outer) connection of the bulb is left free, as it is capacitively coupled to the cavity.

(c) Drill a $\frac{1}{16}$ in hole in the lid of the cavity at a point above the position of the bulb (this can subsequently be filled with a 2BA nut and bolt).

(d) Feed 432MHz rf into the *output* socket of the linear.

(e) With the lid off and rf applied, adjust tuning dimensions until resonance is indicated by a glowing bulb which should be peaked (ease off rf if bulb becomes too bright).

(f) If no resonance can be obtained during (e), fix the lid and try looking again for the glow through the hole. Repeat (e) and (f) until a satisfactory reasonance is observed (with the lid on). Removing the bulb will have a small effect.

"The above procedure can also be applied to the grid circuit with rf applied to the *input* socket. When the linear amplifier is connected normally, with heater and eht supplies, resonance points will shift a little; however, no difficulty should be encountered in retuning slightly to allow for this.

"This method has a number of advantages, including: working with the linear totally inactive (*no lethal eht*); no possible radiation hazards; direct access to resonant circuits; the ability to 'find' the resonance point; minimizes the risks inherent in driving valves under non-resonant conditions; and avoids excessive 'on air' or 'dummy load' tuning, although some will be needed for the final setting up."

## The "Hinatron" sawtooth generator

H. Hina, BRS30467, sends along details (Fig 10) of a novel form of transistor sawtooth generator which, with careful feedback linearity, is capable of being well controlled. Practically any type of transistor can be used. Although some other designers have come close to this approach, he has never seen an exact duplicate in print.

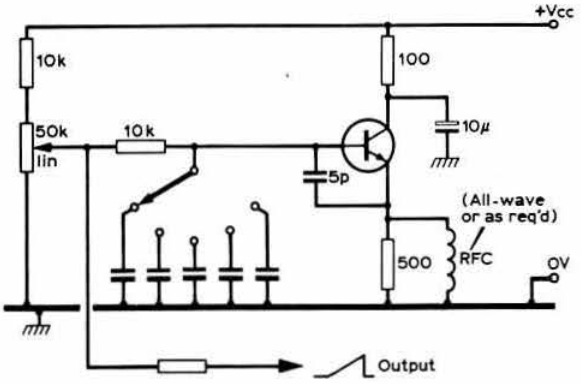



Fig 10. "Hinatron" sawtooth generator

## Feedback

Lyell Herdman, G6HD, found some errors in the March *TT* notes on the ZL1AUW battery eliminator for 12V rigs: the home-made mains transformer has 900 primary turns (not 200); the bridge rectifier is KBPC 8005 (not 80055); the transistor is BC212 (not BC211).

Lawrence Milner, G4GJH, has spotted a drafting error in the original *Electronics* basic diagram for logically switching rf signals (Fig 8(a) of March *TT*): the logical control signal should be connected to *both* gates, and neither of these earthed; this is shown correctly in the extended double-throw switch diagram (Fig 8(b)).

## Significant snippets

**Cmos dual-polarity keyer.** LA8AK notes that by coincidence his dual-polarity keying adapter (Fig 4 of February *TT*, page 130) appeared next to the HB9ABO cmos el-bug which happens to be the very keying unit he uses with the adapter. He has, however, modified the HB9ABO design as follows. Inverter 6 is the one shown in LA8AK's unit, although he uses the MC14069BCP, (an equivalent to the 74C00) and changes some of the component values (Fig 3 of February): R1, R2 both 1MΩ; R3 100kΩ; C 0·1µF; while D1 was replaced by a 1kΩ resistor.

LA8AK has built several of these HB9ABO keyers, but in one case experienced difficulties that may prove of interest to other constructors. The keyer, instead of sending dah-dah-dah sent dah-dih-dih-dih-dit, and instead of sending dih-dah-dih-dit would send dih-daaah-dit, cutting the space between a dash and the following dot. This second problem is discussed by G3RVM in *Radio Communication* May 1977, page 360, and can be solved by decoupling pin 12 of the 74C04 with an 0·1µF capacitor. The first problem can be solved by decoupling pin 8 of the 74C04 with 1,000pF. If only the 0·1µF capacitor is added, the unit may send dah-dah-dit-dah-dit-dit-dah instead of dah-dah-dah-dah. When modified as above, the keyer is very easy to operate, and LA8AK prefers this design to an earlier ttl design which did not always start when he wanted it to, resulting in several words coming out garbled.

He believes the problems can be traced to glitches in FF2. His first keyer operated on 4·5V only, and the second on 8V, suggesting that this unit may be more sensitive to glitches when the supply voltage is increased, although LA8AK has not investigated this possibility.

**Tackling 24 and 48GHz.** P. Higham, G8JLM, Microwave Associates Ltd, Dunstable, Bedfordshire LU5 4SX, has issued a useful four-page note: "Tackling the amateur 24 and 48GHz bands" by Dana Atchley, Jr, and colleagues. This describes the construction of Gunn-diode oscillator/Schottky-diode mixer transceivers, together with useful notes on propagation and ducting, and the ways in which amateurs could put these bands to work. The 48GHz band is reportedly lying fallow in the USA and is not listed in our own licences. The paper pays credit to the work done by UK amateurs on 10GHz, and the 154km 24GHz contact between G3BNL and G3EEZ.

**PL259 coaxial plug.** There are still ways in which component design could be improved, points out Arthur Milne, G2MI. He notes, for instance, that the large PL259 plug has its knurling at the socket end when, he feels, it would be altogether more logical for it to be on the cable end. At present, recessed sockets and flanges on equipment tend to get in the way.

Manufacturers please note!

**PVC avoids rf burns.** "Some pvc sleeving placed over aluminium tubing used for vertical antennas will prevent rf burns to local wildlife (kids and pets) while you're on the air"—Ken Hand, WB2EUF, in *QST*.

**Jungle depolarization.** S. Swarup and R. K. Tewari (*IEEE Trans Ant & Prop*, Vol AP27, No 1, January 1979) reports on how jungle environments cause depolarization of vhf/uhf signals (50–800MHz). Vertically polarized waves suffer higher depolarization than horizontally polarized ones, but effects tend to decrease with rising frequency for vertically polarized waves—whereas the reverse is true for horizontally polarized waves. Basically, such depolarization is due to scattering from vegetation and intervening terrain, and varies in a complex manner with differing weather conditions, movement of trees due to wind, etc.

**Modernizing the Super Pro.** "I guess the only time the young generation ever sees a tube is at a hamfest," writes John R. Leary, W9WHM, but then goes on to indicate how he has modernized an old Super Pro (SP400X) receiver by adding an antenna trimmer, replacing rf stages with the 6BA6, adding fast/slow agc, product detector, and outboard Q5er (85kHz from BC453). He more than confirms that there is life in old, mechanically-sound chassis yet!

*(Continued on page 535)*

# swl news

Bob Treacher, BRS32525 *

HOPEFULLY, Post Office permitting, this contribution will arrive in time to be included in the journal, and following our non-appearance last time we hope to cram in as much as possible.

## New correspondents

There are six new correspondents this time. Paul Bishop, BRS39161, has been an swl for a number of years, but only became interested in dx last September when he purchased the FRG7000. This receiver has digital read-out, which many may say is an expensive gimmick, but modern technology dictates many hobbies these days. In contests, digital read-out does save a few seconds, as one can quickly move to find the next station without trying to work out the frequency of the last one. Paul finds the receiver very pleasing, and has so far received confirmation from 83 countries since last October. He uses a DX31 rotatable triband dipole of 7m height, and a home-brew atu.

Andrew Hunt, ARS41753, joined the RSGB in February. He runs a modest set-up which provides good results on a.m. and cw but is unable to resolve ssb. He is hoping to purchase a better commercial receiver in a few months. ARS39673 is the number allocated to Andrew Oakley, who is studying for the RAE. He and three others began a course at their local technical college, but after four evenings they were told that they could no longer continue the course. Apparently the local county council stepped in and ruled that any person under 15 who was still in full-time education could not attend a course which involved an examination. This caused quite a stir locally, but the council maintained its view. Strange though, when an amateur licence can be held at the age of 14. Now Andrew is studying at home and hoped to pass the May RAE.

Our fourth new correspondent is Frank Bowles, ARS41554, who lives in Dundee and joined the RSGB in January. He has recently bought a 9R59D, but before that had to be content with an R1155. Unfortunately the snow claimed Frank's antenna system, and when he wrote he was awaiting some warmer weather to repair the damage. John Dougherty, BRS40705, runs an FRG7, finds the hobby interesting but a great time consumer! Michael Tyrrell, ARS39140, uses an AR88 to good effect. He has received a QSL from 9M2-65191 who would be pleased to hear from British swls. His address is c/o Petrochemical (M) SDN, BHD, Jalan Tampoi, Johor Bahru, Johor, West Malaysia.

## March and April reports

March seemed to provide some of the best conditions for dx working. The month was notable for numerous expeditions, and culminated in the CQ WPX Contest. The expeditions consisted of the "valid, all papers in order" trip by KP4AM and others to Desecheo Is. He was reported on all bands from 3·5 to 28MHz, with good signals on each band. The trip seems to have been very successful, and many must have gained a new one. QSLs—with ircs and sae a necessity—should go to the Northern California DX Foundation, PO Box 717, Oakland, California, 94604, USA.

Other expeditions mentioned included K1CO/PJ7, which was mainly active for the ARRL DX contest, during which K1XX/VP9 was also heard. WA1SQB/HC8 was heard on 21MHz; QSLs to his home QTH. VP1KG went QRT on 1 April after giving many a contact with Belize. QSLs for this expedition go to the YASME Foundation or via W6KG. K4YT's expedition around West Africa was also in full swing, being heard from 6W8 and 5T5; he was also scheduled to visit TZ (but no reports of any activity) and TY, which was scheduled for May; all QSLs go via DJ4PI. FR7ZL/T was heard from Tromelin Is on 14MHz; QSLs go via N4NX. HB9TL was also heard on 14MHz signing 8Q7AH.

CQ WPX provided hectic activity, especially on 21MHz, where the band was crowded with loud USA signals until 2130. The regular crop of unusual prefixes was heard, just to add that extra spice to a contest crying out to be made more chaotic by the influx of unusual callsigns. The Americans produced enough unusual prefixes—AA1, AB2, AC5, AD6, AE8, AF0, AG2, AI0, AJ4, AK4 plus KE4, KI4 and KD4. The Spanish authorities allowed the ED prefix to be used, and many took advantage to be a rare prefix. OI and OF were heard from Finland; 6J1 is believed to emanate from XE; the Brazilians were using ZW and ZY prefixes; Venezuela was using YY and 4M, and the Canadians provided CZ and VC. Several G stations were heard, obviously producing large scores for the "multi-single" section. G8JC made 2,810 QSOs, G6UW 15 less, and GB2FJE nearly 2,100, but, according to G3ZAY, G6UW had more multipliers. G3FXB was also heard in the single-operator section and was doing extremely well. It is pleasing to see this healthy competition returning to the British contest scene, and it will be good to see G stations high in the listings again in the "multi-single" category. Not since

### 1979 HF Countries Table

| Station | 28 | 21 | 14 | 7 | 3·5 | 1·8 | Total | Mode |
|---|---|---|---|---|---|---|---|---|
| BRS25429 | 160 | 152 | 192 | 76 | 78 | 21 | 679 | ssb |
| BRS35943 | 135 | 153 | 193 | 95 | 97 | 6 | 679 | ssb |
| A8841 | 135 | 124 | 205 | 61 | 71 | 0 | 576 | ssb/cw |
| BRS25901 | 79 | 88 | 120 | 38 | 41 | 6 | 372 | ssb |
| ARS41426 | 79 | 87 | 73 | 41 | 64 | 18 | 362 | ssb/cw |
| A9191 | 53 | 71 | 134 | 53 | 43 | 7 | 361 | ssb |
| BRS34740 | 79 | 81 | 77 | 30 | 37 | 7 | 311 | ssb |
| ARS41386/GJ | 50 | 94 | 84 | 37 | 12 | 1 | 278 | ssb |
| BRS40293 | 53 | 52 | 74 | 40 | 35 | 0 | 254 | ssb |
| BRS20185 | 68 | 46 | 74 | 7 | 23 | 1 | 219 | ssb |
| BRS39161 | 51 | 39 | 91 | 9 | 18 | 2 | 210 | ssb |
| BRS41333 | 51 | 67 | 36 | 8 | 35 | 2 | 199 | ssb |
| ARS41554 | 25 | 49 | 60 | 16 | 36 | 1 | 187 | ssb |
| BRS40814 | 45 | 40 | 47 | 23 | 16 | 0 | 171 | ssb |
| BRS40292/GU | 40 | 32 | 41 | 17 | 25 | 2 | 157 | ssb |
| BRS40705 | 41 | 42 | 36 | 7 | 12 | 1 | 139 | ssb |
| ARS40133 | 28 | 31 | 34 | 7 | 14 | 0 | 114 | ssb |
| BRS40292 | 27 | 15 | 34 | 10 | 22 | 2 | 110 | ssb |
| A9107 | 32 | 27 | 35 | 0 | 13 | 0 | 107 | ssb |

### All-time Countries Table

(Starting score 500)

| Station | 28 | 21 | 14 | 7 | 3·5 | 1·8 | Total | Mode |
|---|---|---|---|---|---|---|---|---|
| BRS25429 | 239 | 274 | 315 | 210 | 216 | 35 | 1,289 | ssb |
| BRS32525 | 226 | 276 | 300 | 196 | 232 | 26 | 1,256 | ssb |
| BRS17567 | 246 | 285 | 343 | 137 | 221 | 17 | 1,249 | ssb/cw |
| BRS25901 | 212 | 273 | 309 | 182 | 189 | 22 | 1,187 | ssb |
| BRS35943 | 195 | 255 | 290 | 183 | 211 | 23 | 1,147 | ssb |
| ARS8841 | 157 | 212 | 283 | 93 | 124 | 0 | 869 | ssb/cw |
| BRS34740 | 138 | 192 | 219 | 126 | 151 | 33 | 859 | ssb |
| BRS32286 | 96 | 195 | 225 | 75 | 172 | 4 | 767 | ssb |
| A9191 | 144 | 187 | 232 | 72 | 95 | 11 | 731 | ssb |
| BRS20185 | 122 | 125 | 174 | 29 | 44 | 6 | 500 | ssb |

*79 Granby Road, Eltham, London SE9 1EH.

G3WYX and G4DAA have there been any consistent dx contest winners from G-land. Hopefully the situation is about to change; it will certainly be good for amateur radio in this country if it does.

VR6HI was also heard on all bands during April. 1S1DX was activated from the Spratly Is by courtesy of VK2BJL and K1MM. At the time of writing, YV0AA was a very good signal and had been heard on all bands except 7MHz on ssb. Many were also awaiting the OE6EEG expedition to Abu Ail (OE6XG/A—QSL via WA3HUP).

It seems that W2MZV is now the desired route for 4U1UN QSL cards.

Robert Small, ARS8841, mentions 6O1FG heard on 14MHz, plus a number of rare dx stations on G3KTJ's net, including OK3TAB/D2A and ZD9GH. Best QSL returns include 3D2CC, A2CBX and ZD7HW.

Stations in Malta are using the 9H79 prefix to commemorate the withdrawal of British forces from the island and total independence.

Regular dxers may also have managed a few of the following which have been reported:

**28MHz:** K6SAD/KH2, KG6SL, VK9XW, CE0AE, 9V1LG.
**21MHz:** JJ1GUL/JD1, VR6TC, VR3AR, FK8CR, VK2DCA/9 (Norfolk Is).
**14MHz:** YI4SC, KC6GF, ZK1DR, K8VIO/KH4 (Midway Is), A35RB, KH6GB/KH1, KA1MI, VR1BD, 3V8BZ.
**7MHz:** VR6HI, HK0BBD, J3AAE, XT2AV, VE3BWK/4U.
**3·5MHz:** VP8SB, VR6HI, VP2SR.
**1·8MHz:** HI8JAG, KP4Q.

On the QSL scene, it has been reported that cards have been received from these rarities: 3B6CF, TG0FRACAP, N0TG/KP1, VP8SU, FR7AI/T, 4U1UN and ZS6BOK/H5.

## 1·8MHz (cw) and 3·5MHz (ssb) slps

David Whitaker, BRS25429, provides a detailed breakdown of both these events. Regrettably only five listeners strayed from their beds for the 1·8MHz cw slp. David now believes that the event may have been timed a little late. However, some Ws were heard, plus stations from G, GD, F and HB9. An entry was received from Eric Trebilcock, BCRS-195, in Australia, but alas he had no signals to report. The 3·5MHz event was more successful in terms of numbers partaking, with 15 listeners sending in logs, including one from PA0. Thirty-five countries were reported from Europe, seven from Asia and three from North America.

David is grateful for the support which is being shown, but hopes that more swls around the world, say in the USA, will send in logs. In that way, as a propagation exercise, it would be of far more interest to see what overseas stations were hearing, so that a comparison of reports and conditions could be made.

## News from our licensed colleagues

Ken Bishop, G3LQB, is currently in Saudi Arabia and wrote regarding the 8Z4 expedition. Unfortunately, after the HZ1BS trip, the "country" was deleted from the ARRL countries list, so any further activity is not expected.

Rex Williams, G3RSJ, comments on the QSLing aspect and mentions having received a couple of cards as a result of an expedition to HB0. On his return he found two swl reports: one for G3RSJ with no suffix; the other for G3RSJ/HB90. As both sent cards direct, but without an sae, Rex does not feel able to reply. If the details are correct, he QSLs listener reports 100 per cent, so it makes sense to be absolutely certain about the QSL details before writing out a card—let alone sending it.

A letter also from Nick Jarman, who was ARS38280 but is now G4HYX. He is awaiting both hf equipment and QSL cards, but will gladly QSL listener reports.

## The mail

David Hawes, A9191, has been listening to some of the many nets around, in particular the 21MHz DX-DX net and the 14MHz Pacific DX net, both of which produce some useful dx stations. One net to watch for is WB8ZJW's new 7MHz DX net every Sunday on 7,080 and 7,160kHz at 0630.

Bernard Hughes, BRS25901, writes after a long absence. He has bought a Drake R4C receiver and an MS4 speaker in place of his FRG7. He has used eight receivers during his time as a listener: SX112, Eddystone 840C, AR88D, JR300, JR310, Sommerkamp SDX400, FRG7 and now the R4C. He has never used an atu with any of the receivers, but is now of the opinion that he ought to remedy that. On the same theme, Ken Sketheway, BRS20185, has recently purchased an FR101DD, and is now concentrating on improving the antenna system to obtain maximum benefit from the receiver.

Rod Hunt, BRS41333, suggests a handicapping system for the table so that someone with a modest receiving set-up has more of a chance of being in the leading group. Although this may seem a good idea, who would be able to put together a fair handicapping system? There would be far too many disputes, so things are best left as they are.

Other mail has been received from Ken Steele, BRS36883; Ian Marquis, RS41426; BRS40293; Frank Bowles, ARS41554; Robert Andrews, BRS36797; Richard Evans, ARS40133; John Timms, BRS39099, and Ian Le Page, BRS40292.

## Finale

Let your scribe have your updated totals for the table, which is beginning to flourish, and any news and comments, which should reach him by **15 June** for the **August** issue. □

# TECHNICAL TOPICS

*(continued from page 533)*

**New vhf fet.** Mullard have added an n-channel dual-gate device, type **BF981**, to their range of fet devices. This device would seem to be suitable for vhf receiver front-ends, with low feedback capacitance, a typical noise figure of only 1·3dB, and suitable for strip-line circuitry.

**Plessey handbooks.** In *TT* October 1978 (page 863) a brief rundown was given of the series of useful Plessey handbooks which show ways of using their SL series of ic devices. An addition to this series is *IF amplifier/detectors for fm receivers* (32 pages) by James Bryant, G4CLF. This features the SL6600 which provides double-conversion followed by a phase-locked-loop detector; the SL6640 and SL6650 which are for single-conversion with high-Q quadrature detectors suitable for nbfm; and the SL6690 ultra low-consumption quadrature detector device. Practical circuits and application notes make this a useful addition to the series. □

# microwaves

Charles Suckling, G3WDG *

## Moonbounce tests on 1·3GHz

The Oxford University eme group's home-built 20ft dish has recently been checked out by G3WDG and G3YGF on 1·3GHz and 2·3GHz, using measurements of sun noise. These confirmed that the dish has acceptable gain—about 35dB on 1·3GHz and 38dB on 2·3GHz.

The dish was designed to have good profile accuracy up to 2·3GHz, and is constructed out of 18 ribs supported on a 10ft by 10ft square of scaffold tube. Each rib consists of two lengths of 0·5in aluminium tubing, one parabolic, the other straight, fixed to each other at four points by struts. The purpose of this method of construction is that by constraining the straight piece to remain straight by fixing it to the support structure, the parabolic rib maintains its shape to 0·25in or better under load conditions, such as wind or varying elevation. The dish is covered with 0·5in chicken-wire, with the seams "sewn" together with 16swg galvanized wire. The main contribution to surface error is bumpiness in the covering between ribs, and this is minimized by using concentric rings of ¼in galvanized wire spaced 1ft apart and fixed to the parabolic ribs.

The rest of the equipment consists of a circularly-polarized horn feed for 1·3GHz, originally built by G8BGQ, with a gasfet preamplifier, using a Plessey GAT5 device. On 2·3GHz a simple linearly-polarized circular waveguide feed was used, with a three-stage preamplifier using an NEC57835 bipolar transistor, followed by two BFR34A transistors. This preamplifier has an overall gain of 21dB with a noise figure of 4dB. Interdigital converters were used on both bands.

Following these tests, PA0SSB was telephoned, and a 1·3GHz moonbounce test arranged for that evening. Talk-back was first established on 3·5MHz, and while the eme receiver was being set up at Oxford, PA0SSB was able to relay his echoes live on the talk-back. Unfortunately, due to a faulty adapter the gasfet preamplifier could not be used, and the second stage amplifier had to be used instead (noise figure about 3dB). PA0SSB's signal was then found almost immediately, and peaked about 3dB over noise in 500Hz bandwidth. With the 100Hz audio filter the signal sounded quite strong, and was successfully relayed back to PA0SSB on 3·5MHz.

Now that the receiving system is working, G3WDG and G3YGF hope to have a 100W output transmitter operational in the near future.

## 2·3GHz activity in Sweden

There is now a very active group of 2·3GHz operators in Sweden. SM6CKU has written in with details, and mentions SM6ESG, SM6CKU, SM6FHZ and SM6HYG as being operational on the band. SM6ESG is running 25W output of cw/ssb, while the other stations are at the 3W level (cw/fm). The group is very interested in schedules with UK stations during the summer, and anyone interested can contact them via Bengt-Arne Jockert, SM6CKU, Allatorp 1446, S-430 33 Fjares, Sweden (tel 46-300-44389).

*31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

## Beacon news

G3PYB has supplied a progress report on the GB3NEW Newbury 2·3GHz beacon project. The equipment side is progressing well, and it is hoped to have the beacon in operation by mid-summer. Further information can be obtained from those involved—G3PYB, G4EEE and G8ADM.

As regular users of the GB3IOW beacons are no doubt aware, both the 1·3 and 10GHz beacons have been off the air for some months. This has been due to necessary site maintenance by the main users of the site, which entailed the removal of all the beacon equipment. G3KSU reports that the work is nearly complete, and that the transmitters should be back on the air in the very near future.

## Using the sun for aligning high-gain antennas

Many methods have been described in the past for determining beam headings, such as compasses, reference to a known point on the horizon, nulls on talk-back antennas etc, but these are barely accurate enough when very-high-gain antennas are used, such as 4ft dishes on 10GHz. The writer has used another method which is capable of very high accuracy, and can even work in zero visibility conditions! This relies on calculating the position of the sun, and using this to calibrate the azimuth read-out, either visually or by using sun noise.

Very briefly, the sun's position is defined by two astronomical co-ordinates, its Greenwich hour angle (gha) and declination. These are its longitude and latitude in the sky. They cannot be used directly for determining the azimuth of the sun, and have to be converted to useful co-ordinates using two equations:

$$\sin(el) = \sin(lat)\sin(dec) + \cos(lat)\cos(dec)\cos(lha)$$

$$\cos(az) = \frac{\sin(dec)}{\cos(el)\cos(lat)} - \tan(lat)\tan(el)$$

where el = elevation of the sun
az = azimuth of the sun (its bearing relative to true north)
lat = latitude of station (+ve north, −ve south)
dec = declination of sun (+ve north, −ve south)
gha = Greenwich hour angle of sun
lha = local hour angle (= gha + longitude of station (east) − longitude of station (west))

These formulas are easily solved using a scientific calculator; a programmable calculator is preferable if a large number of calculations is envisaged. Clearly it is necessary to know the gha and declination of the sun, and these are tabulated in various almanacs. One recommended almanac is the *Nautical Almanac* (obtainable from HMSO) which tabulates these co-ordinates of the sun (and moon—the formulas apply equally to the moon) for every hour of every day of the year. For those who do not wish to invest in such an almanac, the sun's co-ordinates are given in Fig 1, in which the sun's gha at midnight and declination are tabulated. These data are for 1979, but can be used without significant error for several years hence. The declination can be read off directly, since it does not change significantly during the day, but the gha is a direct function of the time of day, and is calculated for a particular time from the formula:

gha = gha at midnight + 15(gmt)

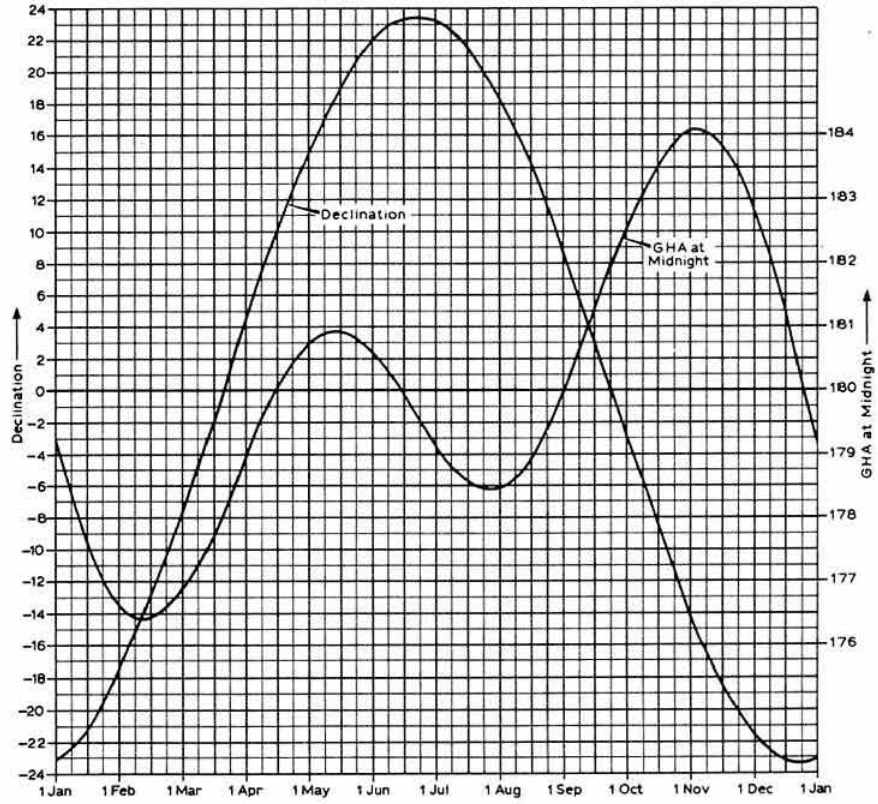



**Fig 1. The Greenwich hour angle at midnight, and declination of the sun during 1979**

where the gmt is expressed as decimal hours. When the gha so calculated exceeds 360°, 360 should be subtracted from the value. For example, on 1 August, the gha at midnight is 178·4°, and the declination is +18·7. At 1350gmt the gha is 178·4° +15(13·833), ie 385·9°. Subtracting 360°, as this figure exceeds 360°, gives a gha of 25·9°. Using the above formulas, the sun's elevation and azimuth at this time in Oxford (51·75°N, 1·25°W) are found to be 51·7° and 219° respectively.

One point which sometimes causes problems in these calculations is in interpreting the answer obtained for the azimuth, when the angle corresponding to cos(az) has to be found. Most calculators give a value between 0° and 90° when cos(az) is positive, and 90°–180° when cos(az) is negative. The rule here is that when the lha is between 180° and 360°, the calculator answer is correct, but when the lha is between 0° and 180° the calculator answer has to be subtracted from 360. Also, due to the lack of exact precision in the calculator, odd answers may be obtained when the lha is a few degrees either side of 0°.

The value of this method is that it enables the azimuth calibration of an antenna to be set to better than one degree, unlike most other methods. It is particularly applicable to narrow-beamwidth antennas mounted on masts, where an accurate calibrated base can be used, such as a 2ft diameter piece of wood marked in degrees. The reference to the sun is most easily done by turning the antenna so that the shadow of the feed falls on the vertical axis of the dish, which can be drawn on the face of the dish beforehand. The calibrated base can then be set so that the pointer on the mast indicates the calculated azimuth of the sun. The antenna may then be pointed accurately in any direction, but remember that the base is then calibrated with reference to true north, and account must be taken of this when working out beam headings on a map. Allowance should also be made for any squinting of the beam.

Of course, this method is not very useful when the sun is behind cloud, or at night! The former case can be overcome by using sun noise. There is no problem in detecting sun noise with any system which has enough gain to make this method worthwhile. The only additions required to the equipment are the facility to vary the dish in elevation (in a calibrated fashion) and an audio noise meter to the receiver output (see *Microwaves* July 1977). Make sure that the agc is not operating, and that the fm detector is not limiting on receiver noise. The procedure then is to set the dish up to the calculated elevation, and then pan the dish slowly in azimuth until the noise level increases as the antenna is pointed at the sun. After peaking up, the calculated azimuth may then be used to set the calibrated base. Be sure that the time is known accurately; an error of a few minutes is quite significant!

While this method may seem somewhat involved, it is perhaps the only reliable way to calibrate a large dish, and is quite easy to use in practice. The writer has never had any problems handling his 4ft dish on 10GHz since this method has been in use.

Next month, another application of the sun will be discussed; that is, the use of sun noise in measuring receiver sensitivities and antenna gains. □

# 4-2-70

Graham Knight, GM8FFX*

## Direction finding on 144MHz

Ian Drysdale, GM3TYS, recently returned from a trip to California with a new type of receiver fitted with an automatic direction finder. The unit is manufactured in America by Ocean Applied Research, and consists of a receiver which incorporates a circular crt display indicating the direction of the transmitter. Under no-signal conditions the crt displays a centre dot but, when a signal is tuned and received on the speaker, a thin line is traced on the crt from the centre to a calibrated compass bezel around the outer edge. The trace also indicates the relative distance to the source of the transmission as well as the "opening" or "closing" range and rate of change.

Unlike many other direction finding systems the antenna does not rotate. In fact the GM3TYS installation consists of an unobtrusive magnetically mounted antenna which looks like a cluster of closely spaced whips and is made up of four monopoles with a fifth whip in the centre for sense reference. GM3TYS recently gave your scribe a demonstration of this interesting equipment, and showed how the antenna could be positioned on the roof of a car so that 0° on the display indicated the signals were coming from a transmission located directly ahead of the car.

Driving around the Aberdeen area dfing vhf transmissions was easy. If the display indicated the signals were coming from 90°, changing to a road leading in that general direction gave a lower figure. By repeating this process a few times it was possible to select a road which gave a 0° indication, then it was simply a case of travelling along that road till the range and sensitivity controls indicated the source of the transmitter. A most useful feature incorporated in the equipment showed up when passing the transmitter—the trace immediately changes from 0° to 180° showing that one is now travelling away from the transmitter.

Direction finding equipment of this type is normally used to locate marine craft in distress, and to assist in the plotting of incoming and outgoing aircraft at airports. However, equipment like this could have its uses on the 144MHz band. During his one-day flying visit to the RSGB VHF Convention, I1PE described how he had also been testing one of the OAR df receivers on behalf of the Fiat Company. I1PE's tests included dfing two non-licensed vhf operators who had been jamming his local repeater. Because their transmissions had been short and from an urban area the pirates were amazed at the speed at which they were traced by I1PE.

## St Kilda activated

In April 1978 a report was broadcast over GB2RS that the rare QTH square of VR was to be activated. This turned out to be an April-fool joke which misled many of the avid 144MHz dx operators. Unfortunately many of those self-same operators treated the report of St Kilda operation in this year's April *4-2-70* with some disdain, thinking it was just another April-fool joke. In fact the report was correct, and quite a large number of contacts were made by Nigel Sedgwick, GM4HDL, from the most westerly location in the British Isles.

Nigel will be making further visits to St Kilda during the next few months, and those operators who missed the April trip and still need locator VR18g can write to GM4HDL, QTHR. Due to the fact that transport to the island is by helicopter, GM4HDL is restricted to carrying a 12W transmitter and a small beam, but he does offer to try cw contacts although this is not his favourite mode. GM4HDL also operates on the WAB net on the 1·8, 3·5 and 7MHz bands, and he suggests that this would be a good place for vhf operators to make contact with him. GM4HDL's site on St Kilda is 1,200ft asl, with a good take off in all directions and a good sea path for the first 100 miles. Nigel's home location is at Benbecula in the Outer Hebrides, and from there he is active on both ssb and fm. GM4HDL reports many contacts with visitors on fm and says that a call on S20, even in remote Scottish locations, often gets a reply.

## Expeditions

The dx expedition to 4U1ITU by the group led by Max Bosschaert, PA3AHD, will be operational at the time this issue is published. The expedition continues until 15 June, and meteor scatter schedules can be arranged on the vhf net around 14·340MHz. This expedition will be on 24h/day and will also be attempting QSOs via other propagation modes if band conditions allow.

Corsica has always been very much in demand and even while this issue is being delivered an expedition by F1BUU is taking place. FC1BUU will be running high power on both 144 and 432MHz from QTH locator EB. Other ambitious expeditions to Corsica are planned by F1ANH, F6CTT and F1CYB. FC1ANH will be active from 16 July until 4 August from QTH locator square EB14e, FC6CTT will be active from 22 July until 10 August from square EC25, and FC1CYB will be active during the whole month of August operating from the EC, EB and ED squares. FC1ANH will have 1kW on 144 and 432MHz, and will be looking for contacts via tropo, Es, ms, and moonbounce. FC1ANH will be using four Tonna 21-el antennas for 432MHz, two Tonna 16-el antennas for 144MHz, and an 8m dish for eme.

The Edinburgh and District Club expedition to the Hebrides is now well organized, and a site near Stornaway has been selected with the help of local resident GM8PEV. GM8MJV, GM8MNG and GM8NCM request schedules from operators needing WS square on 144 or 432MHz. This expedition coincides with the ms contest in August.

Three well-known operators from the Manchester area, G4CBW, G8JHL and G8GAJ, are taking a pair of 4CX250Bs and four 16-el antennas to the Isle of Man for an expedition primarily for meteor scatter contacts. Operation will be from square XO67e, and the callsign GD6UQ/P will be used between 5 and 15 August. The group is prepared to accept schedules for meteor scatter contacts only, and arrangements can be made by writing to G8JHL, 40 Vine Street, Salford, Lancashire M7 0PG. Contacts can also be arranged with this 144MHz-only expedition by contacting it on the vhf net, as it will also be equipped for 14·340MHz operation.

Heinz Gunter, DK2NH, leaves home in Hamburg at the end of July for a trip to Bornholm Island in QTH Locator square HO. He will be QRV on 144 and 432MHz from this much-sought-after locator. Another well-known German operator, DK5QI, will be active in September from Aaland Island, signing DK5QI/OH0. The locator for this expedition is IR55d, and operation will mainly be on 432MHz.

*PO Box 49, Aberdeen AB9 8JA

A letter from G3UBX says that he, G3ONP and G3WOH are joining the Hebridean rally in August. Their plans include operation on 6 and 7 August from WP square—the Isle of Islay; 10 to 12 August from WQ square—Tiree; and 14 to 16 August from XQ square—Mull. Operation will be on 144·155MHz and on 432·185MHz from 1800gmt onwards.

Plans are also well in hand for the Ghent Activity Group's visit to the Isles of Scilly for the August meteor scatter contest, and G3SEK and friends are planning a trip to the South-West at the same time. We hope that all groups planning expeditions get good weather and smooth passages to these exotic places. With so many groups going out for the meteor scatter contest there should be a solid wall of stations calling CQ on the big day; it is to be hoped that they all get their timing sequences right and avoid interfering with each other.

## ARRL moonbounce contest

A number of British stations participated in this contest by working stations on the 144 and 432MHz bands. Douglas Parker, G4DZU, near Leeds, used his array of four 14-el Parabeams to work GW4CQT by pre-arrangement. G4DZU was even more pleased to get WA1JXN, WA7BJU (Oregon) and DK1FGA to answer his CQ calls. Dave Price, GW4CQT, worked more than 10 stations via 144MHz eme, including WA7BJU, WA1JXN, K5BMG, DK5LA and SM7BAE.

Walt Hopkins, now G5CSZ but well known in the USA as W4FAY, was delighted when the eme array he dismantled a few months ago in North Carolina arrived and was erected so that he could listen to the contest. Walt just managed to get the four 16-el Tonna array assembled in time, but he was very pleased to be able to copy 17 stations during the contest. This is about double the number of stations heard by G4DZU a few miles away but, as Walt says, he was able to spend all the time listening, whereas G4DZU was often calling CQ or taking time to work stations. All the 144MHz operators report considerable changes in signal strength due to Faraday rotation, but all remark on the high level of activity from Europe.

Julian Gannaway, G3YGF, manufactured some special connectors to allow the G3WDG dish for 432MHz to be fed with 95ft of RG318—the special coaxial cable which has to be kept under pressure with dry air. This cable is very thick, and a large loop had to be made at the dish end to allow the antenna to be rotated and elevated. The team of G3YGF and G3WDG, operating from Oxford, managed 17 completed contacts on 432MHz with F9FT, F2TU, DL9KR, DJ8QL, DL7YCA, PA0SSB, SM6CKU, I2COR, I5MSH, YU2RGL, LX1DB, ZE5JJ, K2UYH, K3NSS, W1XP, WB5LUA and K5JL. Four stations, W1JR, OZ9CR, W4WD and YV5ZZ, were heard but not worked during the contest.

The moon's declination was quite low, putting the moon very low in the sky for the period of the contest. On the evening before the contest G3YGF and G3WDG modified the scaffold supporting the dish to allow the elevation limit to be reduced from 25° to 15°. This modification increased the available eme window from about two to seven hours, giving a total of 14 available hours during the two-day contest. Some of the contacts were made with the moon behind a large beech tree just in front of the dish; this obstacle blocked the window for about three hours each day. The effect of the tree was to raise the noise threshold by 2dB, due to thermal emission from the tree. During this period of obstruction they noticed that their own echoes were down by 5 or 6dB, but once the moon was in the clear the G3WDG echoes were very good, peaking over 6dB s+n/n in 500Hz bandwidth.

All the G3WDG contacts were random, and many QSOs were completed quickly with RST reports being exchanged. Signals were generally so good that the normal 2·5min period procedure usually used was abandoned, as there was no doubt when the other stations had stopped transmitting. The best report for G3WDG came from K3NSS who sent them 559—K3NSS uses an 80ft dish!

It was disappointing to hear the 144MHz moonbounce operators being QRMd by British stations operating in the 144MHz cw contest. The moonbounce section of the band is clearly defined in the IARU band plan as 144·000MHz to 144·010MHz, but some operators persisted in calling stations for contest reports in this sector. Even Class B operator GM8FFX could read stations who were clearly calling "CQ EME" being answered by cw contest operators who should not have been in that section of the band at all. It is to be hoped that the VHF Contests Committee was listening and noting some of the callsigns.

## Lyrids meteor shower

The April Lyrids shower was much less active than that of previous years, and proved to be disappointing for many meteor scatter operators. GM4COK in Edinburgh completed a cw contact with OE3XUA in the two hours between 0500 and 0700gmt on 22 April, but he reports that the bursts were short and weak. GM8NCM had incomplete ssb contacts with France and Poland, and heard nothing at all from schedules with EA6 and CT1WW.

Geoff Brown, GJ4ICD, from St Saviour, had better luck with a completed contact with I2VRN in locator FF71j, especially as the QSO was on ssb. G8IHT was heard persevering on the random ms ssb frequency for most of the night of 21 April; his tenacity alone deserves a mention in these pages.

## Auroral reports

Radio auroras occurred on 1, 2, 3, 4, 5, 6, 7, 8, 21, 22, 25 and 28 April 1979. During the last week in March and the first in April, the geomagnetic field was more continually disturbed than during any other two-week period in the last eight months. During this period several auroras occurred, and some have already repeated 27 days later. It is also interesting to note long-range transequatorial contacts took place between Italy and South Africa on 144MHz during this same period of increased geomagnetic activity. The present theories advanced to explain transequatorial propagation are being reconsidered by members of the Propagation Studies Committee. Charlie Newton, G2FKZ, puts forward the theory that, as te signals have pronounced Doppler shift, sound tone A, coupled with the fact that these openings have occurred during periods of high solar flux when the magnetic A indices have been as high as 34, the signals could be yet another form of aurora.

Drew Givens, GM3YOR, reports on 70MHz activity during the auroras of 29 March, 2, 3 and 5 April, when he worked the following stations: G6WR (YO33g), GM4CXP (YP37c), GM3WFJ (YQ23a), G3UKV (YM28h), G4ENA (ZL08d), G3FDW (ZN56b), G3OSS (ZL49d), GM3JFG (XR40c) and GI3RXV (WO18f). GM3YOR remarks that activity on 70MHz during auroras seems pretty poor, with most people going to 144MHz first before looking on 70MHz, although 70MHz is often open earlier for auroral contacts and usually closes after 144MHz has gone quiet. GM3YOR would like to see increased activity on 70MHz generally and wonders whether other 70MHz operators would support an activity period. Any

operator looking for YQ square on 70MHz should be on the lookout for cw signals from GM3YOR during auroras, and he is willing to keep schedules for other propagation modes.

All the above dates in April produced radio auroras as high as 144MHz, with the exception of 7 and 8 April when auroral signals only reached 50MHz. More and more stations are now equipped for reception on the 50MHz band, and they are getting early warnings of impending auroral events by monitoring signals from Ch2 television stations located in Scandinavia—these usually go auroral hours before the 144MHz band is affected.

VHF operators who stayed up all night on 22 April for the Lyrids meteor shower received an added bonus in the shape of an aurora which showed no signs earlier but started quite strongly at 0245gmt. GM4DSZ worked LA8YB, SM4IVE(HT) and OH3YW in far away QTH locator MU09g, a distance of 1,680km. This event lasted for about an hour but was limited to northern stations despite the A indices reaching a sub-storm level of 35 on that day.

Some interesting auroral experiments are now being carried out by amateurs on the 432MHz band, and several UK stations, including G3OSS, G4DGU, G3TYE, G3LQR, GM3ZSS, GM3JFG and GM3ZBE, have all had auroral contacts on the next band up from 144MHz. The Chalmer's University Group which operates SK6AB from Göteborg, Sweden, has written to *4-2-70* asking readers to listen carefully on 432·050MHz during auroras for its high power cw signals. The group is now concentrating its auroral activity on this frequency using the huge 368-el array of eight 46-el Multibeams to fire 432MHz signals towards the reflecting curtain. The following stations were active on 432MHz during the large-scale opening on 7 January. DK3UC, DK2NH, OZ1ABE, LA3VU, SM0DFP, SM6FHZ, SM6HYG, SM6CKU and SM7GEP. Many of these stations worked each other on 432MHz on that day between 1600 and 1900gmt. *4-2-70* will be pleased to receive reports from readers on 432MHz auroral activity, and these and all other auroral reports will be passed to G2FKZ, the IARU Region 1 auroral co-ordinator.

## Calling frequency for a.m.

Mindful of discussions with the a.m. users on 145·8MHz which took place at the Scottish Convention, and of the need to keep this frequency clear for the satellite transmissions, the VHF Committee has suggested a calling frequency of 144·550MHz. The chairman of the committee, G3BA, would be pleased to hear of any reaction to this suggestion from a.m. operators.

## Computer corner

The latest edition of the Central Scotland FM Group Newsletter highlights the use of computers and microprocessors as an aid to vhf operation. It notes that the Pets seem to be breeding in Scotland, and that vhf operators GM3SAN, GM3KXM, GM4COK, GM4BVD and GM3SNO each have one of these new animals in their care. GM4COK attended the lecture by Nigel Huntley, G4CDU, at the VHF Convention and has now programmed his Pet to send and receive rtty and cw, compute distances from QTH locators, and to compile contest entries. He is particularly pleased with the ability of the computer to send and receive rtty signals, and he has already used the cw facilities to send high-speed cw during the April Lyrids meteor shower. GM4COK is a marine radio operator by profession, and he is looking forward to the G3PLX article on the uses of microcomputers for rtty transmissions.

## Beacon news

The Wrotham beacon, GB3VHF, which has been off the air since the end of January, is expected to be back on the air by the time this issue appears. Beacon-keeper, Brian Bower, G3COJ, had the new microprocessor-controlled beacon on show at the recent VHF Convention, and Home Office permission has now been received for the beacon to QSY to its new frequency of 145·925MHz.

Frank Hall, GM8BZX, the beacon-keeper for GB3ANG on 145·975MHz, has taken the beacon temporarily out of service. It has now been returned to the builder, Alex Allan, GM3ZBE, who is to make modifications to the keyer. The other beacon which was built by GM3ZBE continues in service, GB3LER on 145·965MHz from ZU square in the Shetlands, and is an invaluable auroral indicator. Reports indicate that GB3LER has now been heard via the aurora in 16 countries.

## Tessa news

Following the success of the 144MHz and 432MHz operations by the Tessa Group, ZE2JV has begun beacon transmissions on 432MHz. He is using 100W into a pair of Quagi antennas stacked horizontally. As reported in last month's *4-2-70*, these signals have already been received by George Vernakis, SV1AB in Athens. The distance involved, approximately 6,300km, is the longest path over which 432MHz signals have been received without involving the use of moonbounce. Attempts were to have been made to make a two-way QSO over this record-breaking distance, but unfortunately ZE2JV's equipment was damaged by fire. To complicate matters, the fire was extinguished by a gardener with the assistance of a great deal of water! It is hoped that the equipment can be repaired soon so that these most interesting tests on 432MHz can be resumed over the path between Athens and Salisbury.

The Tessa Group is also co-operating over plans to add a 432MHz output to the beacon transmissions from ZS6DN. Other te beacons in the planning stages include one from Pete Sawyer, ZS1U, who should by now be beaming 144MHz signals north from Cape Town. EA3ADW now has a 1kW beacon on the air on 144·111MHz from 1730 until 1930gmt daily. Amateurs in Italy and Yugoslavia have also indicated that they would like to join in the Tessa te beacon project in the near future. SV1DH has a 1kW beacon feeding an 88-el Multibeam firing towards Rhodesia, and it will be most interesting to see how far this high-power transmission can reach via te on 432MHz.

The Tessa Group has a regular net on 28·333MHz at 1500gmt to discuss the day's te reports. This frequency is monitored continuously until at least 1930gmt so that stations can immediately be informed of te openings. Anyone who would like to assist the Tessa Group with these experiments on 50,144 and 432MHz is invited to join in the above net and contact the net controller, Ray Cracknell, ZE2JV.

## Repeater news

The Sussex repeater, GB3SR, went off the air for maintenance on 21 March. At the time of writing this report no date has been received for the resumption of the service.

The repeater at Charing in Kent, GB3CK on Ch RB0, has now been fitted with a duplexer, permitting single antenna operation. The transmitter power output has been increased 10 times and the erp is now 10W. A high-gain low-noise preamplifier has also been fitted to the receiver section of the repeater. The users of GB3CK report that they have found a

considerable improvement in the area covered by it. Further details about GB3CK are available from Mike Dennison, G3XDV, QTHR.

The initial tests on the new vhf repeater GB3NM on Ch R2 have now been completed. The repeater is located in Stockport, Cheshire, and was due to come into full service by the end of May. This is another repeater which comes under the umbrella of the UK FM Group Western, and the secretary, Gordon Adams, G3LEQ, will be pleased to provide further details.

The Perth vhf repeater, GB3PR, is another unit which, after being operational for some time, has been undergoing some improvements. The antenna has been changed from a single dipole to a system with two dipoles fed in phase, and the cavity filters have been retuned. The erp is now up to 25W, and GM4DQJ, QTHR, would appreciate reports on coverage. With these improvements it is now possible to travel from the Aberdeen area and get continual repeater coverage via GB3GN, GB3PR and GB3CS to a point well to the south of Glasgow. A repeater to fill the gap between GB3CS and GB3RF would enable a vhf operator to be within mobile range of a repeater over the entire length of the 550-mile journey between Aberdeen and London.

Eight proposals for uhf repeaters have been received at RSGB HQ under the Phase 4 arrangements. These have been vetted by the Repeater Working Group and are being processed at HQ.

## Repeater group of the month—GB3CE

Repeater GB3CE (Colne Estuary) has been operational on Ch RB14 for more than a year. The site is at the University of Essex, and the repeater provides good coverage around the Colchester area. Two full-wave dipole antennas are used, and these are fed with special low-loss heliax coaxial cable.

Ernie York, G8HOR, was the person mainly responsible for getting the repeater on the air, and due to his efforts the repeater has proved to be very reliable in operation. G8HOR is leaving the area soon and moving to A4 (Oman), and the users of GB3CE have written to *4-2-70* to acknowledge his assistance in getting GB3CE on the air. They expect access will prove a bit difficult from his new location but wonder whether he will establish a repeater there. Further infomation about GB3CE can be obtained by contacting the Department of Electrical Engineering, University of Essex, Wivenhoe Park, Colchester.

## VHF dx records

Operators are reminded that Jack Hum, G5UM, compiles the lists of "firsts" and "farthests". These are then passed to the IARU, and SM5AGM compiles a list for the whole of Region 1. The IARU dx record listings will be published in an early *4-2-70*.

Alistair Simpson, GM8NCM, has submitted a list of contacts made by the Glenrothes club's expedition to Iceland last year. These contacts are believed to be "firsts" and are published below to ensure that there are no operators with prior claims.

First OZ-TF, 2 August 1978, OZ1F to GM3YOR/TF by ms.
First DL-TF, 1 August 1978, DK3XT to GM3YOR/TF by ms.
First PA-TF, 4 August 1978, PA2DWH to GM3YOR/TF by ms.
First SM-TF, 1 August 1978, SM3FGL to GM3YOR/TF by ms.
First SM-TF by aurora, 4 August 1978, SM3FGL to GM3YOR/TF.
All the above claimed "firsts" are for operation on 144MHz.

## Schedules wanted on 432MHz

Charles Brown, GW8AIB, at Pendref, Powis, has written to *4-2-70* following the paragraph headed "Regular contacts on 432MHz" which appeared in the March issue. GW8AIB is active on this band each evening and can usually be found around 432·2MHz on ssb. He is presently using 20W, but a 4CX250B linear amplifier is nearing completion. GW8AIB is also active on fm, and often monitors SU20 and other simplex frequencies for calls. He is willing to run schedules with ssb and fm equipped stations, and he can be contacted by writing to the address in the current issue of the callbook.

Geoff Brown, GJ4ICD, now has high power available on 432MHz, as he has completed a K2RIW linear amplifier which can run 400W output of ssb. Schedules can be arranged by telephoning 0534 26788 or by writing to Lemnos, Longueville Road, St Saviour, Jersey, CI.

## 50MHz openings

There have not been any recent openings from Europe on the 50MHz band, but the band has been very active in other parts of the world. 50MHz contacts have been taking place between Australia and Alaska and between Brazil and Japan. A possible new distance record may have been set by LU8AHW in Argentina, who worked HL9TG in Korea.

The latest recruit to the ranks of SMIRK (the Six Metre International Radio Club) is Michael Harris, VP8NO. He used to be G3VUI and, although he operates mainly on 28MHz, he thinks there is a great deal of scope for 50MHz operation from his location at Stanley, Falkland Islands. For those who do not have the SMIRK information, the address of the number one SMIRK is K5ZMS, 7158 Stone Fence Drive, San Antonio, Texas, 78227, USA.

## AGCW-DL VHF CW Contests

1900–2300gmt, 23 June 1979, 144·00–144·150MHz
1900–2300gmt, 22 September 1979, 144·00–144·150MHz
Open to all European radio amateurs according to their licence. Output classes: (a) less than 3·5W, (b) less than 25W, (c) more than 25W. Report: RST, QSO No (commencing with 001)/class/QTH locator, eg 579001/B/EL25a. Points: QSO Class A with Class A, 9; A–B, 7; A–C, 5; B–B, 4; B–C, 3; C–C, 2. QSO with stations who do not send the complete contest report scores only one point. Multi-points: each new QTH locator square (incl own) counts one; each new DXCC country (incl own) counts additional five. Final scoring: sum of QSO points times the sum of multi-points.

Each contest is evaluated separately, as are the three different classes. Output, class and QTH must not be changed during one contest, but it is permitted to do so from one contest to the other. QSOs via artificial reflectors and transponders/repeaters do not count for points. Duplicate QSOs have to be clearly marked in the log. All entries and check logs to Edmund Ramm, DK3UZ, PO Box 38, D-2358 Kaltenkirchen, Fed Rep of Germany. Logs of the June contest should be postmarked not later than 31 July, and those for September not later than 31 October 1979.

## Late news

The February issue of *4-2-70* contained an item about 70MHz operation by ON4ERX and gave the callsign of ON6UG as one of the operators. This was incorrect, as ON6UG was not

*(continued on page 547)*

# the month on the air

John Allaway, G3FKM *

INEFFICIENCY in the Post Office is making the inclusion of up-to-the-last-minute news items in *MOTA* very difficult if not impossible. First-class letters from your scribe to the editor have been taking up to seven days to reach their destination, and material is having to be sent by other means in order to meet deadlines. It would be most helpful if information could be received earlier than the previously published closing dates whenever possible—and any late items will be included if this can be arranged. Apologies in advance to anyone whose contributions seem to have been omitted.

There is still a shortage of pictures for use in this column, and it has been suggested that regular contributors might like to ask some of the more-well-known overseas stations they contact for a station photograph. It might also be interesting to see some of the well-known UK stations and their operators.

G3SGP advises receipt of a report of a contact which he is supposed to have made with G3PZK. He has not been active and points out that for identification purposes the real G3SGP has a strong Manchester accent...

## DX news

A letter from ISOLYN says that he believes that the station 3V8AA which has been active is, in effect, a pirate. His friend Mashil (who operated the station during January 1979) says that the April operation is annulled, and also that probably the contacts he himself made will not count for DXCC because he had not received the documents requested from the Tunisian Government for submission to ARRL. However, Mario says that a group of Italian operators on UNICEF business hopes to obtain operating permission.

G3MHF recently visited Leningrad and attended a meeting of the club (at 7 Fontanka, tel 210.46.55). This is located about 10min walk from the city centre. Meetings are held at 1900 on Tuesdays (for hf members) and the same times Wednesdays and Thursdays for vhf and listener members respectively. Michael points out that it is pointless visiting the club at any other time. On Tuesdays the club station, UK1ADZ, is on the air.

KA1IW will be on Ogasawara for another two months or so. He is using a TR4C transceiver and a linear and his operating habits are fairly regular—he is on 14,285kHz from 1000 to 1130 most days, and on Fridays and Saturdays he uses 21,365kHz from 2330 to 0100. From 2300 to 2330 he favours 28,550kHz.

Efforts by members of SRJ to encourage amateur radio in places where it has hitherto not been well represented seem to have produced results in Sudan. There is now a club station, 6T1YP, which has an Atlas 210 and multiband dipole. Other callsigns being used are 6U2AA, 6T2NI and 6U2DX (which is held by Tom, YU2DX). The club stations would appreciate maps, callbooks or surplus gear, which should be sent via YU2DX.

OK3TAB/D2A is Laci Toth, who went to Angola in mid-March. He is located at Alto Catumbelo in Benguela province and is using a home-built transceiver running 200W input. He has two-element quads for 14, 21 and 28MHz, and inverted-Vs for 3·5 and 7MHz. Operating times and frequencies seem to be mostly after 1100 on 28,300kHz (when he mostly works into OK) and from 1700 near 14,250kHz or 21,360kHz.

S2BTF has been worked, mostly at weekends, on 14MHz ssb after 1300 on Saturdays and after 1200 on Sundays. S2MN is also active on the same band.

Those looking for a contact with the Malagassy Republic might search for 5R8AN around 14,343kHz at 1900 on Mondays and Thursdays. XT2AV often appears at 1800 on Mondays, Wednesdays and Fridays on 21,280kHz. TN8BL in Tchad has been worked on 14,120kHz after 1800.

A51PN is reported on 14MHz on Thursdays, Saturdays and Sundays. From 1200 to 1230 he uses 14,065kHz, and from 1230 to 1300 14,225kHz, but he has also been reported on 14,005, 14,110 and 14,167kHz. 9N1DRL asks for QSLs via YU3DRL, and has been worked on 14 and 21MHz.

## Dxpeditions

*West Coast DX Bulletin* has been mentioning the possibility of some activity from Abu Ail (in the Red Sea). One group was thought to be F6BBJ and F6BDS, and another is also said to have plans. Exact dates are not known, as transportation is difficult to arrange, and, in fact, the expeditions may already have taken place when this is being read.

The rumours of a Swedish group with intentions to operate from Albania still persists.

W9GW will be in the Pacific area during the early summer and hoped to visit New Caledonia before continuing to Wallis Is (FW).

In a final bulletin, Iris and Lloyd Colvin noted that they were returning from Belize to the USA after a six-month journey. In all, from KG4KG, W6QL/6Y5, ZF2CI, W6KG/TI5, HR0QL and VP1KG, they made a total of 50,000 contacts in the rather less than four months that they were actually on the air. VP1KG set a record for QSOs (12,500) and different countries worked (136). At all six stops they made semi-formal presentations to local amateur radio groups. Iris and Lloyd have now held 104 different calls and have an alphabetically-filed collection of 250,000 QSL cards!

The Spratly Is expedition lasted some 60 hours and took place from Barque Canada Reef. The group originally planned to land on Amboina Cay, but on arrival in the area was greeted by warning shots from the military installation on the island. It then moved to Pearson Reef and found this also occupied, so it moved on yet again to the 150ft-long sand bar from which over 13,000 contacts were made. All in all, an incredible effort and one for which the operators deserve unstinted admiration! Expenses incurred were greatly in excess of the original estimates and anyone wishing to make a donation should send it to the Northern California DX Foundation, Box 717, Oakland, Cal, 94604 (QSLs go to the address in "QTH Corner").

VK3OT will be in the New Hebrides from 20 May to 20 June using the callsign YJ8OT and the areas around 14,025, 14,195, 21,025, 21,205, 28,025 and 28,495kHz. He may also be on 3·5 and 7MHz. QSL requests should include sae and three ircs.

*10 Knightlow Road, Birmingham B17 8QB.

# RSGB HF CONVENTION

**Organized by the RSGB HF Committee**

## Pavilion Suite Complex, The Warwickshire County Cricket Ground, Edgbaston, Birmingham

## Saturday 15 September 1979

- **A social event in comfortable surroundings**
- **Interesting film and lecture programme**
- **Saturday evening dinner**
- **Ample free car parking on site**

### PROGRAMME

| | |
|---|---|
| **1030** | Convention opens |
| **1100** | Film of the 7J1RL dxpedition in 16mm sound and colour |
| **1200** | "Technical and operational aspects of Datong equipment", by D. A. Tong, G4GMQ |
| **1400** | "TVI forum", by the RSGB Interference Committee |
| **1545** | "Modern trends in hf equipment", by R. Wysong, K8AY (director of engineering and marketing) and S. Koogler (head of TR7 project development) of the R. L. Drake Co, Miamisburg, Ohio, USA |
| **1830** | Dinner |
| **2230** | Convention ends |

### TICKETS

**Convention only: £1·50**
**Convention and dinner: £5·50 (single), £10 (double)**

Ticket applications should be sent to S. H. Jesson, G4CNY, 181 Kings Acre Road, Hereford HR4 0SP, and should be accompanied by an sase. Cheques/POs should be made payable to "RSGB HF Convention". Early application is advised as the number of places is limited.

## The 79 GT Expedition

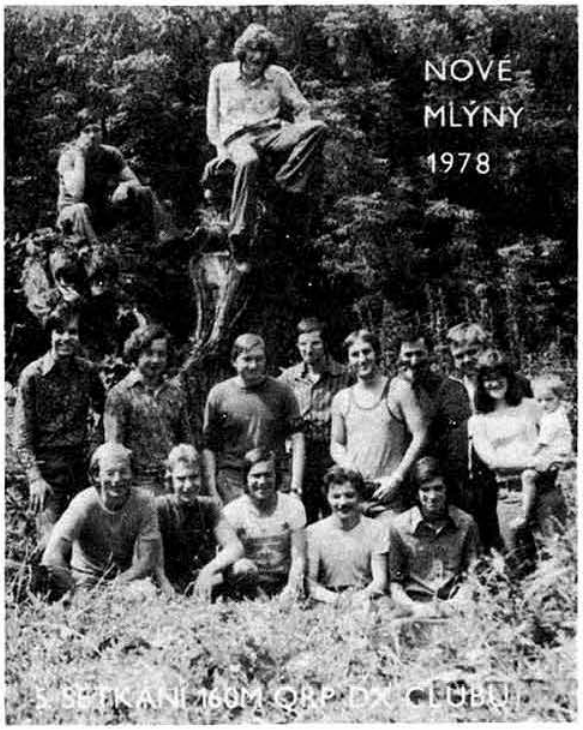
The Warrington & D ARS is organizing a charity expedition to the Isle of Man during the period 1 to 4 July, using the callsign GT4CDA. Operation will be on all hf bands and on 144MHz, using ssb, cw and rtty. The expedition will raise money for mentally handicapped children by means of sponsored QSO lists and QSL distribution. All stations working GT4CDA will receive a QSL, but a contribution of at least one irc will be expected. Immediate QSLs may be obtained by sending one or more ircs to the address in "QTH Corner". Sponsors of the venture include Manx Lines, Brook Lane Finance, Tradeflow International, *Warrington Guardian*, Douglas Bay Hotel and Stephens-James, and copies of the audited accounts will be available after 31 December by sending three ircs to the QSL address. More information is available from Jeff Maynard, G4EJA, 10 Churchfields, Widnes, Cheshire, (telex 628770). A second station, G4EJA/MM, will operate for the same period from aboard the *Manx Viking*—other details are the same.

## BYLARA

The British YL Amateur Radio Association has been formed and its aims are as follows:

(1) To further yl operating in Britain, and to encourage good operating technique and courtesy to other operators at all times;
(2) To promote friendship among fellow enthusiasts;
(3) To stimulate interest among yls;
(4) To offer help in mattters arising from or relating to yl interests;
(5) To liaise, where possible, for mutual benefit, with yl groups in other countries.

Meetings on the air will be held on Mondays at 7.15pm (local time) on 3,605kHz, and the first hour will be devoted to yl matters, after which anyone is welcome to join in. Informal meetings will be held at 2pm in the tea-room at most rallies, but official meetings will take pace at the Leicester ARRA Exhibition (2pm in the tea-room), and the AGM at Drayton Manor




**The Czechoslovak 160m DX Club at its AGM at OK2PGF's weekend house: l to r (front) OK1DWF, OL5AUY, OL5AWC, OK2PGU, OL8CGB; (centre) OK2BCM, OK2BQU, OK1DXW, OK2PGF, OK1MIX, OK1AXD, OK2SBB, OK2PGN, jr op Zuzanka; (back) OK1DFF and OK1ATP** *(W1BB photo)*

Park Rally (1980) at the same time. It is hoped to produce a news sheet each quarter and the editor will be Mrs Mary Adams, G4GAJ, "Little Croft", Shurdington Road, Cheltenham, Glos GL53 0NJ. The secretary is Diana Hughes, G4EZI, 3 Primley Park Crescent, Leeds LS17 7HY.

## Morokulien

In 1959, during UN Refugee Year, this tiny area on the Norwegian/Swedish border was formed, and 1979 is its 20th anniversary. ARIM (LG5LG/SJ9WL) is celebrating this by issuing a special envelope of interest to stamp collectors. It will bear both Norwegian and Swedish stamps and may be ordered until 15 September, price seven ircs. Applications should be addressed to: ARIM, Konglevegen 3, N-2200 Kongsvinger, Norway.

## Welcome

During March the following overseas amateurs joined the Society: CT1GQ, CT4RL, EA1JO, EA2IJ, EA5AEE, EA5FT, EI2I, F3EV, HB9ACO, HB9ASX, JY4MB, KA2ABI, KA2DEZ, K1UVW, K7ZFG, K8YPW, K9MX, ON1CN, ON6RB, SM7GPZ, SP5CIC, VE1EG, VE3EXF, VK3SV, VK5ZES, W2DD, W6VXP, W6WGA, W9AIU, WA3WLM, WA6JYJ, WA6KTZ, WB2KNY, WB2QOH, WB4HJA, WB6TXQ, WD6GET/PA, WD6GZJ and 5B4HK.

## SEANET Convention 1979

This will take place in Penang, Malaysia, on 30 November, and 1, 2 December. Further information and hotel reservations may be arranged through the secretary, 9M2MW, Seanet Convention 1979, PO Box 725, Penang, Malaysia. The SEANET meets every day at 1200 on 14,320kHz.

## Contests

**The Town of Cava Contest**

0000 10 June to 2400 30 June.

3·5 to 28MHz. Two 24h periods of non-operating to be marked in log. Contacts with Cava Dei Tirreni stations count two points, with Salerno province stations one point, with "Jolly" station three, and with IZ8ARI five points. A multiplier of one is counted for each station worked in the first two categories. There are om, yl, cw, rtty, overseas, QRP, and single categories, and listeners may also take part. The Town of Cava Award will be given to those scoring 25 points if they send 10 ircs with their log to reach the following address no later than 30 July 1979: Award Manager ARI Group, PO Box 35, 84013 Cava Dei Tirreni, SA, Italy.

**The All Asia Contests**

1000 16 June to 1600 17 June (cw).

1000 25 August to 1600 26 August (phone).

This contest is between Asia and the rest of the world, and there are single-operator, single- and multi-band, and multi-operator (single-transmitter) all-band categories. Bands 3·5 to 28MHz. Exchanges consist of RS/T plus a two-figure number indicating the operator's age (ladies send "00").

Each contact counts one point, and the multiplier is the total of different Asian prefixes worked on each band added together—note, however, that KA prefixes do not count. Logs should show new prefixes worked, and separate sheets must be used for each band. A summary sheet showing the details of scoring and accompanied by a declaration that all rules and regulations have been observed should also be enclosed. Logs must reach JARL Contest Committee, PO Box 377, Tokyo Central, Japan, no later than 30 September 1979. Results will be sent to entrants who enclose an irc and sae.

G4AEM has kindly forwarded a copy of the results of the **1978 SP DX Contest.** In the cw section (multiband) UK scores were as follows: **G4AEM** (10,302), G4FDC (9,600), **GM3MHG** (5,539) and G2BJY (1,188). In the ssb section they were **G4CVZ** (25,164), G3USA (10,440) and **GM4ELV** (1,248) in the multiband category, and on 14MHz **G4EZI** (23,940), G3VOF (20,292) and **GW3SLA** (5,220) were listed.

**IARU Radiosport Contest**

0000 14 July to 2400 15 July.

1·8 to 28MHz. Single-operator and multi-operator single-transmitter categories. CW, phone or mixed-mode sections—multi-operator must be mixed mode. Single-operator entrants may only operate for 36h, and off times must be at least 30min long. Exchanges consist of RS/T plus ITU zone number (UK is 27). Contacts with one's own ITU zone count one point, with those in other zones in the same continent three points, and with all others five points. Each station may be worked once per band—regardless of mode. Crossband contacts are not allowed except those via satellites—these count as a separate band. The multiplier is the sum of ITU zones worked on each band added together. Entries must be accompanied by a "dupe" sheet if more than 200 contacts have been made, and


VK3BM operates this very fine array of equipment, which includes a cb transceiver used to keep in contact with his son 40 miles away!

must be postmarked no later than 27 August. Send them to IARU HQ, Box AAA, Newington, Conn, 06111, USA. G3FKM has a few log forms which could be used as samples.

**VK/ZL/Oceania Contest**
1000 16 June to 1000 17 June.
This is a new contest, and differs from the one of the same name normally held in October. There are single- and multi-operator and listener entries. Multi-operator logs must be signed by all participants, and listeners should log both sent and received data. Exchanges consist of RST, *CQ* zone number (UK is 14), and time (gmt). Scoring is complicated—"QSO point value is as per the Exchange Point Zone Chart" (no details available—suggest asking a friendly VK or ZL over the air!). The total QSO points should be multiplied by the number of DXCC countries worked, and then again by the number of continents (maximum six). QSOs on 3·5MHz count triple, and on 7MHz double points, but only if outside one's own continent. After the above calculation add 100 points for each VK or ZL worked on 14, 21 or 28MHz, and 200 for each worked on 3·5 or 7MHz. Each station may only be counted once for this purpose if worked on 14, 21 or 28MHz, but may be counted again if worked on 3·5 or 7MHz. The ARRL DXCC list plus call areas in the USA, VK, ZL, VE and JA will be used. Use a separate log sheet for each band, and include a summary sheet showing the scoring, name and address and callsign. Logs must reach Bill Storer, VK2EG, 55 Prince Charles Road, Frenchs Forest, 2086, NSW, Australia.

**MARTS SEANET WW DX Contest**
0001 21 July to 2359 22 July (CW).
0001 18 August to 2359 19 August (Phone).
1·8 to 28MHz. Single-operator, single- or multi-band, and multi-band multi-operator sections. Exchanges consist of RS/T plus serial QSO number (from 001). Contacts with DU, HS, YB, 9M2, 9M6, 9M8 and 9V1 count four points on 14, 21

The VK3BM antenna farm—a TH6DX beam at 100ft and a home-built full-size 7MHz Yagi at 86ft supported by a lattice boom being the main features

and 28MHz, and 10 on 3·5 and 7MHz, and with other countries in the SEANET area half as many. A multiplier of three will be gained for each SEANET country worked, these are A4, A51, A6, A7, AP, BV, China, CR9, DU, EP, HL/HM, HS, Japan, JD1, JY, KA, KC6, KG6, KH6, KX6, P29, S21, S79, VK, VQ9, VS5, VS6, Kamaran, 8Q, VU, VU islands, XU, XV, XW, YB, YJ, ZL, 3B6, 3B8, 3D2, 4S7, 4W, 5Z, 9K, 9M2, 9M6, 9M8, 9N, 9V and C21. Note that contest numbers should begin from 001 on each band. Photocopies of a sample log and summary sheet may be obtained from G3FKM. Entries must reach Eshee, 9M2FK, PO Box 725, Penang, Malaysia, by 31 October 1979.

## Awards

**The Siam Award**
This is issued by the Radio Amateur Society of Thailand to those who have made contact with at least 10 HS stations, single or mixed bands, but no cross-mode contacts accepted. The fee is 20 ircs (or equivalent in US dollars) and applications should be sent to RAST, PO Box 2008, Bangkok, Thailand.

**The Worked All Queensland "VK4" Award**
By the Queensland Division of WIA. It is divided into two sections: (1) Worked All Cities and Towns, and (2) Worked All Shires. The award is available to transmitting amateurs and

listeners. Only one award is issued, but this will be updated when further additions are received. There are 20 incorporated cities and towns in Queensland, and a minimum of 15 must be worked for the basic award (a silver sticker is issued for all 20). The cities are: Brisbane, Bundaberg, Cairns, Charters Towers, Dalby, Gladstone, Gold Coast, Goondiwindi, Gympie, Ipswich, Mackay, Maryborough, Mount Isa, Redcliffe, Rockhampton, Roma, Thursday Island, Toowoomba, Townsville and Warwick. There are 113 shires, and the initial award requires confirmation from 51. Stickers will be issued for 61, 71, 81, 91 and 101, with a gold sticker when all 113 have been worked. Any bands/modes, but not cross-mode. Send a certified list, plus 10 ircs to: The WIA (Q) Awards Manager, GPO Box 638, Brisbane, Queensland, 4001, Australia. Note that all contacts must have been made since 31 December 1975.

**The Cheshire Award**

Available in three classes—Gold (for 50 points), Silver (for 30 points) and Bronze (for 15 points). Band and mode endorsements are available. Licensed amateurs and listeners may apply, and acquire points by working or hearing stations in Cheshire—note that those made via *land based* repeaters are not valid. Points values are as follows: (UK stations) contacts on cw, ssb or a.m., one point; on fm, half point; and on sstv, rtty or via Oscar, five points. European stations count two, five and 10 respectively, and others five, 10 and 15. Contacts with Chester count double once per application. Certified log extracts plus £1.50, US $3 or 10 ircs should be sent to: J. Maynard, G4EJA, 10 Churchfields, Widnes, Cheshire WA8 9RP.

## Band reports

Last month's contribution showed how dangerous it can be to attempt predictions without waiting for the full data (writes G8KG). In the event, the provisional Zurich sunspot number for March was only 137, so that the mean centred on February for plotting on Fig 2 (page 224—March 1979 *Radio Communication*) was 147.

In fact, mean solar flux began to fall steadily after its mid-February peak, and by the end of April was back where it was at the beginning of the year. It therefore seems probable that the cycle reached a subsidiary peak in February (the 32nd month) as did Cycle 19. It looks as if the three-month mean for March will be in the region of 125–135 and the fall may continue for a while, but the next rise will probably have begun by the time this appears in print.

Conditions on the higher bands were rather variable in the last week of March and in early April due to considerable flare activity and a series of magnetic disturbances. There was a strong magnetic storm (A index 66) on 25 April, and increasing flare activity at the end of the month.

The comments made last month about the contact between G3MBA and VK6NDZ/M aboard the *Indian Express* train should have said that it was made on 21MHz not 28MHz—Scot has followed this with another unusual QSO—this time with VK5NRX/M operating from a tractor with a 5ft whip antenna!

The writer is very grateful to the following for sending details of their exploits on the bands from which the next section has been prepared: Gs 2HKU, 3HB, 5JL, 3AAE, 3GVV, 3LOL, GM3LYY, G3LPS, GM3YOR, G4EHQ, GM4ELV, G4FMO, G4GXL, IS0LYN, and BRSs 17567, 25429, 31301, 33915 and 36928.

Stations with callsigns listed in italics were using cw—the others ssb.

## QTH CORNER

| | |
|---|---|
| **A4XGB** | (from 1 May) W2ILT, R. R. Smolenski, 51 S Ridge Trail, Fairport, NY, 14450, USA. |
| **C5ACQ** | via G4AKQ, M. Bernard, 16 Mountbatten Av, Chatham, Kent ME5 0JY. |
| **EJ4DJ**<br>**EJ6CR**<br>**EJ0CL** | via GI4FUM, W. Hutchinson, 8 Lisnee Park, Ravernet, Lisburn, Co Antrim BT27 5NS. |
| **GT3AHD/P** | H. G. Cohen, G4GHS, 41 South Station Rd, Gate Acre, Liverpool L25 3QE. |
| **GT4CDA**<br>**GT4EJA/MM** | PO Box 59, Isle of Man. |
| **DA2WA/HB0** | Dr. H. Jakobljevich, DJ0LC, Am Weinberg 10, D-6200 Wiesbaden-Auringen, W Germany. |
| **J6LHK** | R. Warner, G3SAR, North Lodge, St Julians, Sevenoaks, Kent. |
| **OE6XG/A** | via WA3HUP, Mary Crider, RFD 2-Box 5-A, York Haven, Pa, 17370, USA. |
| **VP5GBX** | via K2ON, G. Buchanan, Box 29, White Plains, NY, 10605, USA. |
| **VP8SB** | now via G4FKK, 47 Arundel Av, Sanderstead, South Croydon, Surrey CR2 8BJ. |
| **VQ9MR** | via N5GU. |
| **YJ8OT** | PO Box 622, Hamilton, Vic, 3300, Australia. |
| **YS9RVE** | N 0543, San Salvador, Salvador. |
| **YV0AA** | via RCV, Box 2285, Caracas, DF, Venezuela. |
| **WH4AAA** | via W5RU, Delta DX Assn, Box 73, Metairie, La, 70004, USA. |
| **ZK1DN** | PO Box 90, Rarotonga, Cook Is. |
| **1S1DX** | H. Mead, VK2BJL, Box 85, Round Corners, 2158, NSW, Australia. |
| **DK6AS/3A** | DK6AS, A. Soechting, August-Bierweg 1, 3180 Wolfsburg, W Germany |
| **6T1YP**<br>**6T2NI** | 6T1YP, Radio Club, Youth Palace, PO Box 80, El Morada, Omdurman, Sudan. |
| **6U2DX** | via YU2DX, Tomislav Dugec, Box 266, 58001 Split, Yugoslavia. |

**RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD**

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**7MHz. 0000** *UA0AGB, VU2RQ.* **0600** *H7Z, W7,* ZF2CL. **0700** *VR6HI, YV0AA.* **2100** *TA1DAR.* **2200** *VK0AC.* **2300** *VQ9KK.*

**14MHz. 0600** VR6s *BJ, HI,* TC, YV0AA. **0700** FK8CR, FO8DT, KC6GF, VK2AGT/LH, *VR6HI,* VS5MS, ZK1BD, 3D2ER. **0800** A35RB, AH2D, CE0AE, CR9AJ, FB8YI, FO8s *EI, FO,* H44CB, KA1IW, KX6PP, *UK0KAA* (Wrangel Is), VP5VD, VR1AY, VR3AR, ZK1DR (QSL to W0WP). **0900** FK8RT, VR6TC, 1S1DX, **1000** FO8ER, KX6PP, T2AAA, VR3AR. **1100** KA1MI, P29CC. **1200** FB8XV. **1300** BV2B, 1S1DX, *9M8UG.* **1500** JT1AS. **1600** JT1BG, KL7JAA, ST2FF, *VS6BB,* 6T1YP, 6T2NI. **1700** FB8WX, JT1AN, ST2MM. **1800** S8AAP (Box 821, Umtati, Transkei), S79WHW. **1900** FH8s CL, OM, FK8CR, JY1, OE6XG/A, S2BTF. **2000** A7XAH, H44CF, KC6GF, *P29EJ,* ST0RK, VP8SB. **2100** OK3TAB/D2A, *KL7PJ,* TR8RG, YI4SC. **2200** J6LFQ, J7DAO, VPs 1WS, 2KT, 2VAT, 8SB. **2300** TG9VN (QSL to I0WDX), VP9IW, ZL.

**21MHz. 0600** *KH6.* **0800** JA, KL7IRT, VK, ZL. **0900** YV0AA. **1000** HM0S, VK9NI, VK0JM, VR3AR. **1100** OE6XG/A. **1300** AP2KS, TI5EWL, YB. **1500** A9ZEX, C6ANU. **1600** HM0S, HS1ABD, 1S1DX. **1700** GW3WGM/MM ("Operation Drake" off TI), J6LHK, OE2WSL/YK. **1800** WA7UWE/C6A, HV2VO. **1900** FK8ED, *FM0EWT* (QSL to K8IKW), FR7ZN, *J20BS,* KH6EQV, *SU1ER.* **2000** FK8CR, VP5GBX (QSL to K2ON), VP8SB, W6-W7. **2100** OK3TAB/D2A, *PA0LOU/ZP.* **2200** CE, CX, HC, LU, VP1SE. **2300** WD5AJE/SU.

**28MHz. 0700** KA1MI, KC6GF, W7ZGA/KH2, ZK1DN. **0800** H44JD, ST0RK, ZL, 1S1DX, 6T2NI. **1000** D4CBS, H44PT, KL7, VK2VGV/VK9 (Norfolk Is). **1100** H44WH, 9N1MM. **1200** P29LS, ST0RK, VK, VU. **1300** J28AM, J6LDE, OE6XG/A, YV0AA, 6T1YP. **1400** AP21Z, *HZ1HZ,* KH6IRT. **1500** VS6AG, 9M2PV. **1600** J6LHK, VQ9RL, VS5OO, 5N0NAS. **1700** HH2SD, KP4USN, VK9XW, *VQ9MR.* **1800** HS1ABD, VE6-VE7, VQ9JJ, W6-W7, YB1AQ, *YV0AA.* **1900** HH2JC, VP2VJ, 5H3FW. **2000** VP8QG, VQ9JJ, ZL. **2100** CE0AE, VK. **2200** CE, CX, JA, LU, PY, VK, ZL, ZP. **2300** LU, PY, VK2.

Thanks are also due to the following dx bulletins for information extracted: *DX'press* **(PA0TO),** *CQ Magazine* **(W1WY),** the *Ex-G Radio Club Magazine* **(W3HQO),** *DX News Sheet* **(Geoff Watts),** *Long Skip* **(VE3FRA),** and *West Coast DX Bulletin* **(WA6AUD).**

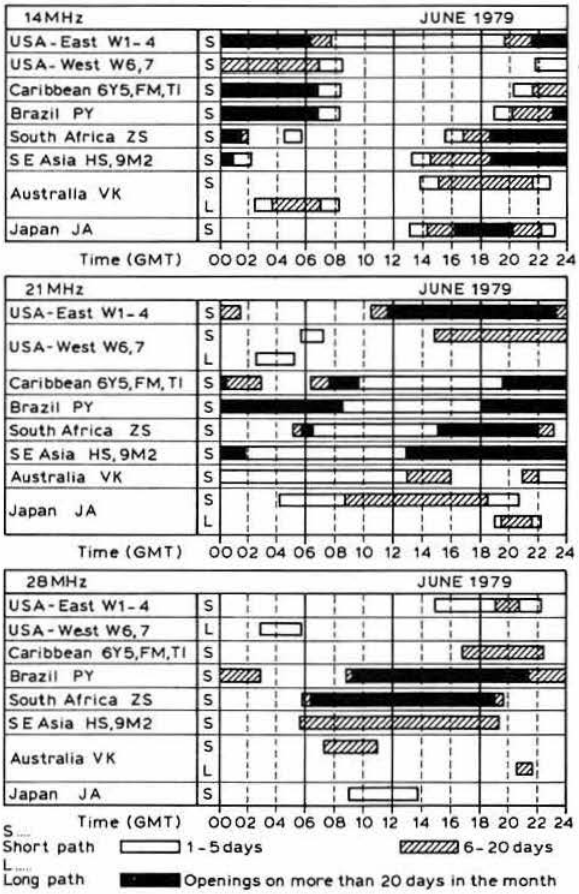
Please allow plenty of time for contribution for the **August** issue to reach G3FKM no later than **28 June**—this is an abnormally early closing date. Information for the **September** issue should arrive no later than **10 August.** □

# Propagation predictions

Summer-time will prevail on **28MHz** during June, and in July and August. This will mean poor conditions for dx on this band; only traffic with Africa and South America will be certain, and traffic with North America will be possible only under favourable conditions during the evening. On **21MHz** the worsening summer-time conditions will not be quite as marked as on 28MHz. Some compensation for the poor dx conditions during the summer is offered by the sporadic short skip conditions, caused by sporadic-E, which will facilitate traffic with Europe on 28 and 21MHz.

The **14MHz** band will remain a night-time dx band. Traffic during the afternoon with Australia and South-East Asia will be interrupted by European QRM (often via short-skip). DX will be possible on **7MHz** if most of the path lies in darkness, but it will be interrupted by summer static and European QRM. During the day 7MHz will be the ideal local band, without the dead zone, while at night **3·5MHz** will be more suitable. There will be no occurrence of dead zones before sunrise on 3·5MHz.

The provisional sunspot number for March 1979 from the Swiss Federal Observatory was 137. Daily numbers for the month ranged between 110 and 170. The predicted smoothed monthly numbers for July, August and September are 163, 165 and 165 respectively.




# HF propagation study

Predicted hpfs (MHz x 10) for June 1979

| GMT = | 00 | 02 | 04 | 06 | 08 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aden | 271 | 263 | 290 | 326 | 333 | 341 | 345 | 338 | 341 | 345 | 313 | 296 | 271 |
| Ascension | 232 | 220 | 220 | 229 | 337 | 343 | 354 | 354 | 355 | 366 | 314 | 267 | 232 |
| Bahrain | 260 | 246 | 288 | 309 | 317 | 322 | 322 | 317 | 324 | 327 | 299 | 286 | 260 |
| Bangkok | 238 | 237 | 260 | 274 | 280 | 279 | 274 | 274 | 288 | 291 | 272 | 258 | 238 |
| Barbados | 296 | 270 | 243 | 228 | 270 | 284 | 277 | 290 | 293 | 305 | 327 | 312 | 296 |
| Bermuda | 284 | 246 | 225 | 210 | 223 | 249 | 262 | 262 | 268 | 274 | 293 | 294 | 284 |
| Bogota | 296 | 265 | 237 | 221 | 267 | 274 | 275 | 275 | 286 | 299 | 317 | 307 | 296 |
| Buenos Aires | 271 | 276 | 244 | 196 | 161 | 246 | 324 | 328 | 323 | 340 | 356 | 323 | 271 |
| Cape Town | 197 | 125 | 112 | 322 | 347 | 354 | 360 | 360 | 361 | 365 | 293 | 268 | 197 |
| Colombo | 249 | 243 | 281 | 298 | 308 | 310 | 313 | 300 | 318 | 314 | 290 | 268 | 249 |
| Cyprus | 238 | 232 | 262 | 281 | 277 | 299 | 291 | 286 | 300 | 303 | 280 | 256 | 238 |
| Dakar | 313 | 290 | 267 | 295 | 337 | 343 | 354 | 354 | 355 | 366 | 359 | 328 | 313 |
| Denver | 225 | 199 | 197 | 185 | 173 | 163 | 188 | 213 | 225 | 219 | 237 | 238 | 225 |
| Fairbanks | 183 | 177 | 177 | 183 | 183 | 196 | 190 | 190 | 190 | 190 | 190 | 190 | 183 |
| Falklands | 172 | 164 | 140 | 131 | 122 | 205 | 335 | 337 | 333 | 347 | 357 | 267 | 172 |
| Gibraltar | 185 | 176 | 166 | 197 | 208 | 202 | 204 | 206 | 205 | 221 | 215 | 199 | 185 |
| Hong Kong | 229 | 233 | 247 | 249 | 258 | 262 | 260 | 253 | 270 | 276 | 260 | 244 | 229 |
| Honolulu | 188 | 176 | 176 | 177 | 190 | 202 | 219 | 205 | 214 | 219 | 219 | 213 | 188 |
| Iceland | 128 | 124 | 124 | 141 | 183 | 204 | 215 | 213 | 216 | 213 | 194 | 154 | 128 |
| Jamaica | 281 | 244 | 227 | 213 | 243 | 252 | 260 | 262 | 271 | 284 | 296 | 298 | 281 |
| Lagos | 308 | 289 | 263 | 318 | 342 | 348 | 359 | 360 | 362 | 370 | 351 | 326 | 308 |
| Las Palmas | 271 | 252 | 229 | 251 | 295 | 294 | 293 | 293 | 294 | 328 | 317 | 288 | 271 |
| Lima | 299 | 274 | 248 | 235 | 290 | 232 | 294 | 300 | 299 | 314 | 337 | 314 | 299 |
| Los Angeles | 213 | 187 | 187 | 182 | 185 | 178 | 199 | 219 | 219 | 219 | 237 | 233 | 213 |
| Malta | 208 | 204 | 197 | 235 | 244 | 244 | 242 | 244 | 244 | 261 | 243 | 229 | 208 |
| Mauritius | 243 | 185 | 279 | 329 | 336 | 347 | 347 | 347 | 350 | 354 | 324 | 298 | 243 |
| Mexico | 261 | 223 | 209 | 199 | 220 | 220 | 227 | 232 | 249 | 261 | 274 | 263 | 261 |
| Montreal | 251 | 223 | 200 | 177 | 174 | 210 | 215 | 227 | 227 | 248 | 248 | 257 | 251 |
| Moscow | 191 | 192 | 204 | 210 | 221 | 224 | 220 | 216 | 214 | 238 | 227 | 213 | 191 |
| Nairobi | 235 | 243 | 268 | 331 | 341 | 350 | 354 | 354 | 351 | 308 | 280 | 288 | 235 |
| New Delhi | 242 | 239 | 265 | 281 | 290 | 293 | 290 | 284 | 298 | 298 | 276 | 266 | 242 |
| New York | 261 | 229 | 210 | 186 | 177 | 214 | 223 | 227 | 235 | 252 | 255 | 268 | 261 |
| Osaka | 208 | 210 | 215 | 225 | 223 | 225 | 235 | 228 | 242 | 243 | 234 | 219 | 208 |
| Perth | 248 | 242 | 277 | 296 | 305 | 308 | 310 | 299 | 228 | 197 | 173 | 166 | 248 |
| Rio de Janeiro | 308 | 288 | 266 | 246 | 190 | 328 | 335 | 337 | 332 | 347 | 357 | 324 | 308 |
| Salisbury | 291 | 272 | 233 | 332 | 345 | 355 | 360 | 364 | 361 | 366 | 331 | 321 | 291 |
| Seychelles | 277 | 270 | 285 | 326 | 336 | 345 | 347 | 343 | 328 | 267 | 265 | 290 | 277 |
| Singapore | 242 | 239 | 265 | 281 | 290 | 293 | 290 | 284 | 298 | 298 | 276 | 266 | 242 |
| Suva (s) | 178 | 177 | 188 | 201 | 201 | 213 | 213 | 214 | 219 | 219 | 213 | 201 | 178 |
| Suva (l) | 313 | 294 | 268 | 309 | 268 | 211 | 187 | 176 | 174 | 174 | 352 | 328 | 313 |
| Sydney (s) | 229 | 233 | 247 | 249 | 258 | 262 | 260 | 218 | 192 | 174 | 174 | 244 | 229 |
| Sydney (l) | 300 | 279 | 252 | 241 | 301 | 197 | 172 | 172 | 164 | 148 | 221 | 317 | 300 |
| Teheran | 249 | 243 | 281 | 298 | 308 | 310 | 313 | 300 | 318 | 313 | 288 | 277 | 249 |
| Vancouver | 195 | 176 | 176 | 177 | 183 | 188 | 200 | 201 | 206 | 225 | 225 | 219 | 195 |
| Wellington (s) | 201 | 200 | 206 | 219 | 220 | 220 | 218 | 206 | 157 | 174 | 225 | 213 | 201 |
| Wellington (l) | 308 | 288 | 268 | 279 | 208 | 183 | 172 | 171 | 171 | 147 | 281 | 324 | 308 |

Bands recommended are those between hpf and half hpf.

# 4–2–70

*(Continued from page 541)*

connected with this operation which was, in fact, organized by ON5FF, to whom requests for QSL cards should be directed. A weak aurora at 1215gmt on 25 April enabled GM8OVN and GM8LHE to have an ar QSO, but no other stations were copied. Further auroras occurred on 28 and 29 April during which GM4COK worked LA, SM and OH stations on 144MHz cw. Lynn Woodward, VK8EW, worked JR6LHX on 145·160MHz fm on 20 April—Lynn's UK call is G4ETT and she claims the first yl contact from Darwin to Japan. Your scribe will be giving a talk at the SMC Exhibition on 22 June, and it is hoped to have tape recordings of the most recent South Africa to Greece te contacts, as well as recordings of eme, aurora and meteor scatter.

**Finally,** send in your news items by telephoning the *4–2–70* answering machine at 0224 780347, by telex to "739169 MANPOW G Knight", or by post to PO Box 49, Aberdeen AB9 8JA. CU at SMC Exhibition on 22 June. □

# Modifying the Hy-Gain 18AVT/WB antenna

by F. L. COLDWELL, LDS RCS Eng, G4ATM*

THIS antenna is an omni-directional self-supporting vertical, about 21ft high, designed to operate on the 3·5 to 28MHz amateur bands, and may be ground mounted, or with a resonant radial system when mounted above ground. Hy-Gain claim a wind speed survival of 80mph, but Fylde coast gales cause the author's antenna to perform some frightening gyrations at well below that speed, and to avoid damage (about £90 for a new one!) a quick and easy method of bringing it down to the ground was devised—no originality is claimed. The author's antenna is ground mounted, and guying is not practicable in his small rear garden.

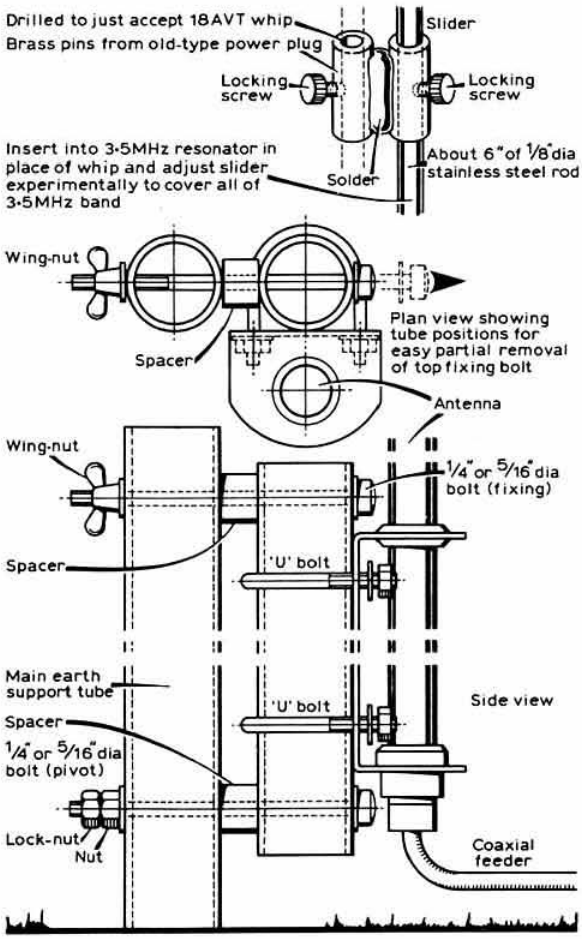



**Fig 1. Details of the modifications**

Instead of bolting the antenna base directly to its ground post, which is 1·5in steel scaffold tube, it is bolted to a 14in-long piece of the same size tube, which in turn is bolted to the ground tube by two suitably long bolts of about 5/16in diameter. The lower bolt is screwed not too tightly and secured with a lock nut after interposing a 0·5in spacer between the tubes. The upper bolt has a similar spacer, but is fastened with a wing nut, using washers where thought necessary. Thus, after removing the wing nut and partially withdrawing the bolt, the antenna is free to pivot to the ground. The descent path is planned by the position of the bolts through the tubes, of course, and a box is kept handy to support the lowered antenna and so avoid damage to the capacity hat rods. Lowering, and raising, the antenna takes just a few seconds, and avoids the use of tools to dissemble the antenna below the 28MHz trap, and the possible hazard of being left holding the upper antenna portion one handed in a gale! This device has been in use for over seven years with no trouble at all.

Apart from safety considerations, ability to lower the antenna readily makes it easy to modify and test. For example, by substituting the existing whip with the adjustable version shown in Fig 1, the antenna can be tuned to cover the whole 3·5MHz band. Or the 3·5MHz resonator and whip can be replaced by a 1·8MHz resonator and whip—for example the G-Line version, with an adapter, to cover top band. Improved swr on 28MHz has been obtained with the length of antenna tube below the 28MHz trap being 22in rather than the 8·25in designated by the manufacturer. A simple braid-breaker proved useful in eliminating tvi on 3·5MHz.

Thanks are extended to G3IZG for suggesting the exercise, and also to G4AVT and G4FRK for their help in many and varied tests. □

*120 Highcross Road, Poulton-le-Fylde, Lancs FY6 8BX.

## NEW PRODUCT

### Morse tutor

Datong Electronics announce their model D70 morse tutor, which is claimed to send a continuous stream of precision morse code in random five-letter groups. The switch selection enables the user to choose letters only, numbers only, or letters and numbers mixed. Technical information on the unit is:

| | |
|---|---|
| Battery supply: | 9V at 5mA; operates down to 6V. |
| Speed range: | 6·5 to 37wpm. |
| Delay between letters: | Variable from the "correct" 3-dot units to over 3s as "delay" increased. |
| Delay between words: | Varies from the "correct" 7-dot units to twice the inter-letter delay as "delay" increased. |
| Overall case size: | 177 by 130 by 35mm (7 by 5 by 1⅜in). Attractive low profile grey plastic case, black panels. |
| Front panel controls: | "Volume", "delay", "speed", "letters/numbers/mixed". |
| Rear panel: | Key jack; earphone jack. |

The price, including postage, within the UK is £37 + 12½ per cent VAT. Further information may be obtained from Datong Electronics, Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE. Tel 0532 552461.

# council proceedings

**A brief report on the Council meeting held on 1 February 1979**

**Present:** Mr J. Bazley (President, in the chair), Dr E. J. Allaway, Messrs J. Anthony, P. Balestrini, R. Bellerby, P. F. D. Cornish, T. P. Douglas, Dr D. S. Evans, Messrs L. N. G. Hawkyard, G. I. Knight, B. O'Brien, C. H. Parsons, R. F. Stevens, G. M. C. Stone, C. J. Thomas (members of Council), D. A. Evans (general manager/secretary), A. W. Hutchinson (editor), Mrs H. M. Allin (minutes secretary).

The President welcomed Messrs Bellerby, Hawkyard and Knight, and all present introduced themselves for the benefit of the new members of Council.

Apologies for absence were received from Mr D. J. Andrews.

**Zone E representation**

The President explained that he had received an offer from Mr D. H. Adams, GW3VBP, to be co-opted on to Council until a new representative was found.

Mr Hawkyard said that although he felt Zone E members were reluctant to be represented on Council, he would like to propose that Mr Adams be co-opted. This was seconded by Dr Allaway and carried unanimously.

**Election of executive vice-President for 1979**

Mr B. O'Brien and Mr P. Balestrini were nominated and, after a ballot, the President declared Mr Balestrini elected.

**General manager's report**

Mr Evans spoke briefly of the latest position on the *DX News Sheet* compiled by Geoff Watts. Following discussions within the F & S Committee, RSGB HQ would be responsible for circulation and subscriptions in future and Geoff Watts would continue to edit the news sheet.

The question of delays in the delivery of *Radio Communication* was discussed, and it was agreed that an explanation of the postal system should be published again, emphasizing that the Society was *not* to blame for delays.

Mr Bellerby reported that he had heard of several cases where equipment advertised in Members' Ads had been sold prior to general distribution of the journal, and he felt that this was the cause of some ill-feeling.

Mr Parsons pointed out that in many cases equipment was sold privately before publication of the advertisement.

Mr Stevens said he thought there was a general misunderstanding of the method of posting the journal. Rebate post was dealt with *after* clearance of 1st and 2nd class mail, and a delay of seven days had been mentioned by the Post Office. This was quoted from a letter received from the Post Office.

The membership figure for February was 22,652—an increase of 2,000 in 12 months.

**Treasurer's report**

Mr Cornish drew Council's attention to a summary of income and expenditure accounts to 30 June 1978, together with detailed expense figures and a recommendation that most subscriptions be increased by 25 per cent from 1 July 1979, which had been circulated. He said there would be a time lag before the Society could begin to reap the benefit of the proposed increase which, if applied from 1 July, would probably be sufficient for the next two financial years. The Society had gone through three-and-a-half years of steady inflation without an increase in subscriptions, and this was mainly due to the excellent sales of publications.

The President endorsed Mr Cornish's remarks and added that the proposal had been considered in detail by the F & S Committee. Dr Evans said that the F & S Committee had come to the conclusion that there should be an annual review of subscriptions in future.

Mr Cornish answered several queries from members, and then outlined the figures shown in the profit and loss statement for the six months ended 31 December 1978.

Mr Parsons congratulated the treasurer on the work he had done in producing his report. He felt that the recommendation was fair to the membership and he proposed that it be accepted. This was seconded by Mr Thomas. Council unanimously agreed to approve the treasurer's recommendation.

**UK satellite programme**

Mr Stevens gave some brief details of the proposed UK satellite being engineered and built by Surrey University. The total cost of the project was estimated to be about £150,000, which would be donated in cash and kind by industry. AMSAT UK were donating £1,000 in cash, and the F & S Committee recommended to Council that the Society donate up to £2,000 for the project. This recommendation was approved.

**Oscar/Raynet matters**

A report was given by Mr Balestrini on a misunderstanding arising from a joint meeting of the VHF and Raynet committees, which had resulted in the publication of an article entitled "Attack on space band" in AMSAT-UK's *Oscar News*.

Much discussion followed, and it was finally agreed to leave the matter in abeyance until a member of the Raynet Committee had been appointed to serve as corresponding member of the VHF Committee.

**IARU application**

Following a proposal from Dr Allaway, seconded by Dr Evans, approval was given to the application from the Amateur Radio Club of Tonga.

**1979 AGM—date and venue**

A recommendation from the general manager, discussed at the last M & R Committee meeting, to hold the AGM at the IEE on Saturday 8 December 1979, was accepted.

**Appointment of committees**

The composition of committees of Council to serve during 1979 was approved.

It was agreed that the Finance & Staff Committee should consist of Council members only. The President said he would write to Mr L. Newnham, G6NZ, thanking him for his past services extending over very many years.

**Area representatives**

The following appointments were approved: D. B. Appleby, G8FUW, Otley; J. Butcher, G4GWJ, Plymouth; P. N. Butterfield, G4AAQ, Pontefract and Castleford; K. M. Cleary, G4ATZ, Harrogate and district; J. Clegg, G3FQH, area of Kirklees, Yorks; B. Edmondson, GI8RJW, Mid-Ulster; I. R. Flrth, G3WWF, Wakefield and district; B. H. Green, GW8AAA, Conway Valley area of Region 11; F. Harrison, G3XII, Leyland and South Ribble; J. K. Harvey, G8KLO, Bromsgrove; N. Jenkin, G4CGT, Blackburn; M. J. Topham, G8NUC, Bradford and Halifax; S. F. Weber, GM8ACC, Scottish islands.

**Affiliation**

The following applications for affiliation were approved: Billingham & District ARC; East Barnet Amateur Radio Contest Club; Paisley Astronomical Society, Radio Astronomy Section; RAF Scampton Club, Lincs; Skelleftea ARS, Sweden; Sperry Gyroscope ARS, Bracknell; Sunderland & District Scout Association; University of Exeter ARS; University of Sheffield Union of Students ARS.

**Guildford Repeater Group—open meeting**

A letter and report from Dr Manley, G3OWF, circulated to Council, had described a stormy meeting held on 4 January 1979 at which two members of the audience were abusive and consequently ordered to leave the meeting; Dr Manley requested Council to consider the matter.

After discussion it was decided to advise Dr Manley that substantiating reports were needed from others present before further action could be taken.

**Committee minutes**

*Education*–28.10.78, 9.11.78.

A discussion took place on representation on the RAE Advisory Committee. Mr Anthony said he was disturbed by the lack of liaison between the RAE Advisory and Education committees. City and Guilds of London Institute acted as agents *of the Society* in running the RAE and many problems had been experienced by Mr Anthony.

Mr Stevens reminded Council that the Society, not City and Guilds, should be in complete control of the situation, the organization of the RAE being delegated to the RSGB by the Home Office.

After further discussion it was decided that the President would write to Mr Hughes.

*Interference*–20.10.78.

The general manager commented on a letter he had received from BREMA, from which it appeared that the Society had misunderstood its representative role. Rather than having permanent representation on BREMA, BREMA would approach the RSGB if it were felt necessary.

A copy of the BREMA letter was to be sent to the chairman of the Interference Committee.

*Microwave*–9.12.78, 21.1.79.
Due to an administrative problem at the Home Office, the acceptance of the recently submitted proposals for two 24GHz beacons had not yet been confirmed.

*Mobile & Exhibition*–24.10.78, 28.11.78.
Mr Hawkyard asked why a loss of £83 on exhibitions and rallies was shown in the accounts. Mr Cornish explained that this was the result after profits had been re-allocated and which appeared elsewhere in the accounts.

*Raynet*–21.10.78, 9.12.78.
Mr Balestrini reported on a letter he had received from G4CLF, president of the CB Association, in which he had expressed the desire for Raynet/"React" liaison when cb became legal. Mr Balestrini had replied that consideration would be given *if* cb became legal!

It was felt unnecessary to comment on a complaint of non-representation of Raynet at international level despite the presentation of a paper prepared by the Raynet Committee at last year's IARU Region 1 Conference.

Dr Evans asked for clarification of a statement regarding membership cards, and explained that *any* radio amateur could pass emergency traffic on behalf of the specified organization if required. Mr Balestrini replied that the cards were for insurance purposes only.

Mr Balestrini reported that the committee was discussing the question of insurance but was concerned about the age limit of 70 years.

*Telecommunication Liaison*–30.11.78.
Mr Knight asked for confirmation of the statements about the apprehension of an alleged repeater jammer by the West Mercia Police.

Mr Douglas confirmed the comments and added that he understood the Home Office had since returned the alleged offender's licence.

*VHF*–25.11.78, 6.1.79.
The general manager confirmed that an antenna had already been provided for the 432MHz Crowborough beacon, in line with similar assistance for beacons in past years.

Mr Douglas said that he felt that the time had come when the Repeater Working Group should be contracting, not expanding, its useful work having mainly been completed, with only a small number of proposals being current at any one time. Mr Knight endorsed these remarks and said that in his opinion the RWG was not a totally responsible group. Dr Evans said that the enormous amount of work undertaken by the group should not be under-estimated.

It was agreed that the group's terms of reference should be re-defined in the future and the method of voting for members to serve on the group should be altered.

Mr Douglas said that he intended to make a personal presentation at the VHF Convention to GW4CQT, the first amateur to work all continents on 144MHz. The general manager would confirm the WAC claim with ARRL.

There was general agreement that this was an outstanding achievement.

*Finance & Staff*–26.10.78.
Approval was given to the list of honoraria as agreed by the committee.

**Correspondence**
Mr Cornish reported on a letter received from the widow of G2ACC, which contained a donation of £50.

The President read a letter from the Worcester & DARC, which enclosed £30 to be used towards expenses associated with preparations for WARC.

The President reported that he had received an invitation to attend the AGM of REF to be held in Strasbourg in May. Mr Stevens felt that Mr Bazley's attendance at such a meeting was imperative.

# your opinion

## FIRST IMPRESSIONS

The Editor
*Radio Communication*

Sir—In May 1968, I sat the RAE and did not pass. I was very discouraged, and instead of trying again, as I should have done, I gave up radio altogether, selling my CR100 receiver etc. In November 1977, an amateur's chance remark about his mobile operation, wakened the dormant "bug" and I soon purchased a JR310 receiver, a 144MHz converter, and a ground-plane for 144MHz. When I listened to 144MHz it had changed out of all recognition, with repeaters, satellites etc, and, in my opinion, for the better. The hf bands were still much the same, except for, naturally, a greater depth of operation.

I went up to Hampstead Heath in June, where the Grafton Radio Society was having its annual field day. Listening to the stations being worked made me want to get the "ticket", and I spoke to G3ZKE who runs the RAE class at the Whittington School. I enrolled in September 1978 with the May 1979 RAE in prospect, but decided to try the December 1978 RAE purely on spec, with the May exam to fall back on in case of failure. I was delighted to receive the pass slip on 26 January 1979, and my "B" licence application was posted immediately. I checked the contents of the envelope *five* times to make sure that I had included everything, especially to see if I had signed the cheque. I sealed the envelope and posted it, but even then I was convinced that I had forgotten something vital. On 3 Februrary 1979 G8RWL "burst forth" on 144MHz, with an IC215 and 3W. My first contact was with G3OUX through the London repeater. The contact was timed at 08·58 (the licence actually arrived at 08·55). In the first week I had about 250 to 300 contacts, being very enthusiastic. I operate from home and from the office and out portable and I have also tried mobile operation. The only modes of operation that I have not tried are /MM and /AM, but time will tell.

An opinion that I have heard widely repeated, is that the "amateur spirit" is either dead, or atrophied. My brief foray on 144MHz has certainly given the lie to this, as all the amateurs that I have spoken to could not have been more charming or helpful. One example will suffice to show this, although I could quote scores. I was in QSO with G8R—(I will not give his full callsign, for fear of embarrassing him), who lives fairly near to me. In the course of our contact I said that I was looking forward to the summer and going out /P in the country. He immediately offered to drive myself and my wife anywhere that we wished to go, as he owned a car, which I do not. This was our very first contact and I found his attitude very pleasing and friendly.

One thing that I have noticed on 144MHz is that some amateurs will not work stations that they do not know personally, or have not worked before. My philosophy of operation is this: "Work friends, by all means, but if a stranger to you comes up, looking for a contact, do not 'eave 'alf a brick at 'im', but give him a shout and make a new friend." Although I am, by nature, a very shy person, I get over this very quickly, and have made lots of new friends by this method.

Finally, I never properly realized how strange our hobby must appear to the non-amateur, until I was sitting in a shopping precinct operating my IC215, when a little boy, about six years old, said to his parents in a very piercing voice, "But, Mummy, why is he talking to that handbag?"

D. Byers, G8RWL

## REPEATER INTERFERENCE

The Editor
*Radio Communication*

Sir—The Leicester Repeater Group is rather concerned at the number of stations disregarding the fact that 145·000MHz is the input frequency of the vhf repeater channel R0 and are still using it for simplex contacts. Since we have the repeater GB3CF on this channel these people are causing interference to our machine. It may be that they are unaware of the existence of the repeater, and since this could be so we would greatly appreciate it if "well-sited" stations refrain from using R0 for simplex QSOs.

A. P. Toone, G8JFD
hon secretary

## IDENTIFICATION

The Editor,
*Radio Communication*

Sir—One would think the RSGB would have enough on its plate putting its house in order rather than setting itself up as an issuing authority for so-called "identity cards" of doubtful value.

In the October issue announcing the idea of such "cards" you say that "over the years amateurs have sometimes been embarrassed by police and other officials asking for an explanation of mobile or portable activities".

Why anyone should be embarrassed by police interest puzzles me, as does the RSGB in thinking that their "certification" of licence-holdership will satisfy the police as to the operator's right to carry on

with his lawful pursuit. In any event, RSGB members already have a membership card showing their callsign.

As to the "other officials" asking for an explanation, perhaps the RSGB will tell us who these officials are that would claim a right to question us in this way.

If the RSGB carries on with its present attitude of condoning the activities of nosey-parkers, we will have to produce a licence or "identity card" to breathe.

The law is quite clear on the freedom of the individual to carry on with his lawful pursuits without let or hindrance. He that prevents him, does so at his peril.

H. L. Millard, G8LWK

Sir—One evening some time ago a fellow amateur and myself decided to try some 144MHz portable activity from the hills of Kent using an 8-el Yagi. Finding a suitable location, I parked my car on the grass verge alongside the road where there was adequate room to set up the antenna. The location proved so successful that time just flew by, but at 2145gmt approximately, a police car pulled up and two constables asked us what we were doing.

We explained, but the attitude of one of the constables was "I've never seen anything like this so it can't be within the law". We volunteered to produce our licences to the local police station first thing the following morning, but they proceeded to radio to the sergeant. The sergeant was much more helpful but confessed he knew little about amateur radio and was prepared to let us produce our amateur licences to the local police station. The constable then gave me a docket requesting me to produce the amateur licences and vehicle documents to the local police station within the next five days.

I appreciate that to non-amateurs the set-up must have looked strange, especially at that time of night, and the police were only doing their job. However, it would have helped if I had had my licence at hand.

Nevertheless I would like to emphasize that as the car was a company vehicle it took several phone calls to obtain the vehicle's paperwork and several trips to my local police station. The police questioned whether our amateur licences were still in force, and they were not happy until they had verified this with the Home Office.

I do not know if this is a broad issue, but it does seem to me that it would save a lot of inconvience if copies of local amateurs' licences could be kept at the local police station, along with an explanation of our hobby, then in a case such as ours it would only need a radio message to verify our authenticity.

Paul Marshall, G8MOO

**G3FGY MEMORIAL**

The Editor
*Radio Communication*

Sir—The management committee of the Derby and District Amateur Radio Society has decided, after lengthy deliberation, to install in the clubroom, as a memorial to Tom Darn, G3FGY, a suitably engraved clock.

Many friends and colleagues of Tom have expressed a wish to contribute to a memorial when its form was decided. Investigations suggest that a clock of suitable size and quality will probably cost in the region of £250, and this therefore has been made the target for this fund.

Anyone wishing to subscribe to this fund is invited to send a contribution to Fred Ward G2CVV, QTHR. Acknowledgement will be given in the society's newsletter and, if possible, in *Radio Communication*.

J. Anthony, G3KQF, chairman, D&DARS

# Mobile rallies calendar

**10 June**—Elvaston Castle Mobile Radio Rally, Elvaston, Castle Country Park (5 miles SE of Derby, on B5010, signposted). 11am start. Talk-in by G3EEO and G3ZBI on GB2ECR, 144MHz fm ch 22, and 432MHz fm chs SU8 and SU20. Usual attractions including grand bring and buy sale, plus full on-site catering facilities. Rally free, but local authority car parking charge of 25p. Further details from G8PTW, QTHR, tel Derby 752358.

**10 June**—RAIBC Mobile Picnic, Broadlands Park, Romsey, Hants. Details from G4COM, QTHR.

**17 June**—Plymouth Mobile Rally, Tamar Secondary School, Plymouth, Devon. New larger venue. Start 10.30am. Talk-in GB2PRC on 144 and 432MHz, which will be operated by Plymouth RC from 16 to 18 June at the rally site. Attractions include PO tvi and tv detector vans, Oracle, usual stands, refreshments and bar. Ample free parking. Further details from G4GSZ, QTHR. Tel Saltash (075 55) 6613.

**17 June**—*HMS Mercury* Mobile Rally, *HMS Mercury*, Nr Petersfield, Hants. Attractions include refreshments, a grand raffle, a fly past by an historic aircraft, field gun runs, radio-controlled model boats, Red Cross displays and first aid cover, plus all the usual trade stands. RSGB identity cards will be made available to licensed members of the RSGB who have their licence with them. GB3RN will be in operation prior to and during the rally. Further details from G4DIU, QTHR.

**24 June**—Longleat Mobile Rally, Longleat Park, Warminster. GB3LMR will be operating from the park on vhf and hf, from Friday 22 June, and will act as the talk-in station on the Sunday on vhf S22. Special Longleat QSL for acknowledgement. Trade stands, an RSGB bookstall, bring and buy, and the facilities of Longleat are among the attractions. Further details from G4FRG, QTHR.

**24 June**—Bangor & D ARS Mobile Rally, Castlewellan Forest Park. Details from GI4AAM, tel 0247 65394.

**1 July**—Upton Mobile Rally, Upton-on-Severn, Worcs.

**22 July**—Cornish ARC Mobile Rally. Venue to be announced later. Details from G3VGO, tel 0872 864255.

**29 July**—Scarborough Mobile Rally and ORM, Scarborough Technical College. Details from G4EDR, QTHR.

**29 July**—Anglian Mobile Rally, Stanway School, Colchester, Essex. Open 1000 to 1700. Talk-in on 144MHz. Further details from G3YAJ, tel 0206 39 3938.

**5 August**—RSGB National Mobile Rally, Woburn Park, Beds. Details from G3MVV, QTHR.

**12 August**—Derby Mobile Rally. Details from Mike Darn, 22 Reservoir Road, Brockwell, Chesterfield, Derbys.

**19 August**—Preston Mobile Rally, Park Hall Leisure Centre, Charnock Richard, Nr Chorley (new venue—well signposted, just off A49,halfway between junctions 27 and 28 on M6). Doors open 11am. Talk-in on S22. Trade stands, bring and buy, bars, buffet, plenty of car parking. Details from G8KTM, QTHR.

**26 August**—Torbay Mobile Rally, STC/ITT Social Club, Brixham Road, Paignton. Talk-in on S22. Trade stands, bookstall, etc. Details from G3UIQ, tel Newton Abbot 3025.

**9 September**—Telford Mobile Rally, Town Centre Malls, Telford, Salop (approached via A5 exit off M6, A442 from N and S, or M54 from W). Free admission and parking. Jointly organized by Telford DARS and Salop ARS. Attractions include trade stands, exhibitions, "flea market" for private sales, excellent catering and club stands. Free coach ride to Ironbridge Gorge Open Air Museum, the best of its kind in Europe. Further details from G8DIR, tel Shrewsbury 64273; or G3UKV, QTHR, tel Telford 55416.

**16 September**—Peterborough R&ES Mobile Rally, Walton School, Mountsteven Avenue, Peterborough. Talk-in S22 G3DQW and RB10 via GB3PB, operational callsign to be advised. Usual exhibits, bring and buy. Details from G3EEL, QTHR, tel 65423 or 62881.

**30 September**—Harlow & D ARS Mobile Rally, Netteswell Comprehensive School, Harlow. Details from G3KEF, 71 Lodge Hall, Harlow, Essex.

**7 October**—Great Lumley AR&ES Mobile Rally, Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Talk-in on 144MHz. All usual attractions. Further details from G4DWM, QTHR.

# Looking ahead

**28-30 June**—The Great British Electronics Bazaar, Alexandra Palace, London N22.

**29 June-1 July**—DARC Boden See Convention and "Ham Radio 79" exhibition, Friedrichshafen, Lake Constance. Details from DARC, PO Box 11 55, D-3507, Baunatal 1, W Germany.

**21 July**—BARTG Convention, Public Hall, Harpenden, Herts.

**15 September**—RSGB HF Convention, Birmingham.

**22 September**—Scottish VHF Convention, Dundee Technical College, Dundee.

**30th September**—Sixth Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent.

**12-14 October**—World Association of Christian Radio Amateurs and Listeners Conference, Willersley Castle, Derbyshire. Details from: WACRAL Secretary, 13 Ferry Road, Warme, Hull HU7 5XU.

**13 October**—EI/GI Convention, Ballymascanlon Hotel, Dundalk, Eire.

**8-10 November**—ARRA Amateur Radio Exhibition, Leicester.

# contest news

## January 70MHz CW Contest results

Conditions were again poor during this event, with G3JYP reporting strong bursts of solar noise to make things worse! Despite this, entries were well up on last year's event, even exceeding the November 1978 cw contest. Most stations enjoyed this contest, and comments from logs were mainly centred on the poor conditions. The duration of the contest seems to be about right, although two of the leading stations made a plea for an extra hour. Several entrants remarked that activity below 70·15MHz was virtually zero.

Congratulations to the winner and runner-up, both of whom will receive certificates. *G3WDG*

| Posn | Callsign | Points | QSOs | Best dx | Km |
|---|---|---|---|---|---|
| 1 | G3UKV | 294 | 40 | GM3YOR | 371 |
| 2 | G2AMV | 263 | 29 | G3DAH | 368 |
| 3 | G3BOC | 224 | 28 | G3DAH | 355 |
| 4 | G3SPJ | 192 | 48 | G3JYP | 384 |
| 5 | G3PWK | 179 | 33 | G6WR | 342 |
| 6 | G3WGV | 165 | 37 | G3JYP | 370 |
| 7 | G3YDX | 161 | 40 | G2AMV | 315 |
| 8 | G3JYP | 154 | 16 | G3TAL | 418 |
| 9 | G4ENB | 153 | 39 | G3JYP | 329 |
| 10 | G3TDG | 151 | 39 | G2AMV | 320 |
| 11 | G3LVP | 131 | 37 | G2AMV | 316 |
| 12 | G3TAL | 128 | 22 | G3JYP | 418 |
| 13 | G3NPI | 126 | 31 | G6WR | 300 |
| 14 | G5UM | 122 | 26 | G6WR | 258 |
| 15 | G4APL | 112 | 29 | G2AMV | 305 |
| 16 | G3UGF | 102 | 14 | G3TDG | 305 |
| 17 | G3FIJ | 100 | 20 | G2AMV | 318 |
| 18 | G4BAO | 93 | 23 | G3UGF | 230 |
| 19 | G3LXP | 83 | 31 | G3UKV | 180 |
| 20 | G3TWG | 71 | 31 | G3AKU | 140 |
| 21 | G3IKR | 68 | 14 | G3SPJ | 180 |
| 22 | G5DF | 57 | 8 | G2AXI | 375 |
| 23 | GM3YOR | 36 | 8 | G3UKV | 371 |
| 24 | G3PJX | 35 | 14 | - | - |
| 25 | G3JKY | 5 | 5 | G3IGQ | 48 |

## March 144/432MHz Contest results

Adverse weather and poor conditions helped to make this contest a struggle for many, and this was reflected in reduced entries in all four sections.

The new rules were accepted by most, with only one exception regarding the single-operator time break, and only one regarding the two-callsign rule; next year the rules for two-callsign operation will be strengthened. A few entrants called for separate fixed and portable sections, but perusal of the results will show that fixed stations won three of the four sections in open contest. In general, log-keeping was good but several stations lost points through not following the rules.

Congratulations and certificates go to the winner and runner-up in each section. *G3VPK*

**144MHz SINGLE-OPERATOR SECTION**

| Posn | Callsign | Points | QSOs | QRA | Best dx | Km |
|---|---|---|---|---|---|---|
| 1 | GJ8ORH | 1,869 | 260 | YJ70 | DK0LE | 738 |
| 2 | G8IQL | 1,246 | 136 | AL56 | DF5DL | 525 |
| 3 | G8NEY | 964 | 140 | YL63 | PA0AWL | 535 |
| 4 | G4FES/P | 914 | 132 | YK04 | PA0HKD | 643 |
| 5 | G8LHT | 661 | 122 | ZN34 | GJ8ORH | 498 |
| 6 | G8NQP/A | 616 | 105 | ZL71 | ON7DB/A | 521 |
| 7 | G4BHF/P | 607 | 133 | ZN18 | G4GTH/P | 370 |
| 8 | G8PLY | 606 | 102 | YN19 | F1KAR/P | 510 |
| 9 | G8NNJ | 463 | 130 | AL31 | PA0CKV/P | 347 |
| 10 | G8LVM | 374 | 88 | ZM14 | PA0WRT/P | 470 |
| 11 | G4HFO | 372 | 50 | YK03 | PA0AWL | 520 |
| 12 | G8MHV | 313 | 61 | ZM39 | GJ8ORH | 400 |
| 13 | G8OPS | 308 | 54 | ZN68 | GJ8ORH | — |
| 14 | G8BIJ | 263 | 69 | ZL48 | PE1AYI/P | 355 |
| 15 | G4APJ | 223 | 39 | YN29 | — | — |
| 16 | G8OMI | 218 | 50 | ZM41 | F1DPX | 485 |
| 17 | G3XKZ | 199 | 41 | ZM53 | GJ8ORH | 375 |
| 18 | G8PLZ | 178 | 44 | AM61 | ON5FF | — |
| 19 | G8RHI/A | 176 | 48 | ZL14 | GD3YEO/M | 337 |
| 20 | G8INO | 128 | 20 | ZN03 | GM8MJV | 345 |
| 21 | G8MWU | 97 | 31 | AL51 | GW4ALE/P | 237 |
| 22 | G8NMQ | 50 | 28 | ZL37 | G6HH/P | 121 |

**144MHz MULTI-OPERATOR SECTION**

| Posn | Callsign | Points | QSOs | QRA | Best dx | Km |
|---|---|---|---|---|---|---|
| 1 | G6HH/P | 4,323 | 495 | AK03 | F1DYD | 620 |
| 2 | G4GTH/P | 3,253 | 421 | YK19 | GM8AGM | 775 |
| 3 | G3WKS/P | 3,208 | 433 | AL73 | GI4GVS | 580 |
| 4 | GW3OXD/P | 2,832 | 387 | YM54 | F1DUE/P | 860 |
| 5 | G3UNU | 2,516 | 410 | ZM04 | DJ6CA | 646 |
| 6 | G3ZIG | 2,412 | 264 | AM35 | DK0OX | 673 |
| 7 | G8PTA/P | 2,247 | 306 | ZN49 | DK0HF/P | 620 |
| 8 | G8OPR/P | 2,201 | 371 | ZL53 | DK0LE | 620 |
| 9 | G4ERP/P | 2,162 | 406 | ZL01 | GM8MJV | 572 |
| 10 | G8OCT/P | 2,151 | 400 | ZM73 | DK0OX | 858 |
| 11 | G3VCP/P | 2,047 | 243 | AL45 | — | — |
| 12 | G4APA/P | 1,911 | 383 | ZL15 | DK0LE | 591 |
| 13 | G8IZN/P | 1,851 | 362 | AL21 | GM8DWJ | 575 |
| 14 | G3KMI | 1,783 | 293 | ZK04 | PA0THT | 584 |
| 15 | G4FKB/P | 1,552 | 306 | YM20 | F6KLK | 610 |
| 16 | G3GBU/P | 1,466 | 320 | YN80 | F1DPX | 567 |
| 17 | G8LVS/P | 1,219 | 274 | ZL18 | GM8EYB | 490 |
| 18 | G8JVM | 1,197 | 170 | ZL31 | GM8MJV | 612 |
| 19 | GM8MJV | 1,165 | 88 | YR80 | G3CHN | 705 |
| 20 | G8MZV/P | 1,132 | 230 | ZL11 | DL0WU | 620 |
| 21 | G4CDA/A | 897 | 163 | YN58 | GJ8ORH | 464 |
| 22 | G4CLB | 847 | 234 | ZL37 | F1DUE/P | 520 |
| 23 | GM3OPW/P | 772 | 120 | YQ56 | G4GTH/P | 605 |
| 24 | GI4GTY/P | 690 | 92 | WO40 | G3EFX/P | 560 |
| 25 | G8KHR | 459 | 83 | ZN77 | — | — |
| 26 | G8EYC | 232 | 103 | ZL50 | F1KLQ | 334 |

**144/432MHz SINGLE-OPERATOR SECTION**

| Posn | Callsign | Points Total | Points 144 | Points 432 | QSOs 144 | QSOs 432 | QRA |
|---|---|---|---|---|---|---|---|
| 1 | G3TDG | 2,660 | — | 2,660 | — | 108 | AL51 |
| 2 | G8OGL | 2,613 | 218 | 2,395 | 58 | 101 | ZL47 |
| 3 | G8SFI/P | 2,547 | 1,377 | 1,170 | 201 | 36 | ZO55 |
| 4 | G4ERX | 2,327 | 297 | 2,030 | 69 | 80 | AL22 |
| 5 | G3YTE | 1,943 | 628 | 1,315 | 112 | 57 | AL13 |
| 6 | G3VJG | 1,130 | 245 | 885 | 73 | 53 | ZL40 |
| 7 | G8KWC | 923 | 413 | 510 | 71 | 28 | ZL32 |
| 8 | G4HMF | 705 | 385 | 320 | 42 | 13 | AM76 |
| 9 | G8GDZ | 685 | — | 685 | — | 27 | ZM41 |
| 10 | G8ITS | 321 | 171 | 150 | 99 | 20 | ZL40 |
| 11 | G8GXE | 308 | 118 | 190 | 56 | 22 | ZL48 |
| 12 | G8GMC | 306 | 96 | 210 | 20 | 10 | YM40 |
| 13 | G8CTT | 173 | 28 | 145 | 16 | 15 | AL41 |
| 14 | G5DF | 110 | — | 110 | — | 4 | ZO51 |
| 15 | G3ILO | 89 | 19 | 70 | 7 | 6 | YL29 |

**144/432MHz MULTI-OPERATOR SECTION**

| Posn | Callsigns 144 | Callsigns 432 | Points Total | Points 144 | Points 432 | QRA |
|---|---|---|---|---|---|---|
| 1 | G3PIA | G3NNG | 8,414 | 4,259 | 4,155 | ZL34 |
| 2 | G3PMH/A | G8PMH/A | 6,428 | 3,333 | 3,095 | AM51 |
| 3 | G3EFX/P | G4FBK/P | 5,975 | 4,286 | 1,689 | ZK10 |
| 4 | GW4ALE/P | GW8GLN/P | 3,525 | 1,010 | 2,515 | YM75 |
| 5 | G6YB/A | G6YB/A | 2,689 | 909 | 1,780 | YL49 |
| 6 | G3XZW/P | G8JXK/P | 1,967 | 1,622 | 345 | YL75 |
| 7 | G8HGN | G8HRC/A | 1,922 | 682 | 1,240 | AL31 |
| 8 | G8LED/P | G3GWB/P | 1,760 | 1,075 | 685 | ZM45 |
| 9 | G3PEJ/A | G8AZA | 1,204 | 854 | 350 | ZO69 |
| 10 | G8PLR | G3ZTT/A | 964 | 494 | 470 | YN69 |
| 11 | G8HZK/P | G4GMO/P | 760 | 470 | 290 | YM66 |
| 12 | G4EUZ | G8NUC/A | 610 | 410 | 200 | ZO13 |

**LISTENERS CONTEST**

| Posn | Station | Points Total | Points 144 | Points 432 | QRA |
|---|---|---|---|---|---|
| 1 | BRS34310 | 745 | 510 | 235 | ZL80h |
| 2 | BRS34740 | 455 | 340 | 115 | ZM41b |
| 3 | BRS32525 | 369 | 233 | 135 | AL41a |
| 4 | BRS15822 | 368 | 298 | 70 | ZL40j |
| 5 | BRS33823 | 200 | 95 | 105 | ZL27j |
| 6 | BRS26003 | 172 | 172 | — | YO23e |
| 7 | BRS40920 | 87 | 87 | — | ZK05d |

Check logs received from G3LCH and G4DGU.

## 3·5MHz Field Day 1979 rules

Members who enjoy low-power contests are invited to take part in this year's 3·5MHz Field Day.

1. The general rules for RSGB hf contests, published in the January 1979 issue of *Radio Communication,* will apply.
2. **Eligible entrants.** RSGB members resident in the British Isles. A maximum of two operators per station is allowed.
3. **When.** 0900gmt to 1600gmt 15 July 1979.
4. **Contacts.** CW (A1) only in the band 3·520 to 3·570MHz.
5. **Exchange.** RST plus serial number starting at 001, location (defined by place name), and county code (see *Radio Communication* January 1979 p56).

6. **Scoring.** Portable or mobile stations: 15 points per contact. Fixed stations: 5 points per contact.
7. **Power.** The maximum power 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 batteries from petrol or diesel driven generators is not permitted. Entrants must specify how the power input limit was adhered to, especially when commercial equipment capable of running well in excess of 10W was used.
8. **Antenna.** The maximum height must not exceed 35ft above ground level.
9. **Logs.** Column (5) to be headed "Callsign of operator". Column (6) to be headed "Location and county of station worked".
10. **Address of entries.** RSGB HF Contests Committee, c/o D. Thom, G3NKS, 37 Whittington Road, Benhall, Cheltenham, Glos GL51 6DB.
11. **Awards.** The Houston-Fergus Trophy will be awarded to the entrant with the highest checked score. Certificates of merit will be sent to the entrants placed second and third.

## 70MHz Contest rules

**0900–1700gmt, 19 August 1979**

All entries and check logs to: VHF Contests Committee, c/o Mr J. H. Quarmby, G3XDY, 16 Peacroft Road, Ipswich, Suffolk IP1 6PJ.

The following general rules, published in the January 1979 issue of *Radio Communication,* will apply: 1, 2, 3, 4a, 5a, 6a,7a, 8, 9a, 10a, 11a, 12–22.

## IARU Region 1 VHF/UHF/SHF Contest rules

Stations wishing to enter the contest should conform to the rules below and forward their logs to the normal RSGB adjudicator for the events run by the RSGB on the same dates.

1. **Eligible entrants.** All licensed radio amateurs in Region 1 can participate in the contest. Multi-operator entries will be accepted, provided only one callsign is used during the contest. The contestants must operate within the letter and spirit of the contest and at no greater power than permitted in the ordinary licences of their country. Stations operating under special high power licences do so *hors concours* and cannot be placed in the contest proper.
2. **Contest sections.** The contest will comprise two sections as decided at the Miskolc Region 1 Conference 1978:
   **VHF Contest:** 1. Single-operator station, operated by owner of the licence (no club stations).
   2. All other stations.
   **UHF/SHF Contest:** The contest will comprise two sections for the 432MHz and for every higher frequency amateur band.
   All participating stations must operate from the same location throughout the event.
3. **Dates. VHF Contest:** The contest will take place during the weekend of 1 and 2 September 1979.
   **UHF/SHF Contest:** The contest will take place during the weekend of 6 and 7 October 1979.
4. **Duration of the contest.** Contests will commence at 1600ut/gmt on the Saturday and will end at 1600ut/gmt on the Sunday.
5. **Contacts.** Each station can be worked only once on each band, whether it is fixed, portable or mobile. If a station is worked again during the same contest, only one contact will count for points, but any duplicate contact should be logged without claim for points and clearly marked as duplicate. Contacts made via active repeaters or translators do not count for points. Any telephony contact made with stations generating in the cw(A1) sub-band shall not count for points.
6. **Type of emission.** Contacts may be made on A1, A3a, A3j or F3. F2 may be used above 1GHz. Only one transmitter or transceiver may be used on each band at any time.
7. **Contest exchanges.** Code numbers exchanged during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for the first contact on each band, and increasing by one for each successive contact on this band; this must be followed immediately by the QTH locator of the sending station (eg 59003 GX24j or 579023 HG46e).
8. **Scoring.** Points will be scored on the basis of one point per kilometre. The final claimed score must be shown on the first sheet
9. **Entries.** The entries must be set out on log sheets fulfilling the requirements given under rule 12. Multi-operator stations shall be clearly marked as such. A copy of the logs must be sent to the national contest committee, postmarked not later than the second Monday following the contest weekend. Late entries will not be accepted. The submission of the logs implies that the entrant accepts the contest rules.
10. **Judging of entries.** The judging of the entries shall be the responsibility of the organizing society, whose decision shall be final. Entrants deliberately contravening any of these rules, or flagrantly disregarding IARU band plans, shall be disqualified. Minor errors may result in loss of points. Errors in the callsign and code numbers will be penalized by deducting, from both stations, the following percentage of the score claimed for the pertaining contact:
    One error–25 per cent.
    Two errors–50 per cent.
    Three or more errors–100 per cent.
11. **Awards.** The winner of each section will receive a certificate, and entrants compete for the following challenge trophies:
    **VHF Contest** **(a)** The IARU Region 1 VHF Trophy, donated by NEAL Crystals, for the winner of section 1.
    **(b)** The PZK Trophy, donated by PZK, for the winner of section 2.
    **UHF/SHF Contest** **(a)** The Vittoria Alata Cup 1, donated by Giovanni Mikelli, I1XD, for the winner for the fixed 432MHz section.
    **(b)** The Vittoria Alata Cup 2, donated by Giovanni Mikelli, I1XD, for the winner of the portable/mobile 432MHz section.
    Overall winner: An overall winner of the UHF/SHF Contest will be declared, and for this competition the scores of the entrants will be combined, using following multipliers: 432MHz, 1; 1,296MHz, 5; 2,400MHz, 10; Higher bands, 20. The entrants scoring highest will be awarded an IARU Region 1 medal.

The 1979 organizing society is the UBA (Union of Belgian Radio Amateurs).

## 7MHz Contests 1980 rules

Licensed radio amateurs and listeners throughout the world are invited to take part in these RSGB 7MHz contests. **Please note that there will be no contests in 1979**—the dates have been altered to February in order to try to avoid other contests, and to increase participation and interest. The entry in the phone section has been disappointing in the past and the HF Contests Committee feels that, should it not increase in 1980, the event will not be continued.

Log and cover sheets may be obtained from the RSGB, 35 Doughty Street, London WC1N 2AE, in exchange for a large stamped addressed envelope—those who need a larger quantity are advised to purchase one of the new combined log and summary sheet pads advertised elsewhere in *Radio Communication.*

### TRANSMITTING SECTION

1. The general rules for RSGB hf contests, to be published in the January 1980 issue of *Radio Communication,* will apply.
2. **Eligible entrants.** British Isles: RSGB members only.
   Rest of world: all licensed amateurs.
3. **Periods.** Phone: 1200gmt 2 February to 1200gmt 3 February 1980.
   CW: 1200gmt 16 February to 1200gmt 17 February 1980.
4. **Sections.** Single-operator only.
5. **Bands.** Phone: 7·04 to 7·10MHz.
   CW: 7·00 to 7·04MHz.
6. **Exchange.** RS(T) plus serial number starting at 001.
7. **Scoring. (a) British Isles stations with:**
   European stations: 5 points per QSO.
   Non-European stations: 15 points per QSO.
   *British Isles stations may not work each other.*
   **(b) European stations with:**
   British Isles stations: 5 points per QSO.
   **(c) Non-European stations: with**
   British Isles stations: 15 points per QSO.
8. **Multiplier. (a) British Isles stations:** one for each different country worked (RSGB list applies). VE, VK, USA, ZL, and ZS call areas will each count as a country for this purpose.
   **(b) Overseas stations:** One for each different British Isles prefix worked, ie G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6 and GW8, (a maximum of 42). *Note that the prefix GB will not count.*

# Contests calendar

| | |
|---|---|
| **9–10 June** | NFD *(Rules in February issue)* |
| **9–10 June** | Diploma Altamira *(Rules in May issue)* |
| **10–30 June** | Town of Cava *(Rules in June issue)* |
| **16–17 June** | Microwave *(Rules in April issue)* |
| **16–17 June** | VK/ZL Oceania *(Rules in June issue)* |
| **16–17 June** | All Asia CW *(Rules in June issue)* |
| **17 June** | DF Qualifying Event Burton-on-Trent *(Rules in May issue)* |
| **23 June** | AGCW-DL VHF CW *(Rules in June issue)* |
| **23–24 June** | G-QRP Club QRP CW *(Rules in April issue)* |
| **23–24 June** | Summer 1·8MHz *(Rules in May issue)* |
| **23–24 June** | ARRL FD |
| **1 July** | DF Qualifying Event Mid-Thames *(Rules in June issue)* |
| **7–8 July** | VHF NFD *(Rules in April issue)* |
| **14–15 July** | IARU Radiosport *(Rules in June issue)* |
| **15 July** | 3·5MHz Field Day *(Rules in June issue)* |
| **15 July** | DF Qualifying Event Conventry *(Rules in June issue)* |
| **21–22 July** | MARTS SEANET WW DX CW *(Rules in June issue)* |
| **29 July** | 144MHz QRP *(Rules in May issue)* |
| **4–5 August** | G-QRP Club QRP CW *(Rules in April issue)* |
| **5 August** | DF Qualifying Event Salisbury |
| **11–12 August** | European Meteor Scatter *(Rules in May issue)* |
| **18–19 August** | MARTS SEANET WW DX Phone *(Rules in June issue)* |
| **18–19 August** | 9th SARTG Worldwide RTTY |
| **19 August** | 70MHz *(Rules in June issue)* |
| **19 August** | DF Qualifying Event Slade |
| **25–26 August** | All Asia Phone *(Rules in June issue)* |
| **1–2 September** | IARU Region 1 VHF *(Rules in June issue)* |
| **1–2 September** | 144MHz Open and SWL |
| **1–2 September** | SSB Field Day *(Rules in May issue)* |
| **8 September** | BARTG VHF RTTY |
| **8–9 September** | International ATV Activity *(Rules in April issue)* |
| **16 September** | BARTG VHF RTTY |
| **16 September** | RSGB Region 1 VHF |
| **16 September** | DF Final Rugby |
| **22 September** | AGCW-DL VHF CW *(Rules in June issue)* |
| **October–November** | 432/1,296MHz Cumulative |
| **6 October** | VK/ZL Oceania DX Phone |
| **6–7 October** | IARU Region 1 UHF/SHF *(Rules in June issue)* |
| **6–7 October** | G-QRP Club QRP CW *(Rules in April issue)* |
| **6–7 October** | 432/1,296/2,304MHz |
| **13 October** | VK/ZL Oceania DX CW |
| **13–14 October** | 21/28MHz *(Rules in May issue)* |
| **21 October** | 70MHz Fixed |
| **3–4 November** | 144MHz CW |
| **10–11 November** | 2nd 1·8MHz |
| **17 November** | All Austria 1979 |
| **24–25 November** | BATC SSTV |
| **2 December** | 144MHz Fixed |

**1980**

| | |
|---|---|
| **9–10 February** | 7MHz Phone *(Rules in June 1979 issue)* |
| **23–24 February** | 7MHz CW *(Rules in June 1979 issue)* |

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9. **Final score.** QSO points multiplied by the number of different multipliers contacted.
10. **Logs.** Log sheets should be headed: date, time (gmt), callsign of station worked, RS(T) and number sent, RS(T) and number received, if multiplier, and QSO points claimed. A summary sheet is required showing the countries or prefixes worked.
11. **Declaration.** Each log must be accompanied by the following declaration, "I declare that my station was operated in accordance with the rules of the contest, and in accordance with the terms of my licence". The declaration must be signed and dated.
12. **Address for entries.** Entries must be sent to: RSGB HF Contests Committee, c/o P. A. Miles, 28 Scotch Orchard, Lichfield, Staffs WS13 6DE, England, and not via RSGB HQ. Misdirected entries may be disqualified.
13. **Closing date for receipt of logs.**
    **Phone contest:** 29 March 1980.
    **CW contest:** 12 April 1980.
14. **Awards.** The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw contest. Certificates will be sent to the entrants placed first, second and third in the British Isles, European and non-European section of each contest.
15. **Dispute.** In the case of any dispute, the ruling of the Council of the RSGB shall be final.

**RECEIVING SECTION**

Rules as transmitting section except as superseded below.

1. The general rules for RSGB hf receiving contests, to be published in the January 1980 issue of *Radio Communication* will apply.
2. **Eligible entrants.** British Isles: RSGB members only.
   Rest of world: all listeners.
3. **Scoring. (a) British Isles listeners** should log only overseas stations in contact with British Isles stations. European stations logged count five points, others 15 points.
   **(b) Overseas listeners** should log only British Isles stations participating in the contest. European listeners may claim five points per QSO logged, others 15.
4. **Multiplier.** As transmitting section.
5. **Logs.** Log sheets must be headed: date, time (gmt), callsign of station heard, callsign of station being worked, if multiplier, and points claimed. Note that the callsign of the stations being worked may only repeat once in every six contacts logged.
6. **Declaration.** As transmitting section plus, "I certify that I do not hold a transmitting licence".

## DF Qualifying Event Mid-Thames

**Date:** 1 July 1979.
**Map:** OS Sheet 187, 1:50,000 series, Dorking, Reigate and Crawley.
**Assembly:** 1300bst for start at 1320bst.
**Location:** Bridle path by pond ¼km south of Bletchingly, ngr 328503.

Competitors requiring tea are asked to notify Mr P. Lisle, 5 Isabella Cottages, Lewins Road, Epsom, Surrey KT6 6HT (Tel 03727 40863, home; or 01-261 1302, office) not later than 25 June.

## DF Qualifying Event Coventry

**Date:** 15 July 1979.
**Map:** OS Sheet 151, 1:50,000 series, Stratford-on-Avon.
**Assembly:** 1300bst for start at 1320bst.
**Location:** Chesterton, six miles SE of Warwick, ngr 355583.

Competitors requiring tea are asked to notify Mr G. Whenham, "Lavernock", Chapel Street, Bishop's Itchington, Leamington Spa, Warks (Tel 0926 612806) not later than 7 July.

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# Special event stations

**NOTICE TO EVENT ORGANIZERS**

**Information supplied to RSGB headquarters when applying for special event callsigns is usually lacking in detail for the purpose of this column.**

**Organizers who wish to have details of the event published in this column should, therefore, submit them direct to the editor after the special event callsign has been issued.**

**GB2EF, 9–16 June**

A demonstration amateur radio station will be set up at Lakeland Forum, Enniskillen, during the Enniskillen Festival. Three stations, designed to publicise amateur radio, help community relations and arouse general interest in the hobby, will operate on bands 1·8–28MHz, and 144MHz fm and ssb, on a limited basis from 10am to 6pm, and fully manned from 6pm to 10pm. Special festival QSL cards will be issued to all stations contacted. The operators, GI4CZW, GI3WBR, GI8LDM, GI3GRD and GI8SJT, also hope to demonstrate slow- and fast-scan television and rtty, and there will be a static display of second world war British and American radio equipment. Further information from GI3ZIA, QTHR.

**GB3RSR, 9 June**

A special event station will be in operation from Clifton Park, Rotherham, South Yorks, for the Rotherham Metro Scout Gala. Further information from G4GES, QTHR.

**GB2RAC, 15–16 June**
Racal Electronics Ltd will have a special event station in operation during its annual fête at Longhill Road Sports Ground, Bracknell, Berks. Other attractions will include hobby stands and sports competitions. Further information from P. A. Barron, G3WTM, tel Bracknell 24747 ext 20, daytime.

**GB2RAF, 16 June**
A station will operate at the RAF Waddington Open Day, RAF Waddington, Lincoln, as one of a variety of demonstrations. Operation will be mainly on 3·5 and 144MHz fm and ssb, from 10am. Further details from G4EYL, 20 Sussex Gardens, Scampton, Lincoln, tel Lincoln 33531 ext 9, daytime.

**GB2SYS, 16 June**
The Loxley District Scout Field Day, at Hillsborough Park, Sheffield, South Yorks, is to be the venue for a special event station. Further information from G4GES, QTHR.

**GB3RSS, 22–24 June**
A station will operate at "Scoubado", a camp held every four years for Scouts and Cubs from the West Yorkshire area. It will be located at Shibden Park, Halifax. Further details from G3XBG, QTHR.

**GB2CSV, 22–24 June**
South Yorkshire County Scout Camp Site, Hesley Wood, Chapeltown, Rotherham, South Yorks, will be the location of a special event station on the occasion of the Chief Scout's visit to the site. Further information from G4GES, QTHR.

**GB2WSD, 29 June–1 July**
Wetherby District Scouts will operate a special station at their annual Scouts and Cubs activity weekend camp, at Doncaster District Camp Site, Squirrel Wood, Burghwallis, Doncaster. Further details from G4FTI, QTHR.

**GB2PPS, 29–30 June**
The City of Bristol RSGB Group is to operate a special event station at an open day at Portishead Power Station, a conventional oil-fired power station. Operation is intended, from the evening of 29 June, on 1·8–28MHz and on 144MHz. Special QSL cards for acknowledgement. Further details from G4FRG, QTHR.

**GB2BEN, 30 June**
A special station will operate at the Lynwood Summer Spectacular, Lynwood, Sunninghill, Nr Ascot, Berks, an annual fête arranged by the motor and cycle trades benevolent fund, "BEN". Further details from E. F. Jones, G3EUE, SMMT, "Forbes House", Halkin Street, London SW1X 7DS.

**GB2LIE, 5–6 July**
A special station will be operated at the Llangollen International Musical Eisteddfod, an international competition of music and verse, located at the Eisteddfod Field, Llangollen, Clwyd. Further details from GW3UOO, QTHR.

**GB2WHI, 7 July**
A special event station will be in operation at the Whitehill Charity Fête, at the village hall, Whitehill, Bordon, Hants. Further information from G2APN, QTHR.

**GB2JRS, 7 July**
The Joseph Rowntree School, Haxby Road, New Earswick, York, will be holding a summer fair which is to include a special event station as one of the attractions. Further information from G3FTS, QTHR, or G3WVO, QTHR.

**GB2SSC, 9–14 July**
A special station will be operational at Sherborne School, Abbey Road, Sherborne, Dorset, in chemistry laboratory 4, during the annual commemoration of the school's founding in 1550. Further details from Dr J. R. G. Beavon, G3PPR, at the school.

**GB2GYS, 10–12 July**
A station will be operated by York ARS at the Great Yorkshire Show. The station will be located at the Great Yorkshire Showground, Hookstone Oval, Harrogate.

**GB3RSR, 14 July**
A special event station will be operating at the Wickersley Scout Gala, from the village hall, Wickersley, Rotherham, South Yorks. Further information from G4GES, QTHR.

**GB2DTS, 14–15 July**
Barking R&ES will be operating a station at the Dagenham Town Show, Central Park, Wood Lane, Dagenham. In addition to GB2DTS, the group's exhibits will include rtty, AMSAT-UK and sstv items, and there will be extensive cctv coverage of the continuous arena displays. Further information from G8PUY, tel 01-594 6584.

**GB2SCS, 14–15 July**
A special station will be in operation at "Scoutout '79", an activity weekend for approximately 4,000 Scouts and Guides from Surrey, located at Rushmoor Arena, Aldershot, Hants. Further details from G4FKX, QTHR.

# obituaries

*The Society records with regret the deaths of the following radio amateurs:*

**Mr M. Bates, G3GVQ**
Milton Bates, who died on 28 February, was a keen cw operator who enjoyed dx operating on the hf bands. He was a member of the RSGB, RNARS and the Horndean ARC, and he participated in the weekly Horndean net and ASWE Portsdown activities.

**Mr R. Beal, G4FLI**
Ron Beal, who died on 7 February aged 68, was keen on building his own gear, concentrating mainly on top band. He always radiated an outstanding signal on a.m. and cw, proving just what can be achieved by a city dweller with a small garden through effective station design. He was always ready to help anyone showing an interest in home construction, and was a very active member of Fulford & D ARS.

**Mr W. Davy, G4EOY**
Walter Davy died in mid-April at the age of 85. His interest in radio stemmed from service in the RNVR during the first world war and, although he did not qualify as a wireless operator, he was posted to Marconi's yacht *Elettra* for a time. Business commitments did not allow him to pursue the interest for 50 years, but in 1974 he passed the RAE, and is believed to have been the oldest successful candidate in this examination. He followed this achievement by obtaining his Class A licence 10 months later.

He was a member of the Otley R&ES, and was operational on the air until shortly before his death.

**Herr C. Litschauer, OE3CL**
Camillo Litschauer, who died on 18 April, aged 47, was an ex-president of Österreichischen Versuchssenderverbandes, the Austrian national amateur radio society.

**Mr G. Williams, GW2FOF**
Garfield Williams died on 4 April. Licensed immediately after his wartime service in the RAF, he became one of the most popular figures in the South Wales radio community. He was active, although in bad health, until the time of his death, maintaining his high standards of operating and quality of signal. No major function, such as ORMs, conventions and rallies, was complete without him, and he will be missed particularly by the Rhondda ARS, of which he was a founder member and president.

We have also been advised of the deaths of:
**Mr C. W. Burton, G4ELO,** on 3 February;
**Mr E. Chambers, G4CUW,** in July 1978;
**Mr A. H. Jones, G3KLB;**
**Mr J. Morris, LA6M,** on 18 December 1978;
**Mr T. Nicol, RS38816,** in March;
**Mr A. Read, G4RO,** in March;
**Mrs C. M. Slack, BRS40137,** on 23 October 1978;
**Mr A. T. West, G2RG,** on 5 September 1978.

*We apologise to Messrs W. D. Stirling, GM4DGT, and A. D. Sutton, GM3AJY, who were listed in this column in error in the April issue.*

# members' ads

These subsidized flat-rate advertisements are accepted as a service to members of the 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* mailing label addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 75p (stamps not accepted) for every 40 words or part thereof. They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

Closing dates in 1979; **21 June, 2 Aug, 30 Aug, 27 Sept, 25 Oct, 22 Nov, 27 Dec.** No guarantee of inclusion in a specific issue can be given, other than the first possible issue after receipt.

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.

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**Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.**

**Do not post to RSGB HQ or Advertising Representative**

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## FOR SALE

**KW204/202**, £450 pair. VOX, £5. KW match, £10. Shure mic 444, £20. Microwave conv 144, £10. Trio 9R59DS rx, £45. Belling i.f. filter, £5. KW low pass filter, £5. Buyer collect. G3PPH , QTHR.

**JR599** custom special, 2m converter, vgc, £160; uhf Starphone, 5ch, on 70cm, t/b, RB2, 4, 6, 10, 12, £80; Pye A80U, 70cm QRO linear, 4CX250B/8122, vgc, £80; EC10, battery pack, £45; offers. G8HVV, QTHR. Tel 0342 712005.

**Yaesu YO100** monitorscope, as new, perfect cond, with handbook, leads, etc, current price £156, offers please? Tel Brighton (0273) 504634, evenings.

**FT101E**, FR101B, nearly new, £510 ono. G3GHS, 26 Grand Avenue, Berrylands, Surbiton, Surrey. Tel 01-399 6293.

**Transformer**, 45-36-0-36-45 3A, new, unused, bargain, £11. *Wanted:* mains isolating transformer, 1kVA. McGregor, 87 Main Street, Tomintoul, Banffshire. Tel 080 74 300.

**HRO**, mod front end, five g/c, two b/s coils, power supply, £18. 4in 'scope, Cossor, ex-WD, case tatty, £6. Wavemeter 1191, charts, £10. Buyer collects. Denton, "Jodrell", Oakfield Lane, Wilmington, Kent. Tel Dartford 24623.

**Teletext decoder**, Tifax module, interface, power supply, keypad, full instructions, suit most sets, cost £205, accept £110. Quad, 3-band, boxed, comp, Labgear, £60. TR2200, 6ch, hb tone, 1W, £65. G3AQX, QTHR. Tel Alfreton 2943, or (bus) Ripley 43189.

**KW202**, mint cond, orig packing, manual, matching spkr, value £190; exch for Trio JR599CS, same cond, to comp Trio stn. BRS33915, 163 Halton Road, Runcorn, Cheshire. Tel (092 85) 65319, after 6pm.

**KW2000B**, psu, Shure 444 mic, Q-multiplier, morse key, new 6146s, fb cond, £150. Eddystone EA12 rx, as new, £100. G3YFH, QTHR. Tel 0636 703183.

**Antec** 2m whip antenna, window clip, £10. Commodore PR100 prog calculator, mains adaptor, £30. Tel Chestfield (Kent) (022779) 3262, evenings.

**Creed 54**, 6S4 reader, 7TR3 punch, wkg on 45·5 bauds, the lot, £20. 2m 10XY, £15. 48ft ex-gov't mast, 12 4ft sections, hinged base guys, bag, £15. G8MFV, QTHR. Tel Romford 65807.

**IC240**, synthesized, 2m, fm, hardly used, no snags, simply vhf fm, not for me, in orig packing, £150. *Wanted:* hf ssb, suitable refurbishing, tx/rx, £100 or less; separates, £50; why? Ex-WD clunkers, under £10. Tel South Benfleet 3033, evenings/weekends.

**TR7/DR7**, 1·8MHz xtal filter, PS7 psu, in mint cond, £800 (a saving of over £200 on current prices). G3XHX. Tel Liskeard 43749, after 7pm.

**Marconi** valve voltohmeter, £15; Eddystone rx, 550-30MHz, marine 659/670, £15; power supply, 12V 3·5A, £12; all plus carr. A. Stewart, GM8OKA, 49 Glenmuir Crescent, Logan, Cumnock. Tel 0290 21378.

**TR3200**, three months old, mic, straps, etc, orig packing, £150 (worth it), no offers. New nicads and xtals, also available. *Wanted:* amateur(s) to play chess on 2m fm or ssb. (Skeds arranged.) G8OCC. Tel Steve, Norwich 60421 ext 209.

**FT101E**, cw filter fitted, as new, used few hours only, £450, incl Securicor delivery. GM3CEA, QTHR. Tel 0776 2716.

**Eddystone EC10 Mk1**, SO239 fitted for antenna, t/r switch as Mk2, £60. Mains psu available. G4FAS, QTHR (Manchester). Tel 061-437 7784.

**FR50B**, £70. Eddystone EC10 Mk2, £95. Buyer collects or Securicor extra. John Booth. Tel Newport (0239) 820521.

**FRDX500S, FLDX500**, spkr, all options, 2m, 4m, fm, filters, handbooks, orig cartons, £325. Datong rf speech processor, £25. Pye Lynx camera, £25. Solartron dual-beam 'scope, handbook, £120 ono. GI3MBB, QTHR. Tel Bangor 61946.

**Trio TS700G**, £325; Heathkit DX100U tx, 150W, a.m./cw, £40; 14-el Parabeam, £15; all vgc. Rabjohn, G3YBG. Tel Exeter 74607.

**Atlas 210X**, latest model, sensitive 6·545kHz i.f., incl Atlas supply, noise blanker, mic, new, no scratch cond, £400. Wilson 800, 1-10W, synthesized, 2m fm, hand-portable/mobile, mic, nicads, helical, charger, £200. Chandler, 87 West Green Road, London N15.

**Burndept BE357**, uhf, portable, comp with two sets of nicads, charger, full handbook. Pye PF1 Pocketfones, xtalled wkg RB14, nicads, data, £35. *Wanted:* MMT432/144-R transverter. GM8LKL, QTHR. Tel 031-449 2096.

**Drake T4X**, AC4, full 10m, spare valves, £250 ono; Drake 2B, 2BQ, 2AC, 2LF, spare valves, slight fault, £75 ono; will split, both must go. GM5AIW, NOT QTHR. Tel Kilsyth 822645.

**Effects of the late G6QM:** *RSGB Bulletin* and *Radio Communication*, 1935 to date, very clean and believed a complete set, offers, prefer buyer to collect; also other books, etc. Tel Cheltenham 45936.

**FRDX400**, exc cond, all filters, incl 4 and 2m converters, fm dis, comp manuals, packing, £195. YC355 freq counter, as new, £105. *Wanted:* Creed 444 printer, good cond. A. Doherty, 16 Crock-na-Mac Square, Portrush, Co Antrim, N Ireland. Tel Portrush 822716, 12-1pm only.

**2200G tx/rx**, fully xtalled for 2m, charger, lead, etc, buyer collects, £110 cash. 3ft dia aluminium dish, £10. VLF rx, 15-1,500kHz, £12. 10m roll black pvc heatshrink sleeving, 9·5mm id, shrinks 50 per cent. G8JAO. Tel Malvern (06845) 63270.

**Europa C** transverter, repeater shift, wired to plug into FT101, two months old, £80. Heathkit HA201A, 2m, 10W, linear, exc cond, £15. Jaybeam 10XY, new, £18. Jaybeam D5/2M, £5. Ringo Ranger ARX2, new, £15. AT5 mobile psu and switch box, £12. Creed 7E teleprinter, 240V mains, exc cond, £15. Buyers to collect. G4FLY, QTHR. Tel 0734 594495.

**Hallicrafters SX100 Mk2** rx, good cond, £90. Drake 2B and 2BQ rx, very good cond, £90. Hemmings, 51 Orchard Road, Street, Somerset. Tel 45179, after 6pm.

**Mullard** radio telephone GNE5/OL, tx, rx, a.m., cw, etc, 1·5-13MHz, handbook, mains, eight xtals, £40. Collect or arrange transport. GW3JI. Tel Beganwy 81519.

**FT401**, £250; KW E-Zee match, £20; SXR30, £150; HQ Minibeam, mast, rotator, balun, cables (30m), £100; TR8300, all 70cm repeaters, SU8, SU20, £230; Datong rf speech clipper RF1, £35; Sentinel auto hf amplifier, £10; FT227R, £200; all items in vgc. G3LWM, QTHR. Tel 0279 814929, days; or 0279 56347, evenings.

**IC202**, 144-·4, ·6-145, 25W, linear, 3N204 preamp, nicads, charger, helical, exc cond, £185 ono; 18V 10-80m vert, £7.50; microscope, to 900×, £10; or swop all for FT200/250 or similar (+cash), why? G4HAO, G8LYH QTHR. Tel Bob, 051-724 1209.

**Exch:** 1976 MZ 250cc sports motorcycle and 4-berth frame tent; for hf tx/rx or separates, or why? G8RLO. Tel Chester 374584.

**Yaesu FT227R**, four months old, mint cond, 5/8 mobile whip, £230. Buyer collects. Tel 0291 423003 (Gwent), after 5.30pm.

**Icom IC215**, fitted S20-23, R0-R9, orig packing, good cond, helical whip, £120. G8GPQ. Tel Newton Regis 444.

**Atlas DD6C** frequency readout for Atlas or Drake equipment, £100. Datong up converter, mint, £80. Heath IB102 prescaler, to 150MHz, £25. Collins 312B4, £120. 32A fully regulated 14V dc psu, £60. G3NAC, QTHR. Tel 0954 60584.

**Trio TR2200GX**, R3-7, S20-24, nicads, helical; VFO30G, hardly used; both with makers' packing; hb 10W pa (2N6081), rf switched; £170. Yaesu YD846 mic, never used, £5. MMC 432/144, £18. Unused QQVO6/40As, £3.50 incl post. Taylor, G4DYN, 925 Ecclesall Road, Sheffield. Tel 660709.

**Valves:** 13 12AT7s, five 12AU7s, five 6AK5s, 10 6AL5s, nine 6BA6s, 14 6AM6s, 12 6AM5s, five EF86s, six EF92s, four KT66s, two QQVO2/6s, three QQVO3/20As. G.M. Christie, "Burnbank", Hillside Road, Stromness, Orkney KW16 3HR.

**KW201** rx, 100kHz calibrator, property of late swl, offers invited in region of £100; on behalf of widow. Cobb, G3UI, QTHR. Tel Halifax 60574.

**Liner 2**, little used, mint cond, with access, £95; will exch for fm mobile, cash adjust. Heath HM102 power meter, £25. KVG XF9A filter, with xtals, new, £12. G3UCE, QTHR. Tel. Heysham 51760, evenings.

**KW2000B**, ac and dc psus, Shure mic. First class cond and appearance, just overhauled, new 6146 valves fitted, bargain, £225. Prefer buyer collects, otherwise buyer pays carr, etc. G2KA, QTHR.

**TS520**, as new, hardly used, £370. Prefer buyer tests and collects. Morse keys; keyers; paddles; sae details. GM3GJB, QTHR. Tel Falkirk 23608.

**Direction finder** 6140 Vidiorama, as new, three bands, vhf, 12V, £80. Thrush resistance capacitor bridge, new cond, hardly used, £30. Valves 5B/254M, six, two holders, 75p ea. Please send sae; collect if possible. GW4XF, QTHR.

**Yaesu FT101 Mk2**, good cond, comp with 160m, fan, Holdings speech clipper, Technical Associates peak and notch filter, manual, four spare pa valves, offers? Prefer sell comp, but consider split. G4BUE, "Alamosa", The Paddocks, U Beeding. Tel Steyning (W Sussex) 814594.

**KDK FM2015R** 2m tx/rx, £190. KF430 70cm tx/rx, 10ch, £150; would consider part exch for Multi U11 70cm. *Wanted:* uhf hand-helds, Starphones, PF5, PF2 types etc, quantity considered. G8OOW, QTHR. Tel Louth (0507) 2220, after 6pm.

**Eddystone EC10 Mk1**, manual, recently overhauled, 550kHz-30MHz, bfo, afc, af filter, mint cond, £85. Giles Tel 01-657 3630.

**Sig gen TF144G**, £20; 'scope 13A, £20; audio gen, £8; Heath stereo amp S33, £7; all wkg, with leads and probes. Buyer collect pref. G3UTX, QTHR. Tel, 29317.

**Eddystone 888A**, KW Viceroy, ext ac psu, the pair £100 ono. Tiger 160-10m 150W a.m./cw tx, £20 ono. New ex-commercial 2m amp/tripler, 4W in, 10W out, with info, £12. Taylor, G4DYN, 23 Welland Way, Oakham, Leics. Tel Oakham 2721.

**Jaybeam antenna D8/2M**, still in box, £15. Microwave module 144/28MHz, £15. FRG7, £175. Consider Eddystone EA12 in exch, must be in mint cond. Buyer collects or pays carr. Tel Dewsbury (0924) 452303.

**Telescopic Hilomast**, type WTM1, retracted 17ft, extended 43ft, aluminium alloy sections with stainless steel fittings, sections extend simultaneously with full length keys, takes antenna loads 50lbs at 80mph extended, unguyed, fitted electrical epicyclic winch, £350. Letters only. G8IQO, QTHR.

**ATU**, Barker/Williamson 0-20MHz; 15 rf amps; sig gen, mint cond, 0-200kHz; teletypes, 15, 14, 7B; all offers accepted. Towers, 80ft, 50ft, £30 ea. PIL German language course, books, cassettes, two months old, mint. Jackman, 33 Shrubber Avenue, Worcester. Tel 0905 20040.

**HQ1**, £45. AR40, £30. Cowl Gill motor, £10. Carr extra; but prefer buyer collects beam as partially assembled. G3KGN, QTHR. Tel Southend (0702) 77779.

**KSR33** teletype, maintained under contract, little used, in exc cond, £380 ono. P.S. Bush, 41 Waverley Road, Bristol BS6 6ET. Tel Bristol (0272) 421900, day.

**New**, unused BAY96 varactor diodes, £2.50 ea. New, unused nicad battery packs with four or five AA type batteries in each pack, £2 ea. P&P extra. G3RNV.

**Pye Bantam**, fm, xtalled S0, S20, rx of R6, £45. G4CEY, QTHR. Tel Elton 355.

**Icom 202S**, unused, in orig packing, never on the air except for test of five minutes, four xtals, no reasonable offer refused. Icom 215, in mint cond, nicads, fully xtalled, 24 xtals, mobile mounting bracket, never used, no reasonable offer refused. Other equipment available, sold subject to reasonable offers, call for details any time. Ken Hatton, 8 Alnwick Street, Newburn, Newcastle upon Tyne, Tyne & Wear NE15 8PT. Tel 0632 678828.

**Shack clearance:** TS820, hardly used, as new, £595; JR310 rx, c/w narrow filter, rit, £85; Lafayette KT320 gen cov rx, £50; FRDX400, 160-10, 6m, 2m, seven filters, etc, £170; IC20XT 2m tx/rx, 10W/1W, R0, R5-7, S20-24, £90; Standard sig gen TF144, £15; bfo osc No3, £10; US army 'scope, £15; auto tx, 1·2kW, £5. G3XYT. Tel 021-354 1566.

**TAS 600W** portable petrol generator, two-stroke engine, 220 240V ac, comp with tool set, instruction manual, connecting plugs, cable, mint cond, £120 ono. G4BAL, QTHR. Tel 01-302 4062.

**Yaesu FT7**, £260; Yaesu FT227R, £190; ETI 40W pa, for 2m, £20; uncased rack type 10A 13·5V psu, £20; all exc cond. Buyers to collect. G4CEU. Tel Rayleigh (Essex) (0268) 778202, evenings and weekends.

**FT101B**, 500Hz cw filter, fan, 160 thru 10m, first class performer, plus hand mic, WWV fitted, first £350 buys. G3UAZ, QTHR. Tel Wokingham 782378, weekends or evenings.

**Amstrad IC2000 Mk2** stereo amplifier, 25W, £25. Pair Wharfedale Denton I/spkrs, £15. Technical Associates speech compressor, £19. *Wanted:* H6CU xtals, 7·8, 9·5, 13·0MHz. G4CHL, QTHR. Tel Gravesend 68233.

**Sphinx** ssb/cw tx, 160/80/40/20, 6146 pa, £35. Yaesu FRDX400, 2m and 4m conv, etc, £120. Buyer collects. Spencer, G3ILO, 49 Rosebery Road, Dursley, Glos GL11 4PT.

**Drake SSR1** gen cov rx, almost new, mint cond, hardly used, no mods, orig packing, full-size circuit diagram, handbook, £148 no offers. Buyer collects SW London. D. Mathews. Tel 01-876 7868.

**Eddystone EC10 Mk2**, vgc, fitted Burns FMD-1 fm detector, c/w MWM 2m converter and psu, £90. CT52 3in service 'scope, transit case, manual, £30. Buyers collect N London. G8CDW, QTHR. Tel 01-363 9270, evenings.

**FT227R**, nine months old, mint cond, owner going hf, £195 ono. GW3RUE, QTHR. Tel Denbigh 3389.

**PF1** tx/rx, tuned, xtalled 70cm, £25. BC221, charts, psu, £12. Plessey 10MHz solid-state 'scope, £30. R4187 hf rx, control box, modification details, components, £12. *Teleprinter Handbook*, £5. *Wanted:* FL1; compact video monitor for microprocessor. GI4BDR, QTHR. Tel (064885) 261, evenings.

**FT221RD**, vgc, all accessories, manual, box, etc, £325. Pair Pye Pocketfones, wkg on SU8, nicads, battery charger, £40. G4HDI, NOT QTHR. Tel 048483 7656 (W Yorks).

**FRG7**, fine tune, no mods, £135 ovno. Delivered 30 mile radius Nottingham, or carr at cost. R206, ex-WD, £25. Buyer collects. Towlson, 12 Lansdown Grove, Long Eaton. Tel 63125.

**Green TG2400** tx, analyser, dummy load, pwr/swr meters, 'scope, tone, etc, cost £400, sell £160. KW109 antenna tuner, pwr/swr meter, dummy load, £85. YC305D dig frequency counter, 200MHz, £75. G8HCL, QTHR. Tel Weybridge 43267.

**TR2200GX**, fitted S20-24, R3-7, 145·800, S0, orig packing, manual, nicads, charger, helical antenna and $\lambda/4$ telescopic, £135 ono. G4HKJ, 12 Woodvale Gardens, Wylam, Northumberland. Tel Wylam 3325, weekends.

**"RSGB Bulletin"**, *Radio Communication*, 1950-'77 incl, £1 per year. R50M power unit only, £6. 600Ω to 3Ω transformer, £1, carr extra. G3LTU, QTHR. Tel 0472 66412, after 7pm.

**Liner 2**, fitted preamp, Belcom psu, all accessories, mint cond, £120 ono. Trio JR310, fitted ssb filter, recent overhaul, mint cond, £90. Cash only, buyer collects. G4HZV, G8ECO QTHR. Tel 0276 632728, after 6pm.

**Telford TC10 Mk2**, late model, vgc, 2m tx, all mode solid-state, external audio preamp, £80. Burns FS2 2m fet converter, i.f. 28-30, never used, £15. Buyers collect N London. G8CDW, QTHR. Tel 01-363 9270, evenings.

**0-12U Heathkit** 5MHz oscilloscope, 5in tube, performance and appearance as new, £45. G3FSA, QTHR. Tel North Petherton (0278) 662413.

**MMC** 144 to 2/4 4/6 converter, unused gift, 100%, £12 no offers. Collect. C. Dickinson, 38 Shinfield Road, Reading, Berks.

**IC22A**, immac cond, 11ch, R6 input, orig packing, manual, mobile mount, £135. *Wanted:* 40ft tower, winch, base, rotator, DX33 or similar beam, KW107, KW109, KW dummy load. G4FVN, QTHR. Tel 051-427 1949, after 6pm please.

**FR50B, FL50B**, Europa-B, MMC144/28LO, MMC432/28, £220; or will split. *Wanted:* MMT432/144R; HC1 heatsink mounts for CCS1 tetrode, or information on source or substitute for same. G4BLT, QTHR. Tel Wakefield (0924) 863378.

**TH6DXX**, Ham 2 rotator controller, balun, £275. Hustler mobile antennas, 80/20/15 10m with bumper mount, £45. G3RDA, QTHR. Tel 0705 594821.

**CR100/2** rx, good cond, S-meter, £20. CR150 rx, no psu, £12. Tatty HRO rx, rebuilt, four coil packs incl 160m bandspread, £6. Marconi CSR5 rx, almost wkg, £6. PSU, 6·3V ac 6A, 12·6V ac 3A, 950V 400mA, -150V stabilized 30mA, £10. BC625A 2m a.m. tx (+ rx), QQVO6-40A pa, £7. Approx 200 valves, some very old, some new/boxed, £5. 2×5B254M with bases, £3.50. 1944 Fullerphone Mk5, good cond, £5. Buyer collects. *Wanted:* two pairs PF1s. G4FTK, QTHR. Tel Bath 62937.

**10W public address amplifier** c/w spkrs, £25. 3W guitar practice amplifier, needs attention, £10. Multimeter, mint cond, £6.90. 52MHz xtals, £1 ea. Wharfedale 12in hi-fi spkr, £12. P. Wayer, 124 White Dirt Lane, Catherington, Portsmouth, Hants. Tel Horndean 592687, after 6pm.

**FRSDX400**, 160-10, 2m and 4m, vgc, £185. Three TY2-125s, £20. TY4-400, new, £30. KW Vespa Mk2, 220W p.e.p., £90. AR88LF, £50. G4BMH, QTHR. Tel 0604 846533.

**FT221R**, used little, orig packing, fitted 3N204 preamp, all accessories, £319. D. Jones, G4GRU, QTHR. Tel 061-440 0556.

**Drake MS4** spkr/cabinet, as new, orig carton, has internal linings and enclosed back to cut resonances, bottom lining and back removable for tx power pack use, £12.50. BRS12234, 16 East Parade, Rhyl, Clwyd.

**Trio** hf tx/rx, 80–10m, 160W i/p, comp with psu, spkr, ptt mic, £150. G3WYJ, QTHR. Tel Saltash (07555) 2613.

**Swan 350** tx/rx, ac/dc psus, new unfitted Swan 500W pa kit, £190. Advance OFS1 Droitwich-locked 100/1,000kHz standard, £60. MM 5W a.m. tx, £28. Heathkit Labscope, £30. AG9U audio generator, £18. Cossor d/b 1091, £30. Pye 20W marine tx/rx, £35. *Wanted:* 2m multimode; 432/144 transverter. G3PYW, QTHR. Tel Maldon (0621) 52041.

**Racal RA117**, in case, full manual, used few months only since workshop checked, very pleased with performance but need cash for expensive project, will only part with this investment for good cash offer. G4EJJ, QTHR. Tel Dronfield 412775.

**Alarm clock chips**, CK3100 12h direct large led drive, CK3200 24h plasma or led with simple interface, chip plus easily modifiable new printed board and circuit details, £1 plus sae. G3OHW, QTHR.

**Swan 500C** tx/rx, new driver and pa valves, needs alignment check on 10m, otherwise ok, incl hb cw break-in unit, manual, £200; or swop 2m gear. Can deliver reasonable distance from Cumbria. G3APV, QTHR. Tel Seascale 449.

**TR7010**, £135. Scopex 6MHz 'scope, £105. Sentinel auto 144MHz preamp, £12. Sentinel MF 144MHz converter, £10. 144–432 transverter and converter, pair in box, £20. G8ESK, QTHR. Tel Bradford 45611.

**AR88**, good wkg order, antenna, circuit diagrams, spkr, very reliable, cannot deliver, £45. Mulholland, 36 Althorp Road, London SW17. Tel 01-672 7833.

**Pye F60** fm tx, 2m, case, vfo, four xtals, blower, £40. GEC 2m 20W transistor tx, one xtal, £25. 12MHz vfo, £6. 2–70 tripler, 20W o/p, £10. SSM Europa B, mint, £55. BC221, charts, psu, £18. G8JCA, QTHR. Tel Southend (0702) 528402.

**Tarpen** portable generator, type 10D, 115/230V ac, as new, £300 ono. G3HEK, QTHR.

**BC221T** wavemeter, in good wkg order, orig charts, built-in mains psu, £20; or part exch for Avo model 8. G4CAZ, QTHR. Tel Somerby 546, evenings.

**FT620B** 6m tx/rx, £175. MM 6m/70cm transverter, £85. FL110, 200W, 12V, hf, linear, £100. 10/4m transverter, £40. Vibratrol FL80/2M amplifier, £55. 400W 12V dc–250V ac inverter, £40. Sig gen. G4CXL, QTHR. Tel Weybridge 43267.

**Single el-bug paddle**, marble base, £10. CMOS keyer, May '77 *Radio Communication*, twin paddle, £16. Medco 50Ω lp filter, uhf sockets, uhf/BNC adaptors, £8. Braid breaker high pass tvi filters, "TT", £1 ea. Four SL640Cs, £1.50 ea. Plus postage. G3IZJ, QTHR.

**2200GX** 2m fm tx/rx, 10ch, R3–7, S0, S20–23, nicads, charger, helical ant, good cond, orig packing, £140 ono. G4AXA, QTHR. Tel 01-857 3639.

**HRO Senior**, vgc, eight coils, three bs, £35; M/M 144/2, as new, £15; 3½in 'scope, slight attn, £10. QQVO3/20, 6/40A, £3 ea; all ono. Buyer insps and collects. G3JDN, QTHR. Tel Reigate 40646, after 6pm.

**FTDX401**, SP401, cw filter, spare valves, relays, manual, orig packing, exc cond due to occasional use, £300 or by agreement for cash. QM70 (28–30) solid-state 2m transverter, 2W rf o/p, £30 ono; or swop, why? Walker. Tel Burton Joyce 3498.

**Phasing modulation** quality ssb American Heathkit SB10, power supply, DX100U, handbooks, exc cond, see wkg and collect, £95. G3SM, 66 The Drive, North Harrow, Middx. Tel 01-868 6841.

**Barlow Wadley XCR30** rx, good cond, £100. 12AVQ vertical antenna, comp but well used cond, £5. Buyer collects. G4AWL, QTHR. Tel Cosham 73503.

**FT101B** with cw filter, fan, hand mic, £300. G3VQO, QTHR. Tel Horsham (0403) 3190.

**YF-90F** filter, 9MHz, with usb and lsb xtals, £13. G3HLG, QTHR. Tel 0636 72621, days; or 0636 892384, evenings.

**IC215** 2m fm portable tx/rx, c/w nicads, 14ch, S0, R1–9, S20, S22–23, rev R4, £125. Sutton, G3ZAJ, QTHR. Tel 0233 74 441, evenings or weekends.

**70cm** 18-el Parabeam, £12. 4m 4-el beam, £8. Mains transformer, 400–0–400, 300–0–300, 6·3V 9A, 5V 4A, £15. Carr extra. GW3YPP, QTHR.

**Swan 500** tx/rx, with vox unit, spare pair 6HF5s and external blower, comp with ac power supply, £350. GW4AYJ, QTHR. Tel Swansea 21692.

**Eddystone 840C** gen cov rx, bfo on amateur bands, new set of valves just fitted, vgc, £75 ono. RS41621, 41 West View, Clitheroe, Lancs. Tel Clitheroe 26137.

**Racal P70** Digideck digital cassette recorder, 8-bits parallel i/p–o/p ttl, 0–40 bytes/s incremental, 40–630 bytes/s continuous, four speeds, bi-directional, comp with handbook, £80. G8KSA, QTHR. Tel Stockton (0642) 581570.

**KW2000E**, £250. EC10, £40. Trio 9R59D, £40. Liner 2, preamp fitted, £110. KW600 linear, £90. Vanguard AM25B, £12. G2DAF rx, £35. Buyer to collect or carr extra. GW3KYT, QTHR. Tel Llanddulas 66737.

**Jaybeam**, colinear type C5/2M, six months old, comp with clamps for 2in mast, will swop for 18AVT/WB. Scott, G3FUJ, QTHR. Tel Derby 24472.

**TR2300**, comp with nicads, charger etc, used few hours only, owner going multi-mode, £170. Carr paid. GI3ZCK, QTHR. Tel 0232 56221 ext 36, business hours.

**Trio 9R59DS**, vgc, boxed, handbook, £50 ono. G4HGD. Tel South Benfleet 51712.

**FT200**, exc cond, home-made psu, fan, £225. TR2200G, five repeater, seven simplex, nicads, etc, £120. Nearly finished home-made linear, minus tubes, £25. Cossor 'scope, wkg, £15. Delivery Manchester area. Tel 061-792 4685, evenings.

**Swan 350** tx/rx, 400W p.e.p., built-in xtal frequency check, psu, used approx 2h only, handbook, lp filter, £220. AR22 rotator and control unit, hardly used, £20. G3KRU, QTHR. Tel Macclesfield 23022, evenings.

**Heath SB220** linear, Drake MN4 atu/pwr/swr meter, Autek Mk1 memory keyer, Heath HD1410 electronic keyer, Drake TV42, TV3300, and KW low pass filters, Heath HM102 pwr/swr meter, two HD1234 coaxial antenna switches, several W2AU baluns. Write. G4AMT, QTHR.

**Yaesu FT501** digital tx/rx, matching FP501, completely checked by SMC, orig packing, £375. Heath HWA20363 power supply, 10/15V 3A regulated, £20. TH6DXX antenna, fb cond, orig box, £150. No space to put here. G8BW, 21 Southill Road, Bournemouth. Tel 0202 529848.

**Microwave Modules** 432MHz varactor, £20; 1,296MHz varactor, £20; 1,296MHz antenna, £15; all new, unused. Yaesu FT220 2m ssb/cw/fm tx/rx, comp, mic, handbook, £195. Microwave Modules 432/28 ssb transverter, little used, £100. G4GGV, QTHR. Tel 0628 20651.

**MMT 144/432MHz** transverter, £100. GM8HSY, QTHR. Tel 0324 23860, after 10 June.

**CR100** rx, wkg order, minor mods (bandspread etc), can be removed without detriment to original, handbook, £25. Deliver 10 miles Tenbury Wells, or buyer collects. G3AEC, QTHR. Tel 08854 248.

**Catronics** uhf modulator, unused, £9. Catronics CT101 tu, £49. Avo 8, £20. *Wanted:* KB5 keyboard, or similar, for G3PLX vdu; commercial tu/afsk generator. Hicks, DJ0BU, Globe Cinema, BFPO 30.

**IC215**, 2m, fm, portable, nine months old, as new, comp with Icom supplied nicads, charger, case, 14ch incl five simplex, worth over £210, will accept £150 ono. G8PSY. Tel Hatfield (07072) 65182.

**12AVQ** antenna, brand-new, unused, in orig packing, with instructions, £30 collect, or plus carr. G3ZOH, QTHR. Tel Farnborough (Kent) 58413, evenings or weekends.

**Hy-Gain** 14AVQ vertical, £35. Jaybeam 6-el 2m quad, boxed, £16. G3TDZ collapsible 2m quad, 4-el, £3. Two dural masts, 21ft by 2in by 3/16in wall, £10 ea. G3TSO, NOT QTHR. Tel 0666 (Glos) 53425.

**TR2200G**, R5–7, S20–22, S0, R6 i/p, nicads, charger, BNC socket, helical, exc cond, reason for sale—buying TR2300, £110 ono; or swop for 70cm h-held, cash adjustment, not Pocketfones PF1. R. Smith, T8089291, G8NCT/DC, GRF, RAF Gutersloh, BFPO 47.

**Storno CQM662** uhf fm 12V mobile tx/rx, control box, cable, manual, toneburst, xtalled on RB0, RB2, RB4, RB6, SU8, RB10, RB14, 6W rf output, perfect wkg order, £115. G3KLF, QTHR. Tel Ipswich (0473) 310442, weekends or evenings please.

**Realistic DX160**, gen cov, bfo, cost £130, sell £100 ono. JVC and Winthronics radio cassette recorders, Harvard headphones, volume control and tone, all new except headphones. L. D. Ireland, 16 Cathebedron Road, Carnhell Green, Camborne, Cornwall TR14 0NA. Tel Praze 236.

**Liner 2**, with preamp, £105. Murphy Rover fm radio telephone, S20, R4, £20. Pye Ranger, AR77E, both not too good. 8/8 slot antenna, £8. *Wanted:* Two 9V Pye Pocketfone batteries. G8JTP, QTHR. Tel Tim, Sheffield 731714, any time.

**NAG linear**, seven months old, perfect cond, still under guarantee, £395. Buyer collects (Birmingham). Tel 021-552 2853, evenings.

**Chart recorder**, Heath model SR204, input sensitivity 10mV–10V/in, chart speeds 0·01–10in/min, £50. G8IBV, QTHR. Tel Gloucester (0452) 36119.

**Trio stn**, secondary, little used, TS900, cw filter, £435; VFO900, £130; DS900, unused, mobile power supply, £70; all handbooks, leads. Trio MC10 50K fist mic, £12. Comp stn, £615. Carr paid Securicor. GM4AGS, QTHR. Tel 0382 543113.

**IC215**, mobile mount, helical whip, auto toneburst, channels R0–9, RR0, S20–23, £160 ono. MM transverter 432/28, £90. Homebrew transverter 144/28, 5mW input, 5W output, MD108 mixer, rx has SD306, 3N201, £40. G4FMD, QTHR. Tel Malcolm, Great Dunmow 3119.

**Cambridge AM10D**, 2m, a.m./fm, 10ch, strength meter, t/burst, fitted 4ch, S22, R3, R5, R7, £50; also 44MHz rx xtals to suit above, for S14R, R6R, £1.50 ea. GM8MNG, QTHR. Tel Ford (Midlothian) (0875) 320383.

**TA32Jr** antenna, new, never assembled, £45. Tektronix oscilloscope, model 310A, spare tube, handbook, £45. Variac transformer, 110V, or 235V in 260V or less out, £15. Pair 5B254M valves, £5. Labgear Televerter, £7.50. Prefer buyer collects. GM3ZXG, QTHR. Tel 0475 28282.

**Osker** swr and power meter, 52/75Ω, mint cond, £20 plus post. *Wanted:* Trio VB2200GX rf amplifier. G4CKA, 41 Park Mount Drive, Macclesfield, Cheshire. Tel 25154.

**Heathkit gear:** 'scope IO-12U, £40; vvm V-7AU, £25; trace doubler S-3U, £20; probes Pk-1, Pk-3, £2 ea; all with manuals. Demodulator probe, £2. G8JEH, QTHR. Tel Steve, Chorley (Lancs) 3142.

**Creed model 90** tape verifier set: keyboard, model 25 tape punch, model 90 tape reader, S4252 psu, manuals, comp, wkg, £17.50 ono. *Wanted:* manuals: Solartron CD514 oscilloscope, Pye 2816/CE tv monitor; prefer to buy. G4EIK, QTHR. Tel Great Chesterford 718.

**2m tx/rx** components (see ARRL *Handbook*); filter, S22 xtals, CA3089, CA3028, CA3018, LM380, 2N3866, 2N5913, £20. No time to build after buying bits. G4DSO, QTHR. Tel Pangbourne (07357) 2119.

**McGregor** 4ch radio control, four servos etc; Yamamoto 47in monoplane, part built bipe. Last, 213 Rushmere Road, Ipswich. Tel 714563.

**Ten-Tec Argonaut 509** QRP tx/rx, ssb/cw, 80-10m, 5W, £190. MFJ Audio cw filter, £15. G4DDL, QTHR. Tel 0344 52395, evenings.

**Heathkit SB101,** matching spkr/psu, 12V dc psu, cw filter, built-in speech compressor, good wkg order. *Wanted:* Eddystone 770 vhf rx. GM4FEO. QTHR. Tel 0436 2539, after 6pm.

**TW communicator,** 2m, fm, £40. Mosfet converter, 24MHz i.f., commercial, £12. VVM CT54, £9. H/B 2m tx, £12. Variable capacitors, small, £1 ea. Panel meters. Transformer, Woden 750-0-750, £6. Yagi, 6-el, new, £6. Quad valve amps, 15 × 2W, £30. Tel 07014 52442.

**Standard C146A** 2W fm h/held tx/rx, nicads, helical, case, etc, mint cond, used little; Bell & Howell 491 Autoload Super 8 cine camera, one year old, as new; Revue Super 8 editor; offers? G8NRJ, 122 Stradbroke Road, Lowestoft, Suffolk. Tel Andy, 0502 4122.

**Yaesu FR50B** rx, 160-10m, handbook, orig packing, £75. KW Vanguard tx, 160-10m, all circuit information, £35. G4FCR, QTHR (Solihull). Tel 021-745 5868.

**Bargain sale,** following purchase of TR7: SB303, 401, tx fb on 80, 40, 20, but may need slight attention on 15, 10 (tweak neuting?), around £300. Mic, spkr, cw filter, some spare tubes available. G5YH, QTHR. Tel Tisbury 870325.

**70cm** mobile Eddystone ET8800 tx/rx, 10W, all solid-state, 6ch incl SU8, SU20, RB4, RB4 r/r, xtal t/b, £80. Pye Bantam, fm, good cond, xtalled wkg R3, £40. G8HUE, QTHR. Tel Ipswich (0473) 212854.

**Electronic piano,** all parts incl keyboard, final stages assembly, testing, £230; Rhythm generator, comp, wkg, £35; both, £250. 3½in 'scope, wkg, ok, £10. "Honest" Mini, 50MHz dfm, new, unused, £35. G8FBY. Tel Sheffield (0742) 882621.

**Liner 430,** Belcom psu, 432-432·48, 432·5-432·98, for beacons, spare xtals 433-433·48 and Oscar 8, fitted Modular Electronics PA-U2 preamp, £180. Trio JR500 amateur band rx, WWV mod for 160m, £45. Carr extra. G8FAK, 32 Springfield Way, Cranfield, Beds MK43 0JN.

**Short wave rx,** Heath SB310, covers 500kHz up from 3·5, 5·7, 7·0, 9·5, 11·5, 14·0, 15·0, 17·5 and 26·9MHz, comp with ssb and a.m. filters, immac cond, £70. G8IBV, QTHR. Tel Gloucester (0452) 36119.

**IC22A,** R2-7, S19-23, mobile mount, £120; IC3PA mains psu/spkr, mount for 22A/240, £35; or £145 the pair. Barlow Wadley XCR30 Mk2, £75. Comdel CSP11 rf proc, £25. 38 Downlands, Waltham Abbey, Essex EN9 1UH.

**KW Atlanta,** ac psu, vgc, £180. Cossor d/b 'scope, 1035, £15. Marconi vvm, TF428B/1, £10. CR150 rx, £20. Joystick and 4RF tuner, £5. SWR bridge, £5. G3XRJ, QTHR. Tel 0736 87 285.

**HQ1 Minibeam,** 14MHz, 21MHz, 28MHz, 6ft turning radius, 11ft across, ideal for small garden. GM4AWA, QTHR. Tel Bridge of Earn (0738 81) 2815, evenings and weekends.

**Drake T4X,** AC4, all 10m, offers, circa £250. Drake 2B, 2BQ, 2AC, 2LF, slight fault, wkg all bands 160-10m, offers, over £50. GM5AIW, NOT QTHR. Tel Kilsyth 822645.

**KW2000B,** £190. Trio TR7010, £120; vfo VFO700S, £50; ac psu, £8. Grisley, G4DNJ, 45 Ramsdell, Stevenage, Herts.

**Heathkit HD10** keyer, £15. Ten-Tec keyer module, £5. Spare cmos. G3JLB, QTHR. Tel 0474 4694.

**KW202** rx, mint cond, orig packing, manual, matching spkr, £180. BRS33915. Tel 092 85 65319 (Cheshire).

**Trio TS500,** PS500, 80-10m, comp with remote vfo, recently overhauled, two new 6146Bs fitted, £165. GM3UTJ. Tel (0563) 21900, evenings.

**Trio 9R59** and R206 gen cov rxs; to exch for 2m fm rx; or £28 the two. G4HQY. Tel (0533) 866723.

**FT101B,** good cond, prefer buyer inspects and collects, £320. G4EBC, QTHR. Tel Exeter (0392) 54754, evenings after 7pm.

**Trio 2200G,** nicads, helical antenna, fitted 7ch, £100. Yaesu FT2 auto, fitted 8ch, preamp, £120. 40ft tower, steel, climbable, £40. Parabeam, 2m, 14-el, £12. G3JTQ, QTHR. Tel 01-894 7249.

**Tandy** communications rx, DX150A, as new, bfo, bandspread amateur bands, £75. G4BQS, QTHR. Tel Selsted 216.

**Trio 2200GX,** as new, orig packing, fully equipped as supplied, seven simplex, five repeater channels, £140. G4GEY, QTHR. Tel Poynton (09967) 2442; or Burton-on-Trent (0283) 43332.

**KW Vespa Mk2** tx, KW201 rx, comp with Q-mult, 10-160m, together, £175 ono. IC22A with 2N6081 in pa, 15W out, R3-8, S20-24, 145·8, mobile mount, £150 ono, with ETI. GM4FDM, 3 Kings Crescent, Elderslie, Strathclyde.

**Polar EDL432P** 70cm linear, boxed, manual, cost £151, accept £120 ono; MM T432/144S transverter, 432-436MHz, manual, ok for Oscar, cost £169, accept £130 ono; both as new, little used. G8DFZ, QTHR. Tel Otley (Yorks) 3083.

**50ft** telescopic tower, comp; 3-band Gem quad; Hy-Gain 18HT tower; Mosley trapped vertical; coaxial galore; all dismantled on site; must sell; offers. Tel Johnson, Ipswich 713152.

**If you** cannot afford £600+ for an FT225RD or a TR700S, then my FT221R with digital display is yours, boxed, as new, for £415. G8KOP, QTHR. Tel Dave, 01-349 1122, days; or 01-200 0466, evenings.

**Cambridge** hi-band AM10D, 12½kHz filter, cradle, mint, £45. Ex-USA test gear: TS497B r/f sig gen, 2-400MHz; TS382D audio oscillator, 20Hz-200kHz; precision instruments, mint cond, manuals, sae details. Solid-state 13·5V variable 5A dc psu, ex-Ministry, £14. All carr extra. G3GUU, QTHR.

**KW202,** £140. LM14 meter/psu, £15. Advance DI/P sig gen, 2-190MHz, atten to 1μV, £13. Barlow Wadley XCR30 Mk2, £80. Boxed new valves, tx/rx types, cheap lot to enquirer; ditto xtals. Marconi TF1374 precision xtal calibrator, £8. GW3JUV. Tel 0656 3875.

**Pye FM60** tx chassis, modified 2m, 14 xtals, Pye mic, full handbook, £52; psu available if required, sae details. Bendix BC348-0 rx, internal mains psu, spkr, £32; Eddystone 440B, modified 4m, £8; both plus carr. G8GI, QTHR. Tel 0522 682668.

**Tape drive** Honeywell keytape, 7ch, 556 cpi, 24in/s, manual, keyboard, 2K core buffer, etc, offers, cash or swop, why? G8HPH, QTHR. Tel Ipswich (0473) 59690.

**Uniden 2030** fm tx/rx, fitted four repeater, six simplex channels, as new, £100. KW E-Zee match, £15. KW lpf, £4.50. Copy MM 432/28 converter, £9. Cooper, 17 Castlepark, Fairlie, Largs, Ayrshire.

**New FT7,** £275; Palomar 400W solid-state linear, £285; together £485; both unused due arrival TR7, ideal low/high power mobile, etc; high power G-whip available. Jolly, G3TJY, QTHR. Tel 0202 622142.

**Bantam HP1FM,** wkg, S20-22, helical whip, nicads, £50. Heller Electronics 2m 1W fm tx board, fitted S20-22, £25. MK14 microprocessor board, fully expanded, £45. Futaba Medalion 2ch radio control system, £40. G4EML, QTHR. Tel Ripley (Surrey) 2472, after 6pm.

**Telford TC10 Mk2** 2m tx, fm, a.m., ssb, cw, 10W output, mains or 12V dc, toneburst, 144-146 vfo, plus one xtal ssb calling channel, no mods, exc cond, £90 ono. G8MLQ, QTHR. Tel 01-310 1494.

## WANTED

**BC348** rx. Also interested in other surplus sets and manuals. Tel 01-949 2317.

**American Vibroplex** morse key. Hurst, G3JJU, 31 Avondale Road, Fleet, Hants. Tel 5831.

**"RSGB Bulletin"**, pre 1960. G3VOW, "Spindlewood", Stoney Lane, Newbury, Berks.

**Book:** *Short wave radio and the ionosphere,* published by Iliffe, second edition, reasonable price and postage paid. G3HFO, QTHR. Tel 01-399 9526.

**Postally used** pre-1950 QSL cards, still avidly sought by collector, particularly "earlies" from Europe or dx, pinholes disregarded and good prices offered for wanted cards, what have you? G3BDQ, "Whitefriars", Friar's Hill, Guestling, Hastings, E Sussex TN35 4EP.

**All mode** 2m rig for base use, digital preferred, with or without scanner. All letters answered. Ken Hatton, 8 Alnwick Street, Newburn, Newcastle upon Tyne NE15 8PT. Tel 0632 678828.

**40W 2m** rf amplifier. 2m Slim Jim antenna. High band fm hand-portable tx/rx. G8RHU, QTHR. Tel Seaford (Sussex) 892358.

**Any "suitcase"** type tx/rxs. WS19 Mk1, Mk2 or Mk3. WS62. Wireless sender 53. Plug and connector No1 (ZA/C 00037/CMC 106-560), for connecting No52 rx to ZE12 psu. RA117 and ssb adaptor, in exc cond. Belling-Lee mains rf interference filter, 250V/30A. No12 tx atu, type F, ZA/0841 or ZA/0986. High power atu No1, ZA/10435. Any connectors for 19 set. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

**Eddystone EA12**. G3PJN, QTHR. Tel Chesterfield 6040, after 6pm.

**Russian Midget** rx, "Orion", iw/mw, wkg. BRS40540, 19 St Stephen's Road, Winchester. Tel 66764.

**Decca KW109 Super Match** antenna tuning system, good wkg order; Hilomast mast, pump-up PNAM-1. G4HAF, QTHR (Wolverhampton). Tel Codsall 3509, any time.

**TR2200GX**, unmodified, good cond, carrying case, nicads, charger, ac psu, fitted S20-23, R6, good price paid for unmarked f/b rig. GM3VXR, 48 Crawford Street, Motherwell, Strathclyde ML1 3AF. Tel Motherwell 65443, after 6pm; or Bellshill 747633, day.

**Crank-up** tilt-over tower for school stn: Versatower, Westower or why 40ft or higher? Chris Pedder, G3VBL, Canford School, Wimborne, Dorset. Tel Wimborne (0202) 883455.

**Manual** or circuit diag Sommerkamp IC21XT 2m tx/rx, borrow or buy, will refund any costs incurred. P. Taylor, 23 Broomfield Gardens, Walton, Liverpool L9 3AA. Tel 051-525 8397.

**CRT** base type USM11, as used with 2AP1, good price for undamaged example. GM4FDD, QTHR. Tel Aberdeen (0224) 50968.

**EHT transformer**, 230V in, 2·5kV out, Gardner HV308 or similar, for use with Mullard DP13-2 crt; HC6U (style D) xtals, 4,500 to 4,599MHz. G6HL, "Lamont", Mill Lane, Cleeve Prior, Worcs.

**Yaesu FL50B**, with handbook. G4HQD. Tel South Benfleet 51712.

**FTDX401**, preferably in exc or good cond, but minor faults acceptable, commensurate with price, collection possible, offers. G3FYW, QTHR. Tel Whitby (0947) 810280.

**CW filter** for FTDX560 tx/rx. G3OWQ, QTHR. Tel Sandwich 3997.

**HF bands** rx or similar converter for use with If band rx suitable for young swl. G3OAZ, QTHR.

**Buy or borrow** a handbook and circuit diagram for the surplus R107T rx. G8KJJ, QTHR. Tel Nottingham 231887.

**No 19** wireless sets; also interested in other surplus equipment and manuals/handbooks, any cond considered. Tel 01-949 2317.

**Vintage** xtal sets, valves, radios, horn spkrs, *Wireless World*, by collector. A. Nolf, 7 Cambrian Way, Ewloe, N Wales. Tel Hawarden 534329.



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- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc, for 75p.**
- **Do not forget to include remittance and a *Radio Communication* mailing label.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current *RSGB Amateur Radio Call Book* is correct. BRS and A members will, of course, have to provide their name and address.

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to cover the cost of this advertisement.

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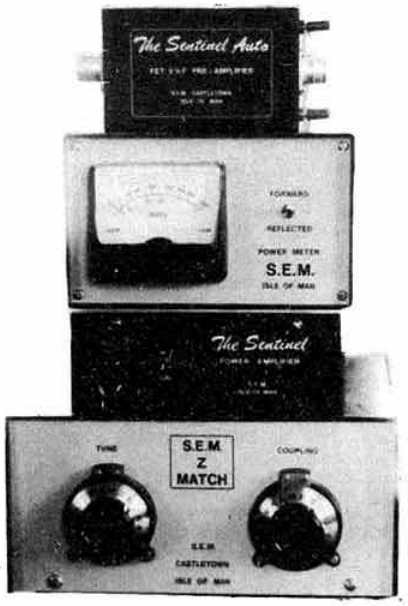


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I guess that about half the active stations on 2 metres have one of these units. What about the other half? They connect straight into the transceiver aerial feeder and the rf switch changes over between transmit and receive automatically on any mode. **£17.35*** Ex stock. 70cm version **£20.25*** Ex stock.

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2-40MHz, 15dB gain. Ideal units for pepping up receivers on 15 and 10, for OSCAR reception and as an ACTIVE AERIAL.

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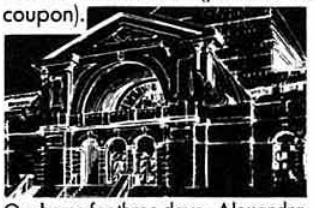

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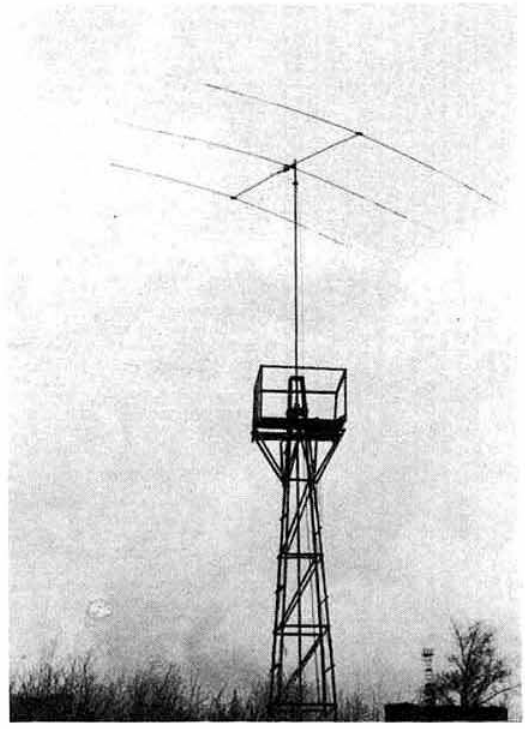

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| Frequency | 10, 15 & 20 meters | Mast Diameter | 31·75 to 41·30mm |
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**Pace Electronics Ltd,** 9 Lime Kiln, Wootton Bassett, Swindon, Wilts. Tel 0793 850056
**Packer Communications,** 28 Henniker Road, Debenham, Stowmarket, Suffolk IP14 6PY. Tel 072886 214
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| FT901D | .. | £737.50 | FC301 | .. | £108.00 |
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| FL2100B | .. | £311.00 | FP4* | .. | £35.00 |
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WANTED: FR50B's in good condition and good working order, with handbook.

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Agents for G2DYM, J Beam 2m, and Ascot Antennas
Aerial Wire, Insulators, Co-ax Cable, Twin Feeder
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HP available. Carriage extra
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**V.H.F. RECEIVERS** New **SR—9** for 2-metres FM, with 144–146MHz VFO, **improved 2-speed slow-motion dial,** also 11 xtal controlled channels, ideal for fixed, /P or /M use. Built-in LS, 12v DC operation. **WITH IMPROVED VFO STABILITY & CAREFUL PRE-DELIVERY CHECK: EXCLUSIVE TO GAREX. £57.35** inc VAT (xtals **£2.50** each).
**Marine band** version (156–162MHz) **£57.35** (xtals **£2.79**).
Sae for full details. Credit facilities available.

**AMPLIFIED MOBILE EXTENSION SPEAKER** the perfect answer for boosting audio level of /P rigs. 12V DV operation, compact built-in 6watt amplifier, supplied with leads and jack-plugs 4–8Ω input. **£11.25.**

**Amplifiers,** ex above, sold sep at **£2.70** each.

**Integrated circuits:** 723 (TO5), **75p;** SN76660, **75p;** CD4001AE, **25p;** NE555, **55p;** 709 (TO5), **30p;** 741 (DIL 8). **30p;** 7410, **25p.**

**Neons** Panel mounting, type JH8, 8mm hole, 240V, red, amber or clear, **35p** each, any 5+: **30p,** 10+: **27p.**

Miniature, wire end **8p** each, 10+: **6½p,** 100+: **4p.**

**Resistor Kits.** E12 series, **22Ω to 1M, 57 values,** 5% carbon film, ¼W or ½W (please state). **Replenishments available**
Starter pack, 5 ea value (285) **£2.95.** Standard pack, 10 ea (570) **£5.40.** Mixed pack, 5 ea ¼W+½W (570) **£5.40.** Giant pack, 25 ea (1425) **£13.25.**

**PL259 UHF Plugs** +reducer **68p** each, 5+: **60p.**

**SO239 UHF Socket** panel mtg **55p** each, 5+: **45p.**

**NICAD RECHARGEABLES**—physically equivalent to zinc-carbon types AAA(U16) **£1.64;** AA(U7) **£1.20;** C(U11) **£3.15;** D(U2) **£4.94;** PP3 **£5.20. ANY 5+** : less 10%; **ANY 10+** : less 20%.

**Slide switches,** min. DPDT **18p** ea; 5+: **14p.** 10+: **12p.**

**Toggle switches,** min. full range SP thro' to 4P C/O sae list.

**GAREX FM detector and squelch conversion** ready assembled with full fitting instructions. Tailor made, easy-fit design for AM Cambridge, replaces squelch board with minimum of other modifications, **£5.40.** Transistor Vanguard (AM25T) version (modified squelch), **£5.94.**

**CRYSTALS FOR 10 METRES:** (HC25U) 28,500MHz Tx plus 28,045Mhz for Rx (455kHz I.F.) suit most "C.B." w/t **£4.50** pair.

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## 47 WARRINGTON ROAD, LEIGH, LANCS WN7 3EA TEL 0942-676790

**TRIO**

| | |
|---|---|
| TS820 Transceiver | £695.00 |
| TS820S Transciever | £814.00 |
| R820 Receiver | £773.00 |
| SP820 Speaker | £38.00 |
| TS520S Transceiver | £530.00 |
| SP520 | £17.50 |
| SM220 Monitorscope | £231.00 |
| AT200 Antenna Tuner | £93.00 |
| TL922 Linear Amplifier | £780.00 |
| TS120V Mobile Transceiver | £399.00 |
| PS20 AC PSU for TS120V | £51.00 |
| TS700S All mode VHF Transceiver | £537.00 |
| SP70 Speaker | £20.00 |
| TR7101 SSB VHF Transceiver | £189.00 |
| TR7400A 2m FM Transceiver | £336.00 |
| TR500 2m FM Transceiver | £235.00 |
| TR2300 2m FM Portable Transceiver | £196.00 |
| TR8300 70cm FM Transceiver | £245.00 |
| TR3200 70cm FM Portable Transceiver | £186.00 |
| R300 General coverage Reciever | £185.00 |

Full range of crystal, microphones, plugs, psu, etc.

**YAESU**

| | |
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| FRG7 Receiver | £210.00 |
| FRG7000 Receiver | £367.00 |
| YH55 Headphones | £9.85 |
| SP101B Speaker | £19.65 |

**DRAKE**

| | |
|---|---|
| SSR-1 Solid state receiver | £175.00 |
| TV3300 Low Pass Filter | £18.00 |
| MN7 Antenna Matching Unit | £123.75 |
| TR7 Solid State Transceiver | £999.00 |
| R4C Receiver | £496.00 |
| T4X Transmitter | £496.00 |

Crystals and accessories available

**STE MILAN**

| | |
|---|---|
| AA1 Audio amplifier for AR10 | £4.75 |
| AD4 FM Discriminator | £5.00 |
| AR20 FM Crystal controlled receiver module | £50.00 |
| AT23 FM Crystal controlled transmitter | £50.00 |
| AG10 Tone burst unit | £4.50 |
| AL8 10 watt Linear amplifier | £27.00 |
| ARAC 102 2 band Receiver | £100.00 |
| ARAC 170 70cm and 10m Receiver | £127.00 |

**ROTATORS**

| | | | |
|---|---|---|---|
| AR40 | £53.44 | KPR400 | £97.00 |
| CD44 | £106.87 | AR22R | £48.38 |
| HAM2 | £145.12 | DR7500 | £105.75 |

**G-Whip Mobile antenna range**

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|---|---|
| Tribander helical 10-15-20m | £21.15 |
| LF Coils for tribander | £6.17 |
| Telescopic for coils | £2.70 |
| Basemount standard | £3.82 |
| Basemount swivel type | £5.34 |
| Flexiwhip basic 10m | £14.62 |
| Coils for flexi | £6.17 |

**ALDA 103**

New model Solid State Transceiver
250 watts PEP/250 watts CW with built in CW Monitor. 12v DC operation.
80-40-20 metres. 6 Pole crystal filter
Complete with Microphone and Mobile Bracket
Due to direct importation from USA we can now offer these at **£360.** 5-band model available shortly.

**SXR30**

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550KHz to 30MHz £175.00

**AORC**

AR240—800 channel 2m FM Hand-held Transceiver £195.00

**MICROWAVE MODULES**

Transverters

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| MMT432/28-S | £133.88 |
| MMT432/144-R | £169.88 |
| MMT144/28 | £88.88 |
| MMC144 any IF | £20.25 |
| MMC144/28 LO | £22.50 |
| MMC70/any IF | £20.25 |
| MMC70/28 LO | £22.50 |
| MMA144 Preamp | £14.63 |
| MMC432 any IF | £27.00 |
| MMC1296 any IF | £28.00 |
| MMD050/500 | £69.00 |

**N.D.I.**

HC1400 25 watt 2m Transceiver £255.00

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| | |
|---|---|
| C5-2M Glass-fibre coliner | £34.87 |
| 8Y/2M 8 element Yagi | £11.25 |
| 5Y/2M 5 Element Yagi | £8.66 |
| PBM10/2m 10 element Parabeam | £28.75 |
| PBM14/2m 14 element Parabeam | £36.56 |

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| TM56B VHF Monitor Receiver | £105.00 |
| PALM II Hand Held Transceiver | £149.00 |
| 700E 2m Transceiver | £229.00 |

**STATION ACCESSORIES** (including postage)

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| Single Meter SWR Wall Type | £10.25 |
| Single Meter SWR Desk Type | £10.45 |
| Twin Meter Desk Type | £12.50 |
| 2 Way heavy duty Antenna switch | £11.95 |
| 2 Way Antenna switch | £4.50 |
| 4 Way Antenna switch | £6.00 |
| 3 Way Antenna switch | £8.00 |
| 6 Way Antenna switch | £17.25 |
| HyMound Morse Key | £10.00 |
| Hansem FS301 through Line Wattmeter | £33.25 |
| HP3A Low Pass Filter | £3.00 |
| Plastic antenna insulators | 23p |
| Nye King 003 Morse Key | £8.75 |
| Standard type Morse Keys | £3.15 |

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| 14AVQ/WB Vertical 10-15-20-40m | £59.06 |
| 18AVT/WB Vertical 10 through 80m | £85.50 |
| Th3MK3 Triband Beam | £176.62 |

Carriage **£2.50** on antennas

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| PSU-5 AC Power Supply | £140.00 |
| 350D Digital Transceiver | £550.00 |
| 350B Transceiver | £480.00 |

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| Model 122S 12·6V 2·5Amp | £18.00 |
| Model 125 12V 5Amp | £24.00 |
| Model 153S Dual Meter 4-15V 4Amp | £26.73 |
| Model 156S Twin Meter 4-15V 5Amp | £35.00 |
| Model 1210S Twin Meter 4-20V 10Amp | £80.00 |

Max. rating quoted

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| Preselector MK1 with relay | £29.75 |
| Preselector MK2 for SWL | £26.55 |
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**NEC**

CQ.R700 Gen Coverage RX £220.00

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| HQ1 Mini-Beam | £94.30 |

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MK2 Covers 550Khz to 30MHz £25.00

Designed and manufactured by us. Fifty switchable tunable positions, will match any antenna to your receiver. Now in use in over 40 countries. Ideal for use with QRP transmitters. Price includes VAT and postage on this unit.

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| VFO520S | Remote VFO | 101.00 | 3.50 |
| SP520 | Matching speaker | 19.00 | 1.06 |
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| YG3395C | CW filter | 39.00 | .36 |
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| BS5 | TS520 scanboard for SM220 | 46.50 | .44 |
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| PS-20 | AC power supply for TS120V | 51.00 | 3.50 |
| MB100 | Mobile mounting bracket | 16.50 | .67 |
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| TR7010 | 2m SSB/CW mobile transceiver 10W output | 189.00 | 3.50 |
| TS770 | 2m/70cm all mode dual bander | t.b.a. | |
| TR7400A | 2m FM 30W mobile transceiver 800 channels | 336.00 | 3.50 |
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| TR2300 | 2m FM portable transceiver PLL with all 80 FM channels | 195.00 | 3.50 |
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| | Spare power lead | 1.25 | .15 |
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| MC35S | 50K fist microphone | 13.00 | .44 |
| MC30S | 500Ω fist microphone | 13.00 | .44 |
| LF30A | HF low pass filter 1Kw 90dB. Stop band rejection | 18.50 | .67 |
| BPF2A | 2m band pass filter 144-146MHz 50W rms 100W P.E.P. | 28.00 | .86 |
| Mizuho SB-2M 2 metre SSB/CW portable transceiver | | 165.00 | 3.50 |
| **VHF AMATEUR RECEIVERS** | | | |
| SR9 | Tuneable/crystal 2m FM receiver 144-146MHz | 45.00 | .86 |
| AMR217B | Scanner with 8 crystals. The best and most popular. Mains/battery | 118.12 | 1.06 |
| | Crystals for above. Each | 2.40 | .15 |
| **HF MOBILE ANTENNAS** | | | |
| 'G' whip tribander helical 20/15/10 | | 21.15 | 1.06 |
| 'G' whip multimobile 20/15/10 | | 24.30 | 1.06 |
| L.F. coils for the above whips (Specify whether tribander or multimobile) | | 6.07 | .66 |
| Telescopic whips for the above | | 3.00 | .66 |
| Base mount for all 'G' whips | | 3.82 | .66 |
| Extendarod 40" booster | | 10.12 | 1.06 |
| **VHF/UHF 'J' BEAMS** All 'J'-Beam products available | | | |
| **ROTATORS** | | | |
| AR40 | (5 core cable required) | 53.44 | 3.50 |
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| DR7500 | Will take 3 element tribander | 105.75 | 3.50 |
| DR7600 | Will take 2 element 40 metre beam | 150.75 | 3.50 |
| DR7600P | As above but with preset or manual controller | 200.25 | 3.50 |
| **VHF MOBILE WHIPS** | | | |
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| ASP157 | ¼ wave gutter mounted 2m | 10.26 | 1.55 |
| ASP2009 | ⅝ wave 2m | 9.72 | 1.55 |
| ASP677 | ⅝ wave 2m | 16.20 | 1.55 |
| ASP2011 | ⅝ wave disguise | 27.22 | 1.55 |
| ASP462 | ⅝ wave 70cms | 8.21 | 1.55 |
| ASP667 | Colinear 70cms base station | 20.00 | 1.55 |
| ASP655 | ⅝ wave 2m base station | 21.60 | 1.55 |
| ASPA659 | 70cms | 21.60 | 1.55 |
| M161 | No hole boot mount | 3.20 | 1.55 |
| K220 | Magnetic mount | 7.56 | 1.55 |
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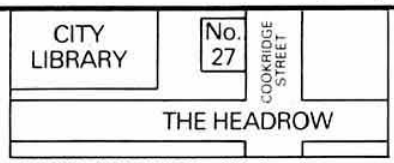


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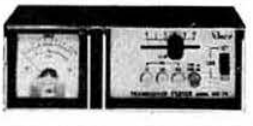

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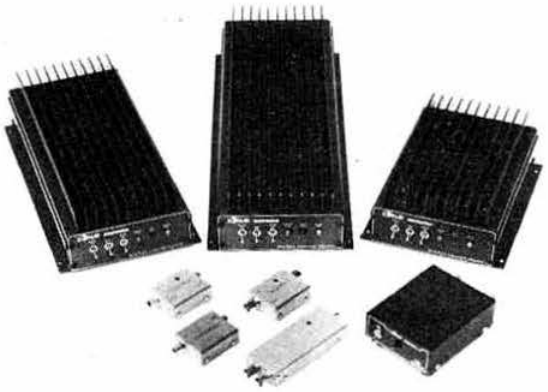

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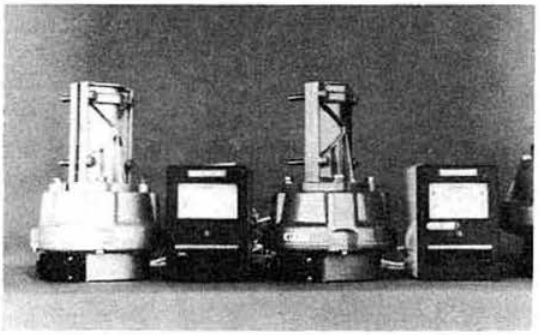

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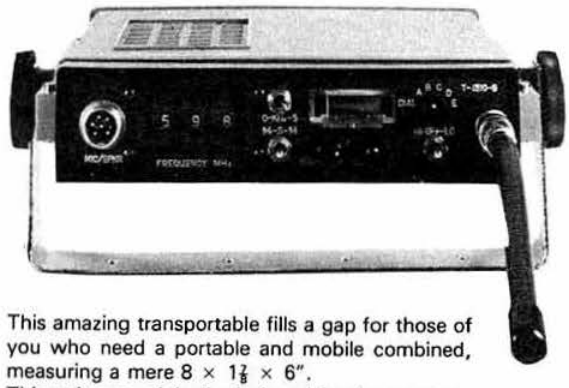

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2N5947 marked SRF1117 FT 1·5GHz ½ watt out @ 430MHz @ 12v **65p**

**FERRITE CORES** mixed bag 100 **50p**

**AUDIO AMPLIFIER ICs** LM380 2 watt @ 12 volt into 4 ohm **85p**
TBA641A 2·4 watts into 4 ohms @ 9 volt data **£1.25**
TA7205P 5·8 watts into 4 ohms @ 13·2 volt ex-new equipment with data sheet **90p**
ESM231 18 watts into 4 ohms @ 24 volt with data new only **£1.80**
TAD110 IF amp for AM/FM receivers no data **£1.50**
CA3089E IF amp for FM receivers NBFM or WBFM **£2.00** with data sheet
NE555 timer **35p**
741 op amp **27p**

**TBA120A** FM IF amp & limiter **50p.**

**DISC CERAMIC CAPACITORS**
1000pf, 2200pf, 500vw, 0·1mf 3vw, all 10 for **15p**
0·047mf 30vw 10 for **20p.** 100pf co-axial discs 500vw very small PKt 20 for **20p.**
27pf, 5000pf 500vw both types 12mm dia. 10 for **15p**
0·01 mf 2·5kv **5p** each, 1000pf 1·2kv **5p** each.

**ERIE HIGH VOLTAGE DISCS** with axial leads 1000pf 10Kv working **15p** each.

**BAG OF 100 MIXED DISC CERAMICS** ERIE type 831 & 861 approx 18 values 1pf to 220pf (our mixture) equal values of each ideal for the VHF/UHF constructor ONLY **£1.15p** per bag.

**CERAMIC FEEDTHROUGH CAPs.** 1000pf 500v. solder in type requires 3mm hole 10 for **20p**

**SLIDE SWITCHES** 2.p.c.o. **10p** (pre-set type **10p** 10 for **50p**

**PYE COILS** 5mm dia. 10m sq. base P.C. mounting with core 10 for **60p,** as above but 4mm dia. 6mm sq. base 10 for **60p.**

**NEOSID COIL FORMERS** horizontal P.C. mounting with tags each end 4·5mm dia. 15mm long with core new unused **6p** each 10 for **50p**

**SWITCHES** (rotary)
3p 3 way with earthing ring + off position 1" dia. std ¼" shaft. **40p**
3 × 1 pole 12 way break before make 1" dia. std ¼" shaft. **£1.00**
2 × 1 pole 12 way break before make 1" dia. std ¼" shaft. **80p**

**PUSH SWITCHES**
3 banks of 4 pole change over self cancelling for PCB or panel mounting **75p**
2 pole change over for PCB or panel mounting **25p** or 10 for **£1.75**
4 pole change over for PCB or panel mounting **30p** or 10 for **£2.00**

**TOGGLE SWITCH** 2 pole change over with centre off. 250v @ 10a. 34 × 17 × 25mm **45p**

**CRYSTAL HOLDERS** HC25/U **13p.** HC6/U **13p.** FT243 **13p.**

**SF1 STARPHONE BATTERY CHARGER MODULE** requires 26 volts D.C. @ 50 m/A **£1.50** each.

**STOCK LIST NOW AVAILABLE 15p stamps please.**

**THE GABLES, 20 BARBY LANE, HILLMORTON, RUGBY, WARWICKSHIRE CV22 5QJ**

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