



April 1979

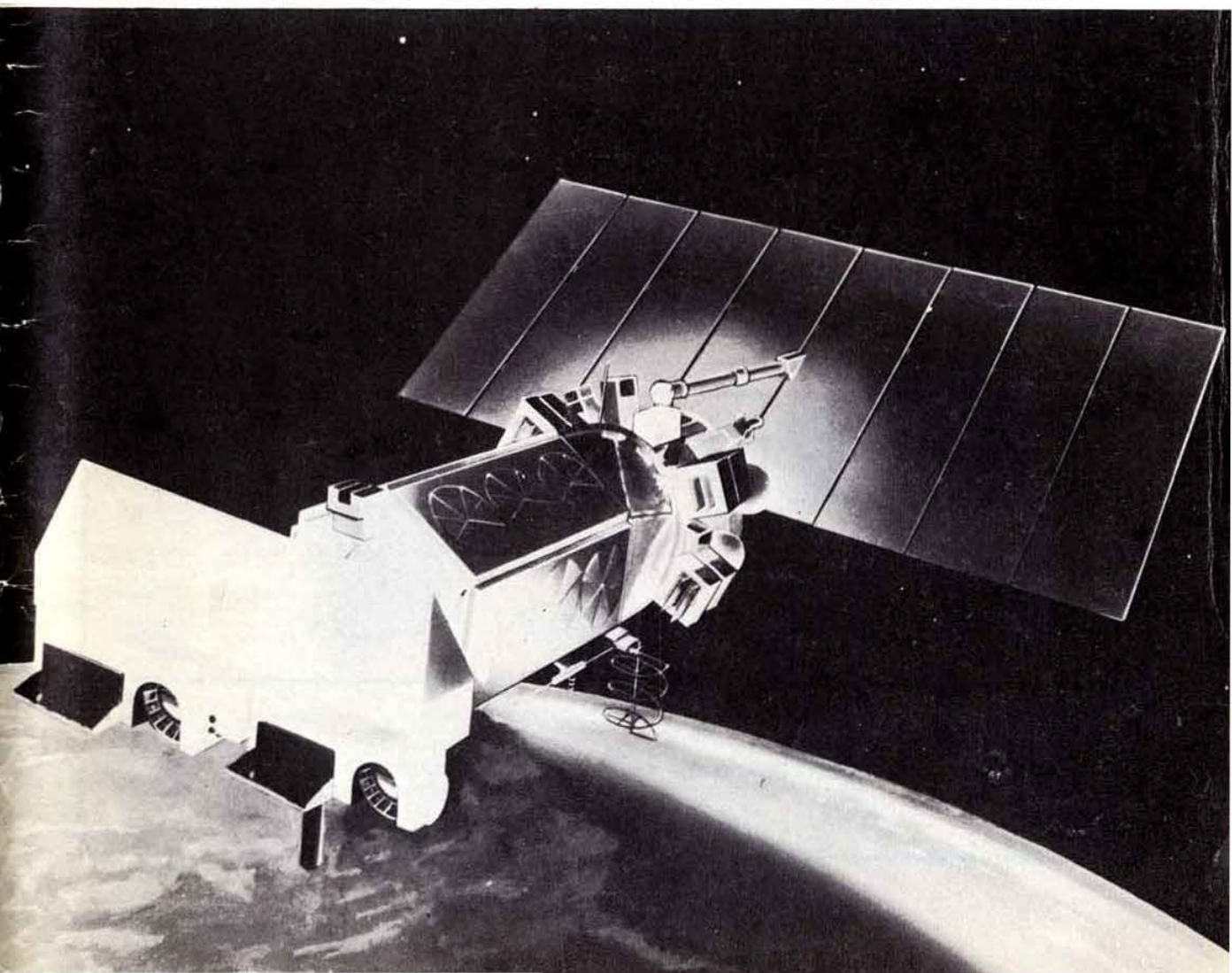
# radio communication

journal of the Radio Society of Great Britain

## THE TIROS-N WEATHER SATELLITE

(Artist's impression, by courtesy of NASA)

An article on processing the satellite's telemetry commences on page 320 of this issue



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

## TS820

THE WORLD'S MOST POPULAR  
HF TRANSCEIVER



### TS820 Brief Specification

Frequency range: 160m to 10m Amateur Bands  
 Mode: CW, USB, LSB, FSK  
 RF Input Power SSB: 220 watts PEP  
 CW: 160 watts DC  
 FSK: 100 watts DC  
 RX sensitivity: 10dB S/N at 0.25µV  
 Price: £758.00  
 or £899.00 with dig. readout



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

## TS120V

MULTUM IN PARVO



### TS120 Brief Specification

Frequency range: 160m to 10m Amateur Bands  
 Mode: CW, USB, LSB  
 RF Input Power: 10W PEP  
 RX sensitivity: 10dB S/N at 0.25µV  
 Power requirements: Max. 4A at 13.8V DC  
 Price: £435.00

THE CENTRE FOR

## TR7500

WHY SETTLE FOR ANYTHING LESS?



### TR7500 Brief Specification

Frequency range: 144-146MHz  
 Channel spacing: 25kHz (other spacings available)  
 Repeater shift: + or - 600kHz (1-6MHz available)  
 Power output: Nominally 15-18W  
 RX sensitivity: 12dB SINAD for 0.2µV or less  
 Tone burst: 1750Hz tuning fork. Automatic in repeater mode  
 Price: £235 inc. VAT

COME TO



## TRIO



A WIDE RANGE OF  
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EQUIPMENT  
ALWAYS AVAILABLE

AMATEUR RADIO

## TR2300

2m SYNTHESISER PORTABLE



### TR2300 Brief Specification

Frequency range: 144-146MHz  
 Channel spacing: 25kHz  
 Repeater shift: - 600kHz (+ 600kHz option)  
 Power output: Nominally 1 watt  
 RX sensitivity: 12dB SINAD for 0.2µV or less  
 Tone burst: 1750Hz tuning fork (Automatic)  
 Price: £195.00 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. Mail orders—normally dealt with on day of receipt. Securicor delivery arranged. All prices include VAT at current rates.

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# radio communication

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GREAT BRITAIN 1979



# Belle Vue Radio And

by the Northern Radio Societies Association

## NRSA '79

### RADIO & ELECTRONICS EXHIBITION BELLE VUE — MANCHESTER

SUNDAY 22nd APRIL 1979 — DOORS OPEN AT 11 a.m.

*THE NORTH'S PREMIER AMATEUR RADIO EVENT*

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- |                        |                               |                                    |
|------------------------|-------------------------------|------------------------------------|
| ★ Inter-Club Quiz      | ★ Grand Raffle                | ★ Radio Societies' Stands & Trophy |
| ★ Construction Contest | ★ Amateur Computer Club Stand | ★ Morse Code Challenge             |
| ★ RSGB Bookstall       |                               | ★ Home Office & Raynet Exhibits    |

*(Bring your transmitting licence for an RSGB identity card)*

- ★ Trade stands featuring Radio Equipment, Micro-processors, Personal Computers and Components

The following traders have booked space:

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Amateur Radio Exchange  
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Bettinson Electronics  
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Bredhurst Electronics  
CB Electronics  
C & R Jewellery  
Calderbrook Technical Services  
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Digital Devices Ltd  
Display Electronics  
Electronica CG Ltd

Greens Telecom  
Greenwell Electronics  
Heron Pike Electronics  
Hewart Electronics Ltd  
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JMG Electronics  
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Lowe Electronics Ltd  
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Mechanelec Ltd  
Microdigital Ltd  
Microwave Modules Ltd  
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SMC Ltd (Northern)  
SOTA Communications Systems Ltd  
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# ELECTRONICS Exhibition

Sunday 22nd April 1979

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This solid state linear transverter is intended for use with a 144MHz transceiver to produce a high reliability transceive capability at 28MHz. A wide range of applications is offered by this MMT28/144 transverter, which by virtue of its linear mode of operation will enable 144MHz SSB, FM, AM or CW equipment to be used at 28MHz.

The inclusion of an RF vox network minimises the necessary connections to the drive source, and will automatically switch the transverter into the transmit mode when 144MHz drive is applied. The incorporation of a low noise receive

converter and a low distortion transmit mixer makes the unit ideal for all types of communication, particularly where a high degree of stability, sensitivity and linearity are of prime importance.

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

#### SPECIFICATION

##### GENERAL

Frequency Coverage: 28-30MHz  
Input frequency range: 144-146MHz  
DC power requirements: 11-13.8 volts (12 volts nominal)  
Current consumption: 300mA quiescent  
2.1 Amps peak  
R.F. connectors: 50 ohm BNC sockets  
Power connector: 5 pin DIN socket  
Size: 187 x 120 x 53 mm  
(7 3/8 x 4 3/4 x 2 1/8")  
Weight: 900 grams (2lb)

##### RECEIVE SECTION

Overall converter gain: 30dB typical  
Overall converter noise figure: 2dB maximum  
Input Impedance: 50 ohm  
IF output Impedance: 50 ohm

##### TRANSMIT SECTION

Input Impedance: 50 ohm  
Input Modes: SSB, FM, AM or CW  
Input required for full output: 300mW or 10 watts with supplied 15dB attenuator

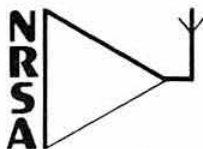
Power Output: 10 watts continuous rating  
Output Impedance: 50 ohm  
Relative 116MHz output: Better than -65dB  
Other spurious outputs: Better than -50dB

##### LOCAL OSCILLATOR

Local oscillator frequency: 116MHz  
Maximum frequency error at 28MHz: ± 1kHz/hour  
Typical Drift at 28MHz: 1kHz/hour  
Frequency sensitivity over voltage range 11-13 volts: 50Hz

PRICE £88.88 inc. VAT

**SEE THIS NEW PRODUCT AND OUR ENTIRE RANGE ON STAND 12**



# Belle Vue Radio And

by the Northern Radio Societies Association

## S.E.M.

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**NEW!** Our Forward/reflected power meter designed for British power levels. F.S.D. 500W.  $\frac{1}{2}$  scale 100W.  $\frac{1}{10}$  scale 1W. 1-30MHz. The pick up unit with two, SO239s is 2" x 2" x 1 1/2" and connects in the aerial lead. The meter unit is a separate box, 6 1/2" x 3 1/2" panel, 2 1/2" deep, which you can put in any convenient position. £28.50. Ex stock.

**SEM 2 MATCH** The updated unit uses much more reliable slow motion drives; which make adjustment and resetting easy. It will match aerials of 15-5000 Ohms, to your equipment. BALANCED or UNBALANCED at up to 1kW, SO239 and 4mm terminals for co-ax or wire aerials £39.44. Ex stock.

**INCREASE YOUR 2 METRE RANGE.** Our Sentinel range of pre-amplifiers use a J FET rather than the usual MOSFET because they give lower noise figures. They are selected for 1dB noise figure. We also stock these units on Marine Band and Satellite Band and on other frequencies to order.

**SENTINEL AUTO 2 METRE PRE-AMPLIFIER** Connects straight into transceiver aerial feeder and the r.f. switching looks after the change over. Gain is 18dB. Any transmit mode. £17.35. Ex stock. 70cms version is £20.25. Ex stock.

**SENTINEL STANDARD PRE-AMPLIFIERS** Same as above but without the automatic R.F. switching. 2 metres is £10.85. 70cms is £13.50. BOTH IN STOCK.

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stock. Yes, they do work fine with FT221s and TS700s.

**SENTINEL H.F. WIDEBAND PRE-AMPLIFIERS** 2-40MHz, 15dB gain. Ideal units for pepping up receivers on 15 and 10, for OSCAR reception and as an ACTIVE aerial.

**SENTINEL STANDARD H.F. PRE-AMPLIFIERS** Performance as above. £9.00.

**SENTINEL AUTO H.F. PRE-AMPLIFIER** Same performance as above with a change over relay operated by your transceiver relay for direct connection in your aerial co-ax. £12.94. Ex stock.

**The most popular 2 metre transverters:**

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**SENTINEL X 2 METRES CONVERTER** Same as above with A.C. power supply. £22.75. Ex stock.

**SEM 70 70cms to 2 metre converter.** Price: £20.25. Ex stock.

**SENTINEL 70 70cms to 10 metre converter.** Price: £22.50. Ex stock.

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\* SO239 sockets available on these units at an extra cost of £1.69.

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SOAR ME522 Digital multimeter 3 digits. Hand held	£47.50
REACER T75D Frequency counter. To 30MHz 12V DC	£47.50
JD JD110 SWR Power meter 1.5-150MHz, 10+100W	£11.80
LEADER LPM885 Wattmeter 1.8-54MHz. 20, 200, 1000W	£85.30
SOATA EDW1 Absorption wavemeter 65-230MHz	£17.20
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SMC HF12 Receiver pocket, 12 channel. C/w Accs.	£56.20
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MICROWAVE 432-100 Linear amp. 432MHz, 100W out	£247.50
KLM 15-160BL Linear amp. 144MHz, 160W out, 12V DC	£200.00
HI-MOUND BK100 Morse key. Mechanical Bug, semi-auto	£17.50
SHURE 444 Microphone desk, controlled response	£30.00
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Sunday 22nd April 1979

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SWR IND.

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Portable Masts 16ft. 4 sections £6.00

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Yaesu 4 pin Mic Plug & Socket £1 pair

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LATE NIGHT THURSDAY UNTIL 8pm

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Resistor and Capacitor Pack	3.10	Min BNC Sockets (50Ω)	0.65
Logic and Display PCBs	4.84	Min BNC Plugs (50Ω)	0.70
5MHz Crystal	3.45	500MHz Prescaler Kit	1.78
Transformer 8-0—V 0.5A		SP8630B 600MHz IC	13.50
(+75p P & P)	2.48	NE592 Wideband Video Amp	1.43
Switches, Knob, BNC's etc.	4.15	DFM Reprint (post free)	0.50

**NEW!** Hi-Z Buffer Kit enables DFM to count below 100Hz  
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All prices inc VAT at the standard rate.  
Please add 20p P & P for packs. SAE for full  
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Designer  
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# Belle Vue Radio And

by the Northern Radio Societies Association

## LOWE ELECTRONICS Ltd

### TR7500

#### WHY SETTLE FOR ANYTHING LESS?



TR7500 Brief Specification

Frequency range:	144-146MHz
Channel spacing:	25kHz (other spacings available)
Repeater shift:	+ or - 600kHz (1.6MHz available)
Power output:	Nominally 15-18W
RX sensitivity:	12dB SINAD for 0.2µV or less
Tone burst:	1750Hz tuning fork. Automatic in repeater mode
Price:	£235 inc. VAT

#### VAT ★ IMPORTANT ★ VAT

Prices include VAT at current rates. If Budget includes increase in rates please contact us before ordering goods.

The TR7500 is still the commonsense two-metre FM mobile rig, employing as it does the straightforward channel number display which reads 20 for S20, 7 for R7 and so on, with no six-digit frequencies to remember and straightforward fast access to any channel within the two-metre band 144-146MHz. A scanner unit is now available from M.R.S. Communications Ltd (see address section) to further expand the TR7500 facilities.

The sharp eyes will notice that the mode switch is now different on the TR7500, having four, not three, positions (marked 4, 5, N, R) and we are finding that the current equipment seems to have higher transmitter power and an improved receiver performance. Inevitably, people are calling this the TR7500B but it's really a case of a production improvement. So B it!

Why not call at your nearest authorised Trio dealer before you consider buying a two-metre FM mobile and ask to see the TR7500(B)? Take the lid off and see what good engineering design looks like in the unbeatable TR7500 from Trio.



## TRIO

### TS120V

MULTUM IN PARVO

### TR3200

PEAK PORTABLE PERFORMANCE



FOR FULL  
CATALOGUE  
SEND 40p  
IN STAMPS  
TO MATLOCK

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 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.

We introduce yet another exciting innovation from Trio in the new TS120V HF transceiver. Equally at home in mobile or home station situations, the TS120V packs more features into a small package than any other comparable model.

Measuring only 9 1/2" x 3 1/4" x 9 1/4" — which is about the size of a packet of cornflakes, the TS120V can best be described as a miniature TS820. The rig covers all bands 80 10 metres — and all of 10 metres 28 30 MHz so it's ideal for transverter driving, has digital readout built in, vox, break-in CW, RIT, noise blanker and the unique Trio passband tuning system used in the 820. The power output is 10W and a matching linear will be along shortly.

The TS120V is clearly a winner for mobile operation but is equally attractive at home and is perfect for the VHF/UHF enthusiast who requires a high per-

formance 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.

We at Matlock, have all fallen in love with the TS120V and we feel sure that you will too. At it's price of £435 including V.A.T. (and including digital readout, vox, etc) we have no doubt that this transceiver will be another winner from Trio. See it soon.





# ELECTRONICS Exhibition

Sunday 22nd April 1979

LOWE ELECTRONICS Ltd

## TRIO TR7010 TR2300



£195 Inc VAT

### 2 METRE SYNTHESIZER PORTABLE

The TR2300 is a really 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 144-148MHz 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 and also in mobile situations.

The transmitter puts out a very clean signal indeed at a power in excess of one watt, and the receiver is very sensitive, in fact better than many big rigs. Using the external power and external antenna sockets allows 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!

For further information, please do not hesitate to contact your nearest authorised Trio dealer.



Work real DX with ease on two-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 any other part of the two-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 amplified 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 for £189. Send for full details now.

**IMPORTANT—VAT  
SEE NOTE ON FACING PAGE**

### SURELY THE MOST AMAZING HAND-HELD TRANSCIVER YET!

The AR240 is a truly staggering rig. In a small hand-held unit, you have a fully synthesised 2 metre FM transceiver covering 144-148MHz in 5kHz steps. Frequency selection is by direct reading top mounted decade switches giving instant access to any frequency in the tuning range. Power output is over 1W and the receiver sensitivity is not only excellent, it's maintained across the full tuning range by automatic voltage controlled tracking. Both up and down 600kHz repeater shifts are built in as is a 1750Hz tone burst.

What more could you ask for in a hand held, except possibly a price of £195 including VAT?

## AR240

FROM A. O. R.

**FULL COVERAGE 144-148MHz  
CHANNEL SPACING 5kHz  
FULLY SYNTHESIZED  
+600 and -600kHz SHIFTS  
1750Hz TONEBURST  
1½ WATT OUTPUT**



### HEAD OFFICE AND SERVICE CENTRE

119 CAVENDISH ROAD, MATLOCK, DERBS. TEL: 0629-2817 or 2430. TELEX 377482. OPEN 9-5.30 TUES-SAT. PHONE IN 9am-9pm.  
Agents: John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex, Ringmer BN2071. Sim, GM3SAN, 19 Ellismuir Road, Baillieston, N. Glasgow. 041-771 0364

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

**TRIO****MODEL OF THE MONTH – THE BEST IN HAM RADIO****TRIO**

# TS820

**FOR THE THINKING RADIO AMATEUR**


160-10 metres  
200W PEP  
0.2µV for 10dB S/N  
Speech processor  
Full metering  
True FSK  
and everything  
that's right

**MATCHING  
ACCESSORIES**  
AT200 Ant. Tuner  
SM220 Station  
Monitorscope and  
band scanner  
SP820 External Speaker  
TL922 2kW Linear

For the thinking radio amateur who can see beyond advertising claims, who listens on the air to what amateurs worldwide are saying and using, who knows how to interpret detailed specifications, who knows the questions to ask—and is not afraid to ask them, who really wants the best transceiver on the HF bands today—for that man, Trio made the TS820.

All the features and facilities required in a top performance transceiver have of course been included in the specification of the TS820. However, it's in the careful assessment by Trio of the overall usability of a rig where the TS820 scores. An example of this is in the unambiguous dial readout which gives you the exact frequency at a glance—just glance at dials on other transceivers and see if you can interpret them. The digital readout unit tells you the truth, and if you think that sounds silly, just look at so called digital readouts which you can twiddle to read almost anything *except* the operating frequency. "IF shift"; who fits that in transceivers; Collins, Drake and Trio—and they are all market leaders in advanced design so they can't be wrong, can they?

For the true measure of the TS820, you must simply see it and use it. It's on show at all authorised Trio dealers and if you want to ask about any aspect of the TS820 and why it has no real competition, simply ring Matlock 2817 and ask away.

TS820—the leader all the way.

**NOTE: THE TS820 IS NOW FACTORY FITTED WITH THE DC INVERTER SUPPLY.**

**Specification**

Frequency Range:

Modes:

Input Power:

Antenna Impedance:

Carrier Suppression:

Sideband Suppression:

Sensitivity:

Selectivity

Image Ratio:

If Rejection:

Power Source:

Weight:

1.8-30MHz

USB, LSB, CW, FSK

200W PEP on SSB

160W DC on CW

100W DC on FSK

50-75ohms

>40dB

>50dB

(10dB S/N) <0.2µV

SSB 2.4kHz (-6dB)

4.4kHz (-60dB)

CW 0.5kHz (optional filter)

>60dB

>80dB

120/240Vac 50/60Hz

13.8Vdc (DC inverter now included in price)

16kg (35.2 lbs)

**TS820 £758 inc VAT, DGI readout £149**

**All Trio equipment is available from the following authorised Trio dealers**  
**LOWE ELECTRONICS LTD, 119 Cavendish Road, Matlock, Derby. Tel: 0629-2430 or 2817**

**WILTSHIRE**

**PAGE ELECTRONICS**

9 Lime Kiln

Wootton Bassett, Nr. SWINDON

Tel. Nos. Charles (0793) 850056

Phil (0793) 771153

**WALES**

**M.R.S. COMMUNICATIONS LTD**

76 Park Road

Whitchurch, CARDIFF

Tel. No. 0222 616936

**BIRMINGHAM**

**WARD ELECTRONICS**

Soho House, 362-364 Soho Road

BIRMINGHAM B21 9OL

Telephone No. 021 554 0708

**NORTH LONDON**

**RADIO SHACK LTD**

188 Broadhurst Gardens

LONDON NW6 3AY

Telephone No. 01-624 7174

**YORKSHIRE**

**LEEDS AMATEUR RADIO**

27 Cookridge Street

LEEDS LE2 3AG

Telephone No. 0532 452657

**LANCASHIRE**

**STEPHENS-JAMES LTD**

47 Warrington Road

LEIGH

Telephone No. 0942 676790

**SOUTH LONDON**

**COMMUNICATIONS HOUSE**

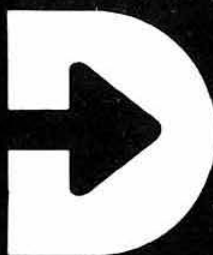
20 Wallington Square

WALLINGTON SM6 8RG

Telephone No. 01-669 6700

**WHY DON'T YOU  
TRADE UP TO  
TRIO**

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



# DATONG ELECTRONICS LIMITED

**NEW PRODUCT**

## MORSE TUTOR

Model D70

The revolutionary new way to practice morse code reception. The DATONG Morse Tutor gives you an unlimited supply of precision morse at the turn of a switch, PLUS built-in oscillator for sending practice.

Now, you can practice receiving morse whenever, and wherever, you like. The DATONG MORSE TUTOR sends a continuous stream of precision morse in five character groups which never repeat. For optimum learning efficiency it has a calibrated variable speed control plus a separately variable delay facility between characters.

It delivers letters only, numbers only, or mixed letters and numbers. It comes with a built-in tone oscillator for sending practice (key required), built-in loudspeaker, and also a separate earpiece for private listening.

Learn morse, the easy, convenient and self-pacing way with the DATONG D70 Morse Tutor. Supplied complete with battery for only £37.00 plus VAT giving a total of £41.62. Now available from stock.



Model ASP Automatic R.F. Speech Processor



Our R.F. Speech Processors, using the advanced technique of R.F. clipping, greatly increase your talk power and help your voice punch through the QRM.

They work on any rig, with any speech mode, at any power level, and on any band. Simply connect in series with your microphone to get a really punchy speech signal. MODEL ASP, our latest model, offers for the first time the ultimate convenience of instant push-button selection of the desired amount of clipping and elimination of manual level setting.

Prices: ASP £65.00 plus VAT (£73.13 total); RFC £40.00 plus VAT (£45.00 total); RFC/M £21.50 plus VAT (£24.19 total).

Model FL1 Frequency Agile Audio Filter



A versatile add-on unit for communications receivers which helps to extract wanted signals from background interference. It connects in series with the loudspeaker or headphones. The effect is similar to "I.F. pass-band tuning" for SSB or RTTY reception, and bandwidth down to 20Hz (with limited a.f.c.) gives an amazing capability for pulling weak CW stations out of the QRM. MODEL FL1 is unique in being able to tune itself when notching out unwanted whistles.

Price: £53.00 plus VAT (£59.63 total).

Model UC/1 Up converter



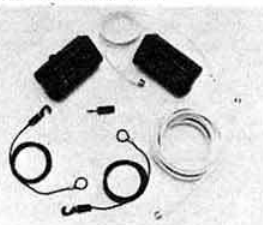
If you already own a good quality ten-metre or two-metre receiver or transceiver you are only £118 away from a really high performance general coverage receiver. Just add the magic ingredient, MODEL UC/1 from DATONG!

You get full coverage in thirty synthesised 1MHz segments from 60kHz (Rugby MSF) to 30MHz, at high sensitivity and with all the facilities and high performance of your existing rig!

For good measure UC/1 also adds two-metre coverage to ten-metre receivers.

Price: £105.00 plus VAT (£118.13 total).

Model AD170 Active Antenna



For sensitive reception right through from MSF at 60kHz to Band 1 TV DX around 50MHz, without the need for an antenna farm, MODEL AD170 is ideal. Designed for loft mounting, MODEL AD170 has no adjustments and needs no external tuning units.

Although only three metres long, MODEL AD170 has the same directional properties as a full size dipole, even at 60kHz.

Price: £29.50 plus VAT (£33.19 total). Special price complete with mains power unit: £33.00 plus VAT (£37.13 total).

# DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone: (0532) 552461

## SOME ICOM PRICES ARE DOWN! (for the time being) SEE THE FULL RANGE AT BELLE VUE



### 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 = £496 With VAT = £558

### 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-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-245E NOW £399 inc.



### IC-280E NOW £245 inc.

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)  
North West—Gordon G3LEQ (Knutsford 0565) 4040 Yorkshire—Peter G3TPX (022678 2517)

H.P. TERMS AVAILABLE

FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

**THANET ELECTRONICS**

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







## LEADERS IN THEIR FIELD



**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 connector 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 U11) 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 crystallised 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 hotbed 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**



**IC-701PS**

**IC-701**



**IC-RM3**

The IC-701 with its power supply the IC-701PS and the remote, micro-processor controlled IC-RM3 make the ideal station for HF. By no means the cheapest on the market, this transceiver system, which has all the facilities normally listed as extras with other systems, is getting a very good name for itself throughout the world. The quality is typically ICOM and the sheer pleasure of driving one of these beasts has to be tried to be understood. The size is so compact too, so that mobile operation with 100Watts of RF into the antenna is easy to achieve. The RM3 is the luxury extra for the man who wants the lot. It provides automatic remote band changing and the facility to key in any allowed frequency on any band and to store up to four. Scanning up or down the band over a range programmed in by the user is possible. The RM3 can also be used on your 2 metre station if you have a 211E or a 245E.

The IC-SM2, which is supplied as standard with the IC701, is also available as a separate. It is a superb Electret desk microphone which is powered directly from all current ICOM equipment without modification. Details can be given for use with other makes of equipment also.

IC-701	Less VAT = £760	With VAT = £855	IC-RM3	Less VAT = £88	With VAT = £99
IC-701PS	Less VAT = £128	With VAT = £144	IC-SM2	Less VAT = £23.11	With VAT = £26

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**

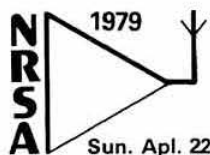
**HP AND PART EXCHANGE WELCOMED**

SEE IT AT



BELLE VUE

## THE 'REMOTABLE' 2m RIG



**IC-280**



**£245**

inc VAT

**25kHz SPACING OVER THE WHOLE BAND:  
3 MEMORIES: LED READOUT:  
BUT MOST IMPORTANT—ICOM QUALITY**

Icom's new 2 meter mobile has a detachable microprocessor controlled head, easy to read LED's and a new style meter set in a brushed aluminium front panel.

The 280E comes as one radio which can be mounted in the normal manner but as an option the entire front one third of the radio detaches and can be mounted in that small location in the car (such as the glove pocket) where other sets are just too large to fit, while the main body tucks neatly out of sight several feet away—such as under the passenger's seat. No longer do you have to mount a radio in a position where it is poised all ready to smash your right kneecap should you have an accident!

With the microprocessor head the IC-280E can store three frequencies of your choice, which are selected by a four position front panel switch. These frequencies are retained in the 280E's memory for as

long as power is applied to the radio. Even when power is turned off at the front panel switch the programmed memories are maintained; and the 600kHz repeater shift is always retained.

It goes without saying that the usual high quality engineering for which Icom are renowned is found in the 280E. There are no nasty shortcuts to try to keep the price down to the detriment of performance.

It includes the latest innovations in large signal handling FET front ends for excellent intermodulation performance and good sensitivity at the same time. The IF filters are crystal monolithics in the first IF and ceramic in the second, providing narrow band capacity for today and tomorrow's crowded operating conditions. Modular PA construction with broad band tuning provides full rated power across the full 2 meter band.

FROM **THANET ELECTRONICS** OF COURSE

# WATERS & STANTON ELECTRONICS

## 12½ kHz IS HERE! MULTI 700E

It's the latest model! 25 watts output



IN STOCK  
NOW!



This is the rig you won't have to modify for 12½kHz!  
£229 inc VAT! and this is what you get:

- ★ Transmit power variable 1-25 watts from front panel control
- ★ Tunes in 25kHz switched channels
- ★ Front panel control inserts 12½kHz between each 25kHz channel
- ★ Xtal controlled tone burst for reliable repeater operation
- ★ Plus & minus 600kHz shift for European repeaters
- ★ Bright 4-digit LED display for true frequency readout
- ★ All the usual accessories including microphone & mobile bracket

- ★ Rx filter is sharp enough to permit 12½kHz operation in the interim period of changeover yet copes perfectly with 25kHz
- ★ Dual conversion Rx with xtal shaping filter
- ★ Helical front end tuning. New 2-stage RF Amplifier
- ★ Rx sensitivity typically better than 0.3µv for 20db N/Q
- ★ Plug-in modular construction for easy servicing
- ★ Fantastic value for money 12 months full warranty

H.P. TERMS: Deposit £46. Balance: 6 months £33.09; 12 months £17.61; 18 months £12.52; 24 months £9.97

TO: WATERS & STANTON ELECTRONICS, 31 SPA ROAD, HOCKLEY, ESSEX

TEL: HOCKLEY (03704) 6835

\*Please supply Multi 700E by return. Cheque/P.O. enclosed for £229

\*Please send me H.P. forms for completion. Payments to be.....months at.....per month. Deposit of £46 enclosed

Name.....Call sign (if issued).....

Address.....

\*Delete whichever not applicable

# WATERS & STANTON ELECTRONICS

## MAIL ORDER!

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

FRG7000 General Coverage Receiver	£210.00 (N/C)
FRG7000 Digital deluxe receiver	£367.00 (N/C)
FT101E 160-10m transceiver	£569.00 (N/C)
8 pole 350Hz CW filter	£21.75 (N/C)
SP101 Matching speaker	£21.25 (N/C)
YO100 Monitor scope	£156.00 (N/C)
FT200B 80-10m transceiver	£394.00 (N/C)
FP200B Matching AC PSU	£77.50 (N/C)
FT901DE 160-10m digital transceiver	£785.00 (N/C)
FT901DM 160-10m digital transceiver	£960.00 (N/C)
FT77 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 hood	£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)

### ICOM (NOTE NEW PRICES!)

IC215E 2m FM 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)

### 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	£59.80 (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	t.b.a.

### 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	£69.00 (N/C)
160-10m "open-wire" doublet	£22.00 (N/C)
1Kw 80-10m linear 240v	
GLA 1000 (March/April)	£268.00 (N/C)

### AR

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

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

### NAIGAI

2200 2m 500w PIP linear	£481.00 (N/C)
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### ADONIS MICROPHONES

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

### ASP MOBILE ANTENNAS

201 - 2m 1/4 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	£6.75 (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 RDS SWL ham dipole	£30.35 (1.00)
EL-40X 80-40 Mini dipole	£39.00 (1.00)
DX5V 5 band vertical	£59.00 (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)
HD/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)
MBM/88 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)
AR400 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	£9.95 (0.50)
UR67 per metre	£0.54 (0.02)
UR43 per metre	£0.18 (0.01)
5 core cable per metre	£0.22 (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	£0.23 (0.05)
Twin SWR meters 3-150mHz	£11.95 (0.50)

### HILOMAST LTD

PNAM-1 Telescopes to 9m	£239.00 (14.00)
PNAM-2 Telescopes to 14m	£293.00 (15.00)
SAE for details	

All prices include VAT  
Carrier costs shown in brackets

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**POWERFUL**—1.5 watts output  
**3 MODES**—Simplex/ +600kHz/ -600kHz  
**QUALITY**—Built-in condenser microphone  
**PORTABLE**—External 12 volt socket

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AC CHARGER	£4.50
BNC FLEXI-WHIP	FREE
CIGAR LIGHTER DC CABLE	FREE

£139.95

### EXTRA DEAL

Any 4 extra channels from:	
R0-R7 & S15-S23	£9.00
Xtal tone burst	£7.50
Real leather case	£6.75
BB-2 pouch for external HP7 cells	£5.00

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credit and send you the goods. Example—Palm II £139.95. Deposit £28.95 plus 6 payments of £18.50. (Applies only to these two items.)

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Dear Sirs,

(1) Please send me free credit forms by return for the undermentioned items.

I enclose cheque/postal order for £.....

(2) Please send me full details of the following items.

Items referred to: .....

NAME .....

ADDRESS .....

CALL SIGN IF ISSUED.....

**HOLD IT!**  
**HERE'S TWO REALLY GREAT**  
**PORTABLE DEALS FOR 2M!**  
**FRESH FROM OUR FACTORY**



## MIZUHO—2M SSB/CW Hand-Held



Fitted 144.20-144.40MHz

### 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!

**DELIVERED ANYWHERE IN UK**  
**12 MONTHS GUARANTEE £165 inc VAT**

Yes, here's your chance to avoid those price increases. Pay 20% deposit and providing you pay the balance by six monthly instalments, you will pay no interest. Simply calculate the total value of your purchase, send us a cheque for one fifth of the total amount, plus any odd pence to round the balance down to the nearest £1. We will arrange your free

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BELOW AND YOU'LL FIND FEATURES AND VER-  
SATILITY ONLY AVAILABLE ON MUCH MORE  
EXPENSIVE RIGS—CALL, PHONE OR WRITE  
FOR FULL DETAILS (PLEASE SEE FACING PAGE).

## FT101ZD Series High Performance Transceiver

### FULL COVERAGE

Full band coverage is provided on the FT-101ZD: 160 through 10 meters, plus WWV/JJY reception on 5MHz. Teamed with the FTV-901R transverter, operation can be extended to 50, 144, and 430MHz from your desk top.

### CLEAN OUTPUT SIGNAL

With today's crowded bands, we all have the responsibility to keep our transmitted signal free of spurious radiation. YAESU engineers have included RF negative feedback, for a clean output signal.

### STATE OF THE ART NOISE BLANKER

The all-new noise blanker is extraordinarily helpful in reducing the level of impulse noise. The blanking level may be adjusted from the front panel.

### RF SPEECH PROCESSOR

A high-performance RF speech processor is built into every FT-101ZD, providing an increase in your average talk power of approximately 6dB. The processor level can be adjusted from the front panel, for optimum signal enhancement.

### WORLD-WIDE POWER CAPABILITY

The FT-101ZD has provision for operation from a variety of AC voltages, from 100 to 234 volts. When you're travelling, you'll never need a heavy, bulky transformer for operation with your FT-101ZD. A DC-DC converter is an available option, for mobile operation. The FT-101ZD is small enough to qualify as carry-on baggage on most airlines, and is equipped with a strong, side-mounted handle for ease of carrying.

### VARIABLE IF BANDWIDTH

Using two 8-pole crystal filters with superior shape factors, the FT-101ZD variable bandwidth system is a valuable tool on today's crowded bands. With the turn of a dial, high-pitched SSB "buckshot," or unwanted CW signals, can be eliminated from the IF passband.

Compare for yourself: other systems use a single filter in the IF; though you can move away from one interfering signal, you may move into more QRM. The YAESU design actually varies the bandwidth, eliminating the QRM. Other manufacturers would have you spend hundreds of pounds on different filters for 2.1kHz, 1.8kHz, 1.5kHz, 800Hz, 500Hz, etc. With the FT-101ZD, you have continuously variable bandwidth—from 2.4kHz down to 300Hz.

### DIGITAL PLUS ANALOG READOUT

The FT-101ZD features digital plus analog frequency readout. The display features big, bright LED digits, for maximum readability. For extra savings, the economy model FT-101Z gives you the same precision analog display, at a significantly reduced cost. You can add the digital display later, if you wish.

### INTERFACE WITH 901 SERIES COMPONENTS

Your FT-101ZD may be used with all of the exciting FT-901DM series accessories. The FV-901DM synthesized, scanning VFO provides storage and recall of up to 40 frequencies, in addition to its 3-speed scanner and auto scan function. See for information on other accessories.

### HOW TO REACH US (EASY PRIVATE PARKING ON OUR 70ft. FORECOURT)

**FROM SOUTH AND EAST.** We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within 1 mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.

**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.

**FROM THE WEST AND SOUTH/WEST.** Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

**Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.**



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## NEW! ADVANCED TECHNOLOGY from **SWAN** ELECTRONICS



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Solid state HF transceiver. 100 watt PEP and CW output, 80M-10M. Broadband design featuring noise blanker, VOX, 25KHz calibrator, CW sidetone, semi-break in CW, RIT, built-in speaker. Ultra stable PTO frequency source. Operates directly on 11 to 15 VDC, USB, LSB, CW operation. 9MHz 8 pole crystal IF filter. 4W Audio O/P.

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### YAESU FT-101E

**£559**

Yes, you'll still need to go a long way to beat the Yaesu FT-101E! The world's No 1 HF Transceiver, with an impeccable pedigree! We've tried it alongside the newer stuff and it's hard to tell the difference. Maybe it doesn't have the fancy extras, but for sheer value for money and reliability, it takes a lot of beating.

- ★ Full coverage 10-160 metres, AM/CW/SSB
- ★ 260 watts PEP input SSB, 180 watts CW
- ★ RF speech processor with operator control for greater talk-power
- ★ Base station or mobile operation with integral AC or DC (12v) power supplies
- ★ Outstanding sensitivity and stability, VFO read-out to 1kHz

### YAESU FT-901DM

**£949**

The Amateurs Dream! Tomorrow's Transceiver here Today!

Yes—The Yaesu FT-901DM is all of this . . .  
Superb performance and state-of-the-art features makes the '901 a dream to own and operate under today's conditions.

- ★ Digital frequency display and memory circuit for transmit and receive frequency control giving the ultimate in versatility
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- ★ Efficient RF speech processor for enhanced transmission efficiency
- ★ Built-in Curtis electronic keyer
- ★ All-mode operation—including FM
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### YAESU FRG-7000

**£329**

The New Performance Standard in Communications receivers!

A high quality general coverage receiver for the discerning SWL and a worthwhile addition as a second receiver for the transmitting amateur. How often have you wanted a true general coverage receiver of this calibre but been put off by the price.

The FRG-7000 is a cost-effective answer to your prayers.

- ★ Full and continuous coverage 250kHz to 29.999MHz
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- ★ CPU controlled timing clock switches receiver on or off at preselected times; also enables control of external unit such as tape recorder
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### TRIO TS-820S

£879

The pacesetter 10-160m Transceiver for the amateur who wants to keep up-to-the-minute! Loaded with features to make your operating even more enjoyable; among these are:

- ★ Advanced PLL circuitry and ultra-stable VFO for accurate and spurious-free frequency control
- ★ Factory-fitted digital readout of TRUE frequency—NOT just a "VFO counter" like some others
- ★ Speech processor gives true RF compression; front panel controlled and fully metered
- ★ IF shift to combat QRM on a busy band

### TRIO TS-120V

£425

Trio's latest for HF Mobile.

Join in the mobile scene now that conditions are up.

- ★ Big rig features in a compact package
- ★ Digital frequency readout
- ★ All bands 80-10 metres CW/SSB
- ★ 10 watts output
- ★ IF passband tuning and other fine features

### TRIO TL-992

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Want a BIG LINEAR? This is it!

A real powerhouse to complement your station, only needs 80 watts drive for full output.

- ★ 2000 watts PEP input SSB; 1000 watts CW/RTTY
- ★ 2x Elmac 3-500Z in AB2 grounded-grid for cool efficiency
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### TRIO TS-520S

£549

Yet another Trio bargain from WESTERN! The latest version of this fine HF Transceiver with all the up-to-date features needed by today's amateur but at a realistic price. No frills, just good all-round performance and excellent value at the price.

- ★ Full coverage 10-160 metres, CW/SSB
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- ★ Improved speech processor to help in those pile-ups
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### PORTABLE TR-2300

- ★ The leading 2m portable
- ★ Small, rugged, easy-to-use
- ★ 25kHz channels
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- ★ Really—the only choice

OUR PRICE £189

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### MOBILE FT-227R

- ★ Yaesu's up-to-date mobile rig
- ★ 800 channels 144-148MHz
- ★ Instant REV RPT—a WESTERN special
- ★ Large, clear LED frequency readout
- ★ Quick-release mobile mount

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DETAILS

### PORTABLE FT-202R

- ★ A tiny handful of fun
- ★ Full 1 watt output
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- ★ Fitted S20, S21, S22
- ★ Helical antenna supplied

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### MOBILE TR-7500

- ★ 25kHz channel spacing
- ★ Clear LED readout of channel number
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- ★ Quick-release mobile mount

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# Radio Shack

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## PRICE LIST, MARCH 1979 (prices include VAT)

### R. L. DRAKE PRODUCTS

#### COMMUNICATIONS RECEIVERS & ACCESSORIES

R-4C Receiver—SSB, AM, SW, RTTY	£495.00
FL-250 Filter for R-4C (250Hz)	£39.60
FL-500 Filter for R-4C (500Hz)	£39.60
FL-1500 Filter for R-4C (1500Hz)	£39.60
FL-4000 Filter for R-4C (4000Hz)	£39.60
FL-6000 Filter for R-4C (6000Hz)	£39.60
4-NB Noise Blanking for R-4C	£54.00
MS-4 Matching Speaker R-4C, SPR-4, TR-4CW	£24.75
Crystals—Accessory Crystals for R-4C	£4.95
SPR-4 Receiver—General Purpose	£450.00
DC-PC DC Power Cord for SPR-4	£4.05
Crystals—Accessory Crystals for SPR-4	£4.95
DSR-2 VLF/HF Digital Synthesized Receiver	£2250.00
SSR-1 Receiver-General Purpose	£175.00

#### TRANSCIVERS & ACCESSORIES

TR-7/DR-7 Transceiver with gen. cov. & Digital	£864.00
PS-7 120/240V Power Supply for TR-7	£135.00
RV-7 Remote VFO for TR-7	£139.50
MS-7 Matching Speaker for TR-7	£24.75
NB-7 Noise Blanking for TR-7	£64.80
FA-7 Fan for TR-7 & PS-7	£18.00
AUX-7 Range programme board & 1 Receive module	£31.50
RRM-7 Range receive modules (500kHz) for AUX-7	£5.40
RTM-7 Range transceive modules (500kHz) for AUX-7	£5.40
SL-300 CW Filter (300Hz) for TR-7	£39.60
SL-500 CW Filter (500Hz) for TR-7	£39.60
SL-1800 SSB/RTTY Filter (1800Hz) for TR-7	£39.60
SL-6000 AM Filter (6000Hz) for TR-7	£39.60
MMK-7 Mobile mounting kit (case, filters, cable) TR-7	£33.75
MN-7 ATU/RF wattmeter 160-10m, 250W	£123.75
MN-2700 ATU/RF wattmeter 160-10m, 2kw	£199.80
WH-7 HF wattmeter/VSWR bridge	£59.40
385-0004 Service Manual for TR-7	£16.50
TR-4CW (RIT) Transceiver AM/SSB/CW with R.I.T.	£504.00
AC-4 120/240V Power supply for TR-4 CW/T-4XC	£108.00
34-PNB Plug in Noise Blanking for TR-4CW	£72.00
DC-4 DC Power supply for TR-4CW, T-4XC & R-4C	£139.50
RV-4C Remote VFO for TR-4CW	£108.00
FF-1 Crystal Control for TR-4CW	£38.25
UV-3E 144/432 MHz FM Transceiver	£495.00
PS-3 AC Power supply for UV-3E (13.6V @ 9A)	£69.75
UMK-3 Remote Trunk kit for UV-3E	£54.00

#### LINEAR AMPLIFIER

L-7 Linear Amplifier 160-10m	£765.00
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#### TRANSMITTER

T-4XC Transmitter AM/SSB/CW	£495.00
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#### ADDITIONAL ACCESSORIES

TV-42 LP Low Pass Filter 100w	£10.13
TV-3300 LP Low Pass Filter 2kw	£18.00
RP-500 Receiver Protector	£72.00
7072 Hand mic. for TR-4CW/T-4XC	£13.50

7073 Hand mic. for TR-7/UV-3E	£13.50
7077 Desk mic. for TR-7/UV-3E	£24.75
DL-300 Dummy Load, 300 watts	£15.75
DL-1000 Dummy Load, 1000 watts	£29.70
RCS-4 Remote Control Antenna switch	£83.25
B-1000 Balun 4:1 for MN-7/MN-2700/MN-4C only	£18.00
1525-EM Encoder mic.	£36.00

The R. L. Drake Company are no longer making the following items; however, we still have a few of each—please check our stock position before ordering:

AA-10 1w in-10w out 2m Amplifier	£45.00
WV-4 RF wattmeter 20-200MHz	£64.80

#### HY-GAIN ANTENNAS

18HT 6-80m Vertical Tower	£253.12
12AVQ 10-20m Trapped Vertical	£42.18
14AVQ/WB 10-40m Trapped Vertical	£59.06
18AVT/WB 10-80m Trapped Vertical	£85.50
18V 10-80m Vertical	£31.28
TH6DX 6 element beam for 10/15/20	£230.62
TH3MK3 3 element beam for 10/15/20	£176.62
TH3JR 3 element beam for 10/15/20	£127.68
TH2MK3 2 element beam for 10/15/20	£123.46
HY-QUAD 2 element quad for 10/15/20	£190.12
DB 10-15A 10 and 15 beam	£129.38
204BA 4 element 20m beam	£174.38
203BA 3 element 20m beam	£132.19
153BA 3 element 15m beam	£70.58
103BA 3 element 10m beam	£57.38
402BA 2 element 40m beam	£177.75
511 Heavy duty spring	POA
499 Flush body mount	£11.59
417 Deluxe spring	£8.83
492 Miniature spring	£4.50
LA-1 Lightning arrestor	£22.84
LA-2 In-Line Lightning arrestor	£3.71
BN-88 Ferrite balun	£15.19

#### YAESU

FT-202R 2m 1w Hand held Tcwr fitted 3 ch	£119.81
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#### TEN-TEC

509 Argonaut 5w SSB/CW Tcwr 3-5-30	£247.50
540 Triton 1V 200w SSB/CW Tcwr 3-5-30	£495.00
544 Digital Triton 1V 200w SSB/CW Tcwr 3-5-30	£618.75
545 Omni-A Analogue Transceiver	£652.50
546 Omni-D Digital Transceiver	£765.00
570 Century 21, 70w CW Tcwr 3-5-29MHz	£220.50
574 Digital Century D	£281.25
405 Linear Amp. 100w, 3-5-30MHz	£112.50
210/E (1A) 115/230vac/13vdc psu for Argonaut	£27.00
251/E (9A) 115/230vac/13vdc psu for Argonaut/405	£67.50
262G/E (18A) 115/230vac/13vdc psu for Tritons	£108.00
247 Tuner	£49.50
277 Tuner/SWR	£58.50
212 Crystal 29-0-29-5MHz for Tritons	£4.50
213 Crystal 29-5-30-0MHz for Tritons	£4.50
240 Converter 160m for Tritons	£72.00
241 Crystal Oscillator for Tritons	£22.50
242 Remote VFO for Tritons	£119.25
245 CW filter for Tritons	£19.80
249 Noise Blanking for Tritons	£19.80

276 Crystal Calibrator for Century 21	£19.80
KR-1A Dual paddle assembly	£27.00
KR-5A Single-paddle keyer, 6-14vdc	£31.50
KR-50 Ultramatic keyer dual paddle 117vac/6-14vdc	£85.50

#### BARLOW-WADLEY

XCR-30 General coverage receiver	£149.85
XCR-30 General coverage receiver with FM unit	£170.00

#### STANDARD

C-146A 2m FM Tcwr, 2w 5 channels (hand held) with leather case/tones burst/S20/22	£140.62
AT-19 Flexible antenna	£5.56
HP-7 Set of 10 rechargeable ni-cads	£9.56
Battery charger	£5.06
Hand microphone	£15.18
Basemaster	£24.75
Extra crystals S21/23/24 R3/4/5/6/7	£3.89

#### TELEX COMMUNICATIONS INC.

LIGHTWEIGHT HEADPHONES 3-2-20ohms	
HFC-91 Underchin 1-5oz with foam ear-pads	£6.08
HMC-2 Underchin 1-5oz with plastic ear-tips	£9.00
HTC-2 1-6oz Twin Receiver headphone	£14.40
DUAL MUFF HEADPHONES	
C-610 3-2-20ohms Dual Receiver Magnetic	6.75
SWL-610 2000ohms Dual Receiver Magnetic	£7.99
C-1210 3-2-20ohms Dynamic foam padded	£18.45
C-1320 3-2-20ohms TELEX'S finest	£25.65

#### BOOM MICROPHONE HEADSETS

(headphones as above)	
CM-610 As C-610 with high Z Ceramic microphone	£29.70
CM-1210 As C-1210 with high Z Ceramic microphone	£38.25
CM-1320 As C-1320 with high Z Ceramic microphone	£47.25
CM-1320S As CM-1320 with single head-phone (all the above headsets fitted ptt switch)	£36.90

#### MICROPHONES (hand held battery powered)

ProCom 1 Electret High Output	£11.70
ProCom 11 Electret Variable Gain	£17.55
CB-73R Dynamic Noise-cancelling (re-lay switch)	£23.40
CB-73S As above with 6-wire universal lead	£24.75

#### HAL COMMUNICATIONS CORP.

ELECTRONIC TTY SYSTEM	
DS-3000 KSR version 3.X (ASC11/Baudot/Morse)	£1134.00
DS-3000 KSR version 2.X (ASC11/Baudot)	£885.36
ST-6000 Demodulator/Keyer with 'scope	£432.00
ST-5000 Demodulator/Keyer	£194.40
RVD-1005 Visual Display Unit (Baudot)	£285.12
DKB-2010 Dual mode keyboard with 128 key buffer memory	£345.60

## TRIO EQUIPMENT

TS 820S 160-10m Tcvt. 200w PEP (with DG-1)	£899.00
TS 520S 1.8-28MHz SSB Tcvt. 200w PEP	£575.00
SM 220 Monitorscope	£251.00
TS 700S 2m all mode dig. Tcvt.	£637.00
TR 7010 2m CW/SSB Tcvt. 10w output	£189.00
TR 7200G 2m FM mobile Tcvt. 10w fitted 10ch	£189.00
TR 7400A 2m FM mobile Tcvt. 800ch	£365.00
TR 7200G 2m FM mobile Tcvt. 10w PLL 80 FM ch	£235.00
TR 2300 2m FM portable Tcvt. PLL 80 FM ch	£210.00
TR 8300 70cm FM mobile 10w Tcvt. fitted 4ch	£267.00
TR-3200 70cm Tcvt. 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.

## CDE ROTATORS

AR-20	£38.81
AR-22L	£48.38
AR-30	£46.13
AR-40	£53.44
CD-44	£106.88
HAM-3	£145.13
BIG-TALK	£89.44
TAIL-TWISTER	£241.88

## COAXIAL CABLE

UR-67 52ohms per metre	£0.60
UR-76 52ohms per metre	£0.20
T3234 52ohms per metre	£0.55
UR-70 75ohms per metre	£0.20
RG-174U per metre	£0.30
300ohm ribbon per metre	£0.10
14swg enamelled copper wire per metre	£0.12
4-core rotor control cable per metre	£0.20
5-core rotor control cable per metre	£0.25
8-core rotor control cable per metre	£0.35

## THE FABULOUS BEARCATS ARE IN STOCK AGAIN!

WE CAN NOW OFFER 2 MODELS	
Bearcat 210	£199.80
Bearcat 250	£249.75

## BARKER & WILLIAMSON

331A Little Dipper 2-230MHz grid-dip meter	£81.00
334A Dummy load/Wattmeter. 1kW	£135.00
371-1 Wide-range Attenuator	£33.75
375 Protax antenna switch	£16.88
377 Coax relay	£15.30
551A Antenna switch 6-way	£15.30
595 Antenna switch 6-way	£16.20

## THE AMAZING AR-240

Synthesized, 800 channel, hand held TCVR. Complete with ni-cads and charger unit.	£195.00
---	---------

## AMECO

### EQUIPMENT

OCMK Code practice oscillator kit	£12.38
OCMV Code practice oscillator wired	£16.20
PLF-2 FET Receiver preamp	£47.25
PT-2 FET Transceiver preamp. 10-160m	£67.50
MORSE CODE COURSES	
101-33 Senior Code Course.	
33rpm Record	£5.40
101-T Senior Code Course. Cassette	£6.48
103-33 Advanced Code Course.	
33rpm Record	£2.80
103-T Advanced Code Course. Cassette	£3.78
105-33 Gen. class supplementary course	
33rpm Record	£2.80

### PUBLICATIONS

3-01 Radio Electronics Made Simple	£2.00
102-01 Amateur Radio Theory Course	£3.50
23-01 Novice Class Theory Course	£2.50

## ASTATIC MICROPHONES

T-UG9-D104 Golden Eagle gold-plated transistorised	£69.75
T-UG9-D104 Silver Eagle chrome-plated transistorised	£49.50
UG8-D104 The famous Crystal D104	£31.50
T-UG9-D104 Transistorised amplified D104 grip-t-t	£40.50
T-UG9-D104 Transistorised amplified p.t.t. (grey or black)	£45.00
525 DL6 Dynamic Hand Microphone.	
400 Z	£12.15
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
555 4-wire Hand Mic. noise-cancelling "Trucker"	£21.60
557 6-wire Hand Mic. noise-cancelling "Trucker"	£26.10
531 Hand Mic. mobile. High Z	£7.65
539 Hand Mic. mobile. noise-cancelling	£7.65
1104C Desk Mic. FET amplified	£36.00

## SHURE MICROPHONES

201 Hand held ceramic	£14.18
202 Hand held noise-cancelling ceramic	£14.85
401A Hand held magnetic	£16.20
404C Hand held	£24.98
444 Desk model	£31.72
526T Desk model with preamp	£38.48

## JAYBEAM ANTENNAS

4Y/4M 4 element folded dipole yagi	£14.85
C5/2M 50B glass fibre colinear	£35.42
5Y/2M 5 element folded dipole yagi	£8.67
8Y/2M 8 element folded dipole yagi	£11.25
10Y/2M 10 element folded dipole yagi	£24.58
PBM 10/2M 10 element Parabeam	£29.72
PBM 14/2M 14 element Parabeam	£36.12
8XY/2M Crossed 8 element yagi	£22.50
10XY/2M Crossed 10 element yagi	£30.28
PMH/2C 2-way phasing harness	£5.95
Q4/2M 4 element quad yagi	£18.98
Q6/2M 6 element quad yagi	£24.75
D5/2M Double 5 slot-fed yagi	£15.77
D8/2M Double 8 slot-fed yagi	£21.02

SVMK/2M Mounting kit	£5.62
UGP/2M Unipole & ground plane	£8.12
HM/2M Mobile halo with mast	£4.45
PMH2/2M 2-way phasing harness for two 2m ants.	£7.82
PMH4/2M 4-way phasing harness	£18.62
D8/70cm Double 8 slot-fed yagi	£17.71
PBM 18/70cm 18 element Parabeam	£21.38
MBM 48/70cm 48 element Multibeam	£24.92
MBM 88/70cm 88 element Multibeam	£33.15
TAS 2m 5/8 mobile whip	£13.59
U5 70cm Colinear 5-6dB	£20.25
DL Double lashing chimney kit	£8.92
W6 6" wall bracket	£2.83
W21 21" wall stand-off bracket	£11.09
W24 HD 24" wall stand-off bracket heavy duty	£15.77
SPM 16' x 1" Portable Mast	£11.31
PME 4" extension for double arrays	£1.91
A4 4' 6" x 1 1/2" mast	£2.89
A5 5' x 1" mast	£2.16
A9 9' x 1 1/2" mast	£5.82
A10 10' x 2" mast	£10.06
CP1 Cross-over plate 2" x 2"	£2.50
JBL 59/6 6" jointing sleeve for 2" masts only	£2.12
JBL 59/15 15" jointing sleeve for 2" masts only	£5.00
JBL 29 Universal clamp 1 1/2" boom to 1"-2" mast	£1.20
JBL 30 Universal clamp 1" boom to 1"-2" mast	£1.20
JBL 53 Universal clamp 1" boom to 1"-2" mast	£1.20
JBL 58 3-hook guy wire clamp non-rotating	£1.31
JBL 63 Universal clamp 1-1 1/2" boom to 1"-2" mast	£0.98
JBL 64 Die-cast clamp 1" boom to 1" mast	£0.93
JBL 65 Die-cast clamp 1" boom to 1"-2" mast	£0.98
JBL 73 Heavy-duty universal clamp	£1.64
MBP Mast base plate for 2" diam. mast	£2.72

## PHILIPS

AAC-4000 Language-trainer, comprising Cassette Recorder and headphone with microphone attached	£129.60
AAC Language courses for use with the AAC-4000 trainer above	
Courses are available in FRENCH/GERMAN RUSSIAN/SPANISH/ITALIAN/PORTUGUESE and ENGLISH. There are four parts to a full course.	
Parts 1, 2, 3 (each part)	£36.72
Part 4	£41.04
(Send LARGE sae for brochure please)	

## FASTFIT CONNECTORS

CPF1259-10 PL-259 type for UR-43/UR-76	£0.65
CPF1249-15 Female line-connectors for UR-43/76	£1.00
CPF1259-7 PL-259 quick-dis. male for UR-43/76	£1.08
CPF15858 Cable splice, twist-on for UR-43/76	£0.97
CPF1259-13 PL-259 for RG-8/UR-67	£0.87

WE ARE SITUATED just around the corner from WEST HAMPSTEAD UNDERGROUND STATION which is on the BAKERLOO LINE. A few minutes walk away is WEST HAMPSTEAD MIDLAND REGION STATION and WEST END LANE on the BROAD STREET LINE. We are on the following BUS ROUTES: 28, 59, 159, C11

WE ARE OPEN 9-5 MONDAY to FRIDAY, 9-12.30 SATURDAYS.

We are closed for lunch between 1 p.m. and 2 p.m.

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### 2m HAND PORTABLE

### ONLY £88.00

plus VAT  
Full range of accessories available

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ESTABLISHED FOR MORE THAN TWO DECADES  
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LONDON'S LARGEST STOCKISTS OF YAESU • ANTENNA  
SPECIALISTS • STANDARD • ICOM • LUNAR  
• JAYBEAM • SST • QM70 • ATLAS • ETC

ACCESS • BARCLAYCARD • INSTANT HP • P/EX

### FRG-7—DIGITAL DISPLAY

Yes, The world famous FRG-7 is now available with digital read-out fitted by Lee Electronics in place of kHz dial. Special price £227.00 + 12½% VAT  
For customers who already own FRG-7's we can supply the digital read-out complete with installation instructions. £39.50 + 12½% VAT

### MICROWAVE MODULES DESPATCHED TO ANY PART OF THE WORLD POST FREE

TRANSVERTORS	FREQUENCY COUNTERS	CONVERTORS	ATV435/51 converter
MMT 144/28 Transverter £79.00	MMD 050/500Mhz Counter £63.89	MMC 432/28S for Oscar £26.58	MMC1296/144/28 £30.00
MMT 432/28S Transverter with Oscar shift £119.00	M500P 10 Prescaler £25.00	MMC 432/144S for Oscar £26.58	MMC156/28 Marine £20.00
MMT 432/144R Transverter £151.00	LINEAR AMPS	MMC 70 4m converter £18.00	MMC28/144 up converter £18.00
VARIABLES	MML432 100W £220.00	MMC 70 LO 4m converter £20.00	All 2m converters can be supplied with IF outputs of 2-4-12-14-18-28MHz 70cm models with IF outputs of 28-14-18- or 144MHz.
MMV 1296 23cm Tripler £30.00	MML144 80W £120.00	MMC 144 2m converter £18.00	
		MMC 144 LO 2m converter £20.00	

ALL MICROWAVE MODELS SUBJECT TO VAT IN UK 8% ON FREQUENCY COUNTERS, ALL OTHER MODELS 12½%

### A.S.P. MOBILE AND BASE STATION ANTENNAS

Asp201 1W 2m mobile £3.50	Asp393 1W 3dB 2m mobile £17	Asp E462 70cm 3dB mobile £7.23
Asp2009 1/3dB 2m mobile £7.50	Asp no hole boot mount £3.70	Asp E667 70cm 5dB mobile £16.90
Asp629 1W 3dB 2m mobile £7.60	Asp magnetic mount £8.95	Asp A659 UK 70cm 5dB, base antenna £22.00
Asp677 1/3dB 2m mobile £13.50	Asp cutter with cable £6.75	

Post & Package; £1.00 + VAT 8%

### YAESU MUSEN (FULL RANGE AVAILABLE) FREE DELIVERY IN UK

FT901DM £853.00	FT101E £515.00	CPU2500RK £308.00	FRG7000 £327.00
FT901D/DE £737.50	FR101D £525.00	FT225R £487.50	YO100 £145.00
FT301 £515.00	FR101DD £615.00	FT225RD £535.00	QTR24 £16.00
FT301D £588.00	FL101 £453.00	FT227R £213.00	YH55 £8.75
FP301 £398.00	FT7 £318.00	FT227RX £253.00	YC500J £168.50
FP301D £162.50	FL110 £130.00	FT202 £106.50	YP150 £58.50
FV301 £86.00	FP4 £35.00	FRG7 £187.00	YD844 £19.50
FC301 £108.00	FL2100D £311.00	FRG7DIG £227.00	YD846 £7.50

All prices subject to 12½% VAT

### ICOM RANGE

IC701 transceiver and power supply	£888.00
IC215 2M portable	£141.33
IC202S 2M SSB	£176.89
IC402 70cm SSB	£256.00
IC240 2M Transceiver	£168.00
IC245 2M FM/SSB	£354.62
IC211E 2M FM/SSB	£496.00
Xtals for 215/22 p/pair	£4.50
Cases 202/215/402	£6.75
Mobile mounting bracket 202/215	£10.75

### SHURE MICROPHONES

444 Desk adjustable	£28.00
562 Desk noise cancelling	£28.80
526T Desk power mic	£34.20
401 Hand mic high z	
202 Hand mic n/cancelling	£13.20
201 Hand microphone	£12.60

OTHER MODELS AVAILABLE

### SST ANTENNA TUNERS

SST1 Random Wire Tuner	£22.00
SST2 Coax Wire Tuner	£26.75
SST3 Impedance Match unit	£13.50

### ROTATORS

AR22	£43.00
CD44	£95.00
AR40	£47.50
HAM 11	£129.00
KR400	£85.00

### KYOCUTO DIGITAL 2015

10W mobile 400ch Tx/rx	£245
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### J-BEAM ANTENNAS

ALL MODELS IN STOCK

All above prices + VAT, carr. free

### HELICAL ANTENNAS

2m with BNC	£3.85 each
2m with PL259	£3.85 each
2m for IC215	
Trio 2200 Gx, standard C146A	£3.50

All + post 25p + 12½% VAT

SEND 25P IN STAMPS FOR COMPLETE PRICE LIST AND CATALOGUE

## STANDARD C432 70cm TRANSCEIVER

THIS 6 CHANNEL 2-2 WATT TRANSCEIVER COMES COMPLETE WITH LEATHER CARRY CASE AND FITTED WITH 433.2 AND 433.5 MHz.

£169.95 + VAT

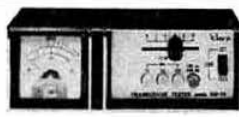
THIS SOPHISTICATED UNIT HAS EXCELLENT SENSITIVITY, OUT PERFORMING MOST OTHER RIGS, JUST THE UNIT NOW 70cm REPEATERS ARE OPENING UP ALL OVER THE COUNTRY. A FULL RANGE OF ACCESSORIES ARE AVAILABLE FOR THIS MODEL.

### ACCESSORIES

Extra channels	£4.50 + 8% VAT
CMPO8 External Microphone	£15.00 + 12½% VAT
SMP30 External Spk/Mic	£16.50 + 12½% VAT
C12 Wall Charger	£5.75 + 12½% VAT
BCA Base Charger	£22.50 + 12½% VAT
N-10 Set Ni-cad	£8.50 + 12½% VAT
Helical Antenna	£3.50 + 12½% VAT



**SWR25** This ever popular twin SWR and power meter covers 3-5-150MHz at £10.50 plus 8% VAT and 25p P & P.  
SWR 15 Single meter SWR and FS 3-5-150MHz at £8.50 plus 8% VAT and 25p P & P.



**UH74** SWR and power meter switchable HF, 2M & 432MHz with remote head at £14.25 plus 8% VAT and 25p P & P.





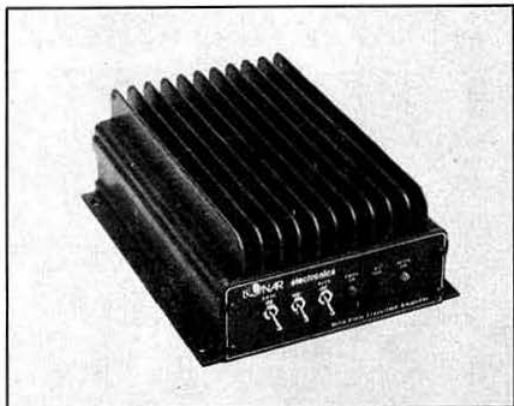
## NOW AVAILABLE FROM LEE ELECTRONICS

400 EDGWARE ROAD, LONDON W2. 01-723 5521. Telex: 298765

### VHF LINEAR AMPLIFIERS

- 10W Input—80W Output nom.
- Low Power Input Yields nom 10dB gain.
- Covers entire Amateur Band w/o Tuning.
- Built-in Receive Preamp.
- Automatic T-R Switching or Hard Keying.
- Remote Control Head Avail Separately.
- Exceeds FCC R&O 20777 Requirements of -60dB.
- Variable T-R Delay for SSB/CW use.
- Preamp & Power Amp Independently Controllable.
- Preamp nom 11dB gain 2½dB Overall NF.
- Functionally Designed Package.

Models available for the 148-174MHz bands, 5MHz segments. Other models 50 thru 432MHz bands plus higher power units out in near future.



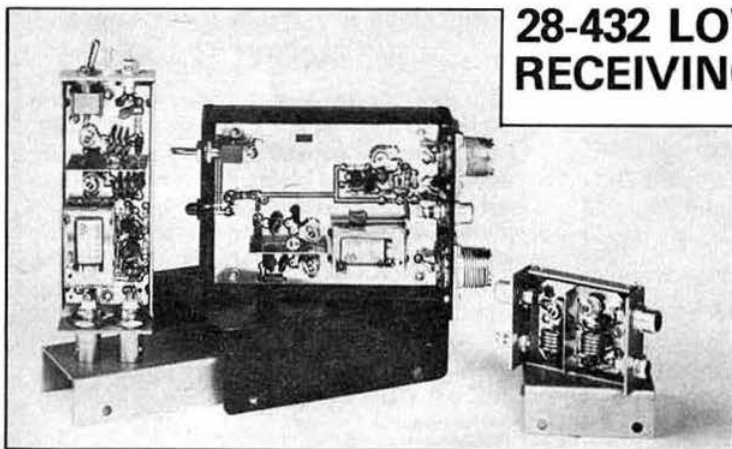
#### LUNAR PRODUCTS

2M10-80P 10W input 80W output with 9dB gain preamp **£120.00**  
2M10-160P 10W input 160W output with 9dB gain preamp **£177.50**

2M10-250P 10W input 250W output with 9dB gain preamp **£255.00**  
2M25-160P 25W input 160W output with 9dB gain preamp **£160.00**

#### PALOMAR NEW HIGH POWER HF LINEAR AMPLIFIER FOR MOBILE USE, 80m-10m

This amplifier delivers 200W RMS or 550W PEP with full transient suppression, VSWR and polarity protection. The unit has switched bands with a 10dB gain preamp on all bands selective low pass filtering for maximum harmonic suppression (45dB on all bands). The unit has no relays and uses the latest solid state switching techniques—power requirements 13.8 volts at 35 amps. **£220.00**. Prices include 12½% VAT.



### 28-432 LOW NOISE FIGURE RECEIVING PREAMPLIFIERS

MODEL	NOISE FIGURE	GAIN	PRICE + VAT
PA 28	1.1dB	15dB	<b>£24.50</b>
PAI 28	1.5dB	14dB	<b>£31.25</b>
PA 70	1.3dB	12dB	<b>POA</b>
PAI 70	1.6dB	11dB	<b>POA</b>
PA 144	1.5dB	11dB	<b>£24.50</b>
PAI 144	1.9dB	10dB	<b>£31.25</b>
PA 432-2	1.6dB	14dB	<b>£26.50</b>
PAF 432-2	3.0dB	13dB	<b>£31.00</b>
PAE 432-5	1.0dB	16dB	<b>£39.00</b>

"I" denotes RF switched.

These ultra-performance receiving preamplifiers are suitable to the most demanding needs where low noise figure is important. Amateur Radio, Commercial, NASA and Military users have lauded their superior performance. Uses include all types of weak signal work such as EME, Tropo and Ionosphere Scatter, Satellite Communications, Radio Astronomy, Meteor Scatter, etc.

Models through 250MHz utilize grounded gate FET's, which deliver moderate gain to overcome system deficiencies while achieving low noise figure with greatest dynamic range. UHF versions utilize bipolar transistors broadbanded to achieve very low noise figures while maintaining excellent stability and dynamic range characteristics. Adequate input filtering is highly recommended for all bipolar amplifiers when used as the front end of communications receiving systems.

Construction is of highest quality: Small physical size, gold alodined conductive chem film enclosures for maximum shielding, RFI filtering of DC line yields -50dB at 30MHz and > -70dB .1-10GHz attenuation, PC Boards are double sided plated holes to ensure maximum performance. All amplifiers are aligned on automatic noise figure measuring equipment, with traceability to standard Hot-Cold noise test system.

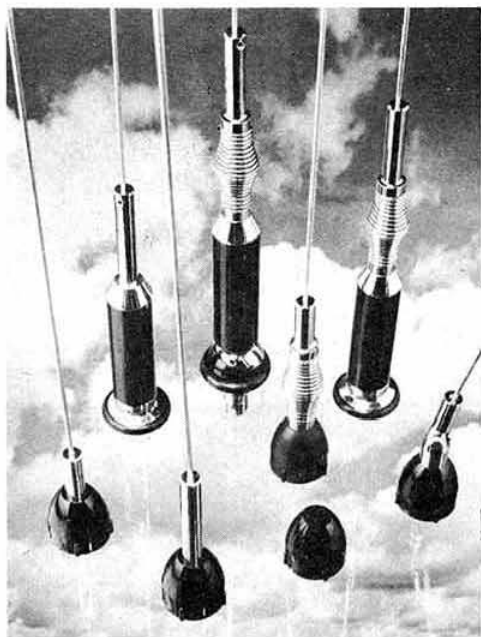




DEPEND UPON



## ASCOT ANTENNAS



The  $\frac{1}{2}$  wave DC grounded antenna illustrated to the left offers significant advantages over most standard designs many applications. The high gain, the DC earth—reduction of "static" and "hash" with maximum equipment protection—results in this antenna being specified in many prestige installations.

The Ascot range comprises  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  wave types (some shown above) to a wide selection of bases (including magnetic).

Write or phone for data sheets and prices.

Ascot antennas are available; mail order from SMC HQ in Totton, personal callers to any branch (Leeds, Chesterfield, Woodhall Spa), SMC agents or reputable amateur radio dealers throughout Britain.

### SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTEN  
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G  
Tel: Totton (04216) 7333 (3 lines)



THE ORIGINAL

## VERSATOWER TELESCOPIC + TILTOVER

*THE STRONGEST YET  
LESS EXPENSIVE*

**P40ft £276.75** +VAT 8%

**P60ft £335.90** +VAT 8%

STANDARD SERIES POST MOUNTING

**P40HD £416.20** +VAT 8%

**P60HD £472.50** +VAT 8%

HEAVY DUTY SERIES POST MOUNTING

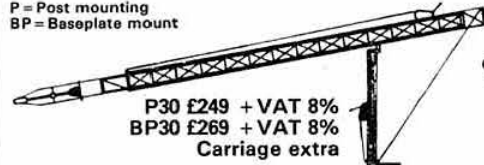
**NO OTHER TOWER COMPARES  
—THE MARKET LEADER**

12 years development, over 50 models available with heights between 25–120ft. Post, base plate, wall or fixed base mounting. Designed to latest BSS and for wind-speeds up to 117 mph. Before purchasing a tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for a particular installation.

MOBILE RANGE ALSO AVAILABLE

### NEW 30FT · 10ft SECTIONS

P = Post mounting  
BP = Baseplate mount



P30 £249 + VAT 8%  
BP30 £269 + VAT 8%  
Carriage extra

### SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTEN  
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G  
Tel: Totton (04216) 7333 (3 lines)



# KYOKUTO

KYOKUTO DENSHI COMPANY LIMITED



## NEW! FROM KDK THE FM2016E 2m FM DIGITAL SYNTHESIZED TRANSCEIVER



There are many synthesized transceivers available at the moment. What makes the 2016 so interesting?

The heart of the transceiver is the synthesizer. This CMOS unit provides a good, clean signal, but more interestingly, the DC level is used to automatically tune Tx and Rx RF circuits. In the Rx this provides uniform sensitivity across the 5MHz coverage and adds to the rejection of out of band signals. In the Tx spurious are also thus minimised. By modulating the VCO, pure FM is produced, resulting in superb emphasised audio quality. A 4-channel electronic RAM memory (dial up any frequency, flick a switch and it is stored) consumes only 25mA from the auto charging internal Ni

Cad cell! The memory channels provide the dual mode scanner (seeks occupied or empty channels), instant recall of favourite frequencies and allows two unusual splits (Tx on one memory channel receiving on another) for triplexer use.

One could go on here about the other features; the tone oscillator (burst or continuous), the  $\pm 600\text{kHz}$  shift, the 15-pole commercial quality 12kHz Rx filter, the 3-function ('S'—centre zero—power out) meter, the RIT control, the large digital readout, the switchable 1–15W output, the 10dB attenuator, but better still call or write to SMC for further details or order processing, or ask to see the new KDK at your local dealers today.

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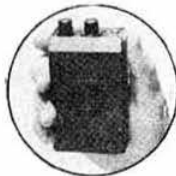
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### FT901DM STAR FEATURES

Squelch on FM  
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Analogue Readout to 1kHz  
12V DC Inverter in-built  
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Full line of accessories

Rejection Tuning  
Built-in Speaker  
180W PIP 80W AM/FM  
RF Speech Processor  
100-230V AC 50 or 60Hz  
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### FT901DM CONSERVATIVE SPECIFICATIONS

**FREQUENCY RANGE**  
160-10M (2MHz on 2B)  
CB (27.0-27.05) MSF RX

#### MODES

SSB (A3, USB & LSB), CW (A1),  
FSK (F1), FM (F3), AM (A3h)

#### VOLTAGE REQUIREMENTS

100-117/200-234V 50/60Hz  
13.5V DC (Negative Earth)

#### CURRENT REQUIREMENTS

AC 45W RX, 70W SRX; 320W TX  
DC 1A RX, 5A SRX, 21A TX

#### SIZE

13.5" x 6" x 13.5"

#### WEIGHT

40lb

#### ANTENNA IMPEDANCE

50-75 ohms

#### PASSBAND TUNING

2-4kHz to 300Hz Cont.

#### BANDWIDTHS (with filters\*)

SSB 2-4kHz (1-7:SF)  
CW\* 0-6kHz (2-1:SF)  
AM\* 6-0kHz (2-1:SF)  
FM 12kHz (2-1:SF)

#### CROSS MODULATION IMMUNITY

80dB (20kHz off 20dB Sig. at 14MHz)

#### DESENSITIZATION

90dB (20kHz off 20dB Sig. at 14MHz)

#### SENSITIVITY

0-25µV for 10d S/N

#### IMAGE RESPONSE

1-8-21MHz better than -60dB

28MHz better than -50dB

#### IF REJECTION

Better than -70dB

#### THIRD ORDER DISTORTION

Better than -31dB

#### TRANSMITTER POWER

180W PIP A1, A3,

80W IN A3h, F3, F1

#### CARRIER SUPPRESSION

Better than -40dB

#### UNWANTED SIDEBAND

Better than -50dB (at 1kHz)

#### SPURIOUS OUTPUTS

Better than -40dB

#### STABILITY

300Hz Cold, 100Hz/1Hr (AWU)

#### NEGATIVE FEEDBACK

6dB at 14MHz

#### MICROPHONE IMPEDANCE

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# RADIO SOCIETY OF GREAT BRITAIN

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Incorporated 1926

Member society, International

Amateur Radio Union

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

## The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

### GENERAL MANAGER AND SECRETARY

D. A. Evans, G3OUF

### EDITOR

A. W. Hutchinson

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(Student applications should give the member's age at last renewal date and include evidence of student status)

Affiliated societies: £6.50 (including *Radio Communication*);  
£3.25 (excluding *Radio Communication*).

## COMPOSITION OF RSGB ZONES

Zone A: Regions 1, 2 and 18

Zone B: Regions 3, 4 and 5

Zone C: Regions 7, 8, 16 and 19

Zone D: Regions 6, 9, 17 and 20

Zone E: Regions 10 and 11

Zone F: Region 15

Zone G: Regions 12, 13 and 14

## COMPOSITION OF RSGB REGIONS

Region 1 Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.

Region 2 All that part of Humberside north of River Humber, North Yorkshire, South Yorkshire, West Yorkshire.

Region 3 Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.

Region 4 Derbyshire, all that part of Humberside south of River Humber, Leicestershire, Lincolnshire, Nottinghamshire.

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Region 13 Borders, Fife, Lothian.

Region 14 Central, Dumfries and Galloway, Strathclyde.

Region 15 Northern Ireland.

Region 16 Essex, Norfolk, Suffolk.

Region 17 Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.

Region 18 Cleveland, Durham, Northumberland, Tyne & Wear.

Region 19 Greater London north of River Thames, Hertfordshire.

Region 20 Avon, Gloucester, Somerset.

## Current Comment

### WARC 79

During the past few weeks, administrations throughout the world have been finalizing their proposals for the conference, among them that of the UK, whose proposals have not yet been published. However, it can be said from negotiations with the Home Office that their amateur service proposals are more favourable than those of many other countries.

Since the Special Preparatory Meeting in Geneva last autumn, the time has been used in the international field to consolidate and reinforce proposals already made. The results of the SPM have now been published in a document, weighing more than 2lb, which will be used as the technical basis for WARC 79. This report is not available for purchase from the ITU and will only be distributed with documents for WARC which are now beginning to be circulated.

The period between now and 24 September will be one of considerable activity. As national proposals are finalized and published they will be examined and collated by IARU Region 1 to determine what further approaches are required. This information will be published in future issues of the WARC newsletters which are sent to all national societies.

Of the final proposals so far known, there is little unusual on which to comment. The Federal German Republic does not support proposals for new bands at 10, 18 and 24MHz, but Singapore will support a band at 10MHz only. An interesting footnote proposed by Norway is that there shall be an allocation at 50MHz when this part of the spectrum has been vacated by the broadcasting service.

### Other IARU activities

As part of the worldwide effort by the amateur service, a training course for radio amateurs in Sri Lanka has been conducted by the German national society DARC, with the support of the IARU. This was supported by the government of Sri Lanka, and some 30 radio amateurs successfully passed the qualifying examinations. It is pleasing to note that Pat Hawker's *A Guide to Amateur Radio* was used as one of the teaching manuals.

The Middle East Electronic Communications Show and Conference (MECOM) will be held in Bahrain between 23 and 26 April. The Amateur Radio Association of Bahrain has been allocated a stand at the exhibition from which A9ZEX will be in operation. This project has been supported by IARU Region 1.

TELECOM 79 will be held in Geneva between 20 and 26 September. Through the courtesy of Monsieur M. Mili, secretary-general of the ITU, a stand has been made available to the IARU. This will be used to display aspects of the amateur service to the many delegates and engineers who will be attending this world telecommunications exhibition. On Saturday 22 September there will be a seminar in the Palais des Expositions at Geneva when presentations will be made on subjects such as satellites and microwaves. The facilities for this seminar have been provided by the ITU, to whom appreciation is due.

G2BVN

# QTC

amateur radio news

### Channel Islands members please note

The new membership fee for corporate members in the Channel Islands from July 1979 will be £9.70 and not £9 as stated in the March issue of *Radio Communication*, p210. The 30p difference between the mainland and Channel Islands rate is due to VAT. It is also worth noting that all concessionary rates; ie, associate, student, oap, etc, are the concessionary subscriptions payable, and in the case of Channel Islands members these subscription rates do not include VAT.

### QSL Bureau, G4GAA—G4HZZ

Because of other commitments, Mr B. George, G3ZOH, has relinquished the position of sub-manager for the series G4GAA—G4HZZ. Mr L. Craven, G4EQI, "Grass Moor", Radford Road, Alvechurch, Birmingham B48 7DT, has been appointed to succeed G3ZOH.

### World At Their Fingertips

The programme transmitted by BBC 2 in the "Open Door" series on 22 and 25 February consisted of a 30min feature on amateur radio. The Society's thanks go to David Thomas, GW3RWX, who initiated and organized the programme, and

to Brian Rix, G2DQU, who made the studio presentation and was responsible for linking the film extracts that appeared. The programme was directed towards the viewing public rather than radio amateurs, and generally seems to have been well received.

### Radio amateurs on active service

During the second world war, many radio amateurs were involved in a number of radio projects, details of which have never been made public because of the Official Secrets Act. However, the BBC in Norwich is producing a television programme, after two years' research, which will make public such information on this subject which can now be revealed. The programme, "The Secret Listeners", will be transmitted in the BBC Eastern Region at 6.50pm on 17 April, and it is hoped to have national coverage later.

Of two past-Presidents of the RSGB interviewed for the programme, Arthur Watts, G6UN (President in 1934) who was in Naval Intelligence, played a very significant role. The programme will reveal this for the first time and show how some 1,200-1,500 radio amateurs working as voluntary interceptors assisted the radio security services, and Professor Hugh Trevor-Roper, the Oxford historian, will give an assessment of the part they played in the allied victory.

### PAVE PAWS

The PAVE PAWS phased array radar is a very high-power system to be utilized for long-range detection and tracking of ballistic missiles. Initially, the average power will be about

145kW into antennas of 37dBi gain. After a year the power will be increased to 290kW and the time-averaged erp will be about 2,900MW in the main beam. At present two sites are under construction, one being near Cape Cod on the USA east coast. The emission is relatively narrow band, and the exact frequency is varied in a random manner so as to reduce the possibilities of jamming. The design specification for the transmit modules shows a range of 420-450MHz, using approximately 50,000 power transistors.

Concern has been expressed to the US Air Force at the effect of the radar on weak signal and satellite experiments, in addition to any possible environmental and biological effects. ARRL has received assurances that amateur radio activities will be taken into account in the operation of the radar. The matter will continue to be monitored.

### Can you help?

**Dr R. D. Harkess, GM3THI, QTHR**, is looking for postage stamps, covers and postal cancellations on the theme of radio, telegraphy and television with particular reference to amateur radio: eg Paris Conference 1950, Opatija 1966, DARC insignia cancellations.

**Mr N. Horrocks, G2CUZ, QTHR**, is trying to locate members of the RAF and WRAF who served at RAF Ventnor, Isle of Wight, in 1940-1, with a view to organizing a 40th anniversary celebration on the island in 1980. Several members were radio amateurs or interested in amateur radio, and information on present addresses would be welcome.

**The Kingston & D ARS** would like to organize an RAE course in its area, and is looking for a lecturer. Anyone in the district who would be interested in filling this post is asked to contact Mr M. Pellatt, G4APG, QTHR, in order to discuss the project.

**G4GSE, QTHR**, would like to hear from anyone who was granted planning permission for a tower or mast in the Kent area during the last four years. Information required: height, type, and name of planning authority.

### REGION 17 REPRESENTATIVE

Valid nominations for this appointment have been received in respect of:  
**G. Brown, GJ8ORH**. Nominated by P. Johnson, GJ8KNV; S. Smith, GJ8EZA; L. D. Woolf, GJ8AAZ; J. H. E. Watson, GJ8EML, and D. Robinson, GJ3YHU.  
**Lt Cdr H. G. Cunningham, G8FG**. Nominated by G. D. Cole, G4EMN; M. J. Linda, G4GTH; A. Hoggan, G8ASX; F. R. Scott, G2CZH, and H. Dunlop, G4FPF.  
**P. J. Sterry, G3CBU**. Nominated by K. Ireland, G3IKW; D. Thompson, G3AHS; D. Wrightson, G3BTO; A. C. Stables, G8FMH, and A. A. Lawrence, G4HTM.

Corporate members residing in Region 17 (Isle of Wight, Channel Islands, Dorset, Hampshire and Wiltshire) are invited to vote for one of these candidates by sending a postcard in the following form addressed to: The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, to arrive not later than 15 May 1979.

I, .....

being a fully paid-up corporate member of the RSGB resident in Region 17, wish to record my vote in favour of

Mr. ....

as representative for Region 17

Signed .....

Callsign or BRS number .....

Address .....

## RSGB Amateur Radio Exhibition

### Alexandra Palace, London

### 11-12 May 1979

With this month's *Radio Communication*, members will receive a ticket for this year's RSGB Amateur Radio Exhibition.

Not only will this ticket permit entry into the exhibition at the special member's price of 50p, but it also gives details of the exhibition, public transport, talk-in arrangements, details of the overseas visitors' reception on the Friday, the door prize draw, and most of the family entertainment at Alexandra Palace.

The overseas visitors' buffet reception is open to any member of the Society who wishes to attend. Tickets for members who are not overseas visitors are obtainable from Dept MH, RSGB HQ, price £4.25, incl VAT.

The RSGB will have its biggest-ever stand, complete with book counter, advice section and the new RSGB identity card system—members must bring their licences to obtain an identity card.

Any enquiries from members concerning the exhibition should be addressed to the membership services officer at RSGB HQ.

### NRSA Exhibition, Manchester

The annual Radio & Electronics Exhibition held at Belle Vue, Manchester, takes place on 22 April this year. The total exhibition area will be three times the size of that occupied last year and, with escalating attendances every year, the exhibition is becoming the premier amateur radio event of the year in the north of England.

Full details are given on page 290 of this issue.

### SERT lecture

The north-west section of the Society of Electronic and Radio Technicians is arranging a two-hour lecture and demonstration in lecture theatre C10 at the Manchester Polytechnic, Chester Street (off Oxford Road), Manchester, on 26 April, commencing at 7pm. The lecture, "Aerials", will be given by Mr H. V. Sims, CEng, FIERE, FIEE.

Members of the RSGB will be most welcome to attend this lecture, and complimentary tickets may be obtained by sending an sae to Mr S. Revell, G3PMJ, QTHR. Club secretaries are invited to apply for tickets on behalf of their members. The supply of tickets may be limited, depending on demand.

### RAYNET SYMPOSIUM

Saturday 21 April 1979

0930am for 1000am

Dragonara Hotel, Bristol

Cost £5, including buffet lunch

Subjects will include: Raynet yesterday, today and tomorrow; Raynet and repeaters; Liaison with user services; Exercises; Live incident case histories; Equipment; and discussion periods.

Further details from G8CAC, QTHR, tel Desford 3026.

# Reception and processing of TIROS-N weather satellite telemetry

by J. GILBERT, G4CEB, and T. J. TERRELL, DipEE, MSc, PhD, CEng, MIEE\*

## (Part 1)

*This article discusses the basic philosophy and principles involved in setting up a ground station for the reception and processing of TIROS-N weather satellite telemetry. In particular, the article deals with (a) the satellite and its orbit prediction, (b) transmitted signals and their reception, (c) processing of the received signal into a useful cloud cover picture, and (d) interpretation of the picture.*

### Introduction

The satellite age began to dawn with the end of the second world war. At that time the USA acquired a number of captured German V2 rockets, and some of Germany's top rocket engineers, including the famous Werner Von Braun, went to the USA to continue working on rocket design and development. With these resources the USA was in a position to undertake feasibility studies for rocket research programmes; scientific instruments replaced the V2's redundant warhead, and successful launchings into the earth's upper atmosphere produced encouraging results.

Following the early successes the USA began to design and build rockets for scientific space research; but astronomers, physicists and engineers did not get together and seriously consider the detailed design of an artificial earth satellite for scientific space research until about 1950.

In 1955 the USA gave official support to a plan to have an artificial satellite orbiting the earth during the International Geophysical Year (1957-8); Russia also announced plans to launch satellites as their contribution. Russia successfully launched Sputnik 1 and Sputnik 2 in 1957, the USA successfully launched Explorer 1, Explorer 3 and Explorer 4 in 1958 (Explorer 2 failed to go into orbit), and in the following two years many successful American and Russian launchings of artificial earth satellites took place [1]. Since those early years of satellite launchings by the USA and the USSR, many other countries, including the UK, have been responsible for successfully placing satellites into orbit. Included in the large number of artificial satellites orbiting the earth are several American and Russian weather satellites transmitting pictures which may be received using suitable equipment [3-12].

The main purpose of this article is to introduce, review and describe the main points relating to the setting up of a receiving station for the reception and processing of weather satellite telemetry. However, the reader should note that in accordance with the Wireless Telegraphy Act 1949 [15], a valid licence is required for the reception as well as transmission of radio signals, the exceptions being the reception of messages sent by telephony from authorized broadcasting stations for general reception, and messages sent by telephony or telegraphy from licensed amateur stations—these were exempted from licensing

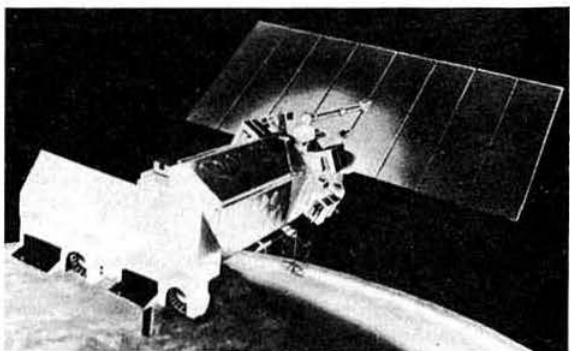


Fig 1. Artist's impression of TIROS-N (by courtesy of NASA)

on 1 April 1971. The authors have written to the Radio Regulatory Department of the Home Office, and have been able to confirm that it will be prepared to consider the issue of a special annual receiving licence (fee £4.80) for applicants who wish to receive signals emitted by weather satellites. Applications should be made to: R1 Division, Radio Regulatory Department, Room 703, Waterloo Bridge House, Waterloo Road, London SE1 8UA.

The acquisition and processing of the transmitted weather satellite pictures by an authorized operator involves consideration of:

- (a) the satellite and its orbit prediction;
- (b) transmitted signals and their reception;
- (c) processing the received signal, and
- (d) picture interpretation.

Each of the above topics is discussed in the following sections of the article.

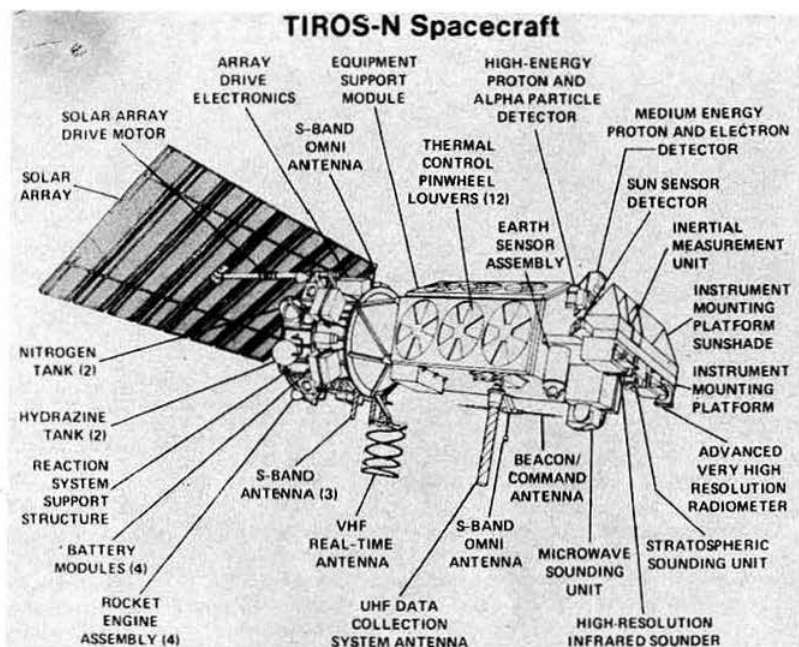
### The satellite and its orbit prediction

In the last 10 years there has been a remarkable, but regular, technological up-dating of satellites and their instrumentation systems, resulting in improved satellites being launched and thereby making some of the earlier satellites redundant. A new generation of USA-operated weather satellites has been under development in recent years. The first spacecraft of this series is known as TIROS-N, and was launched on 13 October 1978 from the Western Test Range, Lompoc, California. This satellite carries many new instruments which provide considerably improved information when compared with the information available from the previous generation of satellites—NOAA-5, launched on 29 July 1976, was the last of that generation of American environmental weather satellites. Some instrumentation aboard the NOAA-5 satellite failed on 24 February 1978, greatly reducing its information output capabilities.

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Fig 2. TIROS-N instrumentation (by courtesy of NASA)



The TIROS-N spacecraft is of main interest to the authors and will be dealt with in depth. Fig 1 is an artist's impression of TIROS-N in orbit, and Fig 2 details the instrumentation on board this satellite.

Weather satellite orbits are normally categorized into three types:

- (a) equatorial orbits, which take the satellite on a path above the equator, see Fig 3(a);
- (b) inclined orbits, which take the satellite on a path at an angle  $i$  with respect to the equator, see Fig 3(b); and
- (c) polar orbits, which are advanced inclined orbits taking the satellite close to the North and South Poles, see Fig 3(c).

TIROS-N was launched into an approximately 864km circular, near polar orbit, with an inclination of  $98.92^\circ$  ( $81.08^\circ$  retrograde) to the equator. There will be variations in orbital height at perigee and apogee due to effects from the sun and moon as well as the earth's oblateness, but for estimating orbital trajectories it is reasonable to assume that the orbital path is circular. The total orbital period is approximately 102min. The earth rotates beneath the orbit approximately  $25.5^\circ$  during this period, allowing the satellite to observe a different portion of the earth's surface with sufficient overlap

from orbit to orbit. The orbit is sun-synchronous and rotates eastward about the earth's polar axis  $1^\circ$ /day; this, in effect, being the earth's annual revolution about the sun, which keeps the satellite in a constant position with reference to the sun for consistent illumination throughout the year. This orbit has an ascending node crossing the equator at approximately 1530 local solar time (1st) each day.

### Orbit prediction

There are several methods of predicting when a satellite will pass within range of a particular receiving station. Orbits may be calculated using classical parameters [2], such as inclination, eccentricity, right ascension of the ascending node and argument of perigee. These methods work well, but they tend to be rather complex and laborious when compared with alternative methods. In this article the method used by the authors will be explained, dealing specifically with TIROS-N orbit calculations.

Orbit prediction bulletin services are available from several organizations; the one dealt with in this article is supplied by NASA [16]. The bulletins contain up-to-date orbit predictions which are based upon calculations of the classical parameters

Fig 3. Satellite orbits: (a) equatorial orbit; (b) inclined orbit ( $i$  is the angle of inclination with respect to the equator,  $r$  is the angle of retrograde); and (c) polar orbit

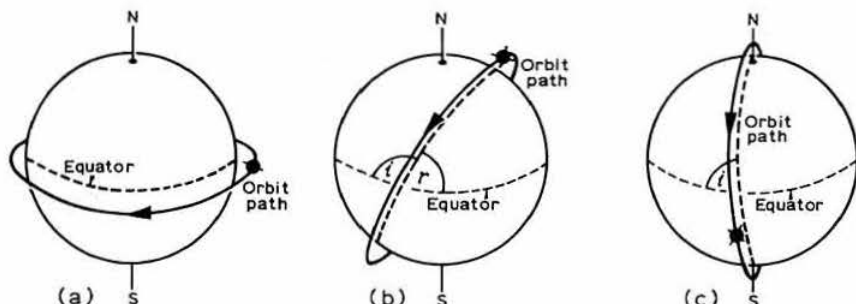




Table 1. South-north equator crossings for TIROS-N

Orbit No	13 November 1978 Time gmt	Longitude West
431	0021-31	140-12
432	0203-43	165-65
433	0345-55	191-18
434	0527-67	216-71
435	0709-79	242-24
436	0851-91	267-77
437	1034-03	293-30
438	1216-15	318-83
439	1358-27	344-36
440	1540-39	009-89
441	1722-51	035-42
442	1904-63	060-94
443	2046-74	086-47
444	2228-86	112-00

Time given in hours, minutes, hundredths of minutes. Longitude given in degrees

and direct observation of the satellite. Tables 1 and 2 summarize TIROS-N orbital details (extracted from a NASA bulletin) for 13 November 1978.

Suppose that transmitted signals from satellite passes within a range of  $\pm 30^\circ$  longitude from a specified receiving station location may be readily received, and that south to north (S-N) passes of TIROS-N are to be calculated for 13 November 1978. Also assume the receiving station location to be at  $0^\circ$  longitude and  $50^\circ$ N latitude. Furthermore, ideally suppose that within a "reception window" of  $60^\circ$  longitude, centred at  $0^\circ$  longitude, passes in the range  $330^\circ$ W and  $30^\circ$ W may be received. From Table 2 it is seen that the longitude equator crossing of Table 1 needs to be corrected by the addition of  $14^\circ 29'$  for S-N passes at  $50^\circ$ N latitude. If this figure is now subtracted from the ideal reception window boundaries, the range of S-N equator crossings for TIROS-N which correspond with the satellite passing within the actual "reception window" at  $50^\circ$ N is obtained. These values being  $315^\circ 71'$ W and  $15^\circ 71'$ W, and from Table 1 it is seen that orbits 438, 439 and 440 are the only passes that fall within the "actual reception window".

Now that the required passes are known it is a relatively simple process to use Table 2 and obtain the positions and times of TIROS-N at other latitudes, say in a range  $30^\circ$ N to  $70^\circ$ N, in  $10^\circ$  steps. Table 3 gives the orbital details for the three selected S-N passes of 13 November 1978 relating to this range of latitudes. These results may then be plotted on a map (prediction chart) as shown in Fig 4. The prediction chart can be used by the station operator to assist him in achieving appropriate antenna steering for reception of signals transmitted during a required pass.

Table 2. Reduction to other latitudes and heights of TIROS-N S-N equator crossings

Latitude North	+ Minutes	Corrections	+ Longitude
00	00-00		00-00
10	02-85		02-28
20	05-71		04-68
30	08-58		07-31
40	11-46		10-38
50	14-37		14-29
60	17-32		19-98
70	20-39		30-42
80	24-19		67-96

Latitude and longitude given in degrees

Table 3. Details of orbits 438, 439 and 440 related to latitude range  $30^\circ$  to  $70^\circ$ N

Latitude North	Orbit	Time gmt	Longitude West
$70^\circ$	438	1236-54	349-25°
$60^\circ$	438	1233-47	338-81°
$50^\circ$	438	1230-52	333-12°
$40^\circ$	438	1227-61	329-21°
$30^\circ$	438	1224-73	326-14°
$70^\circ$	439	1418-66	014-78°
$60^\circ$	439	1415-59	004-34°
$50^\circ$	439	1412-64	358-65°
$40^\circ$	439	1409-73	354-74°
$30^\circ$	439	1406-85	351-67°
$70^\circ$	440	1600-78	040-31°
$60^\circ$	440	1557-71	029-87°
$50^\circ$	440	1554-76	024-18°
$40^\circ$	440	1551-85	020-27°
$30^\circ$	440	1548-97	017-20°

When using the NASA bulletin to predict satellite positions, the associated arithmetic computations may easily be evaluated with the aid of an electronic pocket calculator. From the classical details the orbital shift and orbital time can be determined, and used to extend the bulletin to predict future orbits by simply adding the appropriate orbital elements to the existing results. This method is demonstrated below.

Suppose that it was desired to know the time and longitudinal position of the satellite pass on 15 November 1978 using orbit 439 of the base date, 13 November 1978 (see Table 3), as the starting point of the calculation. For TIROS-N the



Fig 4. Typical TIROS-N prediction chart

orbital period is approximately 1.7 hours, and the corresponding orbital shift is approximately 25.5°W. Therefore an equation that gives the approximate time of a future satellite pass crossing a particular latitude is:

Time of crossing latitude  $\approx \{1.7 [R(14 \cdot 1x)] + \text{base time} - 24x\}$  gmt hours. .... (1)  
where  $x$  is the number of days added to the base date, and the notation  $R(14 \cdot 1x)$  means the value of  $14 \cdot 1x$  rounded to the nearest integer.

Similarly, an equation that gives the corresponding approximate longitudinal crossing is:

Longitudinal crossing  $\approx \{25.5 [R(14 \cdot 1x)] + \text{base longitude} - 360x\}$  °W. .... (2)

For the stated problem, taking a latitude of 50°N:  $x = 2$ , base time = 14.21 hours gmt (1412.64gmt), and base longitude = 358.65°.

Therefore equations (1) and (2) yield:

Time of crossing latitude 50°N  $\approx 13.81$ h gmt (1348.60gmt) on 15 November 1978.

and

Longitudinal crossing  $\approx 352.65$ °W on 15 November 1978.

These results are for orbit 467 (439 + 28) at the latitude 50°N. Now suppose that it is required to know the orbital parameters for this orbit at 30°N, then, from Table 2:

Time correction is  $(8.58 - 14.37)$  min = -5.79min;

and the longitude correction is  $(7.31 - 14.29)$ °W = -6.98°W.

Therefore, time of crossing latitude 30°N for orbit 467 is  $(1348.60 - 0005.79) = 1342.81$ gmt, and the longitudinal crossing for this orbit is  $(352.65 - 6.98) = 345.67$ °W.

In contrast to the manual calculations outlined above, it is possible to deal with the repetitive calculations using a digital computer—the resulting long-term (3-4 months) predictions will be reasonably accurate assuming that orbital elements remain constant. However, it should be noted that NASA bulletins are updated weekly, and hence calculator computation methods usually suffice.

## Transmitted signals and their reception

The TIROS-N satellite carries several instrument systems that provide direct readout and remote recording of meteorological data. As far as this article is concerned, the instrument of interest is the advanced very high resolution radiometer (avhrr). Its operation in producing the automatic picture transmission (apt) telemetry on the vhf downlink is briefly discussed below.

### The advanced very high resolution radiometer

The avhrr for TIROS-N is a scanning radiometer which is sensitive in four spectral regions, see Table 4. In essence the avhrr scans a section of the earth directly below the satellite at a rate

Table 5. HRPT characteristics

Parameter	TIROS-N/avhrr
Line rate	360lines/min
Data channels	5 (first flights will have four spectral intervals)
Data resolution	1.1km
Carrier modulation	Digital split phase, phase modulated
Transmit frequency	1.698-0MHz 1.707-0MHz
Transmit power	5W
EIRP (approximate)	39.0dBm
Polarization	Right-hand circular
Spectrum bandwidth	Less than 3MHz

of 360lines/min; the radiation received is then processed on board the spacecraft limited to  $\pm 55.4^\circ$  from the position directly below the satellite. The information detected is then digitized and transmitted on S-band frequencies. Table 5 details the TIROS-N avhrr characteristics. In the future a change in the avhrr instrument design will add a fifth channel in the 12-micrometer region.

### Automatic picture transmission characteristics

The avhrr supplies data for transmission on the apt link. To provide this data at the apt rate of 120lines/min, the high resolution avhrr data is averaged and the resolution reduced to approximately 4km. The averaging and linearizing technique divides each scan line into five zones on either side of the sub-point, see Fig 5. Each zone uses a separate averaging algorithm: in the subpoint zone (Zone 1) four samples make up the average. In the end-of-line zones (Zone 5) individual data samples are retained; that is, they are not averaged. In order to obtain the 120lines/min rate, only every third line from the avhrr 360lines/min data is transmitted.

The major features of the TIROS-N apt system are shown in Table 6. The apt data format provides a time-multiplexed output of two selected channels from the avhrr with appropriate

Table 6. APT characteristics

Characteristic	TIROS-N apt
Line rate	120lines/min
Data resolution	4km uniform
Carrier modulation	Analogue
Transmit frequency	137.50MHz 137.62MHz
Transmit power	5W
Transmit antenna polarization	Right-hand circular
Sub-carrier frequency	2.4kHz
Carrier deviation	$\pm 17$ kHz
Ground station low-pass filter	1,400Hz 7th order linear
Synchronization	7 pulses at 1,040pps, 50% duty cycle for Channel A. 7 pulses at 832pps, 60% duty cycle for Channel B

Table 4. Basic parameters of the avhrr instrument

	Ch1	Ch2	Ch3	Ch4	Ch5
Spectral range( $\mu$ m)					
protflight	0.55-0.9	0.725-1.1	3.55-3.93	10.5-11.5	Repeat Ch4 data
Next four flights	0.58-0.68	0.725-1.1	3.55-3.93	10.5-11.5	Repeat Ch4 data
Later flights	0.58-0.68	0.725-1.1	3.55-3.93	10.3-11.3	11.5-12.5
Detector type	Silicon	Silicon	InSb*	HgCdTe**	HgCdTe
Resolution (IFOV)	1.3mr	1.3mr	1.3mr	1.3mr	1.3mr
	1.1km	1.1km	1.1km	1.1km	1.1km
Line rate	360lines/min				

\* Indium antimonide

\*\* Mercury cadmium telluride

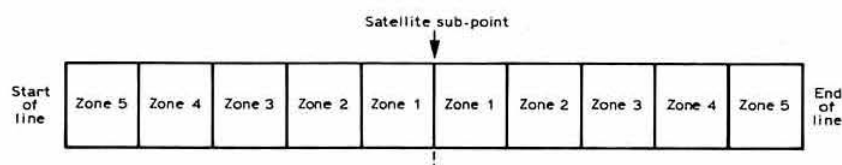


Fig 5. APT scan line zones. Zone 1: average of four data points. Zone 2: average of three data points. Zone 3: average of two data points. Zone 4: average of 1.5 data points. Zone 5: full resolution, no averaging

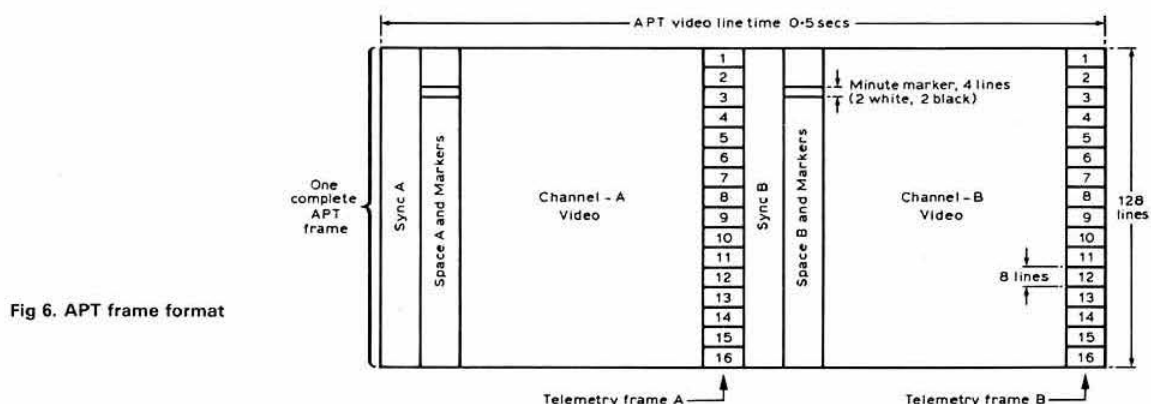


Fig 6. APT frame format

One complete telemetry frame	MI = 10.6% WEGE 1	MI = 21.5% WEGE 2	MI = 32.4% WEGE 3	MI = 43.3% WEGE 4	MI = 54.2% WEGE 5	MI = 65.2% WEGE 6	MI = 76.0% WEGE 7	MI = 87.0% WEGE 8
	1	2	3	4	5	6	7	8
	Zero modulation reference MI = 0.0%	Therm temp 1	Therm temp 2	Therm temp 3	Therm temp 4	Patch temp	Back scan	Channel ID WEGE
	9	10	11	12	13	14	15	16

Fig 7. Telemetry frame format

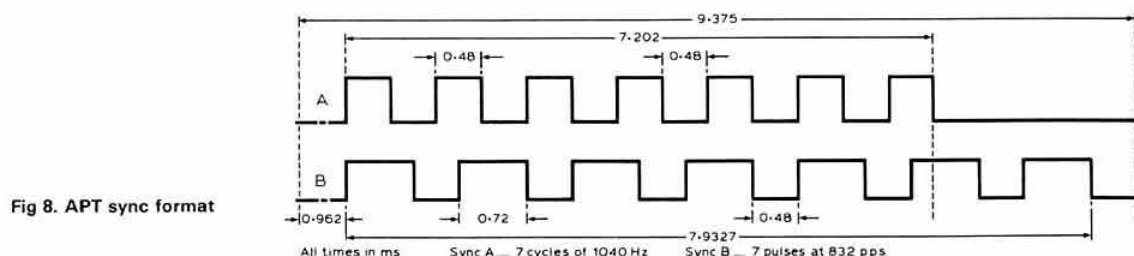


Fig 8. APT sync format

calibrations and telemetry data. After digital processing of the data, the processor converts it to an analogue signal, low-pass filters the output and then modulates a 2400Hz subcarrier. The maximum subcarrier modulation index of 87.5 per cent corresponds to wedge number eight on the telemetry grey scale format (see Fig 7). Fig 6 illustrates the apt frame format, consisting of 128 complete lines of telemetry. Figs 7 and 8 detail one complete telemetry frame and apt synchronization pulses respectively.

#### Signal reception

Fig 9 shows the block diagram of a suitable receiver for the scanning radiometer telemetry.

As far as the receiver antenna is concerned, reasonable

reception of a portion of an overhead pass may be obtained using a simple dipole. However, it is advisable to use either a Yagi array or helical antenna for reliable reception of a complete satellite pass (it is worth noting that the construction of a Yagi array creates less problems than that of a helical antenna). Antenna polarization is right-hand circular for apt telemetry, and therefore a crossed Yagi [19] similarly polarized is used at the receiver. This polarization provides increased signal-to-noise ratio at the receiver when compared with signals that are linearly polarized.

The tracking of a satellite can be achieved using automatic steering mechanisms or by manual operation, the latter being the current method used by the authors. The elevation angles can be calculated if required, but it has been found that these

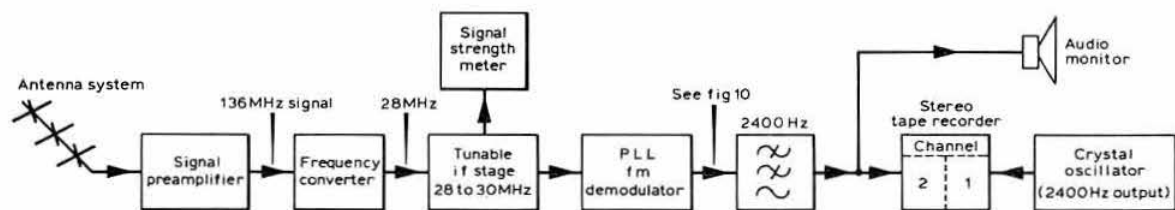


Fig 9. Block diagram of equipment used to receive and record satellite signals

details prove to be cumbersome and unnecessary for manual tracking. With the aid of the orbit charts the position of passes relative to a ground station will soon become obvious with practice. If a signal strength meter is placed near the antenna operator, the signal can be kept close to a maximum without difficulty.

Referring to Fig 9 it is seen that the received signal passes through a stage of preamplification and is then frequency converted to 28.0MHz. This signal is then passed to a variable i.f. stage, (range: 28 to 30MHz) which provides a tuning range of 136 to 138MHz. A phase-locked loop (pll) [14], which is available as a single integrated circuit, is then used as a demodulator. After a stage of filtering, the demodulated signal is recorded on a stereo tape recorder. A second channel is used to record, simultaneously, a signal of 2,400Hz derived from a crystal oscillator. The purpose of this channel is to provide synchronization of picture with the display electronics. The time at which the recordings are started should be noted, because this will give the location of the picture when used in conjunction with the orbit predictions and charts. The demodulated signal is an amplitude modulated 2,400Hz envelope, the modulation representing the telemetry information. Fig 10 illustrates a recording of part of an apt telemetry line scan. A single video channel is shown and the information modulation is clearly visible.

The receiving station can be either very simple or highly complex. However, reasonable results can be obtained using simple antennas and i.f. stages. Typically, the latter could be that of a

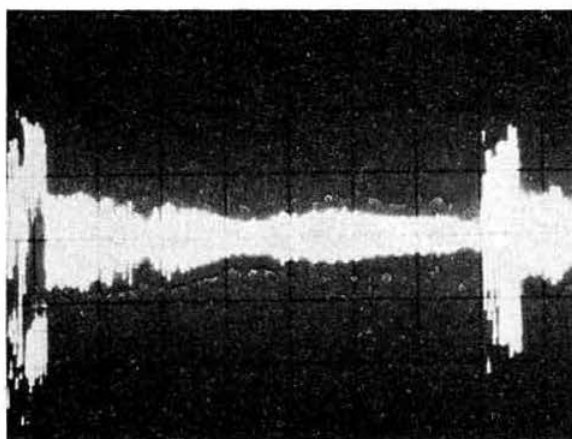


Fig 10. APT telemetry line scan signal

simple transistor radio. Using this simple receiving equipment the corresponding results are generally satisfactory, but more specialized equipment should be used to obtain better picture definition at these frequencies. This becomes evident when working with the S-band frequencies for resolution of avhrr pictures.

TO BE CONTINUED

## NEW PRODUCT

### Griffin soldering kit

David Griffin Ltd of Blandford, Dorset, has produced the Griffin soldering kit, which includes a 25W soldering iron, a spare fine-work bit, a reel of multi-core solder and a pair of tweezers. The Griffin soldering iron is also available separately.

The soldering iron, originally marketed under the Dee Gee brand (model 3612), is quick, safe and simple to use. Its anti-roll handle prevents it rolling off the work bench, and the sensible size and its light weight (2½oz) ensure easy handling, especially for precision work.

The expected retail price for the kit is £4.50, and £3.50 for the soldering iron. This iron is available from retail outlets.

The Griffin soldering kit and soldering iron



# A diode matrix channel numbering system

by I. J. DILWORTH, PhD, G3WRT\*

**I**N a previous article [1] the author described a channel scanning arrangement for quartz crystals. Up to 10 crystals could be sequentially scanned using this system and two forms of channel identification were presented.

\* Dept of Electrical Engineering Science, University of Essex, Colchester.

It is the purpose of this article to describe an additional method of channel identification which provides an exact display of the channel number using two seven-segment led indicators.

The additional circuitry requires no modification to the original hardware and is relatively cheap and straightforward to construct.

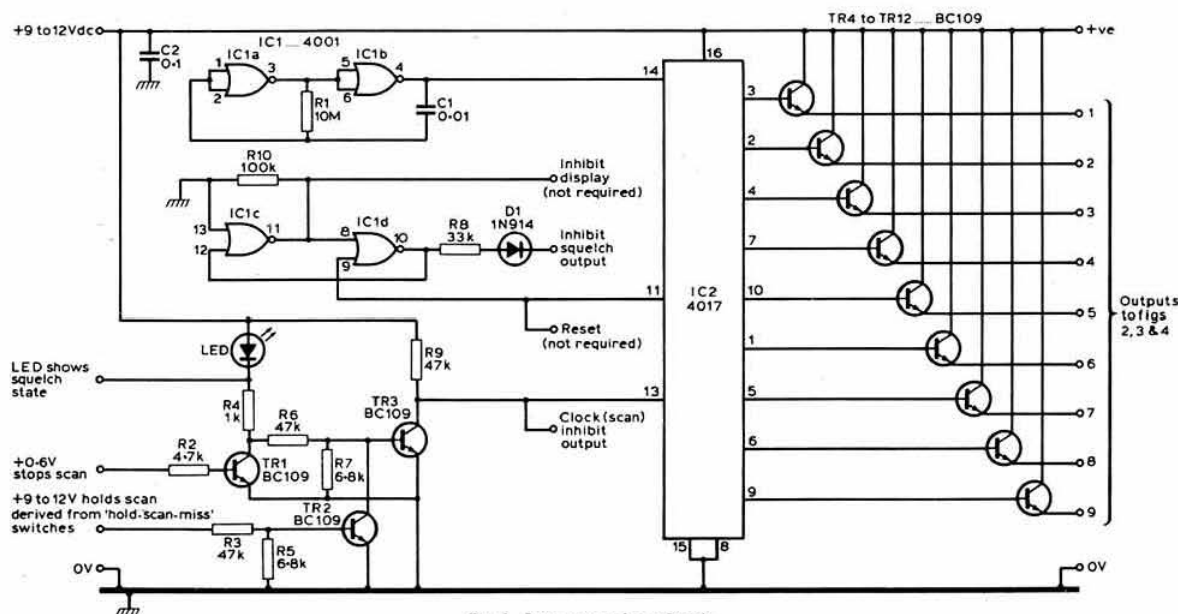


Fig 1. Auto scanning circuit

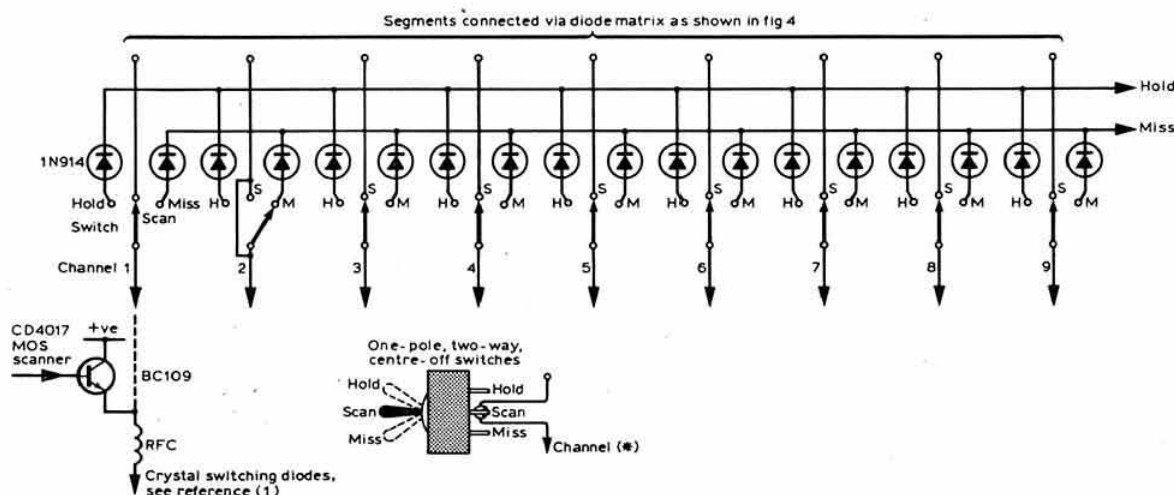


Fig 2. Switching arrangement



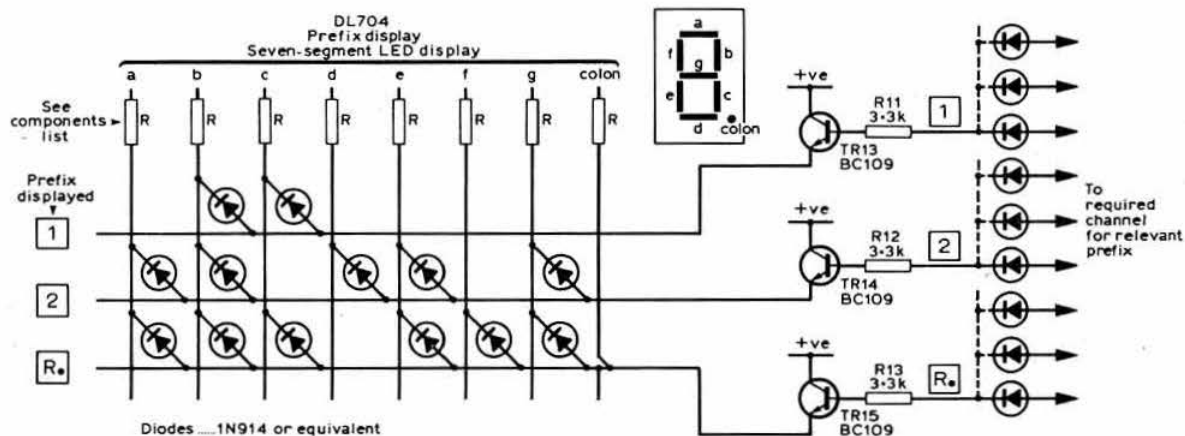


Fig 3. Prefix display

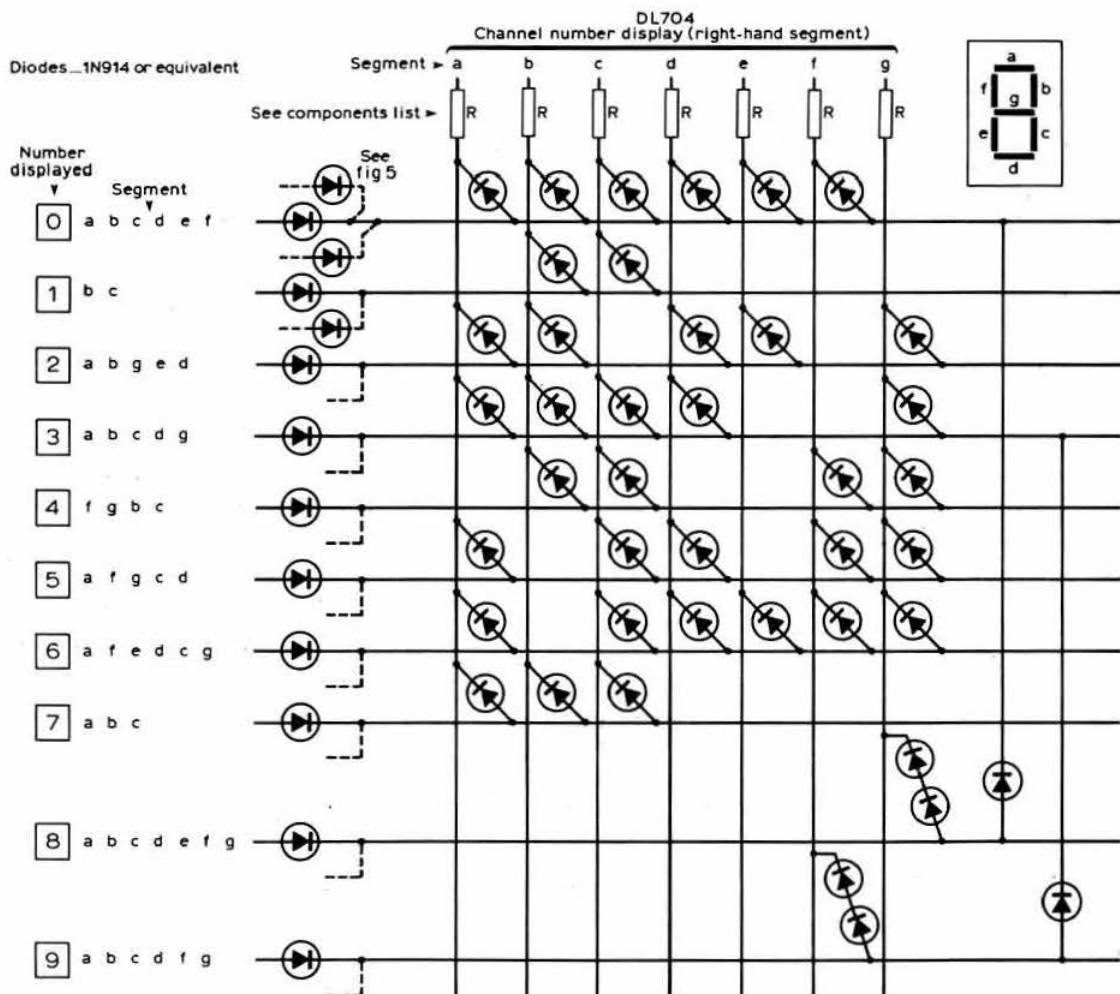


Fig 4. Channel number display (right-hand segment)

## Components list

R1	10M $\Omega$	C1	0.01 $\mu$ F poly (RS)
R2	4.7k $\Omega$	C2	0.1 $\mu$ F poly (RS)
R3, 6, 9	47k $\Omega$	IC1	4001(A) RCA (DT)
R4	1k $\Omega$	IC2	4017(A) RCA (DT)
R5, 7	6.8k $\Omega$	TR1-15	BC109 (RS)
R8	33k $\Omega$	Diodes	IN914 or equiv (RS)
R10	100k $\Omega$	Switches	spdt, centre off (RS)
R11, 12, 13	3.3k $\Omega$		
All resistors 1/3W (RS)			
Displays DL704, common cathode, 7-segment (AT) (SS)			

R for displays			
Applied volts	+5V	+9V	+12V
Resistor value	150 $\Omega$ *	330 $\Omega$	470 $\Omega$

\*May need slight adjustment at this voltage to provide equal brightness from each segment.

RS = Radiospares, PO Box 427, 13-17 Epworth Street, London EC2P 2HA.

DT = Distronic Ltd, 50-51 Burnt Mill, Elizabeth Way, Harlow, Essex.

AT = Atlantic Components, 143 Loughborough Road, Leicester.

SS = Synchro Services, The Moor, Carlton, Bedford.

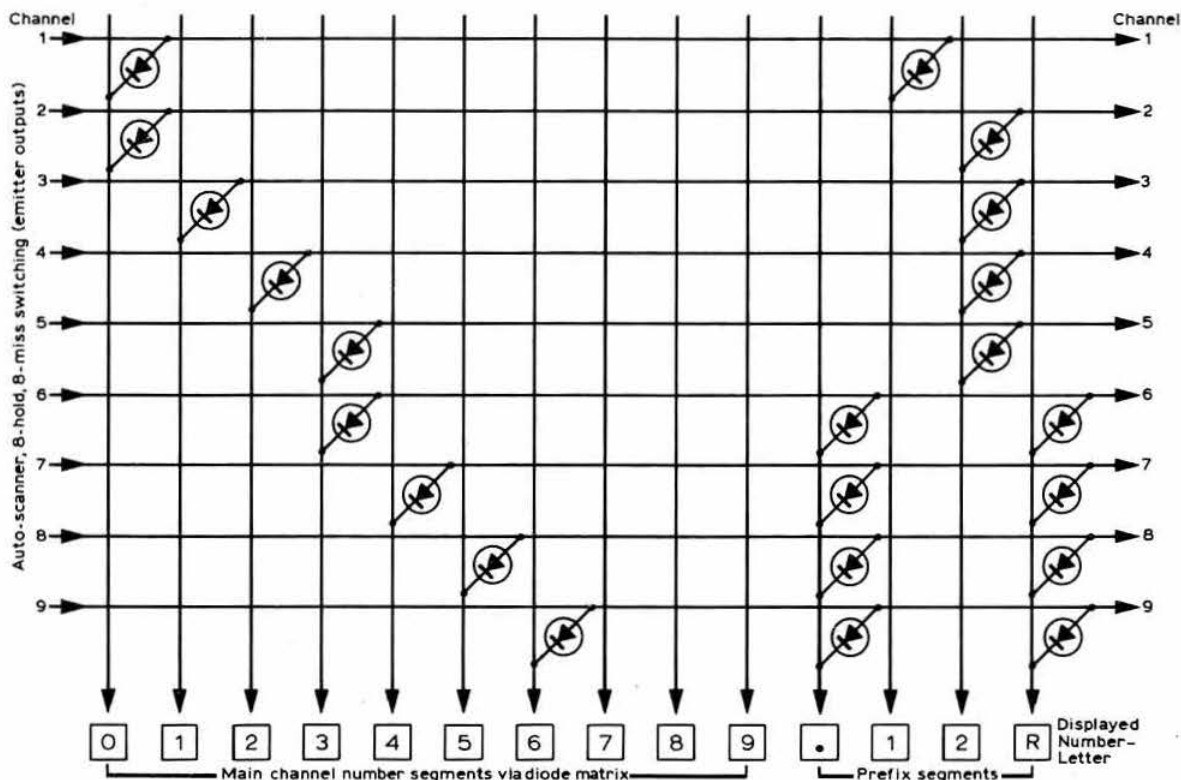
## Description

Using two seven-segment indicators, the display of simplex channels 0-99 and repeater channels R0-R9 is possible. The original scanner circuitry can be found in [1]; for clarity the auto-scanner section is shown in Fig 1. The emitter outputs of TRs 4-12 are used, as before, to select the relevant crystal by diode switches. The HOLD-SCAN-MISS switching used in conjunction with Fig 1 is shown in Fig 2. With the modification described, the emitters of TRs 4-12 are also used to feed the two diode matrices, shown in Figs 3 and 4.

The first arrangement, shown in Fig 3, is the prefix (ie the left-hand) indicator and is arranged to have one of three states; 1, 2 and R. The 1 and 2 indicate the decade part of a simplex channel and the R indicates a repeater channel has been selected. (The use of the colon makes the character look a little bit more like an R than an A.) For simplex channels 0 to 9, the left-hand indicator may either be left blank (as assumed in the circuitry) or made to display zero.

The diode matrix shown in Fig 4 is used to select a number between 0 and 9 for the right-hand indicator.

The selection of channel numbers is straightforward. An example is shown in Fig 5, in block diagram form. Provided a



Example shown wired for the following channels .....

Channel	1	2	3	4	5	6	7	8	9
Display number	10	20	21	22	23	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>

Fig 5. Worked example

separate diode is used for each and every connection, then any combination may be selected; in the example the channels are 10, 20, 21, 22, 23, R3, R4, R5, R6 for channels 1 to 9 respectively.

The advantage of this system is that the correct channel number may be displayed unambiguously without recourse to mental interpolation.

When a change in crystal frequencies is required the new channel number may readily be obtained by a simple reselection of the appropriate matrix lines.

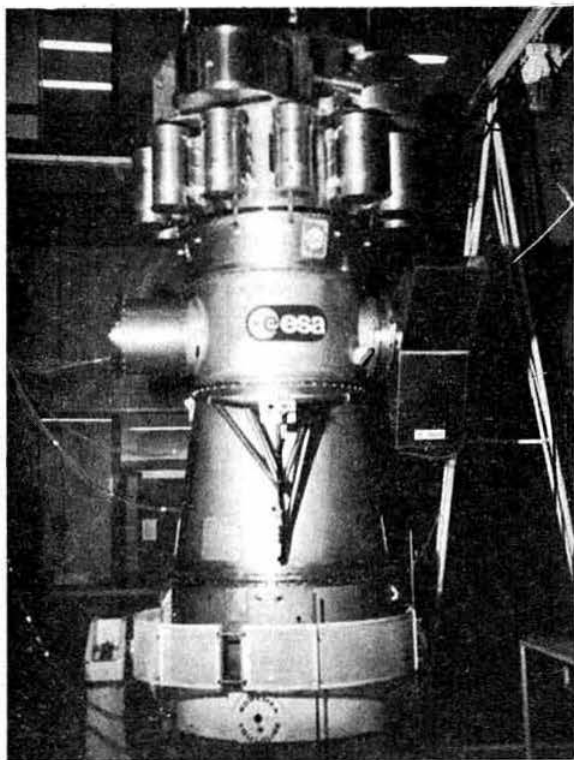
#### References

"A channel scanning arrangement for quartz crystals". I. J. Dilworth, G3WRT. *Radio Communication* September 1977, pp546-8. □

## oscar news

### Phase 3

The launch of the Ariane rocket carrying the Phase 3 satellite has been delayed until spring 1980 due to an explosion during a test start of the rocket at Toulouse.



This photograph was taken by Werner Haas, DJ5KQ, during the vibration test of the Phase 3 satellite at Toulouse, France. The Phase 3 unit is mounted on the right-hand side, with the Firewheel satellite of the Max Planck Institute at the top

### Current satellites

Of the spacecraft now in orbit, the operation of Oscar 7 has been somewhat unpredictable. Mode switching takes place from time to time, although a number of stations report satisfactory use of both the Mode A and B transponders. Cell failure in the battery has led to unreliable telemetry. Oscar 8 continues to operate in Mode A on weekdays and Mode J at the weekends. The Soviet satellite RS1 has experienced a battery problem but it is hoped that the transponder will be available for use again in March/April. RS2 appears to have been used for telemetry transmissions only.

### AMSAT-UK

The annual membership contribution was increased to £4 from 1 January 1979. Membership application forms can be obtained from G3AAJ.

## NEW PRODUCTS

### Tools

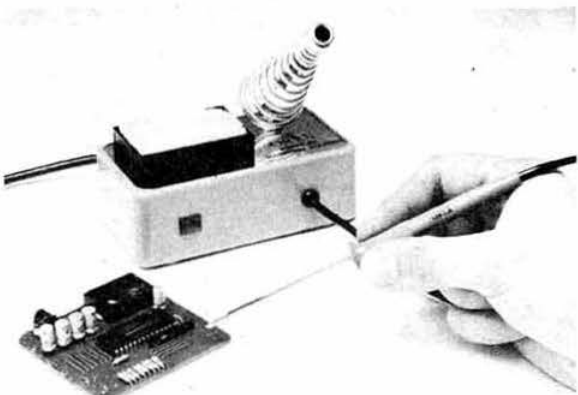
Toolrange Ltd announce the availability of equipment for electronic construction applications, and which include the following:

**Proto's TUR-QUOIS** range of precision electronic pliers;

**Micro desoldering tool** which is less than 7in long, weighs only 1oz and is claimed to be the smallest really effective desolder pump available. Price £5.95 + VAT.

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# technical topics

Pat Hawker, G3VA

THERE comes a time when one tries to forget, rather than gloat over, the passage of the years. So I will not dwell on the fact that this month is the 21st anniversary of *TT*, which began in April 1958 and which by now must be one of the longest running features under the same byline in any British electronics magazine. As Saki wrote: "The young have aspirations that never come to pass, the old have reminiscences of what never happened", so *TT* tries to steer a middle-aged course!

*TT* aims at reflecting technical innovation in amateur radio and it seems relevant to quote a recent editorial in *Nature* about innovation in industry and science.

"Innovation means more than just invention. It encompasses improvements to present products and processes as well as the introduction of new ones, and innovation does not just comprise what goes on in the research and development laboratory; it includes all the activity that goes into getting the new or improved commodity widely accepted. Some relatively unspectacular activities, such as making car doors that shut with a satisfying click, or mechanical devices that break down less frequently than their competitors', may be much more profitably innovative than no end of ultra-high technology. Identifying niches that no-one else has explored, be they relatively humble in technological terms, may bring major rewards."

While, as amateurs, we define "reward" in terms of operating satisfaction rather than financial profit, it is no less true for us, than for industry, that the most useful ideas are often the simplest ones, and are those that make everyday two-way communication more effective or more pleasant or lower the cost—and allow us to continue to feel that it is fun finding out.

## Human engineering the receiver

How good is the present generation of communication receivers? Has all the important innovative work now been done? Are we in danger of slavishly following fashionable trends? Are the professional design engineers really aware of what the amateur wants, or have they started playing the numbers game of seeking to improve on the "specification" of

competitive models regardless of whether the figures mean anything in practice?

Such thoughts are dangerous. They make us look critically at our current receivers. In *QST* (January 1979, pp21-5), Jay B. Rusgrove, W1VD, presents a highly subversive view ("Human engineering the station receiver") on some often neglected aspects of receiver performance and design, calculated to dispel any smug satisfaction with recent purchases.

Quite rightly he gives full credit to the careful attention that has been given during the past decade to improving front-end design. Solid-state receivers are available today with a dynamic range of over 90dB and capable of coping effectively with the signals that come surging off good antennas. We accept (even if we cannot always afford them) that the best designs are likely to use high-level, doubly-balanced mixers, spectrally pure local oscillators and have proper gain distribution, with an excellent crystal filter not far down the i.f. chain.

But W1VD notes that "Unfortunately much of the work ends with the circuitry just ahead of the i.f. filter." He believes that, in concentrating so much on the front-end, designers have not worried enough about what happens to the signal in the stages that actually produce the sound or provide the gain that makes this possible.

An important point (noted in *TT* in August 1978) is the noise added to the filtered signal by a series of relatively wideband, high-gain i.f. stages, unless another narrow-band filter is inserted ahead of the detector. This double filter technique (ie roofing filter and ssb filter) is now widely used in professional receivers but (as noted last year) can be expensive. This, however, provides a rewarding opportunity of drawing on the low-cost crystal ladder filter (see, for example, the design procedures outlined by G3JIR in *Radio Communication* February 1979). A valid point made by W1VD is that even quite a good single filter may be deficient in providing sufficient ultimate rejection, and this can be overcome by using two separate filters.

W1VD also casts a critical eye on agc systems, endorsing my own long-held belief that many agc systems are worse than no agc at all. He notes that the usually recognized faults of agc systems—"clicks, pumping, overshoot, inappropriate delay times, distortion of strong signals"—can all be solved by good design practice. But he adds a new worry: should we be more concerned with the excessively "good" agc system? Most manufacturers equate good agc directly with a "flat" agc slope (the ratio of input signal to audio output). For example, a specification may take the form of "less than 3dB change in audio output for 100dB change of signal input", yet W1VD is convinced that such a characteristic is out of place in an amateur receiver, resulting in an unduly "flat" sound without depth and lacking presence. He compares this with the pleasant "sound" often achieved with simple direct-conversion receivers not incorporating agc.

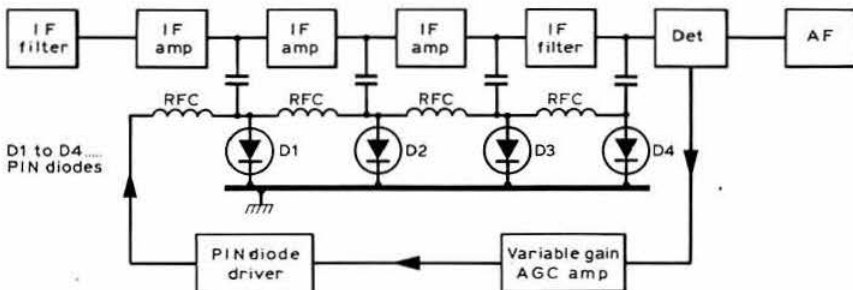
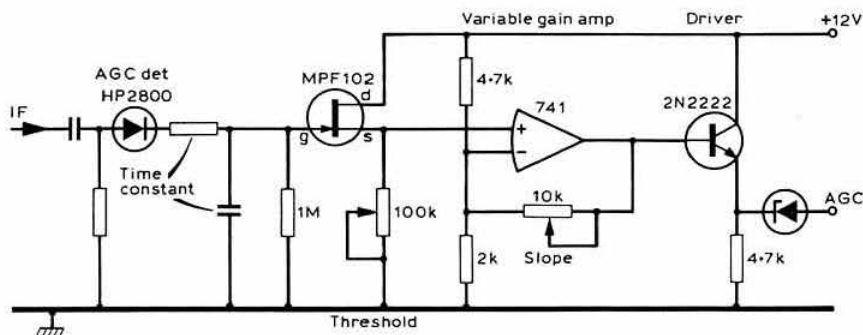


Fig 1. Variable slope agc system using pin-diode attenuators as outlined by W1VD in *QST*

Fig 2. Variable gain amplifier and pin-diode driver circuitry of W1VD's agc system



To overcome a flat characteristic he tried using a dBX audio expander but soon decided this approach was not particularly effective. In its place he devised a new agc system for the receiver using a series of pin-diode attenuators (Fig 1) together with a variable-gain agc amplifier (Fig 2) to form a linear, variable-slope agc system which can be readily adjusted to provide a satisfactory agc slope.

For the product detector, he recommends the increasingly popular doubly-balanced diode ring mixer (Fig 3) using HP2800 hot-carrier (Schottky) diodes, provided that it is recognized that this will have about a 6dB conversion loss. A feature of such an arrangement is that it provides good isolation between ports and reduces bfo breakthrough (as noted in *TT* last August, it should also minimize oscillator sideband noise).

W1VD pays a good deal of attention to what happens in the af end of the receiver; he considers that far too many receivers produce an excessive amount of hiss and hum. He recognizes that human operators have in their brain/ear sub-system perhaps the sharpest and most flexible filter available and able to work effectively in both band-pass and band-rejection modes. This tends to make operators less critical of hum level, than they would be otherwise, since they can ignore it by subconsciously tuning it out. W1VD, however, believes that constant rejection of hum results in operator fatigue (though I feel the evidence he gives for this is perhaps less than definitive). However, he makes the valid point that people sitting near to a film projector soon hardly notice the noise, yet it can result in a dull headache.

High hum level may result from having audio boards located near to a power transformer, or from failure to observe single

point earthing throughout the af circuitry (hum loops remain one of the tricky problems in hi-fi separates), or from insufficient smoothing (he uses a 23,000 $\mu$ F computer-grade electrolytic in his ripple filter). Apart from hum, he also believes that careful attention should be paid to af design, adopting circuitry from hi-fi practice to avoid distortion of the signal in this part of the receiver.

In drawing attention to the "back end" of receivers, he concludes: "There is a need for some original thinking—something other than the 'follow the leader' attitude. It makes no sense to better the specifications of other manufacturers' products when their figures relate to a totally misconceived idea. Many design engineers are naïve as to how a good communication receiver should sound." Fighting words—but worth thinking about!

### G3ZHL's switched octahedral array

Guy Morgan, G3ZHL, is one of a number of amateurs who have indicated considerable interest in the UA31AR switched "rotary" wire beam in octahedral form (*TT* October 1978 *et seq*) but who feel it should be possible to squeeze out rather more gain and/or bandwidth. In his case this has resulted in a design study for a double-sized array (similar in size to the old bi-square design unearthed by G3GMM, but with unidirectional characteristics) providing a calculated forward gain of 6.7dBi (ie just over 4.5dB reference dipole). Although G3ZHL has had to postpone putting his ideas into practice until the summer, he feels they may be of interest to others as a further contribution to the search for an effective switched rather than mechanically rotating low-cost beam. He writes:

"The radiation from an antenna is produced by the current flowing in it. Thus the properties of an array are determined by the location and relative phases of the current maxima in its various elements. In the UA31AR antenna the current maxima occur at the top and bottom vertices, where all four wires are close together. This seems to indicate that the array should have a gain not too different from that of a single, one-wavelength loop. A possible disadvantage of the design is that one current maximum is at the lowest point, closest to any clutter on the ground.

"The use of a high impedance feed and isolated wires at the top vertex of the array moves the current maxima to where they do more to contribute gain. Splitting a one-wave loop at opposite corners and feeding at high impedance will not work. An extra 180° phase shift is introduced at the feed point and the two current maxima are out of phase when the loop is viewed face on. Note the difference from a conventionally current-fed loop as used in a quad.

"The situation with 2 $\lambda$  loops, as described by G3GMM, is

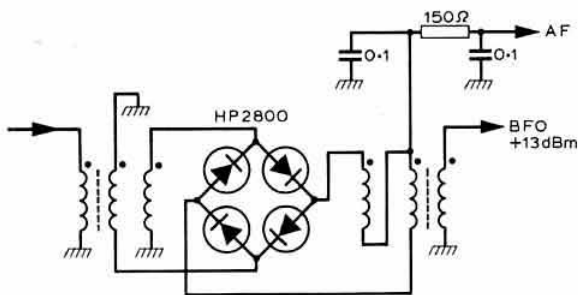


Fig 3. Double-balanced product detector as recommended by W1VD. T1 and T2 comprise 10 turns trifilar wound No 32 awg on 0.37in (9.4mm) toroidal cores of initial 950 permeability. Although it has a 6dB conversion loss it provides good isolation between ports, so reducing bfo feedthrough



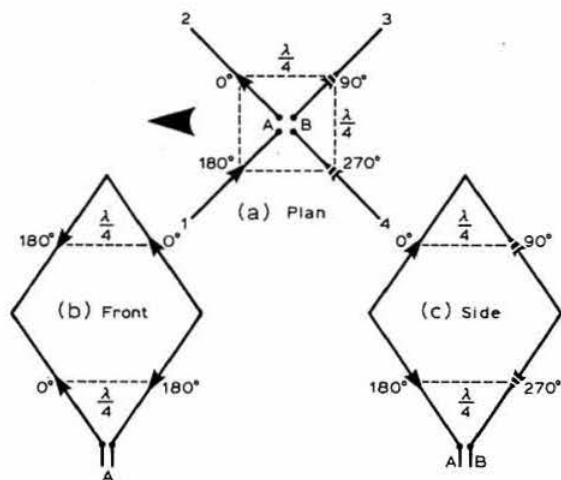


Fig 4. Single-pole switched octahedral quad array proposed by G3ZHL using "bi-square" ( $2\lambda$ ) elements with high-impedance feed points (horizontal polarization)

very different. The current maxima are located at the four mid-points of the sides and, seen face on, they add to produce a horizontally-polarized signal, as seen in Fig 2(a) of *TT* January 1979. I cannot agree with the comment that the insulators are then less critical; quite the opposite, each corner of the loop is now at a voltage maximum so that the support wires need to be insulated from high rf voltages.

"The 1938 bi-square design used only one loop at a time and was bi-directional. The following proposed design uses the same bi-square concept, with insulated wires at the top vertex, but with a different feed arrangement so as to make use of both loops simultaneously in order to produce some gain. A little geometry shows that the centres of the sides lie at the corners of horizontal  $\lambda/4$  squares. Consider the antenna as consisting of two flat loops that have been folded about a vertical line. One of these can be fed at high impedance to produce a current pattern similar to a flat loop (see Fig 2(a) *TT* January 1979). If the other folded loop were to be fed in phase with this the signals would not add to best advantage because of the  $90^\circ$  phase shift introduced by the  $\lambda/4$  spacing. The antenna would also be directional.

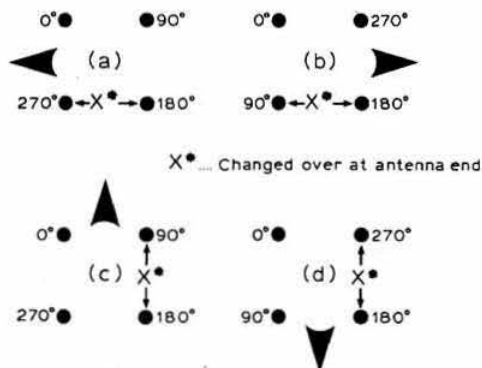


Fig 5. Phasing situations with G3ZHL array using "four-wire" open line feeder with switching arrangements at the antenna end of the line

"The spacing can be used to produce a better gain and a unidirectional radiation pattern by feeding the second loop  $90^\circ$  out of phase. This is shown in Fig 4, which represents a plan of the antenna. The relative phases of the currents are shown for the bottom half of the antenna. Half-loops 1 and 2 are fed from open-wire line A, and half-loops 3 and 4 (advanced  $90^\circ$  in phase from line A) are fed via line B. The phase shift, combined with the spacing, makes signals to the left add in-phase, while signals to the right cancel. The currents in the top legs are  $180^\circ$  out-of-phase with respect to the corresponding currents in the lower legs, but the bends in the wires make the horizontally-polarized signals add, and the vertically-polarized signals cancel. The direction of maximum radiation can be selected by switching phases at the feed point in a similar manner to the previous designs.

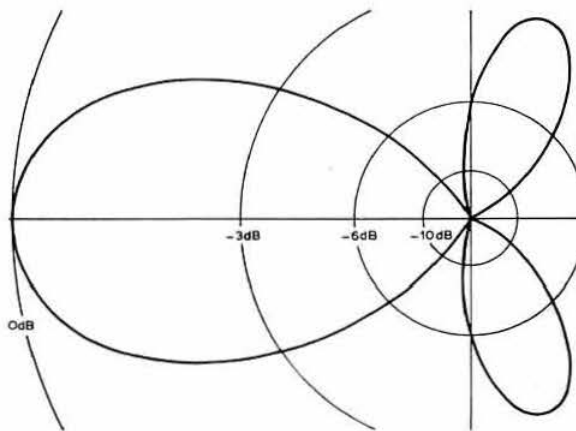


Fig 6. Polar diagram in the horizontal plane for the G3ZHL array

"The high impedance feed can be matched to a low impedance coaxial cable (or twin line) by means of two  $\lambda/4$  transformers of open wire line which can be combined into a square four-wire arrangement. The diagonally opposite wires then form independent open-wire lines. Each pair lies in the zero equipotential plane of the other so the two pairs should have little interaction. The phasing for Fig 4 is produced by inserting an extra  $\lambda/4$  (electrical) length of low-impedance feeder at the base of one open-wire transformer to give the required  $90^\circ$  phase shift, and swapping the  $180^\circ$  and  $270^\circ$  wires at the base of the antenna. The arrangements needed to give the four possible directions are indicated in Fig 5. The direction is reversed by interchanging the  $90^\circ$  and  $270^\circ$  wires at the low-impedance end of the open-wire transformer. The other two directions require switching at the antenna end. A three-pole changeover relay would be needed and should have widely-spaced contacts to cope with the high rf voltages at the antenna feed point."

G3ZHL considers that he can back-up the basic idea with the results of some calculations. He has computed the polar diagram of the array, approximating actual current distribution with Hertzian dipoles located at the midpoints of the sides (representing a reasonable approximation). The resulting pattern gives a gain of 6.7dBi, with the main lobe in the expected direction and a null in the opposite direction. In the horizontal plane (Fig 6) the main lobe has a half-power beam width of  $68^\circ$ . The reverse null is more than 20dB down for a width of

34°, and more than 10dB down for 66°. The bad news is that there are side lobes situated 112° either side of the main lobe, only 3dB down! The side lobes have 6dB points (relative to the main lobe) 45° apart. The nulls between the main and side lobes are more than 10dB down for angles of 53° to 80° off the main lobe.

Although G3ZHL recognizes that the side lobes could be annoying (particularly when trying to work South America from the UK) he feels that the design represents a significant improvement over the two previous single-pole, octahedral wire arrays. It is basically a monoband design, but if it were built for 21MHz with 3λ/4 matching lines then it would present a low impedance to the transmitter also on 7, 14 and 28MHz, although radiation patterns for such operation have not been calculated and the impedance match would not be very good on these additional bands.

## Logic and ttl

In *TT* (February 1978) details were presented of the various well-known ttl families of 7400/5400 ic devices, including basic ttl (7400 series), high-speed ttl (74H00 series), low-power ttl (74L00 series), Schottky-clamped ttl (74S00 series) and Schottky-clamped, low-power ttl (74LS00 series). However, *Electronics* (1 February 1979) has now drawn attention to the introduction of several further series of devices offering higher performance and mostly based on further exploitation of Schottky-type techniques. It is admitted that these new components have so far not been taken up in large numbers, presumably due to the fact that most of them do involve additional cost.

Texas Instruments have an "advanced Schottky" series with the devices coded as the SN74AS00 series and claimed to be twice as fast as the current 74S00 series; also a new "advanced, low-power Schottky" range, SN74ALS00 series, that require only half the power of the 74LS series yet are more than twice as fast. Several other firms have also introduced new series compatible with ttl and offering improved performance. It should be stressed, however, that there is no intention of discontinuing any of the standard series. The integrated-injection-logic (i<sup>2</sup>l or iil) devices continue to make progress, although this form of logic is mainly employed in large-scale integrated circuits having more than 50 gates. The new devices are summarized in Table 1.

In *Ham Radio* (February 1979) there is a timely reminder that handling precautions should be observed with unmounted cmos devices to avoid damage from static electricity. This danger tends to depend on particular circumstances, weather

conditions etc, so do not be lulled into a sense of false security by "getting away" with not observing such precautions without running into trouble.

"Unused devices should be kept in anti-static containers or pushed into conductive plastic foam. Such foam is usually black, somewhat hard, and will read a few kilohms on an ohmmeter."

"Everything on the workbench should be grounded, including an aluminium work-area plate. Use a grounded-tip, three-wire soldering iron. Strap together and ground all powered test equipment; this should be done anyway, since it is possible to get a lethal shock from some test gear."

"Avoid all plastic-fibre clothing if possible. Ground yourself through a 2MΩ resistor (1MΩ with 117V supplies) and flimsy wire. The resistor is a precaution against lethal shock current. The flimsy wire should break if you slip. All this may seem overcautious, but it is standard industrial practice. Ask yourself how many expensive cmos devices you can afford to lose from a static zap."

## The G6XN "Heath Robinson" switched quad

In *Wireless World*, commenting on the UA31AR design, I wrote: "It will be interesting to see who will be the first to come up with a low-cost switch-rotatable beam with a forward gain exceeding, say, 5dB." The G3ZHL entry is only one of a number of responses to this challenge.

Les Moxon, G6XN (who had actually been experimenting with switched beams *before* the publication of the UA31AR design) reports: "I think I have now got the answer to the problem of all-round switchable arrays *without* the disadvantages of the UA31AR version, and *plus* multiband operation." His array remains the same size and octahedral shape as the UA31AR single-pole design; but (like G3ZHL) he makes some ingenious transpositions of current distribution to overcome the snags of X-type elements (looking down on a UA31AR it can be thought of as two stacked X antennas) and the multi-band feature can be achieved by an extension of the "linear

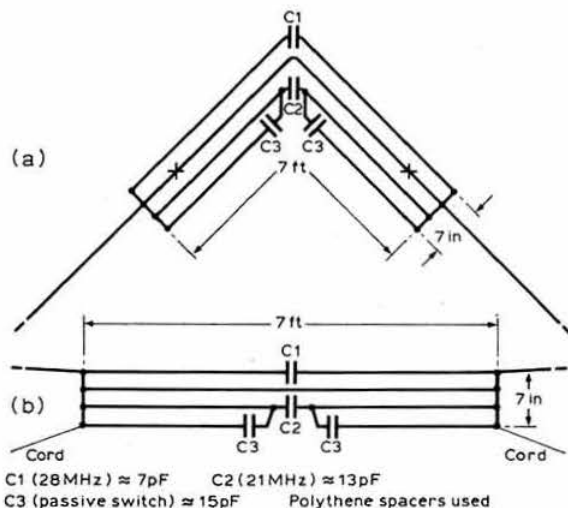


Fig 7. Linear resonators used by G6XN for triband quad elements. Loop circumference 66ft (1λ on 14MHz). The arrangement (a) is that used in practice by G6XN, but the arrangement (b) should also prove satisfactory

Table 1. New forms of ttl logic

Maker	Family	Typical power per gate(mW)	Typical propagation delay (ns) 15pF load	Typical max toggle frequency (MHz)	Initial price premium
Fairchild	FAST	4	2	130	20% above Schottky
National Semi Corp	LS <sup>2</sup>	2	5-6	32	20% above low-power Schottky
Raytheon	Advanced Schottky	20	1.5	200	25-30% above Schottky
Texas Inst	Advanced Schottky	22	1.5	200	15-30% above Schottky
Texas Inst	Advanced low-power Schottky	1	4	50	15-30% above low-power Schottky

resonator" (disappearing inductance) technique (*Radio Communication* April 1977) and by the use of "counterpoise" elements. The following account reports progress (up to last December) on both mechanically rotated and switched versions of his multiband quad. It should be remembered that for many years G6XN has been a firm (if unheeded) advocate of using single large loops in quads rather than the conventional "nested" family of 1λ loops.

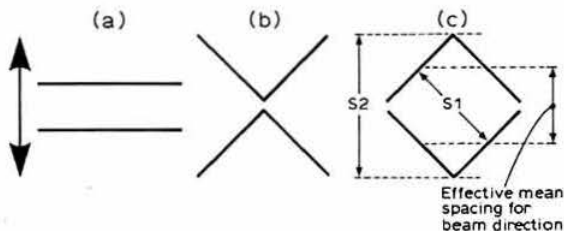


Fig 8. "Taking a pair of parallel elements (a) and bending them into X shape (b) makes a mess of things. So why not try the opposite kind of bending (c)?"

The latest version of his quad uses triband linear resonators (Fig 7). In effect, three elements on 14MHz become 12 on 28MHz, giving significant extra gain (G6XN sees this extra gain at higher frequencies as the main argument in favour of big beams as opposed to mini-beams, and he considers that it also resolves the quad versus Yagi debate in favour of the quad since this yields twice as many 28MHz elements). The quad forms a "bi-square" on 28MHz and "something in between" on 21MHz. For a rotary beam one needs resonators at the top and bottom of each loop. G6XN's original experimental fixed version had resonant stubs for the parasitic elements so that they could be adjusted at ground level as reflectors or directors on any band. But, as a result of gale damage, the driven element developed an unexplained fault on 21MHz. To try and get some clues as to the fault (without lowering the antenna) the lower resonator was scrapped and replaced with a stub, resulting in the current distribution slipping round by 90° and vertically-polarized radiation (parasitic elements becoming inactive). Although this was not of interest in itself, it started G6XN thinking and led to what may well prove to be a practical answer to the switched array problem. This train of thought was reinforced by his pondering on the basic evils of X-beams. G6XN writes:

"If taking a pair of parallel elements (Fig 8(a)) and bending them into X shape (Fig 8(b)) makes such a mess of things (low radiation resistance, nulls at 45° forward, large side and back lobes) why not try the opposite kind of bending: Fig 8(c). Notice that, as with standard elements, spacing S1 for the 45° direction is 0.707 of the maximum spacing S2 but in this case, allowing for the current distribution, the effective mean spacing for the beam direction is going to be a lot less than S2; in fact, not much greater than S1 (ie as the beam is rotated there is at first relatively little change in effective spacing. Thus, instead of being narrower, the beam will be broader than with normal elements, side lobes are almost suppressed and back lobes greatly reduced).

"But how, one might ask, do we go from Fig 8(b) to Fig 8(c)? The trick is simple and there is no basic structural change from the UA31AR arrangement: we merely shift the feedpoint to the middle of a side of the quad loop; this switches the polarization from horizontal to vertical and pushes the current

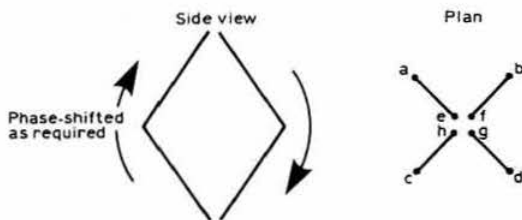


Fig 9. By shifting the feedpoint of a UA31AR array it becomes vertically polarized with the current maxima at the corners instead of at the pinched-in top and bottom vertices

maxima out to the corners instead of the pinched-in top and bottom vertices!

"Looking from the side (Fig 9), we see current maxima at a, b, c and d, whereas for the UA31AR quad the maxima are at e, f, g and h. By the nature of things there is a snag. Feeding at the corners is not nearly as convenient and we are going to have to feed all four corners, or two corners plus some tricky switching at the upper and lower high voltage points, or (having open-circuited the top) use a zepp feed at the bottom (with the G6CJ balun modification—see ARTS, 6 etc) plus a two-pole, four-position switch at the lower high-voltage point. I propose to try this first, using crocodile clips. I feel sure the switching problem is solvable, although the zepp feed may restrict bandwidth and there could be a multibanding problem at 28MHz because of a tendency to excite the full-wave mode; this can probably be overcome by using short counterpoises, so that we have an element looking like Fig 10 (for simplicity this is shown for two-band operation and it should be noted that counterpoises are needed only on 28MHz and are not needed with corner feeds). The four half-elements are paired, as required, for 90° switching of beam direction. For monoband operation one could use a single pair, and the array then, in effect, becomes a vertical VK2ABQ array! However, the full quad configuration should give slightly more gain and better back-to-front ratio, mainly because of the closer effective spacing, and it also cancels unwanted horizontal components.

"The multiband four half-element version suffers from excessive spacing on the higher frequency bands and might be better with one pair unused. Or one could pinch the corners together by an arrangement of cords (plan view shown in Fig

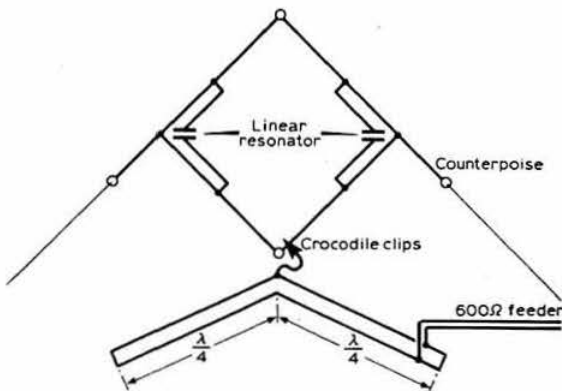


Fig 10. Multiband form of the basic vertically-polarized element, showing method of feeding and use of counterpoise on 28MHz. Note that two crocodile clips are required in order to drive two adjacent vertical members in phase

11) to become what I have termed the 'Heath Robinson' quad. Pinching-in of the quad (at top and bottom) so that it can be supported from a single pole results in a tendency for spurious modes which are suppressed (in free space) provided that the current distribution is symmetrical; in contrast, an ordinary quad is remarkably tolerant of variations in the position of current nodes, etc.

"Another problem concerns the proximity of the high-voltage points to the supporting structure. Metal masts and guys would have to be non-resonant, but one could use an extension of, say, plastic tube, to take care of the top corners. The bottom corners are more of a problem and converting crocodile clips into a switched system may require ingenuity. In my case this represents a height of 25ft and can be reached by ladder for experimental purposes."

G6XN has also provided some notes on the adjustment of linear resonators for the triband and quad element (Fig 7) as follows:

"I set up the loops first of all in a horizontal position, about 6ft high. Walking round them with a current probe one can easily determine the points of zero current, which should be in the middle of the sides. C1 and C2 are adjusted to achieve this on 28MHz and 21MHz respectively. C3 is not critical but, at 28MHz, current through it should be equal to or rather less than that in the adjacent wire, and C1 and C2 should be re-checked after any adjustment of C3.

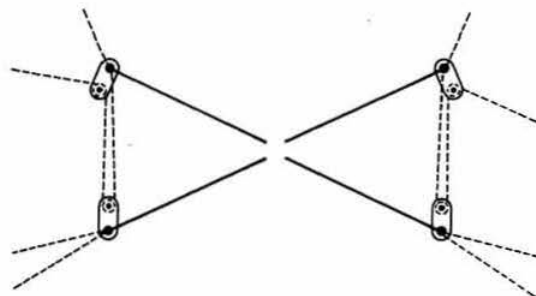


Fig 11. The G6XN "HR" (Heath Robinson) quad arrangement using cords and pulleys to pinch the corners together on the higher frequency bands

"Lower resonators need to be adjusted *in situ* (at low enough height for access) for best matching in the case of the driven element, and for maximum gain or f-b in the case of parasitic elements. For non-rotary operation, resonant stubs can be used with shorting bars (roughly 40 or 18ft for 21MHz, 25 or 42ft for 28MHz, 35ft for 14MHz) in place of the lower resonators."

Although it may be argued that considerable space has been devoted this month to what are still experimental or unproven design concepts by G3ZHL and G6XN, no apology is made since switched and multiband quads currently represent one of the most significant areas in amateur radio for serious and useful development work.

## Imported risks?

A. S. White, G4EGH, draws attention to what he feels represents a potentially dangerous design fault that he has found in a number of Japanese-made equipments. Neither he nor I can be certain just how widespread are these faults and whether they apply to all similar models; for that reason I am

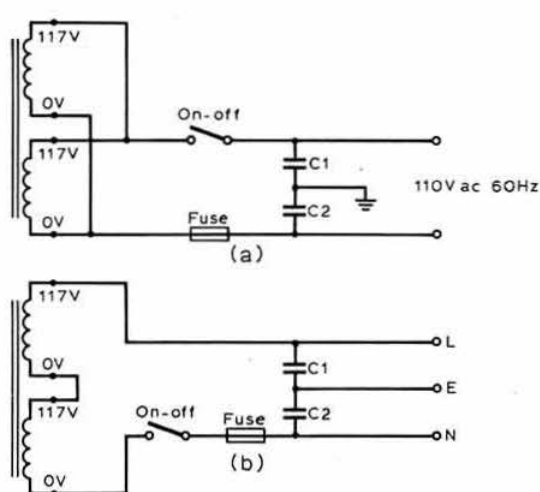


Fig 12. Circuit diagram of mains connections as found in some imported equipment. (a) As shown for 110V mains supplies. Although using only a single-pole switch it is much less hazardous than the actual arrangement found in equipment intended for use on 240V supplies where there is no switch in the "line" lead and C1 is under-rated. Good safety practice demands the use of double-pole switches

deleting brand names and model numbers, except to confirm that his equipment stems from one of the most popular ranges. It would seem advisable to check the actual equipment (circuit diagrams often represent the 110V situation). It should be remembered that American 110V supplies are generally balanced with respect to earth (55V ac with respect to earth on each conductor), whereas British 240V supplies are of the "line" and "neutral" form with the full 240V rms with respect to earth across the "line" conductor. G4EGH writes:

"The circuit diagram for the rig, as published in the handbook, is shown set for 110V supplies as reproduced in Fig 12(a). This seems reasonable, except that C1 and C2 remain 'live' even when the rig is switched off. My rig, however, was supplied for British mains supplies, the mains lead being of Japanese manufacture and a sticker '234V ac' stuck on the rear apron, adjacent to the mains cable entry, and had been exported in this form rather than modified by the importers. The arrangement was as shown in Fig 12(b). Here the 'line' conductor remains connected to the mains transformer, the 'neutral' conductor is both switched and fused, and there is the full 240V rms across C1 at all times. In the maker's manual, C1 and C2 are listed as '0.0047μF, 1.4kV dc' but the components are clearly marked '0.0047μF, 1.4kV dc, 150V ac', though, to be fair, I have had no failures in three years of use.

"Neither switching in the neutral lead nor the use of under-rated capacitors is advisable, representing shock and fire hazards. I feel that members should check and, if necessary, modify their equipment, as well as drawing the attention of importers to such practices."

For many years it has, of course, been recommended in the Society's "Safety recommendations for the amateur radio station" (*A Guide to Amateur Radio*, p116) and in many other safety publications, that "double-pole switches should be used for breaking mains circuits on equipment", yet it would appear that this is by no means standard practice in imported equipment even today.



# 4-2-70

Graham Knight, GM8FFX \*

## German cw awards

Considerable interest has been shown in the awards for cw operation which are issued by the Arbeitsgemeinschaft Telegraphie Deutschland (ACGW-DL). Noel Phelps, G4HJA, of Devises, a correspondent member of ACGW-DL, has kindly sent full details of all the association's awards to 4-2-70. Following the information published in November's 4-2-70 DK3UZ wrote to say the CW-1000 Award was undoubtedly the top award for cw operators. The qualifications for the CW-1000 Award are as follows: One thousand cw QSOs must be accomplished in one calendar year. All cw QSOs (including contests) will be accepted. Non-members should submit a list giving the total number of cw QSOs achieved for each month of the year for which the award is to be claimed. This list must be signed by two licensed radio amateurs or be confirmed by the claimant's local amateur radio club.

A CW-500 Award is available for 500 cw contacts in a single year. VHF-CW-125 is the ACGW-DL award which is issued for activity exclusively on 144MHz and above; 125 cw QSOs are required and there is no transmitter input limitation. All vhf cw contacts are valid, including ms, tropo, local, contest, eme, Oscar, etc. All other conditions remain as quoted for the CW-1000 Award.

SWL awards. All the above ACGW-DL awards may also be issued to short wave listeners. For an swl log it is only necessary to read the transmission of one station in a QSO, but the callsign of the other participating station must be identified and recorded. Received CQ calls do not qualify. All other conditions for swl awards remain as detailed for the CW-1000 Award.

It is possible for the same station to be heard by short wave listeners or contacted by licensed amateurs more than once during the year to which the claim relates. However, all claims must show an interval of not less than 12 hours on each band for which any station is being claimed on more than one occasion.

All transmitting awards will be issued under the name and callsign of the claimant, all the relative contacts must be made using the claimant's own callsign and any combination of the claimant's callsign, eg /A./P./M./HB9 etc. Contacts made by the claimant from the station of other operators will not be valid, except where the claimant's own callsign is used as a participant in a multi-operator cw contest.

Each of the ACGW-DL cw awards costs 5DM, two dollars or eight ircs, and are available from Otto Wiesner, DJ5QK, Freudenheimer Str 14, D- 6900 Heidelberg 1, FRG. The ACGW Association also runs cw tests during the year and is very active in promoting the use of cw on all the amateur bands. Details of the association, its aims, objects, and conditions of membership are available on receipt of an sae from Noel Phelps, G4HJA, "Fair Haven", Station Road, Patney, Devises, Wiltshire SN10 3RD.

## Class B licences in EI

Anthony Harris, BRS36924, of Chester, has sent 4-2-70 the news that the Irish authorities introduced a Class B licence on 15 January 1979, with conditions similar to the UK G8 licence. All the callsigns to be issued under this licence will have three letters, the last of which will be B. Distinctive callsigns will also be issued to Class B visitors. This new facility will be welcomed by many UK Class B operators who have previously been unable to obtain licences for expeditions to Eire. The new licences will be issued by the Department of Post and Telegraphs, General Post Office, Dublin 1.

## Repeater groups of the month—GB3HR and GB3PB

The South-West Hertfordshire UHF Group has been responsible for the operation of GB3HR since it came on the air on 21 August 1976. The repeater operates on Channel RB14 (434·950 input/433·350MHz output), is situated on an elevated site 153m above sea level at Bushey Heath, and serves south-west Hertfordshire, Middlesex and parts of Buckinghamshire. The aim of the group is to further experimentation and development of uhf, and they would welcome suggestions and comments about GB3HR. Further details are available from the group's secretary, Trevor Groves, G8BBE, QTHR.

The Peterborough uhf repeater, GB3PB, became operational just before Christmas and is already proving itself to be popular with fm enthusiasts in that part of Cambridgeshire. The repeater was built and installed by G8KUW, G8LXW, G8OUU and G4FMG, and uses a Pye-manufactured F450T base station transmitter running 4W output. The antenna system consists of two separate four-element close-spaced colinear arrays developed by group member G4EFO. The separation between the transmit and receive antennas is sufficient to provide enough isolation to require the use of only one cavity filter. Further information about GB3PB can be obtained from G4FMG, 10 Bettles Close, Peterborough.

## Repeater news

Mike Dennison, G3XDV, the secretary of the Kent Repeater Group, has kindly sent the group's newsletter to 4-2-70. It is interesting to note that this is the twentieth newsletter this go-ahead group has produced for its members. The most important article in the 10-page publication records an Extra-Ordinary General Meeting of the group at which the members present agreed to a merger with the North Kent Repeater Group which had previously operated GB3NK (RB4 near Orpington) on an independent basis. This amalgamation means that the Kent Repeater Group is responsible for the coordination, building and maintenance of all of Kent's repeaters. These are: GB3CK, Charing RB0; GB3EK, Margate RB2; GB3KR, Dover R4; GB3NK, near Orpington RB4; and GB3SK, Folkestone RB6. The Kent Repeater Group is also currently considering making a proposal for a further vhf repeater under Phase 3, and a site near Maidstone is under consideration.

The Kent group's newsletter also comments on co-channel interference from high-power home stations, and the item makes so much sense that it is reproduced below without alteration:

"Interference from those using other repeaters on R4 has become more of a nuisance since GB3WH (Abingdon, Oxfordshire) became operational a few weeks ago. When you hear

\*PO Box 49, Aberdeen AB9 8JA



fixed stations running 150W to access it, it's easy to understand how the interference occurs. Co-channel interference must, however, be regarded as a fact of life if the country is to be adequately served by a network of repeaters designed to aid mobile and hand-portable stations. Almost all interference of this kind is caused by fixed stations (more often than not the 40W to a colinear types) and it should be borne in mind that if it were only mobiles using vhf repeaters then this problem would virtually disappear. In practice, it is fairly simple to ascertain whether someone is using some other repeater on R4, and there is obviously no need to wait for them to finish.

"It follows that since others cause interference to GB3KR, then some of our local fixed stations probably interfere with GB3HH, GB3WH, ON0OV or FZ3THF, so please ensure that, especially during lifts, you use the lowest power you can to access 'KR, note where your beam is pointing and turn off your toneburst. Better still, have a simplex contact and leave 'KR to the mobiles."

The Grampian Repeater Group, which operates GB3GN on R7 and is responsible for GB3AB on RB14, will be holding its Annual General Meeting on Saturday 28 April at the Music Hall, Aberdeen. The meeting will be preceded by a trade display, with the AGM commencing at 2pm. All members and other interested amateurs are invited to attend, and further information about the meeting or the group is available from the secretary, GM8HGD, 41 Skerry Drive, Peterhead.

The call sign of the Boston, Lincolnshire, uhf repeater on RB6 has been changed from GB3SL to GB3SO. Further information on this repeater can be obtained by contacting G3NNQ, QTHR.

## Mendip repeater proposal

The Mendip Repeater Group was formed on 4 October 1978 at a meeting attended by 28 amateurs who felt that there was a need for another 144MHz repeater to fill the gap between the coverage provided by the existing repeaters GB3BC, GB3NC and GB3SN. Following this initial meeting, tentative enquiries were made as to possible sites, and tests from near Wells in Somerset met with encouraging results. Some of the members of the new group had already been involved in helping to build other repeaters, and it was felt that the group had enough members with the necessary technical skills to make the repeater hardware.

Careful consideration was given to the choice of the frequency, and after weighing up all the arguments the group has proposed that the Mendip repeater be on channel R0. The group chose R0 for three reasons:

1. Amateurs already equipped with crystals for 145MHz and 145.600MHz would not have to buy new crystals.
2. It is at present a relatively unpopulated repeater frequency.
3. It conforms to IARU recommendations.

Since the initial meeting, the membership of the Mendip Group has grown to more than 70, the main and standby transmitters and receivers have been tested, and the logic control circuitry is nearing completion. A full proposal has been received by the RSGB with a request for the allocation of the call sign GB3WR, and this proposal is now being vetted by the VHF Committee and its Repeater Working Group. Further details on the progress of the GB3WR proposal will appear in future pages of 4-2-70, but in the meantime further details about the Mendip Repeater Group can be obtained from the secretary, Barrie Stevens, G8KKA, 25 Hazel Terrace, Mid-somer Norton, Bath, Avon BA3 4BG.

## First 50MHz opening since 1958

Thanks to the predictions in 4-2-70 and to the propagation forecasts on the GB2RS news bulletins, many amateurs were ready for crossband contacts when the maximum usable frequencies rose above 50MHz. This was the first 50MHz opening to America for 21 years and the opening falls into the pattern detailed by G8KG in last month's *Radio Communication*. Brian Bower, G3COJ, was the first person since 1958 to make a crossband 28/50MHz contact by working WB2RLK/VE1 at 1300gmt on 10 February. G3COJ had been monitoring 50MHz for some days previously, and had heard WB2RLK/VE1 on 8 February at 1336gmt, and on 9 February when the same station was heard again but this time on 50.110MHz ssb. Another operator watching closely for 50MHz to open was famed hf contest operator Al Slater, G3FVB, who heard Ed Tilton, W1HDQ, at 1500gmt on 9 February. Next day G3FVB worked crossband to WB8IW1/4 in South Carolina, WB2RLK/VE1, and WA1DZJ in Maine, all operating on cw near 50.005MHz. G3FVB also worked W4WD whom he last worked 21 years ago, also crossband 28/50MHz. SM6PU in Sweden copied WB8IW1/4 on 10 February but did not complete a QSO.

The Gibraltar beacon ZB2VHF, now on 50.035MHz and beaming west with 100W erp from a 5-el antenna, was heard in America on at least 12 days in the month of February. The Cyprus beacon on 50.498MHz, which is still beaming south, was heard on 9 February by VE1ASJ and WA1DZJ. DK2ZF reports hearing strong signals from the South African beacon ZS6PW on 50.030MHz on 19 February at both 1110gmt and at 1655gmt.

Activity on the west to east 50MHz path peaked on the days around 15 February, when as many as 40 crossband contacts were being made between America and Europe. G3COJ, G3FVB, G4CBW and G3BA were among the British stations taking advantage of the spectacular rise in the mufs. The first crossband contact between Germany and Canada took place on 15 February, with DJ2RE near Darmstadt working WB2RLK/VE1 at 1413gmt. ZB2BL is reported to have worked as far as W0 on two-way 50MHz on 18 February, and many crossband contacts have been taking place between Greece and South Africa. As this report goes to press, GW3NJY/W9 and WA5IYX have been received in the UK.

It is expected that the east to west path will decline during the summer and return in the autumn, but that the 50MHz band may be open on a north to south or south-west path during the summer months. Elsewhere in the world, stations in W8 have been working Hawaii, Florida operators have contacted Alaska, and VE1 stations have been contacting Columbia.

A letter from Mike Eccles, GM3PPE, makes a plea for a small allocation in the 50MHz band. GM3PPE has just returned to the UK after an eight-year stay in America where he held the call sign WA6LJG. Mike is member No 1959 of SMIRK and he speaks very highly of the success of that organization in promoting 50MHz throughout the world. In America Mike used an Inoue IC502, a small transceiver similar to the IC202 but which gives 2W output on 50MHz. Contacts made with this rig include from VE7 to KH6, showing just what is possible on 50MHz even with low power. GM3PPE is a professional astronomer and has therefore both a professional and amateur interest in the solar cycles. He feels it would be a great advantage if British amateurs were to get even a 10W cw-only sector between 50.0MHz and 50.020MHz. Amateurs could then participate in and record the few days in each 22-year cycle when the mufs reach above 50MHz.

Most of the crossband contacts have taken place by British

amateurs listening to stations on 50MHz who then nominate a crossband frequency, usually around 28-450MHz. The American and Canadian stations operate in the bottom 10kHz on cw and stay close to 50-110MHz on sideband. A SMIRK information net meets every Sunday at 1700gmt on 28-885MHz, and the latest 50MHz information is exchanged. An unusual feature of these openings has been the fact that several American stations have been copied in Britain at times when they were calling CQ or engaged in local nets.

## EI2W is back on 50MHz

Soon after the 50MHz band opened to America, Harry Wilson, EI2W, in Dublin, was in touch with 4-2-70. EI2W had nearly 300 contacts in all W call areas during the autumn and winter of 1957-8. His observations and International Geophysical Year report on his 50MHz experiments makes absorbing reading today, and the good news is that EI2W is still licensed to transmit on the 50MHz band.

While ordering a beam for 50MHz from SMC, your scribe mentioned to the sales director, Nigel Curzon, G8CKZ, that EI2W still had a 50MHz licence. G8CKZ is another keen 50MHz listener, and he immediately offered to arrange for SMC to lend a Yaesu FT620 50MHz transceiver to EI2W in time for the autumn openings. Harry already has a 4-el beam in Dublin, and he will soon be coming to Britain to pick up the loan transceiver from SMC. This means that he will be the only station north of Gibraltar with transmit facilities for the 50MHz band. EI2W, a former president of the Irish Radio Transmitters Society, is very well known for his experimental work on the vhf bands, and his many friends will be delighted that EI2W is coming back on 50MHz, maybe even in time to work Mexico and California again as he did 22 years ago.

## New transequatorial record on 144MHz

While all the excitement of the 50MHz opening was taking place, SV1DH in Greece worked ZS6DN in South Africa at 1810gmt on 13 February, at a world record distance of 7,117km. This record stood for a mere three days, until SV1AB also worked ZS6DN over a distance of 7,127km. SV1AB also heard ZS5C in Durban, a further 400km. Full details of these tremendously long distance contacts will be in next month's 4-2-70.

## Moonbounce experiments

Charles Suckling, G3WDG, and his helpers G4CNV and G8HDR, have been carrying out further modifications to the moonbounce system installed near Oxford. A significant improvement has been made to the received signals by using a new preamplifier. The latest version uses a British-made Plessey GaAsfet transistor type GAT4, this gives a receiver noise temperature of 50°K—a noise figure of 0.7dB, compared to the old preamplifier which measured 140°K. This improvement has brought signals up considerably, and stations who were previously unworkable are now Q5 copy. A length of the very low loss RG318 coaxial cable has been acquired, and if suitable pump valve type coaxial connectors can be obtained a further system gain of 1dB is anticipated. The K2RIW type amplifier runs 700W output from a pair of brand-new 4CX250B valves which are fitted to SK620a sockets. G3WDG found it was impossible to get good stability and high efficiency using surplus valves and sockets.

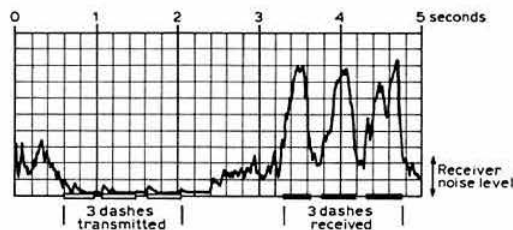


Fig 1. Three dashes transmitted by G3WDG being received 2.5s later by G3WDG. Note the fading on the last echo

Recent moonbounce contacts on 432MHz have included DL9KR, F9FT, I5MSH, W1JR, VE7BBG and two QSOs with ZE5JJ at a distance of 8,284km. A full moonbounce contact was also made with G4DGU who is just 16km away. The signal from G4DGU was, of course, very strong direct, but by careful sending and receiving at 2.5s intervals it was possible to complete a moonbounce QSO in this manner: G4D - GU - DE - G3 - WDG. Using this system all the calls, reports and final "rogers" were completed via the moon.

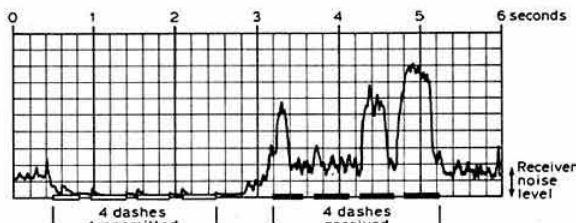


Fig 2. Libration fading has almost removed the second dash completely, thus explaining why moonbounce cw signals can be difficult to read

Tests have also been made to record eme echoes on a chart recorder connected to the receiver's audio output. The fact that the return echo signals show up significantly on the charts shown in Figs 1 and 2 indicate the well above noise signals received back from the moon by G3WDG. Fig 1 shows three dashes transmitted and, 2.5s later, the three return echoes; note the libration fading on the third echo. In Fig 2 the echoes of four dashes transmitted are recorded on the right-hand side of the chart, and it will be seen that libration fading has almost completely removed the second dash return echo. The eme effects known as libration and Faraday rotation will be further detailed in future pages of 4-2-70.

## Worked All Continents on 144MHz

As reported in the late news last month, Dave Price, GW4CQT, has completed the first 144MHz Worked All Continents by working VK5MC in Australia via moonbounce. Since GW4CQT received his high-power licence he has concentrated on moonbounce experiments, and his contact with Australia is the culmination of a great deal of hard work. In particular, Dave Price has spent many hours perfecting his home-made antenna system and in making the very necessary modifications to his receiving and transmitting equipment. His work on 144MHz has justifiably earned him a place in vhf history alongside the only other UK vhf WAC Award winner, Peter Blair, G3LTF, who earned his earlier award for eme contacts on the 432MHz band.

## Big antennas

Norman Fitch, G3FPK, at Purley near Croydon, has still to put up his recently purchased pair of F9FT 16-el 144MHz antennas. Being located in the centre of an area with a very high density of vhf operators, G3FPK is often concerned to reduce the strength of signals off the side of the beam direction. To this end Norman is planning to mount the two antennas side by side, with a motor to adjust the spacing and, therefore, the side lobe patterns. If this system works well it will be of interest to other centrally located amateurs, to say nothing of the mountain-top contest operators.

Alex Dunn, GM8DMZ, at Patna, Ayrshire, has had his 70ft heavy-duty Versatower installed for several months now. With two eight-over-eight slot-fed 144MHz antennas at the top of the tower throughout the winter months, he now feels confident enough to double the size of the array. He feels the inherent strength of the doubly-supported slot antennas are the ideal choice for his very exposed position. As well as having the 64-el antenna for 144MHz, GM8DMZ has also purchased four Jaybeam Multibeams for the 432MHz band.

GM8DMZ and his rigging crew of GM3WOJ and GM8EYB have taken great care to observe the manufacturer's recommendations with regard to the concrete base for the tower, and they feel this care will ensure a reliable antenna system which will be the largest in Scotland.

Ray Lucas, GW8GKF, at Caerphilly in South Wales, has been having a great deal of success on fast scan 432MHz television with his antenna system consisting of four F9FT 21-el Yagis. GW8GKF has now expanded this array by adding four further antennas, making a total of 168 elements, and he has been testing this large array on moonbounce reception by receiving signals from K3NSS; of course, the American station has an even larger antenna—an 80ft dish.

To round off this feature about large antenna systems, news has just reached 4-2-70 of a contest group which plans to take a 160-el array to the hills this summer. This group has been busy over the winter months putting together a home-made array which consists of eight 20-el colinear antennas. Much time and care has been spent in ensuring the phasing harnesses are made up to the correct lengths and that only the highest quality coaxial cable has been used throughout the installation. The contest group with "secret weapon" will reveal themselves in the July VHF NFD.

## Expeditions

Alistair Simpson, GM8NCM, joins forces with GM8MJV and GM8MNG for an expedition to the Western Isles of Scotland to coincide with the August meteor scatter contest. Schedules can be arranged by contacting GM8NCM at 58 Cheviot Road, Kirkcaldy, Fife. The expedition will be equipped with high-power ssb, and hopes to visit many rare QTH locator squares in the week following the contest.

Last year Max Bosschaert, ex PE1AVU, led the very successful GM5CJF expedition to the Shetland Islands. It will be remembered that the expedition to the ZT and ZU squares struck gold by combining meteor scatter operation with large-scale auroral, tropo and sporadic-E openings. Max now has the call PA3AHD, and this year he, PA2WDH, PA3AKM and Richard Staples, G4HGI, are all going on an expedition to 4U1TU. Like the previous Shetland expedition they will be on 24h/day for the two-week period at the beginning of June. Schedules will be accepted by PA3AHD and he can be contacted at Klipper 1G, Huizen, Holland.

St Kilda has been much in demand over the years, and although there has been some spasmodic activity from this rare spot the vast majority of vhf operators have this island at the top of their wanted lists. Nigel Sedgwick, GM4HDL, will be on St Kilda by the time this issue goes to press, and he hopes to be active from there until the last week of April. He will be using an Inoue IC202 and a 25W output amplifier to a 9-el Tonna antenna. Operation will mainly be confined to Saturday and Sundays between 1330 and 1600gmt from a site 1,200ft asl with a clear take-off to the east and south.

David Hutchinson, G14FUM, has been allocated the callsign EJ4DJ to operate from Inishmurray Island off the coast of Sligo in Donegal Bay. The island is in QTH locator VO47c, and operation will be in May. The callsigns to be used will be EJ0CL, EJ6CR and EJ4JD—the EJ prefix denotes an Irish offshore island. The expedition plans to use 100W of ssb to antennas 60ft high, and schedules can be arranged by writing to G14FUM, 8 Lisnoe Park, Raveret, Lisburn, Co Down.

## Auroral reports

As reported, the 50MHz band was frequently open during February, and these openings occurred when the solar flux was high and there were relatively quiet magnetic disturbances. Several weak auroras occurred in February, and these took place on the following dates: 1, 4, 16, 21, 23, 26, 27 and 28. Visual auroras were seen at Aberdeen on 30 January only, and 1, 16 and 23 February, dates which coincide with radio events and a visual only sighting by GM8LHE at Elgin on the night of 24 February. There have been many very short weak auroras with, for example, GM4CXP observing DL0PR auroral from 1910 to 1920gmt on 16 February, and GB3LER coming out of the noise aurorally between 2138 and 2143 on the same evening. The aurora on 21 February was the best of the month but was confined to northerly and well-sited stations; even this opening was confined to GM, G, DL, LA and SM. The Meudon "A" indices reached minor storm levels at 44 on 21 February, but the month ended with little auroral activity.

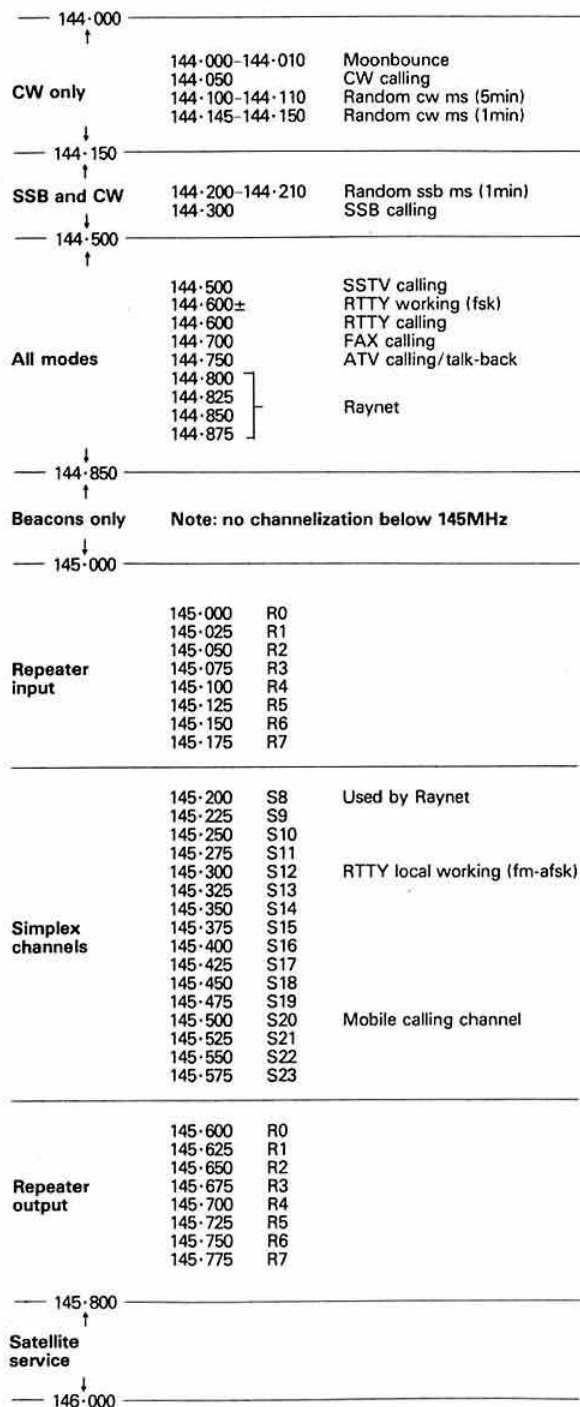
## Late news

The 50MHz band stayed open to South Africa during the first two weeks of March with G3COJ and G3FXB working cross-band to ZS6XJ, ZS6ASO, ZS6AUB and ZS6BGQ. The African stations listen around 28-333MHz for European stations who can hear their 50MHz signals. G4CBW and G3FXB were full of praise for the strong signals heard from the beacon VE1SIX on 50-088MHz. GM4HQR attended a lecture at Edinburgh University by Dr Symon on "Nocti-lucent clouds", the mid-summer night-time phenomenon which occurs when high altitude, fast-moving clouds are lit by rays from the sun which is below the horizon to ground-level observers. GM4HQR notices a distinct co-relation between days when nocti-lucent clouds have been recorded and the dates of sporadic-E openings—more details in future issues. GB3NN, the Bacton 432MHz repeater, is now operational on Channel RB2. The RSGB National VHF Convention was a great success—full report next month.

Finally, send in your news items, real dx '79 entries, 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 Alexandra Palace. □

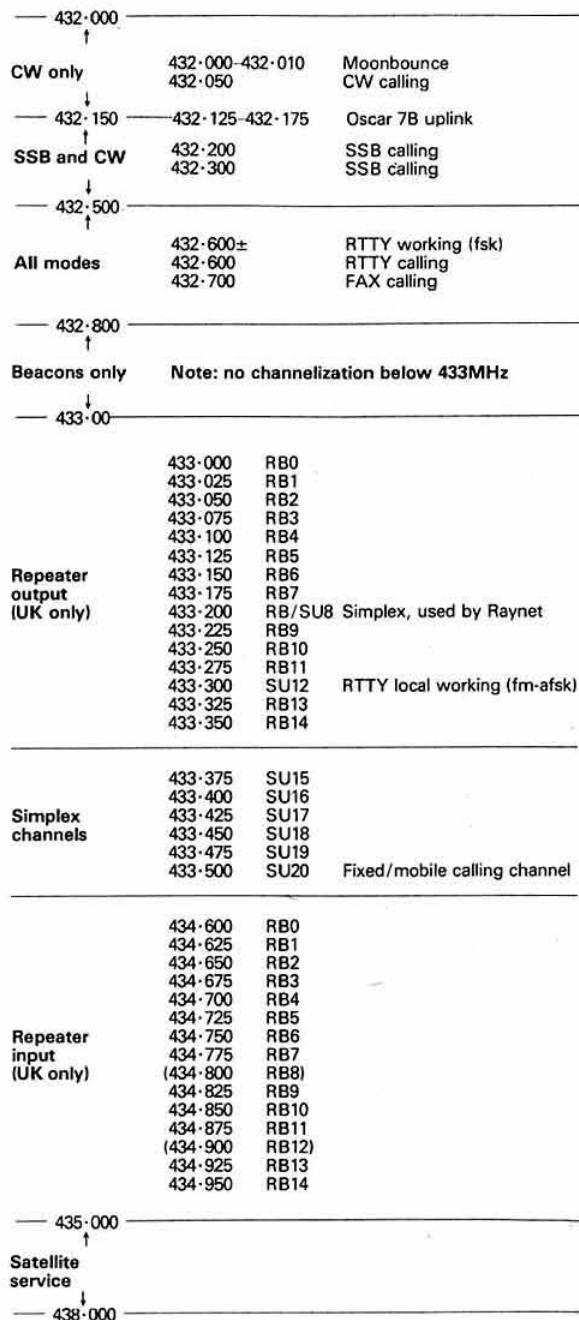
## RSGB 144-146MHz BAND PLAN

(March 1979)



## RSGB 432-440MHz BAND PLAN

(March 1979)



ATV transmissions should take place in the sub-band 434-440MHz on frequencies chosen to avoid interference with other band users, especially the amateur satellite service on 435-438MHz.



## INTERNATIONAL BEACON PROJECT

This project is sponsored and encouraged by IARU Region 1 and organized by Alan Taylor, G3DME. The establishment of the beacon stations has stimulated scientific interest in the

propagation paths revealed by reception of the beacons. In addition, they fulfil a practical role by providing signals on what may otherwise be a dead band.

Frequency (kHz)	Station	Location	Notes	Frequency (kHz)	Station	Location	Notes
28,175	VE3TEN	Ottawa, Canada	(1)	28,232.5	VP8	Falkland Is	(5)
28,200	Common			28,235	VP9BA	Southampton, Bermuda	
28,205	DL0IGI	Mt Predigtstuhl	(2)	28,237.5	LA5TEN	Norway	(5)
28,207.5	N4RD	Englewood, Fla, USA		28,240	PY1CK	Rio de Janeiro, Brazil	(6)
28,210	3B8MS	Signal Mount, Mauritius		28,242.5	ZS1CTB	South Africa	(5)
28,212.5	ZD9GI	Gough Island, S Atlantic	(3)	28,245	A9XC	Hamala, Bahrain	(8)
28,215	GB3SX	Crowborough, England		28,247.5	EA2OIZ	Spain	(9)
28,217.5	VK2WI	Sydney, Australia		28,250	KC4		(10)
28,220	5B4CY	Limassol, Cyprus		28,255	W6	California, USA	(7)
28,222.5	HG5AIR	Budapest	(4)	28,260	VK5	Australia	(7)
28,227.5	FX3	France	(7)	28,265	VK6	Australia	(7)
28,230	ZL2MHF	Mt Climie, New Zealand		28,270	VK8	Australia	(7)

### NOTES

- |  |  |
|--|--|
| <p>(1) Change to new frequency delayed.<br/>                 (2) On 28,200kHz, H to H + 5, H + 30 to H + 35.<br/>                 (3) Expected to be operational soon.<br/>                 (4) Beacon tested and awaiting final location.<br/>                 (5) Under construction.<br/>                 (6) Being rebuilt after a period of unserviceability.</p> | <p>(7) In planning stage.<br/>                 (8) Replacement transmitter now in operation.<br/>                 (9) Unofficial.<br/>                 (10) ARRL advises that installation not approved by authorities, alternative site being sought.</p> |
|--|--|

## UK BEACONS

(March 1979)

Callsign	Frequency (MHz)	QTH	ERP (W)	Antenna	Beam direction	Antenna height (m aod)	Keying
GB3SX	28.215	AL71d	10	Dipole	0°, 180°	167	F1
GB3SX	70.685	AL71d	16	Halo	Omni	168	F1
GB3SU	70.695	ZN61a	20	2 x tilted turnstiles	Omni	440	A1, F1
GB3NEE	144.130	ZO12a	30	2 x 5-el Yagis	135°, 315°	360	F1
GB3CTC	144.915	XK64a	75	2-stack cloverleaf	Omni	122	A1, F1
GB3VHF	144.925	AL52j	50	5-el Yagi	320°	268	F1
GB3GI	144.945	XO41j	40	2 x 4-el Yagis	45°, 135° in sequence	191	F1
GB3LER	144.965	ZU65f	65	2 x 8-el Yagis	35°, 180°	107	F1
GB3ANG	144.975	YQ35c	20	4-el Yagi	160°	900	F1
GB3WHA	432.81	AL71d	50	8-over-8 Yagi	330°	165	F1
GB3SUT	432.89	ZM31b	60	2 x 8-over-8 Yagis	0°, 135°	270	F1
GB3EM	432.91	ZN32b	50	8-over-8 Yagi	150°	600	F1
GB3AND	1,296.87	ZL63b	50	Stacked slots	Omni	85	F1
GB3DUN	1,296.89	ZL08e	2	HB9CV	0°	263	F1
GB3IOW	1,296.9	ZK34a	100	Alford slot	Omni	250	F1
GB3MLE	1,296.93	ZN32b	50	Corner reflector	160°	600	F1
GB3EDN	1,296.99	YP04g	25	2 x corner reflectors	45°, 315°	117	F1
GB3UOS	3,456.0	ZN42c	4	Slotted waveguide	0°, 180°	400	F2
GB3IOW	10,100	ZK34a	0.8	Slotted waveguide	Omni	250	F2
GB3LBH	10,100	AL31c	1.5	Waveguide	Omni	45	F2, F3
GB3ALD	10,120	YJ30h	1	Sectorial horn	30°	90	F2



# microwaves

Charles Suckling, G3WDG \*

## A new world record on 1.3GHz

Details have just come to hand of a new world record contact on 1.3GHz, which took place on 29 December 1978. The contact was between VK6KZ/P at Walpole, in south-west Western Australia, and VK5MC at Hatherleigh via Millicent, about 300km south-east of Adelaide. The distance was 2,109km.

Contact was first established on 432MHz, and VK6KZ/P then listened for VK5MC on 1,296.3MHz. He was surprised to hear not only VK5MC, but also VK5KK (in Adelaide, at 2,009km) on the same frequency! In the rush for a two-way contact VK6KZ/P found that his morse key had open-circuited (not the first time that morse keys have failed in microwave tests!) but this was soon repaired, and the contact followed without difficulty. VK5MC was copied at 559 at VK6KZ/P, and signals in the reverse direction were 559 on cw and 55 on a.m. VK6KZ/P then worked VK5KK and VK5RP (also in Adelaide).

The equipment in use was quite interesting. VK6KZ/P was using an FT101B as a 28MHz cw and a.m. source into a Microwave Modules 432MHz transverter feeding a varactor tripler to produce 3W output, and a two-stage BFR91 preamp into a Microwave Modules converter on receive. The antenna was a 1m dish. The system at VK5MC was somewhat more powerful, and consisted of a 6.5m dish on an el-az mount, a 3dB nf NEC1336 preamp and 45W from a pair of 3CX100A5s.

The dish has a good history, as it was used some years ago by VK3ATN to work W2NFA on 1.3GHz eme. VK5MC is currently working towards eme capability on 1.3GHz and hopes to be operational before long. Congratulations to both stations on their remarkable achievement.

## Activity in the north-west

G3PFR (Warrington) has written in with details of the microwave activity in his area. The most active band appears to be 10GHz, with some 25 stations reported either building or operational. Most activity is on low-power wideband fm, but there is also some interest in high-power narrow-band operation. A number of stations are building for 1.3GHz, and a few for 3.4GHz, but activity is rather low on 2.3 and 5.6GHz. A beacon is also planned for 10GHz.

G3PFR mentions that the group holds a weekly net on 144.19MHz at 2200 local time on Thursday evenings. They prefer this frequency to 144.33MHz, as local activity on 144MHz is rather high above 144.3MHz.

## Improvements to the 2C39 1.3GHz tripler

The simple 2C39 tripler/amplifier described in the *VHF/UHF Manual* has a reputation for inefficiency, and G4DGU has modified the output coupling circuitry from the link-coupled arrangement to a capacitive probe, resulting in much improved performance.

A single-hole fixing bnc socket was mounted in the position

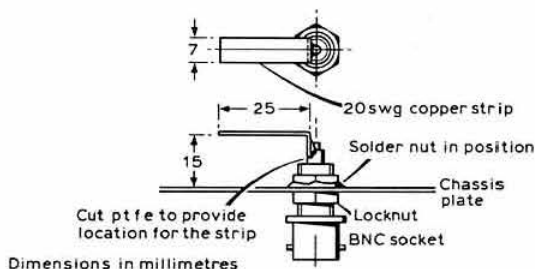


Fig 1. The new output probe

previously occupied by C3, and the old output socket mounting hole blanked off. A piece of copper strip forms the output probe, as shown in Fig 1. The loading is adjustable by rotating the bnc socket, and the approximate position for 50Ω output impedance is shown in Fig 2. Once set for optimum, the output probe should not need further adjustment, unless the load impedance is changed.

At G4DGU the amplifier gives about 8dB gain with Class AB biasing. Around 75W p.e.p. output can be obtained from a 2C39BA with an anode voltage of 900V and a p.e.p. input of 150W. This exceeds the peak cathode current rating of the valve somewhat, but no detrimental effects have so far been noticed. Adequate cooling of the anode (and also the grid/cathode) is of course essential at these power levels.

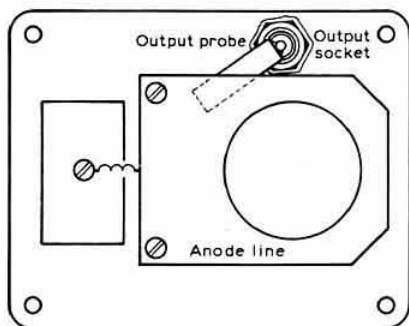


Fig 2. Approx position of output probe for 50Ω output impedance

One effect noticed by G4DGU in the operation of this amplifier is that it is necessary to get a good rf seal between the chassis plate and the die-cast box if good efficiency is to be obtained. Copper foil (0.1mm thick) folded into four layers and used as a gasket has been found to be very effective in doing this.

Intending constructors of this design should note that the grid plate is shown (in the manual) incorrectly mounted in Fig 5.153, and should be located on the outside of the chassis plate as shown in Fig 5.155.

## Correction to G3JVL image recovery mixer

A small error occurred in the description of the G3JVL image recovery mixer described in *Microwaves* (January 1979). This was that 384MHz was quoted as the drive frequency to the step-recovery diode. This should have been 378.667MHz, to give a 144MHz i.f. A suitable starting crystal frequency for this would be 94.6667MHz; it is not recommended to start at a lower frequency, for local oscillator noise considerations. □

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

## 21MHz set listening period

David Whitaker, BRS25429, has provided details of the first slp which took place on 7 January. Twenty listeners participated and submitted logs and reports of band conditions. David was grateful for the support but it is hoped that others may participate in the slps to follow later in the year. Conditions were only moderate—some even said poor—with much European short-skip predominating at the beginning of the event. A few dx stations were audible but QRM was fairly high for most of the time. One report was received from outside the UK—from Buck Taylor, Cape Town, South Africa. One interesting point noted by David was that listeners in northern England were seemingly able to copy stations which those in the south could not hear, and vice-versa. A summary shows that 32 countries in Europe, 16 in Africa, nine in North America, five in South America and four in Asia were logged. The total of countries heard was 66.

## News from abroad

Stephen Lowe, ex-A6993, is G8FEO when in G-land, but now finds himself as semi-rare dx as EP2SL. He was prompted by A9XBD's comments on QSLing, and felt like adding his own thoughts on the matter. Steve has held the call EP2SL since mid-September 1978 and so far has received only 16 swl reports (although there are probably many more at the bureau!). He will QSL all swl reports 100 per cent provided they can be checked against his log. The report should indicate at least one station which was being worked. QSLs will be returned via the bureau, whether or not the report was sent direct, unless return postage is sent—an sase for UK reports, one irc for Europe and two irs for the rest of the world—and a largish self-addressed envelope helps. Reports on 1.8, 3.5 and 7MHz signals would be particularly welcome.

Steve says the most interesting swl card received was from an American swl in Saudi Arabia who reported on a 90min QSO—even following the QSO from 21 to 28MHz and back again as conditions changed. There is no QSL bureau in Iran so all QSLing is done either direct or by QSL manager as follows: EP2AH (also A7XAH) via DJ9ZB; EP2IA via W4YE; EP2LI via WA4PYF; EP2IR via WB4BJR; EP2OK via K8ST; EP2TW via G13HXV; and Steve QSLs via Colin Squires, G3XCS, QTHR.

Also reporting this time is Craig Stoodley, RS41387, from Yellowknife, North-West Territories, Canada. He gave details of the Canadian SWL International Club, and these can be obtained from PO Box 142, Thunder Bay, Ontario, P7E 4V5, Canada.

## Nearer home

Ken Sketheway has heard his first VK1, thanks to information provided by G3AAE and BRS17567. He also points out that 722AP is now back in Saudi Arabia. We reported in an earlier

## 1979 HF countries table

Station	28	21	14	7	3.5	1.8	Total	Mode
BRS25429	121	114	138	46	72	9	500	ssb
ARS8841	101	102	160	51	61	0	475	ssb/cw
BRS35943	65	71	125	65	75	1	402	ssb
ARS41426	55	66	43	27	54	18	263	ssb/cw
BRS40293	40	42	61	33	25	0	201	ssb
A9191	29	40	70	25	30	0	194	ssb/cw
BRS20185	36	39	42	7	8	1	133	ssb
BRS40814	20	36	34	15	1	0	106	ssb

issue that he was operating from Algeria—which he was (your scribe heard him too!). QSL via Box 5796, Riyadh, or via I8YCP.

David Hawes, A9191, was able to spend more time at his receiver thanks to the heavy snowfalls, as the school bus could not get through. He reports F9UW/3A, VP2LGB, VP2MCX and TI2CF on 3.5MHz, while 7MHz has produced D4CBS, CM2HB, TG9AL, 9Y4NP and ZF2CL. His best dx was the 8Q7 expedition by WB4ZNH and his xyl. QSLs for 8Q7AF and 8Q7AG go to WB4ZNH's home QTH.

Dave Stewart, BRS40293, reports good conditions but poor wx (a common theme this time!). His best catches were WA4YPJ/AM who was 400 miles off the south-west coast of England at a height of 35,000ft, and hearing KZ5OZ on 3.5MHz ssb when calling a G-station who could not copy him.

Ian Marquis, RS41426, still using an FRG7 receiver and several antennas, reports a number of 3.5MHz goodies, plus VK9XW (Christmas Is) on 14MHz. On the other hand, Ken Steele, BRS36883, reports gross inactivity.

An interesting letter has been received from Peter Webb, BRS25172, who has been an swl for 30 years and has 369 countries or islands confirmed. He uses an FRDX 500, a Trio QR666 and a Mosley 33 tribander. Peter has some very sensible and philosophical views about QSLing, and tends now to report only to rare stations and those running QRP. As he says, do not get too down-hearted or upset if QSLs do not arrive promptly, as some take years to be answered. A steady flow of cards into the bureau should mean a steady flow in return, but it may take time.

Dennis Byers, BRS40154, has become G8RWL. He was on the air three minutes after the magic piece of paper fell through his letterbox. He will be on the talk-in stand at Alexandra Palace, and will be pleased to make readers' acquaintance there.

Two new contributors this time: John Winfield, RS40166, who joined the Society last April; and Nick Minter, RS40637. John is disabled and, thanks to G3ZOA and his xyl, passed the RAE in December. He is now trying to master the morse before taking out a full licence. John is keen to purchase some inexpensive equipment and if anyone can oblige he will be pleased to hear from them. His QTH is 1 St Catherine's Close, Newark, Nottinghamshire NG24 4QD. Nick became interested in the hobby two years ago and uses an EC10 with a 144MHz converter; he is mainly interested in 144MHz dx, and his 250ft asl QTH on the Isle of Portland proves a good location.

## DX news

The main news at the time of writing is that the authorities have given permission for an expedition to Desecheo Is, off Puerto Rico. It seems that other operations by KV4KV will not count for credit because the necessary permission had not been obtained. However, the expedition by KP4AM, N4ZC etc was

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(Continued on page 349)

# the month on the air

John Allaway, G3FKM \*

**W**HAT do those members who do not keep their copies of *Radio Communication* do with them? A very good recommendation has been made by G3ZHI who suggests sending them to the more remotely located overseas amateurs. The Society already has members in 134 countries—but this could spread the net a little farther! Postage by printed paper rate airmail is not unreasonable.

G4EHQ reports receipt of QSL cards for cw QSOs on 14, 21 and 28MHz addressed to "David" of Worthing. The real G4EHQ lives in Kent.

Bill Gosney, WB7BFBK, (2665 No 1250 East Oak Harbor, Wash, 98277, USA) offers his services as QSL manager for any GD, GJ, GM, GU or ZB2 station. Please contact him direct.

## Top band news

VK6HD has supplied details of his 1978-79 "season" and says that it has proved to be the best yet to Europe, but undoubtedly the worst to the USA. He was active from 24 December to 5 February, and operative for 32 days of the 44. European signals were heard on 19 of these, and European contacts made on 15. A total of 43 QSOs with Europe was reached, compared with 23 last year, and 30 different stations worked. The lucky Europeans were DJ8FR, DJ8WL, F6CNI, F8DB, F8IX, G3s IGW, JMJ, LIQ, MXJ, SZA, YUV, ZEM and ZRS. G4ERZ, GD4BEG, GM3IAA, GU3HFN, GU3MBS, GU5CIA, HB9CM, OKs IDDL, IDIJ, IKSO, 2BQU, 2PGF, 2PGU and 3LL, and PA0s HIP, LOU and INA. A two-way ssb contact was made with G3SZA. Both G3YWZ/A and GM4GRC were heard but not contacted.

WIWY reports that conditions for the CQ 160 Meter Contest were good. He points out that European stations who indicated the frequency they would tune for replies were making many more contacts. It is best to say "QX 03", for example, at the end of CQ calls.

Information from REF, received via G2MI, confirms that at the present time French stations may be granted permission to use the spot frequency of 1,826kHz during contests, if they apply for the privilege in advance.

## News from overseas

Francesco Falanga, 17FFE, is particularly interested in making contact with other amateurs who are architects, and invites them to write to him at PO Box 58, 70100 Bari, Italy.

Bill and Sybil Stevens, ZD7SD and ZD7SS, have now completed their 150th QSO with G3JMH. Bill's total of QSLs received is now about 90,000 and his wife's nearly as many. Their station is located on the NW side of St Helena about 800ft asl, and their antenna consists of a multi-band dipole and

a cubical quad, both at 40ft above ground. At present they have only an HW32, their FT101 having been taken on the *rms St Helena* for repair. Neither Bill nor Sybil have ever been off the island, but both are members of the RSGB and enjoy making UK contacts.

Jules Pedley, G4CKL, is in the United Arab Emirates completing a contract which finishes in October. He is applying for permission to take his TS520 and accessories into the country, and hopes to be able to operate from the second floor of a block of flats with simple antennas. Should he obtain a licence he will be found on 21,075, 21,175, 28,075 and 28,575kHz, with the occasional sortie into the USA phone bands. After June he may have a TS820 and operate on 1.8MHz. He may be reached at c/o Bix Gulf, Box 2976, Dubai, UAE, but any QSLs should be sent to G4CKL.

Eric Sherlock, formerly 5N2ESH, who has been in Bermuda for a while has now returned to the UK and resumed activity as G3BQH. He reports receipt of a letter from NARS which says that the ban on amateur radio activities in the Federal Republic of Nigeria was lifted on 1 January this year.

## DX news

ISOLYN reports that 3V8AA will be activated for a two-week period on cw during April or May by an Algerian petroleum engineer who will be in Tunisia at that time. Suggested frequencies to watch are 3,520 and 7,005kHz between 2230 and 2300, and 28,001kHz from 1430 to 1500. QSLs go via ISOLYN.

10GPY has written to say that he is acting as QSL manager for HV2VO. The first operator of the station is Edmund Benedetti, formerly LU9LAZ, and he is usually on the air after 1900. The advent of the new station is particularly timely as Edwin Amram, HV3SJ, has gone to Colombia and will be there for some years.

David Davis wishes it to be known that he will reply to all requests for QSL cards for contacts made with him when he was VR1X. He apologises for the delay, which has been due to a combination of unfortunate circumstances including the non-arrival of many of his personal effects from VR1. He has logs for VR1X up to June 1977 and is having more QSLs printed.

Jim Barber, G3TJT, says that he was VS9AJC between January 1966 and February 1967. Unfortunately all his logs were lost in a fire just before he left Aden and he is unable to verify VS9AJC contacts.

Requests for confirmation of contacts made with XUIAA a few years ago should now be directed to W1YRC who has the logs of the operation. It seems that W0BN still has most of the logs and a supply of QSLs for those operations of Don Miller's (W9WNV) for which he originally acted as QSL manager.

Dave, T2O, formerly VR8O, has now left Tuvalu and lives in New Zealand (see "QTH Corner"). T2T was operated by Bob, 3D2MD, for a short time early in the year and may be QSLd via W5RBO.

ZS2MI on Marion Is has been heard around 14,135kHz at 1400. F6FFQ/TT8 is with the French Army in Tchad and will be there for eight months. He is often to be found around 14,105kHz between 1600 and 2000, but has also been worked on 14,124kHz.

VP8SU is located in S Georgia and seems to favour 14,275kHz between 1900 and 2200. He is at Grytviken Base and is a Scot, but he has had no previous amateur radio experience and is mainly working into the UK on ssb, often via a list made by G3KJT on a lower frequency.

\*10 Knightlow Road, Birmingham B17 8QB:

Hans Nordwall, SM4MI, expects to be in Guinea during April and hopes to obtain a 3X call.

FW8AC is often found around 14,110kHz at 0700 or on 14,302kHz from 1700 to 1800. He sometimes looks for European stations on 14,125kHz. VK0PK on Macquarie Is often joins the P29JS net on 14,220kHz in the early mornings.

A7XAH is often to be found in I8YCP's net on 14,320kHz at 1300, and also a little later on 14,210kHz. S2BTF says that his name is Peter and asks for QSLs to PO Box 108, Dacca, Bangladesh. He has been contacted on 14MHz ssb. A51PN is very active on Tuesdays and Saturdays on 14,323kHz after 1200, and is also known to keep a schedule with a USA station at 1300 on 14,065kHz. JT1BG is often working into Europe on 28,645kHz at 0800 and asks for QSLs via I8YGP who sometimes helps on his frequency.

Stations in St Lucia, which became independent on 21 February, are now using the prefix J6 in place of the former VP2L. OS is a new special prefix for use by stations in Belgium.

PA0LOU wishes it to be known that he is only able to QSL requests for cw contacts which he made from YB3AB during November 1976, and from YB3AP during the periods 6.3.77, 30.10.77, 12-27.11.77, 14.1.78, 12.3.78, 20-26.11.78 and 9.12.78. Cards for ssb contacts cannot be answered by Lou.

It is believed that there is no amateur on Crozet Is at present. From Kerguelen Is FB8XU is active after 1300, as is FB8XV—both on 14MHz ssb.

From 4 February Greek call areas came into effect and are as follows: SV1—Athens and district, SV2—Macedonia and Thessaly, SV3—Peloponnesus, SV4—Central Greece, SV5—Dodecanese Is, SV6—Epirus, SV7—Thrace, SV8—Aegean Is, SV9—Crete, and SV0—reciprocal licence holders.

ZL1ADI and ZL1AMO were due to be on Pitcairn Is at the end of March as VR6HI and VR6RW. QSLs should be sent to their home addresses.

The authorities in Comoro have withdrawn amateur radio privileges and D68AD has had his licence cancelled. He will be home in the UK as G3RWU in the near future.

## KV4AA

With a last-minute spurt on 30 and 31 December, Dick Spenceley, KV4AA, wound up 1978 with a total of 48,100 contacts—an average of 131 per day or one QSO every 11 minutes



KV4AA operating from his ssb position

of 1978! About 65 per cent were on cw, and a total of 199 countries was worked. Continuous calling by European stations on cw (even during contacts) plus contest operations made large totals easy, and Dick took part in almost every contest. Most contacts were short but not of the contest variety—making a difference of 3min/QSO instead of 3QSOs/min. The marathon started in 1976 when Dick's AJ3AA bicentennial call resulted in 35,335 contacts, and a goal of 36,500 was set for 1978—this was passed on 19 October.

A total has been set for whatever reason its worth (writes Dick). It is realized that certain factors are a "must" for such totals—like a fairly exotic call and plenty of time. This will limit most. KV4AA was not on continuously as he works until 1pm, and until the latter part of the year was seldom on after 7pm. Invaluable aid was given by YASME (WA6AHF) and other west coast USA amateurs who helped with the QSL problem.

KV4AA's three-year total now stands at 115,280 contacts—Dick says "This year we rest, but t'aint easy getting used to..."

## Expeditions

NOTG reports that the recent Navassa Is expedition made a total of 22,303 contacts in six-and-a-half days. QSLs were due to be sent out commencing in March. The group is planning further activities.

The Liverpool & District ARS is mounting an expedition to the Isle of Man during the period of the special GT prefix which is being used to celebrate the 1,000th anniversary of Tynwald. The club's callsign, GT3AHD/P, will be used from 2300 29 June until 2300 8 July, and operation will be on all hf bands and on 144 and 432MHz. Suggested frequencies are: (cw) 1,820-1,835, 3,505, 7,005, 14,080, 21,080 and 28,080kHz; (ssb) 1,820-1,835, 3,695, 3,780, 7,092, 14,195, 14,275, 21,245, 21,275, 28,495, 28,550, 144,290 and 423,290kHz. Club members taking part will include G3s XSN, YBH, G4s AHS, AMX, CVZ, EST, FPB, GEB, GHT, GKF, HGT, HSF, G8s AVJ, CFM, FHD, NNX and NRD. All contacts will be QSLd.

VE3FXT, together with G3WNE and VE3COA, operated from 7P8BE, S8FXT, H5FXT and H5COA from 2 December 1978 until 3 February 1979 for a total of 11,500 contacts. Although S8 and H5 are not on the DXCC list, VE3FXT says that the prefixes were issued by the ITU. George was awarded the gold independence medal of Bophuthatswana for his efforts in operating from the nation since 6 December 1976. At no time was more than 100W input used, as the group only had a small generator; however, some very excellent locations were available. Japanese operators were considered to be the best. QSLs for S8FXT, H5FXT, H5COA, H5AC, H5AA, H5ACD and 7P8BE should be sent to VE3DPB.

Iris and Lloyd Colvin concluded their operation as W6KG/TI5 at the beginning of February. They were in the province of Alajuela which has very few resident amateurs. Some problems were encountered from unreliable power supplies, and from language difficulties as neither Iris nor Lloyd speaks fluent Spanish. A further problem arose when it was discovered that a young man, hired as an interpreter, was in fact a Nicaraguan refugee and had no local knowledge. However, over 6,000 contacts were made with amateurs in 123 different countries on all bands 1.8 to 28MHz—evenly divided between cw and ssb. From Costa Rica the next move was to Honduras where HR0QL was activated with some success. After the conclusion of this, Iris and Lloyd were scheduled to



## QTH CORNER

EP2MT  
HR0QL PO Box 714, Beirut, Lebanon.  
Yasme Foundation, PO Box 2025, Castro Valley, Calif.  
94546, USA.  
HV2VO via IUGPY, G. Carlo Gotnich, Via Vigne di Morena 90, 00040,  
Roma Morena, Italy.  
KP4AM/D W6WV, N California DX Foundation, Box 717, Oakland, Cal.  
94604, USA.  
ST0HF via G4GFI, "Kendall", Derby Rd, Wirksworth, Derbys DE4  
4AR.  
T2T via W5RBO, R. Stone, Box 416, Anna, Texas, 75003, USA.  
VK9N Al Egli, HB9AAA, Box 17, CH-2500 Bienne 4, Switzerland.  
VK0PK via VK3OT, S. Gregory, PO Box 622, Hamilton, Vic, 3300,  
Australia.  
VP2DXF Box 1188, New York, NY, 10001, USA.  
VP8SU via G3RCA, T. Austin, 45 Hallbridge Gardens, Upholland,  
Wigan, Lancs.  
VR1AE PO Box 239, Bikenibeu, Tarawa, Gilbert Is.  
ex-VR1X D. R. Davis, Maurgarrie, Lark Hill Rd, Durrington, Wilts.  
ex-VR80 PO Box 2429, Wellington, New Zealand.  
YV0AA R. C. Venezolano, Box 2285, Caracas, DF, Venezuela.  
ZB2G K. Palmer, RFD 3, Williston Rd, East Aurora, NY, 14052,  
USA.  
3V8AA ISOLYN, M. Lumbau, Via Sardegna 16, 07100 Sassari, Sar-  
dinia, Italy.  
5H3PP PO Box 1022, Dar-es-Salaam, Tanganyika.  
ex-5N2ESH E. Sherlock, 39 Colliedene Rd, Orrell, Wigan WN5 8RL.  
8Q7AF WB4ZNH, C. Henson, 8280 Chestnut Drive, Jonesboro, Ga,  
8Q7AG 30236, USA.

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

return to the USA. QSL cards for all their activities should be sent via YASME.

Still more information has been received concerning the YV0AA expedition which has already been mentioned in the last two MOTAs. It now seems likely that Aves Is will be on the air from 1200 28 April until 0600 1 May. The operators will include YVs 3AZC, 5AGS, 5ANF, 5ANT, 5BNR, 5BQB, 5BUK, 5DFI and 5ZZ, as well as KIMM and YS1RRD, and they will be running three stations using a TR4CW, a Ten-Tec transceiver, a KWM2, a Swan 1200X and Collins 30L1, with three-element beams on 14, 21 and 28MHz and dipoles on 3.5 and 7MHz. A vertical antenna will be used on 1.8MHz. Frequencies now given are 3,525, 3,795, 7,025, 7,085, 14,025, 14,195, 21,025, 21,245, 21,295, 28,025, 28,495 and 28,595kHz and Oscar.

*West Coast DX Bulletin* gives further news of Peter Sutter and his ship *Wild Spirit*—he should be at VR3 (Christmas Is) about 15 June, at VR3 (Fanning Is) about 20 June, and at KHS (Palmyra Is) about 24 June.

At the time of writing, the callsign of the Spratly Is expedition was being given as 1S1DX and the scheduled operation was due to start on 29 March. Donations should be sent to N200, R. W. Schenck, 2-12 Oak Leaf Drive, Tuckerton, NJ, 08087, USA.

It seems that Willy de Roos managed to reach Peter I Island in mid-February, but that conditions were found to be too hostile for his planned stay and he set course for home. VE7ZQ has advised that his return route is scheduled as follows: 1 April—leave Mar del Plata, 20 April—arrive Tristan da Cunha. He hopes to operate from ZD9 until 30 April and then to move on to Trindade Is (PY0) to arrive on 11 May. He will leave there on 21 May and then make for Rio de Janeiro where he should arrive on 28 May. He will depart from Brazil on 14 June for St Paul's Rock where he will arrive on 30 June for a stay until 10 July. Next stop will be the Azores on 31 July, and on 15 August he will sail for England to arrive at Falmouth between 25 and 30 August. Willy has been awarded the Medal for Seamanship by the Royal Cruising Club of GB.

K4YT is travelling in Africa and hopes to be active for a week or so in 6W, 5T, TZ, 5U, XT, 9L, 9G, TU, 5V, TY and 9Q if permission is forthcoming. He will use 14, 21 and 28MHz, and will be found in the Africana Net on 21,280kHz. QSLs should go to W2TK. WA3KNW is in the same area and is trying to operate for similar periods from TL, TN, TJ, TR, 5N, 5Z, ET, ST, SU, OD and YK.

A group of Japanese amateurs is going to Burma to install telecommunications equipment and has asked for operating permission and for the callsign XZ2JA.

Masood Khan, OZ1CRH, is reported by *West Coast DX Bulletin* to have permission to operate from Afghanistan sometime during April or May as YA2MI. Before this he will be AP2LJ from Pakistan, and QSLs for both calls will be dealt with by WA8AJG.

## Expedition

A group of GI amateurs will visit Inishmurray Is (off the coast of Sligo) during the weekend of 18-20 May. They will use the callsigns EJ4DJ, EJ6CR and EJ0CL, and operate around 3,795, 7,095, 14,220, 21,300 and 28,550kHz. QSL cards will be printed specially and sent out by G14FUM, QTHR. If sending via the bureau please mark clearly "via G14FUM".

## Beam headings

N0TG (a member of the 1978 Navassa Is dxpedition team) is offering computer printout beam headings lists to every ARRL DXCC country made on an individual basis for any location in the world. Send details of latitude/longitude plus 25 ircs to: R. Rowe, 3237 Connecticut Drive, St Charles, Mo, 63301, USA. Please allow four weeks for delivery.

## QRP

In order to encourage two-way low-power contacts, the G-QRP Club is organizing three cw and one ssb activity weekends during 1979. The dates will be 23/24 June, 4/5 August and 6/7 October (cw), and 5/6 May (ssb). Activity each cw day will follow a regular pattern which is: 0900-1100 on 14,060kHz, 1100-1300 on 21,060 and 28,060kHz, 1130-1230 on 7,030kHz, 1400-1500 on 3,560kHz, 1600-1900 on 21,060 and 28,060kHz (for Europe/USA contacts), 1900-2200 on 14,060kHz (for Europe/USA contacts), and 2030-2130 on 3,560kHz. During the ssb event, activity will be 1000-1100 on 7,090kHz, 1100-1300 on 14,285, 21,285 and 28,885kHz, 1500-1600 on 3,690kHz, and 1600-1700 on 7,090kHz. The club offers a quarterly journal, *Sprat*, data sheets and morse code training, and full details may be obtained from the secretary, Rev G. Dobbs, G3RJV, "Willowdene", Central Avenue, Stapleford, Nottingham NG9 8PU (sae please). Club awards are administered by A. D. Pickering, G8PG, 37 Pickerill Rd, Greasby, Merseyside L49 3ND.

## Welcome

The following overseas amateurs joined our Society during January: A4XGY, DF1DK, DJ0PC, DJ8RI, DK3MM, DK6PB, DL3NA, DL5NF, EA3ADW, EA3WH, EI8DH, F5MI, F8CW, K9IT, N4BP, SK2AU, SM5APM, SM5BNJ, SM7AHL, VE3BS, VE3KBP, VK6FY, VK8ZJJ, W2JJQ, W2PRL, W3OTI, W8BS, ZB2EO and ZS1WW.



## Contests

### The Bermuda Contest

0001 21 April to 2400 22 April.

Full details of this event were given in the March issue. However, it was not noted there that summary sheets, log forms, and brochures describing the contest are available from J. Bazley, G3HCT, "Brooklands", Ullenhall, Nr Henley in Arden, Warwicks, B65 5NW.

G4BWP has kindly supplied results of the 1977 OK DX Contest. In the multi-operator multi-band section UK5MAF led with 132,120 points, and G3FJE (G4DRS and G4BWP) came 14th with 44,832. Top single-operator multi-band was UA1DZ with 81,716 points, and G3ESF was 13th with 22,750. On 1.8MHz G3SDC/A was second with 563 points, and on 14MHz G3XFW 22nd with 721.

### The PACC Contest

1000 28 April to 1600 29 April.

All bands 1.8 to 28MHz, phone and cw. The same station may be worked on each band for credit, but on one mode only on each. Exchanges consist of RS/T plus serial number (from 001). Netherlands stations will also give a two-letter suffix indicating their province (DH, FR, GD, GR, LB, NB, NH, OV, UT, YP, ZH and ZL). Each completed QSO counts one point, and the multiplier is the total of provinces worked on each band added together (maximum 72). Listeners may enter and should log the callsigns of Dutch stations, serial sent, and station being worked. Logs should indicate the usual data, including each new multiplier, and include a summary sheet showing the scoring, name and address and the usual signed declaration. Post before 15 June to VERON Contest Manager, PAODIN, Schoutstraet 15, Nijmegen, 6805, Netherlands. Contacts made in this contest may be credited towards the PACC 100 Award provided that the station claimed has submitted a log—include seven ircs with the application.

### The Common Market DX Contest

0600 to 2400 21 April (CW)

0600 to 2400 22 April (Phone)

3.5 to 28MHz. Single-operator all band, low band (3.7 and 7MHz), and high band 14, 21 and 28MHz), plus multi-operator single-transmitter all band categories. Exchange is RS/T plus serial QSO number from 001. Points for stations located in the EEC are: one for contacts with other EEC countries; non-EEC European countries two, and outside Europe five. Contact with one's own country may be made only for multiplier credit. The multiplier for EEC stations is DXCC countries, plus ON4UB (if contacted) on each band totalled together. Separate log sheets should be submitted for each band, and they should indicate date, time, numbers exchanged, points, and if multiplier. The summary sheet should include a signed declaration that the station has been operated in accordance with the amateur spirit, amateur radio regulations, and contest rules. Entries must be posted before 31 May to the Common Market Contest Committee, ON4GO, Michel Le Bon, Chee de Wavre 1349, B-1160 Brussels, Belgium. Listeners may enter and should claim five points for each contact between an EEC and non-EEC station logged. Please note that logs must be properly checked for duplicates, and that those containing three per cent or more will be disqualified.

In the 1978 event the only UK entrant in the single-operator section was G3ESF who came second in the EEC all bands (cw) section with 20,196 points. G3FJE was the only UK multi-operator entry with 21,276 points.



Janos Nemeth, HA5-142, specializes in 1.8MHz listening.  
Photo W1BB

### HM The King of Spain Trophy

2000 28 April to 2000 29 April

3.5 to 144MHz. All modes. Only 20 hours of operation allowed. Exchange RS/T plus serial QSO number (from 001). Work Spanish stations only, each contact counts one point. The multiplier is the number of Spanish provinces plus Calella (if worked) on each band added together. A station may be worked once on each band. Logs must show date, time, station worked, numbers sent/received, if multiplier. Mail log and summary sheet by 1 June to ARC, PB 181 Calella, Barcelona, Catalunya, Spain. Top scorer (and companion) will be awarded an eight-day trip to Calella in August to collect the HM The King of Spain Trophy.

Scores in the 1978 NRRL 50th Anniversary Contest were as follows: (Phone) GW4GXR—5,535 points, G3RUV—4,107, G4E2T—1,890, G4CYB—903, GW3SLA—798, G4DND—731, G14GDV—108, and GM5AXY—108. BRS39950 scored 3,135, BRS38709 419, and BRS35121 352 points. In the cw section G3ESF scored 5,226 points, GW3HCL 1,652, G4DND 731, and GW3MPB 434.

### Awards

Congratulations to GW2DHM who is the first amateur outside Switzerland to obtain the H26 Award described in February MOTA. HB7AAA and HB7AAW were the first Swiss stations to qualify. Readers may be interested to know that the three "half-cantons" are Obwalden (OW), Basle, Country (BL) and Inner Appenzell (AI). These are halves of NW, BS and AR respectively.

### CWSP Award

For a minimum of five contacts with the Sao Paulo CW Group since 16 October 1976. Send certified list plus 10 ircs to CWSP, PO Box 15,098 01000 - Sao Paulo - SP - Brazil. The club consists of over 50 PY2s plus PY1DG and PY4WC. Stickers are awarded at multiples of 25 contacts for further cw contacts with any PY2 stations.

### Brussels Millennium Award

This commemorates the Brussels Millennium celebrations (979-1979) and covers the period 1 January to 31 December 1979. All-mode contacts possible in two categories: (a) hf—stations outside Belgium require contacts with at least 10 stations in Brussels; (b) vhf/uhf/shf—with 15 stations. Listeners may also apply and need the same number of loggings. Contacts/reports made via repeaters or during contests are not valid. Log extracts and three ircs should be sent to Brussels

Millennium Award, PB1000 B 1040 Brussels 4, Belgium, before 15 February 1980.

### Fraser Valley DX Club Award

For contact with at least five members of the club since 1 May 1978. Send certified list of contacts, indicating date, time, frequency, mode and callsign, plus five 1rcs, to Box 3112, Langley, BC, Canada, V3A 4R3. (Members include VE7s ADC, AAR, AFY, AIO, AKH, AQC, AUF, AUZ, AVA, AVM, AVW, AZA, AZC, AZG, BCP, BJM, BSM, BVF, BUS, CC, CEK, CBM, CGR, CGY, CIO, CJG, CKW, CMC, CMD, CMK, CML, CMZ, CNY, CXE, SZ, TB, TT, WJ, XQ, HV, FY and DXC, and N7RO, W7EKM, W7ISK and WA7ZWG.)

### Guildford & District RS Diamond Jubilee Radio Award

Please note that claimants must contact not less than five members of the club—not four as stated in February MOTA.

## Band reports

The latest report on propagation received from G8KG reads as follows: "Solar activity made another 'quantum jump' in the first weeks of 1979, the provisional Zurich sunspot number of 165.8 for January being the highest since August 1959. With a provisional number of 138 for February the three-month means centred on December and January were 127 and 141, and if these are added to Fig 2 on p224 of the March issue of *Radio Communication* it will be seen that the steep rise has continued and the lead over Cycle 18 has increased. It is now clear that the smoothed monthly number passed the 100 mark in August 1978, two or three months earlier than predicted, and Zurich is predicting smoothed numbers above 160 by July 1979."

The increase in mean activity has been mainly due to a much more even spread than in 1978 rather than to significantly higher peaks, though the peak solar flux value in February was marginally the highest in the cycle. The average of the seven previous days' WWV solar flux values, which seems to be a useful guide to the trend of high-band conditions, started the year at 170 but passed the 200 level early in January and remained near or above this value until the end of February. As a result, and despite some disturbed days, 28MHz was open to North America on every day in January and February. Solar flux reached a maximum on 19 February, and the previous week coincided with both the seasonal peak in northern hemisphere muf's and with a period of low geomagnetic activity. As a result conditions on the higher bands were outstanding, with openings on many 21MHz paths lasting longer than those predicted for 14MHz, while 28MHz was open simultaneously to all continents in the mornings and to North America for 10 hours or more. It was during this period that the muf on the North Atlantic path reached 50MHz on several days.

Stations listed in italics were using cw, the others ssb.

**1-8MHz.** 0000 SP2BMX, SP3DOI. 0500 W1BB, W4DZH. 0600 K1PBW, K2GNC. 2100 YU3EF, YU3ZV.

**3-5MHz.** 0700 KP4AM/D, LU8DQ.

**7MHz.** 0100 FG7AS, YN1Z (QSL to K4CLA), VU2KMK (QSL to W7ISV). 0200 ZF2CL. 0500 HROQL, KP4AM/D, W7. 0600 KH6BZF, KL7MF, VE7, W6-W7. 0700 VK, XE, ZL. 0800 C6AEP, VK, W6, ZF2CL, 9Y4NP. 0900 C6ANX, KL7CW, PJ2MI, YS9RVE.

**14MHz.** 0000 VK6, 9N1MM, 9V1TF. 0700 CE0AE. 0800 C21IB, FK8CR, FO8DT, H44CF, KC6GF, KL7, KP4AM/D, T2T, VK2AGH/LH, VR6TC, 3V8A4. 0900 FW0TT, VK0JM, VS5DX, 5W1AX. 1100 J3LJE/3V0, YK1AA. 1400 SU1AL, W6-W7, Y11BGD. 1500 601FG. 1600 FR7BU, WH2AVV. 1700 FB8XV, JT1BG, KH6AW, S2BTF, S79WHV. 1800 H51WR, KL7. 1900 FK8CR, JY1, JT1AO, S8AAA, VK0AB,

VP8SU, VR1AE, ZD9GH, 3D2BM, 601FG, 8Q7s AF, AG. 2000 W7ZGA/KH2, KL7MF, P29EJ, 3Y5DQ. 2100, H5FXT, VK2AGH/LH, VP2DXF (QSL to N2OO), 3Y1VC. 2200 HH2MC, HK0BKX, VS5XU, VU2SV, XT2AV.

**21MHz.** 0000 CE0AE, WB5LBJ/DU6, KG6JHC, KL7, VP8QP, VR6TC, VS6AK, W6-W7. 0900 J28AG, KJ6BZ, WL7AAG, ZL. 1000 HV2VO, VY1BD. 1100 H44CF, W6-W7. 1300 KP4AM/D. 1500 WA1S-QB/HCB, 601FG. 1600 YC1BML. 1700 J6LZF, KH6CF, VU, W6-W7. 1800 WA7JRL/SU, VQ9MR, XT2AV. 1900 KH6U, 8Q7AG. 2000 HROQL, KA1NC, ST0HF. 2100 KL7. 2300 AL7D, CE, CP, KC4AAC, LU, PY, W7.

**28MHz.** 0000 CX, LU, PY, W9. 0800 VQ9MR, 3V8ND. 0900 D4CBS, FK8CK, H44JD, VK2VGK/9 (Norfolk Is), VR3AH, I3LJE/3V0 (QSL to I200A). 1000 EP2SL, HL9KE, HM0S, JY6TC, KL7, P29NNL, TJ1AA. 1100 KL7. 1200 C5AAB, H44CF, KG6ABC, NP2AB (QSL via the KV4 bureau), TR8GDC, 3Y1VC. 1400 AP2KS, SU1DP, XE. 1500 HS1ABD, ZF2AX, 3Y1VC. 1600 H21HZ, VP2DXC (QSL to WB8LDH), W6-W7, 9G1KP (QSL to K1MAR). 1700 HROQL, KP4AM/D, VU2DK, W6-W7. 1800 KH6CF, J6LZF. 1900 HH2MC, KH6, VP2SQ, VR3AH, ZL. 2000 HI, HR, OA, 8P6. 2100 HC, KP4AM/D, LU, OA, TR8. 2300 LU, OA, PY.

Your scribe is very grateful to the following for supplying logs from which this section has been compiled: G2AMV, G2HKU, G3s HB, PH, KSH and ZFC, GM3LYY, G4s BLH, BWP, CPS, EHQ and GXL, G14FUM, G5JL, G8KG, G8PQU, IS0LYN, BR5s 17567, 31301 and 33915.

Many thanks also to the authors of the following for information: *Long Skip (VE3FRA)*, the *West Coast DX Bulletin (WA6AUD)*, *DXpress (PA0TO)*, *CQ Magazine (W1WY)*, the *Ex-G Radio Club Magazine (W3HQO)*, and *DX News Sheet (Geoff Watts)*.

Please see that all items for the June issue reach G3FKM no later than 7 May and for July by 2 June.

## HF propagation study

Predicted hpf's (MHz × 10) for April 1979

GMT =	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	288	256	268	351	432	463	475	451	451	389	329	300	288
Ascension	342	338	295	248	413	451	488	477	470	453	390	369	342
Bahrain	253	232	263	327	413	444	451	426	426	351	309	272	253
Bangkok	200	190	251	294	352	401	413	382	376	335	260	201	200
Barbados	294	272	248	225	260	348	376	363	369	383	376	326	294
Bermuda	255	227	208	180	220	288	310	318	326	340	343	286	255
Bogota	279	248	235	204	271	310	347	369	369	368	362	309	279
Buenos Aires	324	305	296	260	277	350	450	439	439	431	402	350	324
Cape Town	323	253	274	336	444	468	489	479	474	440	368	355	323
Colombo	238	215	265	324	401	436	432	420	408	354	296	252	238
Cyprus	242	221	234	296	374	411	421	399	399	350	293	257	242
Dakar	326	324	289	299	382	432	475	464	451	426	395	351	326
Denver	185	176	169	172	169	177	178	239	248	253	268	228	185
Fairbanks	174	172	188	215	228	232	225	225	223	218	223	213	174
Falklands	328	322	296	277	199	352	463	451	451	440	402	350	328
Gibraltar	182	181	161	187	235	253	290	280	285	271	234	202	182
Hong Kong	176	187	243	276	326	366	375	357	327	314	232	200	176
Honolulu	178	171	181	201	229	256	235	215	255	256	248	213	178
Iceland	129	125	125	143	186	206	219	216	220	216	196	157	129
Jamaica	260	237	209	190	251	300	324	351	351	351	293	260	260
Lagos	342	346	290	328	432	469	495	483	477	454	402	370	342
Las Palmas	274	270	252	255	331	366	411	392	402	392	345	303	274
Lima	299	277	268	232	305	362	389	401	413	402	383	332	299
Los Angeles	181	172	168	174	171	178	192	244	265	275	271	223	181
Malta	208	195	191	235	289	328	343	328	328	309	252	228	208
Mauritius	317	268	262	355	445	467	479	468	459	401	329	313	317
Mexico	219	200	182	169	228	219	290	305	307	309	314	256	219
Montreal	221	191	176	176	176	235	249	265	289	277	293	252	221
Moscow	164	148	188	227	267	307	317	310	307	291	229	174	164
Nairobi	317	299	275	351	439	475	488	477	470	378	357	326	317
New Delhi	213	196	253	301	376	413	413	401	351	300	276	219	213
New York	228	201	176	176	176	235	252	274	295	291	301	266	228
Osaka	176	187	220	251	282	315	321	270	253	230	201	200	176
Perth	234	213	263	321	398	434	430	387	324	266	257	233	234
Rio de Janeiro	328	322	298	275	249	426	463	451	451	440	402	351	328
Salisbury	327	324	251	351	451	475	495	477	477	428	376	345	327
Seychelles	299	275	263	332	352	366	382	393	404	378	337	314	299
Singapore	213	196	253	301	376	413	413	401	389	388	276	219	213
Suva (I)	178	178	200	232	243	266	284	276	275	251	225	201	178
Suva (II)	333	335	290	309	354	389	428	424	421	394	352	364	333
Sydney (I)	176	187	243	276	326	366	374	318	282	266	232	200	176
Sydney (II)	299	284	274	327	323	265	243	219	200	210	315	335	299
Teheran	238	215	265	324	401	436	432	420	408	341	289	252	238
Vancouver	180	169	171	182	201	181	205	202	218	218	218	216	180
Wellington (I)	182	188	206	243	260	307	308	285	260	247	218	197	182
Wellington (II)	335	329	293	298	304	260	219	188	171	221	309	362	335

Bands recommended are those between hpf and half hpf.

## Propagation predictions

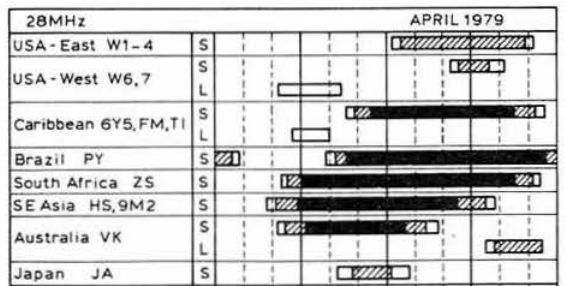
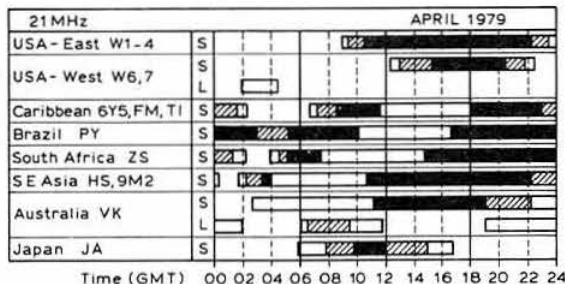
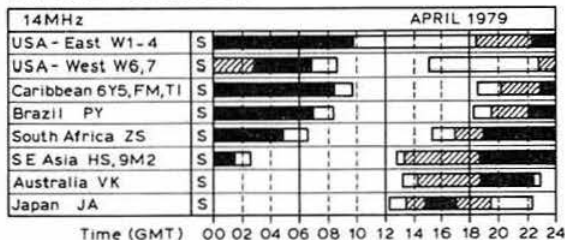
During April the changeover to summer-time is very noticeable on all bands, with the F layer tending to split during day-time into the F1 and F2 layers. This seasonal advance means that dx conditions in the northern hemisphere will continually decline, and will reach their lowest point during July-August.

During the coming month conditions on 28MHz for traffic with North America and, in part, with East Asia will worsen markedly compared with the winter months. Even during April, traffic with North America will not be certain. The 21MHz band will remain open longer in the evening for traffic with North and Central America because of the longer days, and in the early hours of the morning traffic will be favourable with Hawaii on good days. Towards the end of the month it may be possible under favourable conditions to hear western North America via the indirect path on occasions. The 14MHz band will become the main night-time dx band during the summer. During day-time there will be chances of traffic with North and South America during the period before noon.

DX will be possible on 7MHz when the longest part of the path lies in darkness. During day-time, 7 and 3.5MHz will be ideal for local traffic without interruption by the dead zone. The maximum day-time distances are longer on 7MHz than on 3.5MHz and will decrease on both bands until July. During the night local traffic will seldom be interrupted by the dead zone.

The provisional sunspot number for January 1979 from the Swiss Federal Observatory was 165.8. On 24/25 January the daily numbers were 209. During the rest of the month a high level of solar activity was noted, the lowest daily number being 130.

The predicted smoothed sunspot numbers for May, June and July are 145, 148 and 150 respectively.



S Short path 1-5 days  
L Long path 6-20 days  
Opening on more than 20 days in the month

## SWL NEWS

(Continued from page 343)

scheduled for 3-7 March, ssb/cw on all bands, including 1.8MHz. Hopefully, it found its way into many logs for a new one.

VP8SU is on South Georgia and had been active on G3KTJ's net on 14,275kHz around 1900. At the time of writing he was QRT as he was awaiting some new pa tubes for his transmitter. He is scheduled to be active again from about the end of March. VP8SO is active from South Orkney Is, and he has also been heard regularly on the G3KTJ net around 2000. LU1ZA is also on South Orkney, and LU1ZC and LU1ZS have been reported from South Shetland around 14,125kHz between 2000 and 2200. LU3ZY, on South Sandwich Is, skeds LU2AFH at 0100 on 14,220kHz, when a list is run for this rare one. 4U1UN is also reported as being active each Wednesday evening on 14,240kHz around 2100; he has also been reported on 21,355kHz at 1900. 6O1FG has also been heard on 14 and 21MHz, QSL via 10DUD. There is a new amateur on Tuvalu, T2T, who has been heard on 14,275kHz at 1845. QSL via W5RBO.

Two expeditions planned for late March/early April are VK2BJL's trip to Spratly Is (which may now be doubtful because of the political situation), and the YV0 expedition.

Neville Spry, BRS17567, mentions he now has 326/349 all-time, and David Whitaker, BRS25429, has 311 confirmed from 323. W8PSD/VP2S provided Dave with his 206th confirmation on 3.5MHz, and Dave also received cards from S8ABC, A7XZZ, JT1BG, HM1EJ and PY0FN—all new ones on 28MHz. Several reporters mention the really interesting QSL for the VK9ZR expedition (certainly a good one for the shack wall). Keith Kerr, BRS35943, mentions ST0HF on 21MHz for a new one, plus 6O1FG on 14MHz, and KL7JEF on 3.5MHz at 0803 one February morning. Keith comments that for the first time he was unable to log 100 countries in January on 3.5MHz due to the distinct lack of activity (the same comment also applies to BRS25429 and your scribe). Robert Small, ARS8841, comments on QSLs received from LU3ZY, VR1AY and 3D2CC. He managed the elusive 3Y1VC and VP8SU for two new countries. Other notable calls mentioned include FW0TT, JT1AO, VR1BD, HM000, SV9JI (Crete), S2BTF (Box 108, Dacca), ZD9GH (via ZS1Z) and W1UQ/PJ7.

That, once again, is the end of the mail. Keep the news items rolling in and help to keep this page as interesting as possible.

Deadline date for the June issue is 20 April.

### "QTHR" means "My address is correct in the current (1979) Call Book"

Not necessarily in the 1978 edition.  
Quite possibly not in the 1977 edition.  
Even more likely not in the 1976 edition!

The 1979 edition of the RSGB Amateur Radio Call Book incorporates 3,868 amendments and deletions, and 2,482 additions to the entries in the 1978 edition.

184 pages Got your copy yet? £3.21 incl p&p

Obtainable from  
RSGB Publication (Sales)



# As an xyl sees it

by Mrs S. E. Watson\*

As an xyl I sometimes open the door to a stranger to our house who asks to see my husband, or Ron. When I reply with, "I'll go and fetch him, he's in the shack," I can get some funny looks. Unless, they happen to be radio amateurs like himself, in which case I generally direct them to use the method I use myself when looking for him—that is to follow the squeaks, whines, morse or other peculiar noises, sometimes resembling one of those old-fashioned gramophones which need frequent winding-up—and they will find him in the radio shack, which is the old outside toilet and coalhouse converted into a compact unit.

During the 17 years of our marriage he has been interested in amateur radio (you will notice I hesitate to use the word "ham", not wishing to insult any of your readers), and although he had to curtail his activities a little when the two boys were born, he still had the cubby-hole under the stairs so that he could keep his hand in. This proved a magnet for the boys as they grew up, and toys were frequently abandoned when they found the door left open. I well remember one afternoon when there was a loud bang behind the closed door, and it flew open to reveal Dad liberally covered with black spots and accompanied by clouds of evil-smelling yellow smoke. That was the only time, I think, that they beat a retreat from Dad's cupboard—and Dad and I did the same, leaving doors and windows open to get rid of the stench.

Over the years we have gone to mobile rallies with the boys—as babes in arms, in pushchairs, and as toddlers making a beeline for the nearest stretch of water—and now that they are almost teenagers we still go. The most amusing incidents have undoubtedly happened in and around the home, and I am sure some of them will find an echo in many an xyl's heart.

For one thing, there is the vast range and style of equipment, especially the pre-war and immediate post-war stuff which has, I must admit, more character than some of the transistorized equipment which is advertised today. To know that a set came out of a Spitfire, and that Lancaster bombers had the same kind of radio equipment in them, makes it more interesting, especially when one catches a glimpse of it in some film on tv. At the same time, with the amount of space needed to store all this "absolutely essential" gear under the plea that "it might come in useful someday", to be accused of hoarding recipes oneself can be infuriating. A sense of humour is certainly needed, and it comes to the fore when I observe the routine by which more of this hardware enters the house, via car-boot, garage, porch, and then into the shack to be put away in a corner for a while until produced quietly one day. Enquiries as to from where and when it came are met with "Oh! that, I've had it quite a long time now, I did tell you".

I have long since abandoned efforts to clear up in the radio shack, and now leave it to my husband to do this—which usually happens when he can no longer see out of the window or sit down in his chair. My excuse is that radio equipment is such fragile stuff and easily broken, and as I have, in the past, broken valves when trying to dust or clean windows, there is no come-back. But in one way he has me stymied and I have not

found a way around it yet: when I have some urgent household repair job which needs doing, it invariably happens that a set goes on the blink, and there he has me—a set turned upside down and him with tools at the ready telling me "I'll have to see to it or we'll have the neighbours complaining", and I have to retreat or become the scourge of the neighbourhood.

Antennas are the most noticeable sign of a radio amateur at work, and as we live opposite a bus-stop we have had some highly amusing moments when people waiting for buses have seen what they imagined was a tv antenna on the roof begin to revolve. Their comments, when overheard, have been equally diverting, and Jonathan Routh with his candid camera has come in for some down to earth criticism—as, also, have some youngsters when their elders suspected them of telling tall stories. Car drivers tend to develop a crick in their necks when passing our house as they try to see what this is on the roof, and even a trip out in the car for us in summer usually leads to antenna spotting.

Field day; now that brings a wide variety of reactions when mentioned, as it is practically guaranteed that during a period of warm sunny days and nights, the only rain to be seen or felt will come down almost non-stop during those 24 hours. Every year the workers return on the Sunday evening, stiff, wet and cold, vowing "never again!" But, sure enough, when the next one comes along there they are stocking up on sausages and beans and collecting the equipment together, worrying about whether the power source will be better this year and if so—and So will remember to bring along whatever it was he forgot last time.

I find the QSL cards fascinating, and admire the ingenuity and artistry of those who design them, but the wording on the back I leave to hubby to decipher. I cannot pretend to understand the abbreviated alphabetical type of language which amateurs use to communicate with each other. However, I must plead guilty to being caught-out making comments when my husband is on the air, and I have heard some beauties myself at times.

All of which add interest to a fascinating hobby which I am content to leave to my husband, and to my younger son who will take the exam when he is old enough. □

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# your opinion

## TVI

The Editor  
Radio Communication

Sir—I am glad my previous letter (October 1978) provoked some comment (G3WYK, January 1979), as this is a subject on which all opinions should be aired.

Most of what Mr Bysse says is indeed true, and represents my own policy before I made a serious study of the subject. I certainly would not advocate a "transmit and be damned" approach until I had satisfied myself that I stood a good chance of being clear of any trouble.

Before I took the trouble to engineer my lay-out I did indeed break through on several tv receivers and at least two audio amplifiers. At that time I was avoiding peak viewing and listening times.

However, it struck me that if I could put my antenna far enough away from the equipment that was suffering, and at the same time ensure that the feeder did not radiate and that my rf did not get into the mains wiring, I would stand a better chance of avoiding breakthrough.

I therefore acquired a 14AVQ trap vertical antenna which I planted at the end of my garden, as far away from the buildings as possible (I do not think many of my neighbours even noticed it). This I fed with good quality coaxial cable, earthed only at the antenna. The braid of the cable was used to earth the station.

A series of tests was then carried out, using the tv receiver and audio amplifier that I had in my own home. The results were encouraging, and it was then, and only then, that I commenced operating my station at any time that I wanted to.

I did have one case of interference reported to me some months after I commenced. Of course I closed down immediately and looked for the cause. This turned out to be a recently installed audio filter which was equipped with a three-core mains lead and was therefore earthed to the mains earth. When this had been earthed instead to the rest of the metalwork, I carried out further tests and then recommenced operation. I had no further complaints.

Far from being in a state of siege, the whole of my family are on very good terms with our neighbours.

Incidentally, I am also very impressed with the dx capabilities of the antenna system.

Any member who wishes to tackle the problem in a similar fashion can count on the help and support of myself and the other members of the Interference Committee.

P. F. Jobson, G3HLF,  
chairman, Interference Committee

The Editor  
Radio Communication

Sir—The majority of Class A amateurs in this country must surely agree with every word written by G3WYK on the subject of tv.

Unless one can live on a remote island or be happy with 2W to a dipole in the loft, then in a built-up area tv will almost definitely occur with the usual 150W cw rig/400W p.e.p. ssb equipment. The Manchester area contains thousands of Class A amateurs, but how many can I hear any evening on 14MHz? I would be lucky to hear three or four! Which leads one to another conclusion: the only reason why tv statistics are so low is that perhaps one per cent or less of amateurs go on the air during tv hours. In the Manchester area I hear far more stations early in the morning.

One has to reach a compromise. I operate most evenings with full power on cw to a beam, and have only one complainant, who at present is pacified. Most folk would agree that as you have to live with your neighbours, one must be moderate. I personally would not like my tv programmes ruined by the chap up the street, and knowing this and the fact that tv does result when I have the linear on, I am quite happy to be able to operate when I want to rather than not at all.

The important thing is to keep operating as much as possible, in order to "test" the neighbours. When the banging on the door has finished, and the queue has dispersed from the street, and the usual remedies have been tried (filters, braid-breakers etc), then you have to decide whether you are going to stay on the air and be strung up from the nearest lamp-post, or adopt a mode or band where you can operate any time you want. The only other alternative is to give up, and I am afraid this is what most folk seem to do; in fact I nearly did, until I was brought back from the brink!

S. J. Gilbert, G3OAG

## PHONETICS

The Editor  
Radio Communication

Sir—I entirely disagree with Mr Askew's remarks on phonetics in your December 1978 issue.

As a commercial operator I am convinced that the proper use of ITU-recommended phonetics is not only desirable, but necessary. The "translation" he mentions I do not understand. The phonetic alphabet can be learnt in little more than minutes. I rarely use r/t circuits—maybe only twice a month, but when I do I certainly do not have to "translate", least of all for my own commercial callsign, which I am sure changes much more often than does that of Mr Askew.

Notice that I said ITU phonetics; not some fancy individual gimmick.

Tony Bull, G3ICB  
(Marine operator)

## EI VHF

The Editor  
Radio Communication

Sir—Re p24 of your January issue, an EI vhf-only licence is *not* new, although as far as I know it may have been discontinued since I held EI2BN/M for a fortnight's summer holiday in 1967. Some years later, when I heard of the same callsign being used, I wrote to the Department of Posts and Telegraphs in Eire, and they replied that a "pirate" was responsible and appropriate steps were being taken.

I wonder if any of your readers can remember EI2BN's brief but eventful 432MHz tour of the "Emerald Isle"?

W. H. Jarvis, G8APX

## "OPEN DOOR"

The Editor  
Radio Communication

Sir—The RSGB made very effective use of the air-time provided by the BBC's "Open Door" programme.

All those concerned in this programme, from its initial conception through to the final screening, are to be congratulated.

A special tx to Brian Rix for providing the lively link throughout this splendid venture.

K. W. Turner, G4GZB

## PROPOSED NOVICE LICENCE FOR RADIO AMATEURS

The Editor  
Radio Communication

Sir—The recently formed European CW Association is examining the possibility of Western European nations introducing a cw-only novice amateur radio licence. This licence would be a stepping stone for beginners who wish to eventually qualify for a full amateur licence. Suggested licence conditions are:

1. A simple examination covering regulations and radio theory.
2. A 5wpm morse test (administered by any amateur who has held a full licence for at least three years).
3. Crystal control only, in defined segments of amateur bands (hf and vhf).
4. Maximum power input 10W.
5. Holders of an RAE pass certificate need only pass the morse test.
6. A novice licence could only be held for two years in any five-year period.

To try to establish the volume of support for such a proposal I would be obliged if you would publish this letter. Those in favour of the idea—whether licensed amateurs or not—should send their name and address to me on a post card, at the address below. In the case of local radio clubs, correspondence could be saved by the secretary informing me of the number of his members who are in favour of the idea. Considerable support is essential if the proposal is to succeed, and even then negotiations may take many months.

The European CW Association currently consists of the Scandinavian CW Activity Group (Denmark, Finland, Norway and Sweden), The West German CW Activity Group, The TOPS CW Club (UK), and the G-ORP Club (UK). It represents over 1,500 licensed radio amateurs and a number of short wave listeners.

A. D. Taylor, G8PG  
Executive Committee member  
European CW Association  
37 Pickering Road  
Greasby, Merseyside L49 3ND

# contest news

## RSGB 21/28MHz Telephony Contest 1978 results

A total of 210 logs was received, an increase of almost 40 per cent over last year's figure but, with over 500 British Isles stations active in the contest, it is perhaps disappointing that the entry from the British Isles was not greater.

Conditions were good, with record scores being submitted in almost all sections. Most of the leading stations had many more QSOs on 21MHz than on 28MHz; the leading station in the 28MHz single-band section would have been placed sixth in last year's overall results. A number of entrants felt that the time had come for the contest to revert to 28MHz only, but of course there is no guarantee of such good conditions again. However, all comments will be discussed by the HF Contests Committee before this year's rules are formulated.

The standard of log keeping was generally good, but once again there was some misunderstanding about the Russian prefixes and countries; perhaps more people should refer to their RSGB Countries List. Duplicate QSOs were clearly marked in the majority of logs, but there are still one or two entrants who do not do so. One of the leading entrants had 40 unmarked duplicates, and he will note the difference in his claimed and actual scores. One or two entrants take the trouble to submit their cross-check logs; this saves the adjudicator a vast amount of work, and perhaps in future a cross-check log may become part of the entry, as in some major contests.

It is interesting to note that the three leading UK stations had a very commanding lead over the rest of the entries. In this event, for the first time, the Powditch Trophy for the highest score on 28MHz was awarded and was won by G4DMN with 164,562 points, with G3MXJ in second place with 144,904 points, and G3OZF third with 131,806 points.

There was a very large entry from Eastern Europe, with one parcel arriving at the adjudicator's QTH containing 90 logs from Box 88.

### How the leaders made their points

	21MHz		28MHz		Transmitter		Antenna	
	QSOs	Mult	QSOs	Mult				
G3MXJ	382	62	843	59	SB401	KW1000	TH6DXX	
G3FXB	362	56	797	49	T4XC	FL2000	2-el quad with Yagi director on 28MHz	
G3OZF	313	52	781	59	TS520	L48	Mustang	
C5AAP	129	15	301	18	FL101	FL2100B	TH3	
UV3CE	161	13	191	14	200W		4-el quad	
UK6LAZ	162	15	111	14	Not known			

UK TRANSMITTING							
Posn	Callsign	Points	Posn	Callsign	Points		
1	G3MXJ	433,422	27	G3TOE	75,174		
2	G3FXB	364,140	28	G4BYB	73,224*		
3	G3OZF	348,429	29	G4GIR	63,000		
4	G4BHE	251,544	30	G4CVZ	61,008		
5	G3ZQW	245,622	31	G3VAO	59,796		
6	G4CNY	237,711	32	GM4FDM	53,250		
7	G3TMA	216,783	33	G4AGE	43,248		
8	G4BWP	213,348	34	G3YMC	43,092		
9	G3LDI	204,204	35	G4ELZ/P	40,194		
10	G3IVJ	201,600	36	G3DME	26,325*		
11	G3VPW	180,147	37	G3XZW	25,071		
12	G2QT	176,085	38	G3XFW	20,898		
13	G4PLP	169,440	39	G4AZN	18,750		
14	G4DMN	164,562*	40	G3YBH	17,784		
15	G4DUW	145,920	41	G4DBW	16,320		
16	G4FMO	123,396	42	GM3RAO	11,424		
17	G3VOF	120,000	43	G4DDL	9,360		
18	G3ZOE	118,755	44	GM5AXY	9,225		
19	G3TTJ	105,444	45	G2AJB	7,881		
20	G4AFJ	105,228	46	G3ZDF	7,533		
21	G4GUO	102,825*	47	G3COJ	6,732		
22	G4JFJ	102,024*	48	G3KSH	6,600		
23	G4GDV	93,704	49	G3IRM/M	5,280		
24	GM3VEY	86,460*	50	G3TKR	4,680		
25	G3XBN	80,640	51	G4GNK	4,650		
26	GU3YIZ	76,440	52	GM3RFR	3,198†		

\*28MHz only. †5w only

Check logs received from the following British Isles stations: G3BRL, G3XBY, G3ZRS and GW4BLE.

### OVERSEAS TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	C5AAP	42,075	53	TF3AG	1,701
2	UV3CE	28,917	54	WA4TLI	1,650
3	UK6LAZ	23,142	55	YU100N	1,485
4	UW1AE	22,320	56	SP1GHW	1,381
5	9H1CH	17,784	57	OK2KJT	1,380
6	EP2TW	16,992	58	RA9AKO	1,320
7	UK2GKW	16,629	59	UA9FAR	1,200
8	UL7OAO	16,200	[	UK6LWA	1,200
9	UA6LLT	16,119		61	WB2TCI
10	UO5OGE	14,100	62	UW6DZ	1,164
11	UA900	11,700	63	K8BBAC	1,134
12	UA1ZX	10,350	64	I4CSP	1,116
13	UC2OAG	9,834	65	RB5EIZ	1,092
14	UW3EQ	9,372	66	UI8LAF	1,080
15	UA3QBP	9,174	67	SP6ECA	1,053
16	VE3VC	9,048	68	JA3XRC	1,026
17	9K2DR	8,712	69	JA1DQT	891
18	UB5HBT	8,370	70	UB5LU	885
19	HA5KKO	7,980	71	JA6LCJ	880
20	UA9MS	7,854	72	UD6DLJ	810
21	RB5FBB	7,410	73	UP2BCD	792
22	UA1MU	7,275	74	EP2SL	714
23	OH1KA	6,768	75	W9CA	672
24	VE1BNN	5,760	76	UA1ZBY	630
25	UA3TN	5,238	77	UD6DER	621
26	UA3DLH	5,040	78	UA9HBE	528
27	HA3HV	4,832	79	EA8MG	495
28	OH5RZ	4,816	80	JA6PL	483
29	OH5PA	4,482	81	HA5KFL	468
30	UA1AWO	4,320	82	JA0FMB	432
31	UB5ZCE	4,284	83	UB5HDM	414
32	YU1NZW	3,942	84	H18GGL	405
33	HA7SQ	3,915	85	UL7GBP	395
34	RB5EGK	3,861	86	UV9SG	385
35	UP2AV	3,456	87	YU10JT	378
36	UA6APP	3,108	88	RB5MPQ	345
37	OH7NW	3,015	89	N7DF	330
38	UB5HDX	2,970	90	UA4ACA	300
39	K9US	2,667	91	LA9ZV	288
40	RA1ARX	2,520	92	JR3CVJ	285
41	UK5IAZ	2,361	93	UA3TAM	240
42	UA0BAC	2,226	94	RA3DFN	210
43	UA3AEZ	2,106	95	UL7TAC	165
44	UB5ZBQ	2,100	96	WA2TNG	156
45	PY4KL	2,088	97	UK9SAO	88
46	UA3ACD	2,016	98	UA0UBG	72
47	UB5VAA	1,998	99	OH7SQ	48
[	JH7JGG	1,848	[	W8XT	36
	K8MN	1,848		AB8E	36
	N4BP	1,800		UM8NBN	36
50	UA3AJK	1,782	103	JR6CEB	12
51	UA0CCW	1,716			

Check logs received from the following overseas stations: OH1LW, UA3AFY, UA3DLD, UA3TAG, UA3VFI, UA6ADC, UA6BV, UA6LWD, UA8NF, UA9TS, UB5DAG, UB5VAZ, UB5VDK, UK2BCR, UK7LAF, UV3DN, UV9WF, UW3RR, WA2TJF and WA4QCY.

### BRITISH ISLES LISTENERS

Posn	Station	Points	28MHz points
1	BRS32525	138,638	48,620
2	BRS35943	76,896	25,785
3	BRS33823	43,548	13,572
4	BRS34130	43,448	12,654
5	BRS39950	36,792	
6	A8808	36,636	
7	BRS34740	20,352	
8	BRS15822	19,764	
9	A9191	18,468	
10	BRS39782	8,442	
11	BRS26407	7,308	

### OVERSEAS LISTENERS

Posn	Station	Points	Posn	Station	Points
1	UA9084200	10,608	11	HE9OZH	2,715
2	UA3155163	9,636	12	UA2125480	2,040
3	UB5073203	8,073	13	UB50601464	1,563
4	UB5068467	7,524	14	UP2038806	1,254
5	UC2009453	6,680	15	UL7179200	1,050
6	UB5060333	6,213	16	UP2038887	972
7	UA3127376	5,795	17	UP2038521	884
8	UO503927	5,700	18	UA0124153	567
9	UA916555	4,896	19	JA28964	420
10	UO203768	3,159	20	DL15775	18

In the receiving sections BRS32525 was once again winner of the UK section, and of the Powditch Receiving Trophy for the leading 28MHz score. In the overseas section it was a clean sweep for USSR stations, but it was disappointing that all but three of the entrants in this section were from the USSR.

G3KDB

## VHF NFD 1979 rules

Figures in square brackets refer to general rules for vhf/uhf contests published in the January 1979 issue of *Radio Communication*.

- 1 Duration.** From 1600gmt 7 July to 1600gmt 8 July 1979.
- 2 Bands.** Up to four separate stations can be used, operating on the 70, 144, 432 and 1,296MHz bands. Only one station can score or give points on each band. Single-band entries on 144MHz will not be accepted.
- 3 Operators.** Any RSGB member or group of members operating from the British Isles may take part (NB, this excludes Eire). Two groups operating from the same site can combine their scores subject to Rules 2 and 4. Each group should send its own summary sheet.
- 4 Stations.** All the stations forming one entry must operate from within a circle of 1km radius centred on the operating position of any of the stations. Proof of permission to use a site may be required. All equipment, including antennas, must be installed on the site during the 24 hours preceding the contest or during the contest. The site may not be used for any transmitting activities by the group or member during the five days before this time.  
Stations may not use public mains supply. Power for all equipment must be derived from an on-site generator or battery.

### 5 Scoring

- (a) On the 70, 144 and 432MHz bands, contacts will be scored by radial rings (7a).
- (b) Contacts on 1,296MHz will be scored at one point per kilometre.

### 6 Contest exchanges

- (a) Contestants must exchange both callsigns, signal report, serial number (starting at 001 on each band), QTH locator and QTH [11]. Only one scoring contact on each band may be made with each station [10a].
- (b) The QTH given on 1-3GHz must differ in form from that given on the other bands, eg a location given as "10km north of Marlborough" on 432MHz could be given as "8km south-west of Swindon" on 1-3GHz.

The 1-GHz station may operate on any other band for the purposes of arranging a contact, but the exchange of contest information must take place on 1-3GHz only and may not be interrupted by recourse to another band. CQ calls on another band should clearly be "for 1-3GHz only".

### 7 Entries

- (a) All entries must be postmarked not later than 22 July 1979.
  - (b) Separate sets of log sheets and 427 cover sheets are required for each band.
  - (c) A summary sheet must also be completed. Otherwise the scores on each band will be listed but the total will not appear in the overall results table.
  - (d) Entries must be addressed to: The Chairman, VHF Contests Committee, 12 The Rampart, Haddenham, Cambs CB6 3ST.
- 8 Other rules**  
The following general rules will also apply: [5a, 6a, 9a, 10a, 12-22].

### 9 Awards

The Surrey Trophy will be awarded to the overall winners, and certificates of merit will be awarded to the overall runner-up, the leading entry from each country and the highest scoring station on each band. The Tartan Trophy will be awarded to the leading Scottish entry.

## Listeners' Contest rules

A listeners' contest will take place at the same time as VHF NFD. Each band will be treated as a separate event. Listeners' contest rules 1-3 (January 1979 *Radio Communication*) will apply.

## 10GHz Cumulative Contest rules

**0900-2000gmt 20 May, 17 June, 22 July, 26 August, 23 September.**  
All entries and check logs to: VHF Contests Committee, c/o Dr C. W. Suckling, 31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

This contest will be a cumulative event, with three activity periods to count towards the final score. Entrants unable to be active for three periods are strongly encouraged to send in logs as a record of their activity, but will not be eligible for an award. Such logs will be included in the table of results.

During each activity period a station may change location once (see general rule 5b). For the purposes of the contest, the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

To stimulate activity abroad on these dates, entries to this contest will be accepted from stations outside the UK, whether or not they are RSGB members. Stations operating inside the UK must list on their cover sheet the national grid references of all sites used.

Awards will be made to the winner, the runner-up, the leading fixed station operating from his home QTH, the leading non-UK entry, and to the highest-placed station who has not won an award before in this event.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the January 1979 issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5b, 6a, 7b, 9b, 10b, 11a, 12-22.

## Microwave Cumulative Contest rules

**0900-2000gmt 20 May, 17 June, 22 July, 26 August, 23 September.**  
All entries and checklogs to VHF Contests Committee, c/o Dr C. W. Suckling, 31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

This contest, new to the calendar, will be a cumulative event, with the following bands active on the following dates: 2-3GHz-20 May and 23 September, 3-4GHz-17 June, 5-6GHz-22 July, 24GHz-26 August. The final score will be the sum of the scores for the individual bands multiplied by the number of bands on which scoring contacts have been made, ie (2-3GHz points + 3-4GHz points + etc) x number of bands. A station contacted in the second 2-3GHz period who was contacted in the first period will still count for points.

During each activity period, a station may change location once (see general rule 5b). For the purpose of the contest, the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period. Entrants must include on the cover sheet, the ngr of each site used. Separate cover sheets should be used for each band.

Awards will be made to each band leader, the overall winner and the runner-up, and to the leading fixed station operating from his home QTH.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the January 1979 issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5b, 6a, 7b, 9b, 11a, 12-22.

## DF Qualifying Event—South Manchester

**Date:** 13 May 1979.  
**Map:** OS Sheet 109 (Manchester) 1:50,000 series.  
**Assembly:** 1300bst for start at 1320bst.  
**Location:** Lay-by on A57 approximately ¼-mile south of Junction 2 of M63, ngr 748972.

Intending competitors requiring tea are asked to notify Mr D. C. Holland, G3WFT, 32 Woodville Drive, Sale, Cheshire M33 1NF (Tel 061 973 1837) not later than 7 May. The winner of the event will be awarded the South Manchester DF Cup.

## BATC UK Summertime ATV Contest rules

**1800gmt 2 June-1200gmt 3 June 1979**

**Scoring**  
{ points for one-way contacts)  
2 points per kilometre on 432MHz  
8 points per kilometre on 1-3GHz  
16 points per kilometre on 10GHz

(144-75MHz can be used for calling on phone—please QSY from calling channel when QSO has been established).

### Exchanges

1. A code group of four non-consecutive digits chosen by each entrant for the whole contest period.

The code group must be exchanged in video only.

2. Callsign, QTH locator, report and serial number (starting at 001) to be exchanged in video or in sound if necessary.

NB. Long CQ-TV calls on A5 are to be avoided.

**Eligible stations.** Single- or multi-operator, fixed, /A or /P locations. Receive only stations also welcome to join in.

**Logs.** To include all information exchanged plus own QRA, station details, points claimed, full address of entrant, comments and views.  
NB. Log sheets and cover sheets available from G3VZV on receipt of s.e.

Final date for logs: postmarked not later than 2 July 1979. Send to G3VZV, 18 Church End, Milton Bryan, Milton Keynes, Bucks.

## International ATV Activity Contest rules

**1800gmt 8 September to 1200gmt 9 September 1979**

All rules as above June contest except that one-way QSOs will not count for points and logs must be postmarked not later than 8 October 1979.

As a further encouragement the organizer will award a valuable prize to the leading station in each of the above atv contests in addition to the usual certificate.

# Contests calendar

7 April	1,296MHz Open (Rules in February issue)
7-8 April	Polish DX (CW) (Rules in March issue)
8 April	Low Power (Rules in February issue)
8 April	432MHz Open and SWL (Rules in February issue)
21 April	Common Market DX (CW)
21-22 April	Bermuda ARC (Phone and CW) (Rules in March/April issues)
21-22 April	Polish DX (Phone) (Rules in March issue)
22 April	DF Qualifying Event Chelmsford (Rules in March issue)
22 April	Common Market DX (Phone)
22 April	144MHz CW (Rules in February issue)
28-29 April	Helvetia 26 (Rules in February issue)
28-29 April	PACC (Rules in April issue)
29 April	70MHz Open (Rules in February issue)
5-6 May	432/1,296/2,304MHz (Rules in March issue)
6 May	Region Round-up CW (Rules in March issue)
12 May	World Telecommunications Day (Phone)
13 May	DF Qualifying Event South Manchester (Rules in April issue)
19 May	World Telecommunications Day (CW)
20 May	Region Round-up SSB (Rules in March issue)
26-27 May	144MHz Portable (Rules in March issue)
26-27 May	CQ WW WPX CW (Rules in March issue)
2-3 June	BATC Summertime ATV (Rules in April issue)
3 June	DF Qualifying Event Dartford Heath
3 June	Gwent ATV Group (GW800J) (Rules in April issue)
9-10 June	NFD (Rules in February issue)
16-17 June	Microwave
17 June	DF Qualifying Event Burton-on-Trent
23-24 June	Summer 1.8MHz
23-24 June	ARRL FD
1 July	DF Qualifying Event Mid-Thames
7-8 July	VHF NFD (Rules in April issue)
15 July	3.5MHz Field Day
15 July	DF Qualifying Event Coventry
29 July	144MHz QRP
5 August	DF Qualifying Event Salisbury
11-12 August	European Meteor Scatter
18-19 August	70MHz Open
19 August	DF Qualifying Event Slade
1-2 September	144MHz Open and SWL
1-2 September	SSB Field Day
8-9 September	International ATV Activity (Rules in April issue)
16 September	DF Final Rugby
October-November	432/1,296MHz Cumulative
6-7 October	432/1,296/2,304MHz
13-14 October	21/28MHz
20-21 October	7MHz Phone
21 October	70MHz Fixed
3-4 November	144MHz CW
3-4 November	7MHz CW
10-11 November	2nd 1.8MHz
24-25 November	BATC SSTV
2 December	144MHz Fixed

## 1978 Verulam ARC Contest results

### 144MHz SECTION

Posn	Callsign	Points	Counties worked	Posn	Callsign	Points	Counties worked
1	G8KMW	5,328	36	12	G4GEL	1,050	15
2	G4EKB/P	4,585	35	13	G3YHY	928	16
3	G4DEZ	3,630	30	14	G3UFB	826	14
4	G3CXX	3,102	33	15	G3VRG	689	13
5	G8LZP/P	3,038	31	16	G8NHZ	660	15
6	G8KPZ/P	2,442	22	17	G3WFM	636	12
7	G8IZN/P	2,300	23	18	G8IZD	290	10
8	G3ZVV	2,023	17	19	G3KKZ	220	10
9	(G3VER)	1,350	18)*				
10	G3FPK	1,340	20				
11	G4HLX	1,134	21				
	G8KAX	1,125	15				

Receiving Section			
1	BRS15822	966	14
2	BRS34310	708	12

### 1.8MHz SECTION

Posn	Callsign	Points	Counties worked	Posn	Callsign	Points	Counties worked
1	G3CXX	4,100	41	7	G4GYS	403	13
2	GW4EKB/A	3,478	37	8	G4AYS	350	14
	(G3VER)	2,368	32)*	9	G3WFM	336	12
3	G4BUO	1,980	30	10	G4CNH	48	6
4	G3VSQ	1,058	23				
5	G3VRG	987	21				
6	G4DUS	495	15	1	BRS34310	2,442	33
				2	BRS40492	126	9

\* Verulam ARC station.

## Gwent Amateur Television Group (GW800J) Contest

1000bst to 2000bst, 3 June 1979

This 432MHz fast-scan contest is the first of what the organizers hope will become an annual event. The Gwent TV Group will be /P somewhere in Wales. A prize will be given to the winner and to the runner-up.

The rules are as for BATC contests, and log sheets should be sent to M. Rackham, GW8MD0, 31 Severn Road, Crown Estate, Pontllanfraith, Blackwood, Gwent, to arrive not later than 19 June 1979.

# obituaries

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

### Mr D. Q. Aldridge, G5RH

Denis Aldridge, who died on 2 December 1978 aged 62, was a member of the Society for many years. First licensed as GM5RH, he was a highly competent cw operator, active on all hf bands, and was well known for his assistance to newcomers to the hobby. He was also a member of the World Association of Methodist Radio Amateurs and Clubs.

### Mr S. R. Cooke, G2CTC

Bob Cooke, who died on 4 January, served as a wireless technician with the RAF and obtained his amateur licence after being demobbed. He was a great lover of the key, and was particularly active on top band for many years. He had many friends in amateur radio, several of whom would not have attained their licences but for his patient help and guidance.

### Mr F. H. Dewick, G3HIU

Frank Dewick, who died on 13 January, was active on most bands, particularly 1.8MHz a.m. and cw. He was a prominent figure for many years in Buckinghamshire amateur radio circles, and was a founder member of Wolverton & D ARS (now Milton Keynes & D ARS) and a Raynet county controller. He was well known for his assistance to newcomers to the hobby, especially for his lectures at club meetings.

### Mr F. J. Nuttall, GW3XJD

Fred Nuttall died on 31 December 1978. He had been a member of the RSGB since 1967, and was a founder member of the Nevill Hall Hospital Radio Club.

### Mr B. Raynor, G8BR

Bernard Raynor, who died on 1 January, had been a member of the Society since 1945. He was well known on top band in Essex and Kent, and for his encouragement of newcomers to amateur radio.

### Mr W. A. Robbie, GM8JYZ

Bill Robbie died on 11 February aged 36. He was well known on Scotland's east coast on the 144MHz band, and was a member of Dundee Kingsway Technical College ARC.

### Mr B. S. M. Robertson, GM3ZAP

Ben Robertson, who died on 31 January, aged 63, was a member of Glenrothes & D ARC for many years, and remained active until shortly before his death.



#### Mr A. J. Stock, G3VEE

Anthony Stock, who died on 30 January, had been a radio enthusiast since boyhood, gaining much of his knowledge while serving as a radio engineer in the RAF during the second world war. He was a keen cw operator, mainly on the 21MHz band, and built all his own equipment. He was also a volunteer for the British Talking Book Service for the Blind.

We have also been advised of the deaths of:

Mr T. S. Abrahams, G8HPC, on 17 March 1978;  
Mr G. M. Brown, RS40483, on 22 January;  
Mr H. H. Ford, G3OMG;  
Mr D. Hetherington, GM3BRF, on 19 January;  
Mr H. W. A. Holloway, G2DGW, on 20 December 1978;  
Mr J. Meredith, G8OY;  
Mr J. E. Merrett, G3PVQ, on 9 January, aged 66;  
Mr G. W. Morton, G3GTZ, on 18 January;  
Mr E. Robinson, G2DHR, in April 1978;  
Mr W. D. Stirling, GM4DGT;  
Mr D. A. Southall, G3PHE, on 3 April 1978;  
Mr C. W. Sutcliffe, RS31408, on 1 January;  
Mr A. D. Sutton, GM3AJY;  
Mr W. Vinicombe, GM8RV.

## Mobile rallies calendar

**8 April**—White Rose Mobile Rally, Lawnswood School, Leeds 16. GB3VRR will operate during the rally. Details from G4DZL, QTHR.

**29 April**—Southend & D RS Mobile Rally, Fitzwylmer School, Hockley Road, Rayleigh, Essex. Details from M. Daniels, G8KLD, 25 Sweeney Avenue, Southend, Essex SS2 6JQ.

**29 April**—North Midlands Mobile Rally, Drayton Manor, Near Tamworth, Staffs. Details from G8BHE, QTHR.

**6 May**—Tulip Time Mobile Rally, Grammar School, Spalding, Lincs. Details from G4EMK, tel 07782 2649.

**13 May**—Wessex ARG Mobile Family Picnic, Alderholt, Near Fordingbridge. Further details from G4EMN, tel 0202 20027.

**13 May**—Open Beach Angling Festival, Gosport and District Angling Club, Gosport, Hants. G3NGT will be operating a talk-in station on S20, 21, 22, 18, for radio amateurs who are interested in fishing. The beach faces the Isle of Wight, with ample parking and picnic space. Further details from G3NGT, QTHR (enclose sae), tel Gosport 84861.

**20 May**—East Anglia Radio Amateurs' Picnic, East Anglia Transport Museum, Chapel Road, Carlton Colville, Lowestoft (on B1384). Open 11am. Talk-in using GB3ATM via GB3NB (R1) GB3PO (R3), and on S22. Attractions include tram and trolley-bus rides, the Transport Museum, traders, etc. Hotel and caravan park nearby. Details from G3TWQ or G3ZNU, QTHR.

**20 May**—Welsh Mobile Rally, Barry Memorial Hall, Town Centre, Barry, S Glam. Open 11am. Talk-in on GB3BC and S22. Trade stands, RSGB bookstall, bring and buy, light refreshments, licensed bar, all under cover. Admission 25p. Beach and amusement park nearby. Further details from Reg Rowles GV4FOM, QTHR, tel Cardiff 565656.

**20 May**—Northern Mobile Rally, Victoria Park Hall, Keighley. Trade stands, children's films, refreshments, bar, etc. Details from G8DFZ, QTHR.

**27 May**—Hull & DARS Mobile Rally, Hull University. Opens 1200bst. Talk-in S22 G8HUC. All the usual trade stands plus some dealing with microprocessors. For xyls and junior ops, a magic show and films. Further details from G8EAH, QTHR.

**27 May**—Maidstone YMCA ARS Mobile Rally, Y Sportscentre, Melrose Road, Maidstone, Kent. Open 11am. Facilities will include free car parking (ample space for everyone), covered exhibition hall, bring and buy stall (usual 10 per cent commission to club funds), and talk-in stations. GB2YSC will be operational from 21 to 27 May. Details from J. C. Parker, 42 Mote Road, Maidstone, Kent, tel Maidstone 50350.

**3 June**—East Suffolk Wireless Revival, near Ipswich, Suffolk. Details from G4CVB, QTHR.

**10 June**—Elvaston Castle Mobile Radio Rally, Elvaston Castle Country Park (5 miles SE of Derby, on B5010). 11am start. Talk-in by G3EEO and G3ZBI on 144 and 432MHz. 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 G4CTZ, QTHR, tel Derby 71875.

**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, near Petersfield, Hants.

**24 June**—Longleat Mobile Rally, Longleat Park, Warminster. Details later.

**24 June**—Bangor & D ARS Mobile Rally, Castlewella Forest Park. Details from G4AAM, 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.

**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, Mountstevens 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.

## Special event stations

### GB2RN, 13-22 April

The RNARS hopes to operate three stations from the bridge wireless office of HMS Belfast. Continuous operation, from 0800gmt on 13 April to 1700gmt on 22 April, is intended, using all amateur bands from 1.8 to 28MHz and 144MHz. Trio Corporation of Japan has donated an hf installation for use in the special demonstration amateur radio station aboard the ship, and visitors are welcome from 11am to 6pm each day (except Good Friday). QSLs will be acknowledged on receipt.

### Special steam events, 14-16 April

The British Rail ARS is planning to set up three exhibition stations as follows:

GB3SVR, 14-16 April, at the Severn Valley railway station, Bewdley, operated by G4JY;

GB3BRC, 15-16 April, at Bulmers rail centre, Hereford, operated by G4FDH;

GB2DVR, 15 April, at the Dart Valley railway station, Buckfastleigh, operated by G3SCW.

Further details from G3SCW, QTHR.

### GB3WE/P, 6 May

Solihull School Electronics Club will be operating a special portable station, from "World's End" in central England, on the 14 and 28MHz bands on phone and cw.

# RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock time	Callsign	MHz	Mode	Town	Clock time	Callsign	MHz	Mode	Town
<b>Sundays</b>					<b>Wednesdays</b>				
0915	G3LEQ	144.250 .. 145.550 .. slant polarized to WNW 1-950 .. 29-250 ..	A1/A3J F2/F3 A2/A3 F2/F3	Knutsford, Cheshire	1135	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon
1015	G3CGD	1-875 ..	A1/A3	Cheltenham, Glos	1830	G3LR G3NCZ	145-525 ..	F2	Accrington, Lancs Blackburn, Lancs
1030	G3OHM/A	144-180 ..	A1/A3J	Birmingham	1830	G3ZQS G4CGT	1-930 .. 145-525 ..	A1/A3J (usb) F2	Darwen, Lancs
1030	G3NPB	1-875 ..	A1	St Ives, Cornwall	1900	G3JULY	1-826 ..	A1/A3J	Culgeith, Cumbria
1100	G2FXA	1-900 ..	A1/A3	Stockton-on-Tees	1900	G4FKZ	3-575 ..	A1/A3	Chadderton, Lancs
1100	G3KJJ	3-535 ..	A1/A3J	Northampton	1930	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon
1130	G3BLS	1-920 ..	A1/A3	Osney, Oxford	1930	G3ZYY	145-550 ..	F2/F3	Saltash, Cornwall
1200	G3HVI	144-750* ..	A2/A3	Stoke-on-Trent, Staffs	2000	G8QU	1-970 ..	A1	London N22
1800	G3WNR	144-750* .. 144-250 .. 145-250 ..	A1/F3 A1/A3J F2/F3	South Shields, T & W	2000	G3SWP	144-180* ..	A2/A3J	Doncaster, South Yorks
1815	G3LEQ	slant polarized to WNW 1-950 ..	A2/A3 F2/F3	Knutsford, Cheshire	2015	G3VWJ	1-845 ..	A1/A3	Staines, Middlesex
1815	G4DVZ	1-915 ..	A1/A3	Leeds, Yorks	2100	G3HVI	144-750* ..	A2/A3	Stoke-on-Trent, Staffs
1830	GM4HIG	3-550 ..	A1/A3J	Aberdeen	2130	G3VWL	144-160 ..	A1/A3J	Worthing, Sussex
1930	G3LDW	144-160* ..	A1/A3J	Birmingham					
2030	G3ZDW	144-220 ..	A1/A3J	Swinderby, Lincs					
		horizontal, omni-direct							
<b>Mondays</b>					<b>Thursdays</b>				
1135	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon	1135	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon
1830	G3VBI	1-910 ..	A1/A3	Goole, South Humberside	1830	G4BNA	3-590 ..	A1	Swindon, Wilts
1830	G3LR G3NCZ	145-525 ..	F2	Accrington, Lancs Blackburn, Lancs	1830	G3NC	1-968 ..	A1	Swindon, Wilts
1830	G3ZQS G4CGT	1-930 .. 145-525 ..	A1/A3J (usb) F2	Darwen, Lancs	1830	G3LR G3NCZ	145-525 ..	F2	Accrington, Lancs Blackburn, Lancs
1900	G3ZRS	1-975 ..	A1/A3	Blackpool, Lancs	1830	G3ZQS G4CGT	1-930 .. 145-525 ..	A1/A3J (usb) F2	Darwen, Lancs
1900	G4FKZ	3-575 ..	A1/A3	Chadderton, Lancs	1900	G3BLS	1-920 ..	A1/A3	Osney, Oxford
1900	G4BNV	144-170 ..	A1/A3J	Ottery St Mary, Devon	1900	G3ZRS	1-975 ..	A1/A3	Blackpool, Lancs
		horizontally to south-west			1900	G4RS	3-565 .. 144-110 ..	A1/A3J A1/A3J	Catterick, N Yorks
1900	GM4HIG	144-250 .. 145-550 .. 1-810 ..	A1/A3J A2 A2	Aberdeen	1930	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon
1930	G3RAF	3-550 .. 144-025* ..	A2 A2	Locking, Avon	1930	G3ASR/A	1-875 .. 144-175 .. 144-220 ..	A1 A1/A3J (usb) A1/A3J	Harrow, Middlesex
1930	G13SXG	144-101 ..	A1/A3J	Newtownards, Co Down	1930	G3ZYY	145-550 ..	F2/F3	Saltash, Cornwall
2000	G3XWZ	1-910 ..	A1/A3J	Mansfield, Notts	2030	G3ZDW	144-220 ..	A1/A3J	Swinderby, Lincs
2000	GM4ELV	3-570 ..	A1/A3J	Arrochar, Strathclyde	2130	G3LQI	145-300 ..	F2/F3	Lancing, Sussex
2030	G3ASR/A	1-875 .. 144-175 .. vertical* ..	A1/A3J (usb) A1/A3J	Harrow, Middlesex					
2130	G3LQI	145-300 ..	F2/F3	Lancing, Sussex					
<b>Tuesdays</b>					<b>Fridays</b>				
1135	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon	1135	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon
1830	G4BNA	3-590 ..	A1	Swindon, Wilts	1830	G4CRI	3-525 ..	A1	Helston, Cornwall
1830	G3LR G3NCZ	145-525 ..	F2	Accrington, Lancs Blackburn, Lancs	1830	G3LR G3NCZ	145-525 ..	F2	Accrington, Lancs Blackburn, Lancs
1830	G3ZQS G4CGT	1-930 .. 145-525 ..	A1/A3J (usb) F2	Darwen, Lancs	1830	G3ZQS G4CGT	1-930 .. 145-525 ..	A1/A3J (usb) F2	Darwen, Lancs
1900	G4RS	3-565 .. 144-110 .. to NNE	A1/A3J A1/A3J A1/A3J	Catterick, N Yorks	1900	G3NPB	1-875 ..	A1	St Ives, Cornwall
1930	G3RAF	1-810 .. 3-550 .. 144-025* ..	A2 A2 A2	Locking, Avon	1900	G4FKZ	3-575 ..	A1/A3	Chadderton, Lancs
1930	G3ZYY	145-550 ..	F2/F3	Saltash, Cornwall	1930	G3PQF	144-360 ..	F2/F3	Farnborough, Hants
2000	G3IOF	1-875 ..	A1/A3	Marlow, Bucks	2030	G3ZDW	144-220 ..	A1/A3J	Swinderby, Lincs
2000	G4EZA	145-525 ..	F2/F3	Colchester, Essex	2130	G3VWL	144-160 ..	A1/A3J	Worthing, Sussex
2030	G3IRM	1-975 ..	A1/A3	Bury St Edmunds, Suffolk	2200	G3AWL	144-110 ..	A1/A3J	Peterlee, Co Durham
2030	G4FFC	144-390 ..	A1/A3J	Pertenhall, Beds					
2030	G3OHM/A	144-180 ..	A1/A3J	Birmingham					
2030	G3KGU	1-915 ..	A1/A3	Theydon Bois Essex					
2200	G3AWL	144-110 .. to south	A1/A3J	Peterlee, Co Durham					
		horizontal, omni-direct							
<b>Saturdays</b>					<b>Sundays</b>				
0915	G3LEQ	144-250 .. 145-550 .. slant polarized to WNW 1-950 ..	A1/A3J F2/F3 A2/A3 F2/F3	Knutsford, Cheshire	0915	G3LEQ	144-250 .. 145-550 .. slant polarized to WNW 1-950 ..	A1/A3J F2/F3 A2/A3 F2/F3	Knutsford, Cheshire
0930	G2FNK	1-930 .. 1-810 ..	A1/A3J A2	Staines, Middlesex	1015	G3CGD	1-875 ..	A1/A3	Cheltenham, Glos
1135	G3RAF	3-550 .. 144-025* ..	A2 A2	Locking, Avon	1030	G3OHM/A	144-180 ..	A1/A3J	Birmingham

\* Omni-directional

# 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: 27 Apr, 28 May, 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.

Advertisements for 27MHz equipment will not be accepted.

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

Do not post to RSGB HQ or Advertising Representative

## FOR SALE

**SWL triple purpose** atu Joymatch, made by Partridge Electronics Ltd, tapped coil, switched 12 positions, single variable tuning capacitor, price £6.50. E. Card, 8 Penylan Road, Upper Loughor, Near Swansea, Glam. **FT200/FP200**, all 10m, £240. HRO BS coils, £4.50 ea. KW Vespa Mk1, psu, £60. G3RKT, QTHR. Tel Derby 515212.

**Icom IC202**, vgc, fitted new RS Components nicads, £130. Venner hours run indicator, £1.50. Philips valve pa amp, 80W, £25. Gramplan DP4 mics, £7.50 ea. G3USH, QTHR. Tel Haworth (0535) 42284, after 6pm.

**FRDX400**, **FLDX400**, £325; or swop FT221R, TS700G, etc. Creed 75RP on 45dB, recent full overhaul, £50. Pocketphones plus batteries, wkg on SU8, £20. G4GRT, c/o G8GTZ, QTHR. Tel Attleborough 452163.

**Heathkit SB303** hf rx, £75. Heathkit 3-395MHz ssb xtal filter, carrier xtal, £15. 70cm 4-way antenna matching harness, £2. 2m 4-way antenna matching harness, £2. Pye U450T tx, £20. Pye U450R rx, £20. GW8AWM, QTHR. Tel 04955 2254.

**Swan 350** tx/rx, psu, 400W p.e.p., handbook, £220 ono. G4GWF, QTHR. Tel Newton-le-Willows 5151 ext 366, office hours.

**FT212RD/YC221**, few months old, boxed, as new, £50 off list price, genuine sale. G8KOP, QTHR. Tel Dave, 01-349 1122, days.

**30ft+** portable pole, lightweight; generator, 12V dc in 230 ac out; generator 24V dc in, 230 ac out; dc 12V pu, suit KW2000 range; Leece Neville alternator, also 30A alternator, both with controls; 4CX250B, with base, etc; see for bargains. G2MF, QTHR.

**2m fm tx/rx**, Bendix Dyna-Com, dual channel, 30W output, wired for 117V mains, manuals, mic, spkr, needs xtals for desired freqs. C. Kratzer, G5CAA, 8 Fairholt Street, London SW7. Tel 01-589 1816.

**Pair tx/rxs**, 28-5MHz; xtals 3-5 and 7MHz range; 1hp and 1/2hp ac motors; variable vac capacitors; vac relays; variacs 2, 3, 8 and 10A; 3CX1000A, with all parts for QRO linear; see for many bargains. G2MF, QTHR.

**MMT 432/144** transverter, £105. MMC 1,296/144, new, £24. Shure 526T, new, £28. Stolle rotator 2010, RZ100, 20yd cable, £50. Xtal filters: 9MHz YF90F, usb/lsw xtals, £15; YF90H600 cw, £12. Tel 0305 834017, evenings.

**Two dx tv ants**, 3-el Band 1, ex tv relay, offers. Homebrew rotor, with control, £15 ono. TV w/f generator, pulse bar generator, £7.50 pair. Converter, rotary, 28V dc/115 ac 400Hz, £20. Wartime aircraft instruments, offers. VTR, 25h tapes, £500 ono. Tel Martin, Abingdon (0235) 20005.

**FRG7**, November '77, brand-new cond, hardly used since June '78, £140. Buyer collects. Armitage, 28 Queens Road, Bournemouth. Tel Bournemouth 766290.

**TS700**, fitted with auto toneburst, improved front-end, with SD306 rf amp, £250. MM 144/28 converter, £10. Letters only. G8IQO, QTHR.

**FRG7**, nice cond, purchase of Drake gear forces sale, £130 ono. Prefer buyer inspects and collects. Write: Hicks, G4DVP, Flight Simulator, RAF Binbrook, Lincoln LN3 6HF.

**Eddystone 840A** 0-5-30MHz rx, wkg order but hf (above 20MHz) requires attn, £20 ono. G4EJC. Tel 0442 832318.

**TA32Jr**, with feeder, £40. 8Y/2M, with feeder, £10. Buyer collects. G4CRL, 23 Long Common, Ballymena, Co Antrim. Tel 0266 41068.

**Cambridge xtals** tx/rx, S0, S20, S22, R5-7, 144-4 tx, R8 i/p rx, S14 rx, tam, wkg, fitted R5-7, S20-22, xtal toneburst, £45. Single manual elec-G4GUN, QTHR. Tel Ottery St Mary 3390.

**Codar AT5** tx, psu, 160/80m, Joymatch atu, £30. KT340 Lafayette rx, £15. Mod UM3 2x807, 500V ac psu, £12. Cossor db 'scope 1035, £20. DX100U tx, £20. Grundig tape recorder, needs attn, £15. Buyers collect. G3GYW, QTHR. Tel Southend 32963.

**14-el Parabeam**, £18. 6-el quad, £15. MBM88/70, new, unopened, £24. MBM88/70, used for two contests only, boxed, £20. Few 4CX250B, uhf base with ptf chimney, £10. Tel 0305 834017, evenings.

**SB104A** broadband tuned tx/rx, large digital frequency display, HP1144 ac psu, SB644 remote vfo, £500. Atlas 180, deluxe mobile mount, £220. G3XHX, QTHR. Tel Liskeard 43749, after 7pm.

**TS-120V**, b/new, still boxed, very good tx/rx, ssb, cw, 80-10m, cost £435, sell for £400; or swop for Atlas 210X or 350A; first offer seen sale agreed. Tel Peter, 0842 61648, evenings.

**2m fm rig**, 15W, 12V, 6ch, fitted R6, S20, S22, built-in spkr, toneburst, preamp, c/w mic, power cable, etc, size 30 by 15 by 35cm, £50 plus carr. GW80GI, 31 The Park, Ruthin, Clwyd LL15 1PW.

**Hy-Gain 18AVT/WB**, £30. Datong FL1 frequency agile audio filter, unused, £40. Joystick and Joymatch 3A, £7.50. Buyer collects. GM4CUX, QTHR. Tel 031-332 5300.

**2200GX**, 12ch, nicads, charger, case, etc, £135 ono. Two vintage audio pa 807 p/p amps, £3 ea. G8MMM, QTHR. Tel 051-677 2564, 6-8pm.

**Trio 2200G**, comp with nicads, charger, seven simplex, four repeater channels fitted, £110. G4EHG, QTHR. Tel Chichester 0243 789587.

**Trio 2200GX**, R3-7, S20, S22-24, charger, nicads, helical, spare power lead, orig packing, £130 ono. JD110 power and swr meter, £6. GM8DKG, NOT QTHR. Tel 041-552 4400 ext 3069, day; or 0236 874103, evenings.

**Standard C430** 70cm tx/rx, 10W fm, £140. Pye fm 2m Cambridge, five channels fitted, £45 ono. Linc 2, extra xtal, preamp, Shure mic, £100. Tel 01-500 8240.

**Yaesu FT101 Mk2**, covers 160m, comp with cw filter, fan, FV101 vfo, exc cond, one owner, £360. GW3ARS, QTHR. Tel Porthcawl 3058.

**Standard CV146A**, 2m fm, h-held tx/rx, xtals, S0, S6, S20, S22, R7, nicads, helical antenna, case, £100. G3YGB, 18 Chester Street, Coventry. Tel 57793.

**FDK Multi-11**, auto-scan, 2m, S0, S20-24, R3-R7, R3 input sound box, as new, orig packing, £160. G3MBW, QTHR (Yorks). Tel 0943 74794, evenings.

**Trio TS515** tx/rx, exc cond, £220. FT227R, as new, £195. Wanted: Atlas 210 and G-whips. G3NPZ, NOT QTHR. Tel Fareham (Hants) 283736.

**FT221R**, £320. KW Vespa (6146), psu, £70. 160 a.m./cw tx, psu, £20. Mains transformer 1,680 or 1,800V 0-5A secondary, tapped primary, offers. Cossor db 'scope, £10. New, boxed, RCA 813s, £7.50 ea incl post/packing. Tel Basildon 412435, evenings.

**MM 70cm** converter, 432-144MHz, vgc, £22 ono incl carr. Trio 7200G, good cond, four rpt, six simplex, orig accessories, mobile whip, homebrew vfo, £150 ono. G4DJB, QTHR. Tel Peter Roberts, Reading 86373 ext 330, office hours.

**FT75**, FV50B vfo, ac psu, dc psu, £160 ono; DX100U, SB10, £60 ono; Pye fm Bantam, S0, S20, S22, 25kHz, nicads, charger, £60 ono; all with manuals, etc. Army 38 set, £5. Wanted: KW2000 B or E. G4GCB, QTHR (Lancs). Tel Burscough 89 2416.

**Eddystone 730/4**, £125. Taylor 44 transistor tester; Avo 8; Serviscope; Advance sig gen; CR bridge; USA vhf rx; R208; 840C; HW32A; new Philips oscilloscope; offers. Wanted: Marconi Atalanta; Seavoice Marine vhf; cw tx; details. Cain, G3DVF, Tel Alnwick 2487.

**Marconi** five valve mains radio, 1932/33, wkg order, offers. FM Bantam, wkg, fitted R5-7, S20-22, xtal toneburst, £45. Single manual electronic organ, 15 voices, wkg, offers. G3ZLJ, QTHR. Tel 0902 761339.

**Yaesu FT75B** hf mobile rig, comp with dc psu, £175. FT2F fm black box, £90. Icom IC2F, £70. GM4AWA, QTHR. Tel Bridge of Eam (0738 81) 2815, evenings or weekends.



**Books or manuals** for voltmeter valve CT54. Oscilloscope miniature CT84, 1954; also parts for it incl one lock ring and celluloid squared dial for tube, fits on to front of case, back metal end of case; or scrap CT84 for parts. R. Williamson, G3RNY, 13 Avonmore, Antrim Road, Ballymena, Co Antrim BT42 2BJ.

**TC9 Mk2**, a.m./fm/cw, vfo controlled, 2m tx, mint, £50 ono. TR44 beam rotator and control unit, overhauled and top cond, £45. Ferrograph 4AN professional tape recorder, £50. IMHOF equipment cabinet, four 19in racks, almost brand-new, lockable, details on request. Tel 0843 31069.

**FDK Multi 2700 Mk2**, xtal toneburst, nine months old, £450 ono. GW3KHD, QTHR. Tel Cardiff 373631.

**Vanguard AM20BV**, long control cable, hi-band, £15. Ranger 2002V hi-band, £5. 'Scope, 13A, £15. BC348 chassis, good tuning drive, £3. R103 rx, psu, £5. Xtal calibrator No 10, two, £5 ea. G8GEF, QTHR (Oxon). Tel 0491 38800 ext 242, days.

**Storno CQM13** high band tx/rx unit, only £8. Model 40 Avo, general use multimeter, fair, £5. **Wanted:** FT101, cheap early model, in fair wkg order, ORK around £230; faulty one considered, or other hf rigs also considered. Tel Watford 24752.

**AR88LF**, vgc, fitted product detector, S-meter, £40. KW2000 A/B dc psu, connecting cables and plug, £30. KW Q-multiplier, £15. KW E-Zee match, £20. Nuvisor 2m converter, 6-8MHz, powered, £12. Postage extra; delivery could be arranged. G3VNI, QTHR. Tel Alton (0420) 84499. **IC240**, comp, less than one year old, believed perfect, £160. Audio: Heathkit S88 stereo amp, £15; FM40 mono tuner, £8; one large high quality spkr system, £18; Leak 0-1 stereo amp/preamp, £25; open to offers. G3VYV, QTHR. Tel 0772 600234.

**NAG 144XL**, 2m linear amplifier, vgc, only a few months old, £350 ono. G8MBI. Tel Southend-on-Sea 553297.

**Liner 2**, fitted preamp, good wkg order, £90. G3WMT, QTHR. Tel Bracknell 3803.

**Bantam**, 2m, fm, fitted S0, S19, S21, nicads, etc, £60. Tel Andy, 01-554 0399.

**FT200/FP200**, all 28MHz xtals, realigned, £275. G3SEK, QTHR. Tel Didcot (Oxon) 812584.

**Drake**, less than half price: TR4C, £275; AC4, MS4, £60; RV4C, £50; MN4, £50. Heathkit SB102, £190. HP235, £30. AVQ18, £25. TA32Jr, £25. G3DKE, QTHR. Tel Brimscombe (045 388) 3956.

**Collins** station 75A-4 rx, matching KWS1 tx, stn control unit, spec by return of sae, £650; or exch mint C line separates, with cash adjustment. GMA4GS, QTHR.

**RA17L**, good wkg cond, buyer to arrange collection or carr, £275 ono. Modular Electronics 28-70cm 10W transverter, £50 ono; Bauer single paddle key, £8 ono; will deliver reasonable distance. G8JHL, QTHR.

**Seiwa** scanning 2m rx, £40. **Liner 2**, £100. FT221R, £300. KW202, £160. KW Vespa, £75. Heathkit HB23 psu, £25. Datong speech processor, £25. G4DYR. Tel Wolverhampton 37583.

**HW32A**, full band cov, ac and dc psus, £75. PSU 4-15V, 10A, adjustable, £30. 70cm 12XY, circular phasing harness, £15. Carr extra. Deliver reasonable distance Dunstable. Cragg. Tel 0582 600358.

**IRCs** (international reply coupons), half PO price, please send sae with order, hundreds for sale, only 13p ea. Reed, G4BVH, 73 Dudley Road, Brighton, Sussex.

**KW Viceroy** tx, KW 77 rx, seen wkg, £100. Carr 50 miles free. G3EFK, QTHR. Tel Downland 51212.

**Spectrum analyser**, Marconi OA1094 A3, gwo, manual, some spares, 3-30MHz, weighs 280 lb, £65. VVM, CT343, £10. VVM, TF1041A, needs attn, £10. 0-20V 4A dc supply, built-in variac, £10. Buyers must collect. GBLIU, QTHR. Tel Uxbridge 30006, after 6pm.

**FT/FP200**, all 10m, £220. IC240, £160. AR40 rotator, £35. 2m transverter, 6-40 tuned lines, mosfet conv, £50. 10XY 2m beam, £15. Many other small items. G3YBY, 27 Lockey Road, Shepton Mallet, Somerset. Tel Shepton Mallet 4191.

**Pye Bantams HP1**, fm, £75 the pair. 50ft Telomast, with rigging, £40. G3ZAF, QTHR (SW15). Tel 01-785 9666.

**Cambridge**, 2m, fm, 6ch, led display control box, cable, spkr, mobile mount, handbook, fitted S0, S20, S22, R6, only £50. G8IZU. Tel 0536 3154.

**Atlas 210X**, covers 80-10m, 200W p.e.p., £400; tx/rx, copy Swan Cygnet, 80-10m, £100; Pye Cambridge, 2m, a.m., tunable, £30; all ono. G3XMA, QTHR. Tel Coventry 69673.

**IC22A**, 10ch, S20, S22-23, R2-8, good cond, £120 ono. Set PF1s, modified for PP3 batteries, recently overhauled, £25 ono. Price, G4DVB, QTHR. Tel 0474 66347.

**Trio JR310**, late model, xtal calibrator, narrow band filter, exc cond, manual, orig box. Garex 2m converter, 28MHz i.f., has fault, xtal ok, £6.75. **Wanted:** KW201 Q-multiplier. Good DX40 and vfo. G3FK, QTHR. Tel Breamore 436.

**KW1000**, linear, little used, offers. **Wanted:** YC601, FT227R, IC245, TR7500, or similar rig; also AT200; swops arranged. G3BRT, QTHR. Tel 0272 657997, after 7pm.

**Three TY2-125s**, £20. One TY4-400, new, £30. Three 807s, new, £3. G4BMH. Tel 0604 846533.

**Yaesu FR400SDX**, a.m./fm/ssb, 160-2m, matching spkr, Microwave Modules 70cm converter in box with psu, antenna switch etc, all mint cond, the lot £185 ono. M. Prince, 175 Spies Lane, Halesowen, West Midlands B62 9ST.

**Multi 800D**, 25W, autoscans, as new, all fittings, box, etc, immac, £240; or might exch for IC240, plus cash adjustment. Tel Dick, 03763 21869. **KW2000E**, Shure mic, handbook, £275. TW 2m communicator, modified fm, £45. RC/600/TR fm/vhf, will modify 2m, three txs, three control units, three rxs (one modified), cables, handbook, £60. Mosfet converter, 2m, commercial, £10. H/B 2m tx, £12. G4CRM, QTHR. Tel 07014 52442.

**"Radio Communication"**, vols 53, 54, Jan '77-Dec '78, £2 per vol; plus carr. Meters: 57 assorted, most 2 1/2in round, some square, incl seven therm ammeters, the lot £25; buyer collects, pays transport. G3RVY, QTHR.

**FRDX400**, 2m, fm; FLDX400, fan; £350 pr. NR56VF1 2m rx, £35. Eddystone 880/2 0-5-30MHz rx, ssb, £275. BC221, charts, psu, £20. SWR50 meter, new, £11. G3MCL, QTHR. Tel Winchester 65814.

**Microwave Modules** dual output 2m preamp, £12 ono. **Wanted:** for 6N2 2m linear, pa valve type Eimac 8874, please state price. Cowling, G8ERX, 10 Russell Road, Goole, North Humberside DN14 6UW.

**HC60** xtals 8055-55 (R0), 8061 (R4), £1.50 ea. 8031-25 (144-5625), £1. Four 6146Bs, used but ok, £2.50 ea. All plus post. G3ADZ, QTHR.

**SSM E-Zee match**, 80-10m, as new, £25. 4m equipment, Pye base stn tx, Handi-Ranger tx/rx, xtals, etc, offers invited. G3TQY, QTHR. Tel Loxwood 752933.

**IC240**, £150. KW201 rx, £80. H/D mast bearing, £8. 4-400, £8. 15m Andrew HJ4, £10. 2m whip, £5. **Wanted:** Drake R4C. Buffham, G3TMA. Tel Norwich 712548.

**Bang Olufson 3805** portable tv, new tube fitted, luxury set, offers please; or exch for FL50B tx. Thorn 2000 series colour tv, wkg but tube on boost, offers. **Wanted:** 45-5Bd rtty punch and reader. G80XT, QTHR. Tel 01-698 1029.

**FT401B**, in mint cond, exc high power tx/rx, £460. G4AEI, QTHR. Tel Reading 882130, evenings.

**FL50B**, FV50B vfo, £80. **Wanted:** rotator for uhf beam, can collect reasonable distance. G4CZB, QTHR. Tel Northampton (0604) 830129.

**Icom IC201** multimode 2m tx/rx, £280. **Liner 2**, £90. G4CXJ, QTHR. Tel 0993 (Witney) 2573.

**KW204**, fitted low level output and vox, £150. KW202, £130. KW2000, fitted low level output, £120. Buyer inspects and collects by appointment. No cheques. G3LCH, QTHR. Tel 01-672 7066.

**Grundig 600** rx, mw, 1-5/30MHz, bfo, rf bandspeed, ceramic filters, handbook, £45. 12AVQ vertical antenna, approx 50ft RG feeder, £25. KP202 hand-held R5-7, S0, S20, S22, charger, xtal t/b, £85. Stud and whip antenna. G3IES, QTHR. Tel 0272 500742.

**Trio TR7010**, 2m, ssb, 144-1-144-315, boxed, in vgc; also TR2200G, fitted S0, S20-22, R5, R7, rev R7, nicads, charger, case; exch with cash adjustment, for IC201, TS700(G), etc; or otherwise sell. G8MKX, QTHR. Tel 0342 26366.

**Yaesu FT301D**, extra 600Hz filter, FP301D Deluxe psu, FV301, as new, used few hours only, £700. Yaesu 500Q desk mic, £14. Nagasawa TWS-120N coaxial switch, unused, £8.50. Carr extra. J.L. Barry, 10a Henbury Close, Torquay, Devon. Tel Torquay 312879.

**AM10D**, modified a.m./fm, tx xtalled five simplex, two repeater, rx xtalled three simplex, two repeater, variable tuning, toneburst, etc, £50; Bantam, xtalled S0, S20, R5, R7, nicads, £50; or £90 the two. Carr extra. G3NPF, QTHR. Tel Horsham 66290.

**KW Vespa Mk2**, mic, handbook; AR88LF, 2m converter; Pye base stn a.m.; class D wavemeter; field strength meter; large operating desk; the lot, £100. Buyer inspects and collects. G3VVO, QTHR. Tel 028 579 2301.

**Standard C146A** tx/rx, channels S20-23, R5, ext spkr/mic, BNC helical fitted, good cond, £105. Colclough, G8ROI, Charlie Troop, Penney Squadron, AA College, Harrogate HG3 2SE.

**Trio 2200G**, S0, S20-24, R4-5, R7, input channel for R5, R7, nicads, charger, auto toneburst, £110. G4CNC, QTHR. Tel 01-363 1653.

**Microwave Modules** transverter, 28-432MHz, incl three BNC plugs, power plug, handbook, spec sheet, circuit diagram, 41dB rx gain, 11W tx output, £90. Whalley, G4DYN, QTHR. Tel Stoke-on-Trent 643354.

**IC215**, 2m, fm, portable, comp with 1-2Ah nicads, S0, S18-23, R3-7, telescopic whip and helical antenna, automatic switchable toneburst, mic, shoulder strap, etc, good cond, £150 ono. Buyer collects. Green-shields, G4FSU, QTHR. Tel Limpley Stoke (Avon) 3215.

**Clear-out by G8HNN:** QQVO3-20As, components, brand-new variable capacitors, 145MHz 0-5W tx strip, lots of items available, sae for list please, good bargains. Brand-new cases, £1 ea. Carr extra. Callers, please tel first. G8HNN, QTHR. Tel Worcester 22704.

**Monitorscope**, 2kW p.e.p., used few hours only, two-tone oscillator built in, £65 ono. G3DNX, QTHR. Tel 061-480 9994, evenings.



**IC22A**, immac cond, 14ch, xtal toneburst, orig packing, manual, £135. Microwave Modules 2-70 high power varactor tripler, 55W input, 35W out, in case, 2m stop filter, coaxial relay, small 12V supply, £35. G8LHW, Tel 0268 742447.

**Tektronix 513D** cro, needs attn; teletypes, 14, 7B, 15; towers, 80ft (medium duty) 50ft (heavy); Creed 75 manual; uncased Garrard SP25 Mk4 turn-table; all offers considered. New BNC plugs, 40p ea. Jackman, 33 Shrubbery Avenue, Worcester, Worcs. Tel 20040.

**Yaesu FT101** tx/rx, cw filter, fan, £300. Matching 2m transverter, £25. Wanted: double beam portable oscilloscope. 500MHz frequency counter. UHF Pye-type radio telephone. G3RQY, QTHR. Tel 0603 42967.

**Aircraft tx**, pair 4X150s in final, 250W cw, needs ps, good basis for linear: with blower, £25; without blower, £20. 2,000-1,500-0-1,500-2,000 0-5A ht transformer, £20. G3IUL, QTHR. Tel 01-890 7091.

**Atlas 180** mobile tx/rx, 160-20m, recent service, SMC, handbook, offers from £250. SAE please. G4COU, QTHR.

**Hallcrafters HT37** tx, 80-10m, 100W, comp, as new cond, £95 ono. G3WKC, QTHR. Tel 0208 3202.

**Telford Communications** model TC7, tunable i.f. 28-30MHz, all modes, wkg, £20. Buyer collects. K. Brown, 165 Canterbury Road, Morden, Surrey SM4 6QG. Tel 01-648 0028, after 7pm.

**AR88LF**, KW One Sixty, manuals, both good order, £60. G4GTA, QTHR.

**Storno Viscount**, preamp, toneburst, S20-22, R6, two control boxes, £45. Creed 7B teleprinter, silencer cover, base, £10. Mains transformer, 0-80-2,560 2,820V at 700mA, £15. 19 set, £8. Telequipment S51A Servoscope, £38. Hartley 13A double beam 'scope, £30. G4EBQ, QTHR. Tel 061-620 7868.

**HRO**, coils, psu, good cond; CR100, good cond; £40 the two. Buyer collects. H. Wall, 14 Aragon Close, Southend-on-Sea.

**2m fm**, 5kHz steps, Kyokuto FM144 - 10SXR-2, toneburst, £140. G3KEF, 71 Lodge Hall, Harlow, Essex.

**Microwave Modules 28/432**, as new, all reasonable offers considered. G4DZP, QTHR. Tel Plymouth 58558.

**FT101B**, G3LLL clipper, vgc, £360. Europa B transverter, little used, £60. Decca KW dummy load, new, £8. 2m 8-el Yagi, £4. 70cm 6-0-6 slot, £5. AR22 rotor, £10. 50ft rotor cable, £6. G3EPE, QTHR. Tel 0253 890467, after 6pm.

**Custom mobile disco equipment**: 100W stereo (quad 303 slave, Milbank modules mixer, G850 cartridges), spkr cabinets, accessories, £285; or exch IC240, FT227R, 2200GX, cash adjustment. All letters answered. Just passed RAE. Lockwood, 36 Davington Road, Dagenham, Essex.

**Microcomputer**, Science of Cambridge Mk14, extra ram, ram I/O device, cassette tape interface, revised latest monitor, ZN425E chip for music, separate keyboard and edge connectors, £55 post paid. G3RDG, QTHR. Tel 01-455 8831.

**Dash mount Storno 600 fm tx/rx**, low band, comp with mic, rx wkg, tx faulty, £25. High band transistor a.m. rx, xtal for 160MHz, comp with handbook, £20. 10m hand-held tx/rx, 3ch, £10. G3UFB, QTHR. Tel St Albans 60134.

**40ft steel lattice mast**, two sections, telescopic tilt-over, comp with base, £50. Minimeter rotator, comp with selsyns, £15. Pair 813s, new, with bases and top caps, £10 pair. UM3 modulation transformer, £4. Two 5U4G valves, £1.50. G3XQT, QTHR. Tel Wolverhampton 764923.

**TS700**, 2m, multimode, immac cond, modified to TS700G standard, £290. Standard C146A, 2m, fm, hand-held, nicads, accessories, £90 ono. Microwave Modules 28-432MHz transverter, £60. GM8BOV, QTHR. Tel 031-331 2755.

**Trio TS500 PS500** 80-10m tx/rx, all valve except vfo, RCA 6146Bs output, orig boxes, mint, £150. Separate VFO-5, £25. Set new valves, incl 6146Bs, £12. Going solid-state. G3OIH, QTHR. Tel Mr Shields, Blackburn 62411, 10am-6pm; or Great Harwood (0254) 886007, evenings.

**CR100 rx**, 60-420kHz, 500kHz-30MHz, in six bands, recently completely overhauled, in good wkg order, very reliable, photocopy handbook, £36. Buyer collects. Allsorts. Tel Longworth (Oxford area) 820166.

**CRTs**, brand-new, 5FP7A, £10 ea; 3BP1A, £8 ea. Electromagnetic focusing coils for 5FP7A, £2 ea. All plus postage. Wanted: good quality LCR bridge; vhf sig gen. G3FYS, QTHR. Tel Highcliffe 3280.

**SB200**, built but never used, linear amplifier, £300. G4EGP, QTHR. Tel 01-428 2797.

**100ft UR21** coaxial, 75Ω, similar to UR57, atten at 144MHz 2-1dB, £6. Xals 10-245MHz HC18U, £1 ea. Valves: QV07-50, new, with ceramic base, £12; 5B254M, £3. Transistors, ex new equipment: 2N3375, £1.50; 2N3632, £2; 2N5102, £3.50. G3UFB, QTHR. Tel St Albans 60134.

**Yaesu FT101E**, 350Hz 8-pole filter, 160m segment 1-8-2-3MHz, listen 2182 distress etc, professionally aligned, all leads, mic, handbook, orig packing, perfect, £450. Europa B, modified to C spec, fitted ±600kHz shift, exc cond, £65. Datong FL1, £40. SP101 spkr, match FT101E, £8. G4FKR, QTHR. Tel 0962 72 557.

**'Scope**: Hewlett-Packard 185B sampling 'scope, dual-trace, plug-in, dc-1GHz, £120 ono; Solartron CD814-2 10MHz, single beam, £30 ono; both with manuals. G8GDA, 42 Forest Road, Worthing, Sussex. Tel 36424, evenings.

**Uniden 2030 fm tx/rx**, fitted five repeater and six simplex channels, £100 ono. FT2FB fm tx/rx, fitted eight simplex, plus R0, R6-7, RRO, £85 ono. NR56VFI fm rx, not xtalld, £25. G8LXY, 126 Puttidge Road, Luton, Beds LU2 8HQ.

**Pye FM25B**, 50W, boot mount, 2m mobile, xtalld, 4ch, £50. Burndept BE357, hand-held, uhf, orig freq, single channel, batt duff, £30. Pye U450L base tx, 5W on 70 cm, 25W on 2m, £20. G8HLJ, QTHR. Tel 051-653 0767.

**Kyokuto FM144-10SA** mobile tx/rx, 145, S20, S22-23, R6-7, toneburst, mic, mount, £100 ono. GM3GRG, QTHR. Tel 041-776 2065.

**HF Trio TS500 tx/rx**, £125. 2m fm Trio 2200GX, 12ch, nicads, etc, £125. Icom IC22A, 15ch for 2m, seven for tripling, £125. Wanted: FT101B, not mint, must work 2m transverter. Orford, G4FRO. Tel Garry, Bristol 426851, day; or 33981, evenings.

**EMI WM7 'scope**, trolly probes, wide-band, dual-trace and high-gain plug-ins, laboratory instrument, £150 ono. Venner TSA333A freq counter/timer, £20. Wayne Kerr universal bridge B221, £25. Philips ac V/m, 1mV-300V, 0-10MHz, £10. Coutant ES50.10, 0-29V 0-5A, psu, £10. AR88D, £50. KW Vanguard, plus 160m, £25. G3OIS, QTHR. Tel Kelshall 378, evenings.

**Heath HW32A tx/rx**, all 20m phone band, also 40m, exc cond, £55. PS, in-built I/s, metered outputs, £30. TX/rx available separately if required. G3WLX, QTHR. Tel 084 46 643.

**Pye Westminster** low band 4m tx/rx, comp with control box, cables, mic, spkr, some valves and xtals needed, £10. 2m converter, valve type, psu, £2. Elizabethan tape recorder, tapes, reels, no mic, £8. G4DUO, QTHR. Tel 01-560 0951.

**KW Vanguard**, 160m conversion, needs alignment, £35 ono. Buyer collects. G3XKZ, QTHR. Tel Wanwick 496449.

**KW E-Zee match**, £15. 18AVT/WB, £25; or exch for good gc rx, 2m colinear, or why? G3RVX, QTHR. Tel Bath 859195.

**Xtals** for ladder filters (ref *Radio Communication*, Feb '79), freqs in range 9-5 to 9-52MHz (HC6U); 10 of any single freq, £1; also 51MHz 2m rx xtals (HC6U), eg 51-9MHz, 35p ea; prices incl p&p. G3YKB, QTHR. Tel 0634 571909.

**FT101**, xtal filter, fan, vgc, £280. GW4FXF, QTHR. Tel 0685 812151.

**Lindley Hood** cassette tape recorder player, comp kit, V/W design, partly assembled, sale due gift new equipment, cost £100 plus, accept £60 ono. Inspection invited. G4ECH, QTHR (Kent).

**KW103** meter, new, £15. Tech TE65 vvm, £10. Wanted: Codar AT5 tx. G3IRM, QTHR. Tel 0284 4318.

**For FT101E**, digital display YC-601, £80; 'scope YO-100, £100; two Stolle mult rotators, used nine months, £30 ea; two 3cm tx/rxs, £10 ea; all carr extra. Blake, G3MWW, QTHR. Tel (0263) 512872, evenings.

**Yaesu FR50B** amateur band rx, 28-30MHz, xtal calibrator, £60. Buyer to collect or pay carr. Tel 0224 51089.

**SB101** 80-10m tx/rx, comp with psu, spkr, mic, cw filter, instruction manual, wiring diagrams, new valves, £230. HRO communications rx, comp with psu, spkr, coil packs, incl bandspread, £40. G4DUO, QTHR. Tel 01-560 0951.

**Microwaves Associates** Gunnplexer, 3cm, new, unused, maker's individual test report, as reviewed *Radio Communication* November, £69. G8APX, QTHR.

**Liner 2 ssb tx/rx**, £100. TR2200, charger, nicads, £95. Storno 500 tx/rx, hand-held, 3ch, R7, R5, S21, toneburst, three power packs, helical and telescopic whips, comp with twin charger, leather case, £85. G8KOM, QTHR. Tel Littlewick Green 2453.

**Trio 666**, as new, boxed, c/w atu, this rx completely realigned January 1979 and better than new, special reason for selling (with regret). Riley, 39 Parkwood Avenue, Esher. Tel 061-980 4357, weekdays; or 01-398 6968, weekends.

**Philips GM5654 'scope**, £20. Marconi deviation meter TF934, £18. Creed TTR3 perforator, £10. 50V psu, £5. Casio calculator AL8, psu, £8. STC components handbooks, 13 volumes, £6. Brimar valve books, three volumes, £2. G3WMO, QTHR (Wembley). Tel 01-903 4363.

**BRT400** gen cov rx, £50. Trio TR2200GX, 6ch, auto toneburst, £130. MEL15 2m pa, £25. MM 2m converter, 2-4MHz i.f., £12. DX100U tx, £30. SB10 ssb adaptor, £20. G3NAP, QTHR. Tel Coventry 464279.

**Trio TS520**, immac, £385. Yaesu FT221R, extra xtals, £357. SEM Europa 2m transverter, £100 ono. Holdings squelch discrim, £35 ono. Realistic all band rx, 2m converter, £100 ono. Tel 05257 4343, after 5.30pm.

**Pye FM10D**, 8ch fitted, R3, R5-6, S20-24, toneburst, exc orig fm set, £75. G4ERZ, QTHR. Tel 0482 856633.

**HW32** 20m ssb tx/rx, 200W p.e.p., £50. G3XAC, QTHR. Tel 0282 38514.

**TR2200G**, batteries, charger, case, 11ch, £100. TAS 5/8 whip, as new, £6. *Radio Communication*, '73-'77, £2 per year. *SWM*, '75-'77; *Practical Wireless*, '74 (less June)-'77; £1.80. G8KLI, QTHR. Tel 021-472 4678.

**FT221R**, fitted preamp, £295. FR50B rx, manual, £55. Will exch FT221R for hf rig. GV4HEO. Tel John, Porth (044 361) 5392.

**Comp stn**, 160-10, all 2m, all modes, FT101E with fm, Europa C with shift, fan, manuals, leads, six months old, guarantees, packing, £600. Buyer collects or pays carr. G3TFN, QTHR. Tel 061-761 2952.

**Rack mounting cabinet**, 19in by 6ft, incorporates mains filter, four 13A sockets, professionally built, in exc cond, £15 ono. Prefer buyer collects. Shack clearance, new and used components, equipment, see for list by return. G3ZIJ, QTHR. Tel 0632 403706.

**Bearcat 210** vhf/uhf scan and search rx, keypad entry, 30-50, 146-174, 416-512MHz, unmodified but instructions on increasing range and sensitivity, service manual and orig boxing, vgc, £170 ono. G8PRR. Tel 01-340 4139, evenings.

**FTDX401**, exc unmodified cond, fitted cw filter, spares, incl two sets valves, two spare new relays, offers please. Burgis, G6FB, 11 Morningside Avenue, Portchester, Fareham, Hants.

**TS700G**, fitted side-tone, mint cond, £370. 2m 6-el quad, good cond, £12. Collection or carr extra. G3UEN, QTHR. Tel 0262 850258.

**600W** linear amp, using 7094 beam tetrode, 80-10m Green and Davis LA600, £150 ono, incl Securicor delivery in UK. G3SRZ, 30 Fore Street, St Blazey, Cornwall. Tel Par (072681) 3375.

**Trio TS510** tx/rx, revalued and fitted external blower, £210. G3MSW. Tel Harrogate (0423) 879202.

**Drake TR4C**, Oskier twin swr meter, Shure mic 444, exc cond, offers. G4BNQ, QTHR. Tel 0532 665831.

**Ancient valves**, over 100, some brand-new, in boxes, may be old enough to interest collector, UX and B4, 5, 7, comp consignment for nominal price. G3TCU, QTHR. Tel Guildford 65607.

**PTC 3831/2X**, 2m, fm, 60W, spares, handbook, £75. PTC 3301/2, 2m, a.m., 25W, spares, handbook, £35. Anglian tx/rx 10-160m, TT21 output, £125; or with 800W linear, £295. Collect or carr extra. G2PU, QTHR. Tel 0223 870454, after 7pm.

**Europa 2m** transverter; 14-el Parabeam; Pye Cambridge, I/band, r/ts, less xtals. Rovardi, G3HSB, 14 Grasmere Avenue, Acklam, Middlesbrough, Cleveland. Tel 0642 86608, after 5.15pm.

**Avo meter model 7**, some ranges need attn, offers? Buyer please collect or pay carr. Stokes, 39 Alder Grove, Lytham, Lancs. Tel 0253 738925, after 6pm.

**HW202**, full xtals, all brackets, for quick sale, £100. Buyer collects. G3HAW, QTHR.

**SHF sig gen** (Marconi Sanders) 6457, 1.2-5GHz, 100mW, 1% freq resolution, int square wave and fm mod, ext mod i/ps, 0.02%/C stability, manual, buyer collects, £60. VHF sig gen (made for services), 96-155MHz, 0.5µV attenuator, built-in calibration, ext xtal socket, separate psu, buyer collects, £30. Pet owners, comp UK repeater listing, with letter i/p identification, jump and status key options, on low noise cassette, £2 incl. Viney, G8KDC, QTHR. Tel Orpington 22443.

**Pye Vanguard** radio telephones, low band and mid band, models PTB 15 AM, and AM 25 HO, less xtals, believed to be in good cond but untested, all comp with public address system, dash-mounted control unit, telephone handset, boot mounting brackets with quick release facility for easy servicing, loudspeaker in heavy-duty enclosure, £35. Carr at cost. CR300, average cond, ideal beginner's rx, wkg but may need a little attn, less psu, first £15 plus carr at cost secures. D. M. Hogan, 7 Valley View, Landkey, Barnstaple, N Devon EX32 0LW. Tel 027183 489.

**Pye high band fm** Cambridge, FM10P, £40; or exch for a.m. Cambridge, high or low band. Feakes, Tel East Stoke (094 92) 230, evenings.

**Yaesu FR101DD** digital rx, fully xtalld, £390. Shure 444T mic, mint, boxed, £18. Heathkit OS1 'scope, manuals, £20. Belcom psu, 13-8V/3-5A output, as new, £15. Tradiper gdo, £5. G3MIN, QTHR. Tel Shoreham (Sussex) 3552.

**Yaesu FRG7** gen cov rx, matching perspex cover, fine tune, mint cond, little used, no mods, instruction manual, orig packing, buyer collects Purley, Surrey, £155. Tel 01-660 8580.

**Yaesu FRSDX400**, £160. FL400, £140. MM 2m rx, d/conv, £30. MM 2m a.m. tx, £25. Heath HW7 QRP rig, no mods, £30. G4CFW, QTHR. Tel Northbourne 5173.

**Trio 2200GX**, S0, S19-24, R3-7, nicads, helical, maker's accessories £575, no offers. G3GHB, QTHR. Tel 0386 792582, evenings or weekends.

**Trio 2200GX**, S0, S19-24, R3-7, nicads, helical, maker's accessories and packing, £130. Avo valve characteristic meter Mk3, good cond, £32. *RSGB Bulletin*, '60-'69, good cond, £15. GW3SFC, QTHR. Tel 0685 874880, after 6pm.

**Microwaves Modules 500MHz** counter, never used, £59. Hudson FM208, tx on 2m, rx not, extras, service handbook, £30. Philips 807 stereo record player, separate spkrs, never used, belt drive, £35. Buyer collects. G8EKO, QTHR. Tel S Benfleet 50781.

**Honda** portable generator, 300E, 240V ac, 13V dc, used less than 10h, £150 plus carr. Icom 202, extra xtals, 144-4 to 144-6, 145-8 to 146, £120. Hughes, G3GVV, QTHR. Tel Tonbridge (0732) 353360.

**Shure 201** mic, £7.50. U450 base tx, £5. Microwave Modules 500MHz counter, £60. UHF c/o relay, 12V, £4. Pye Cambridge spares. Swap: IC215, 12ch fm; for IC202, ssb; or sell, offers? G8BWR, QTHR. Tel 0926 498388.

**Atlas 210X** hf tx/rx, 200W p.i.p., £390; its own d/frequency counter, doubles as fine test counter, measures up to 40MHz, £100; with psu, £520; superbly sensitive rx. G4GPL (Elstree). Tel Alan, 01-953 6921.

**Hudson FM120** base stn, tx on 2m, rx needs modding for 2m, £60 ono. Barking R&ES. Tel 01-829 4266, day; or 01-594 6584, evenings.

**18AVT**, £25. Tel 01-804 5249, evenings.

**FV101**, as new, £60 ono. G3LLL rf clipper for FT101 series, £18. G3KNA, QTHR. Tel 0274 873122.

**Standard C146A**, 5ch, helical, £95. Liner 2, £85. SSTV monitor, less scan coils, not tested, £15. ELC2000S tuner, never used, £5. G8KEH, QTHR.

**AR10 28-30MHz** module, a.m., fm, ssb, nearly new, £25. Pye base stn rx, single channel 145MHz, buyer collect, £15. D. Seymour, 60 Winwick Place, Westwood Estate, Peterborough. Tel 0733 268135.

**Mains transformer**, 1185-0-1185V, 360mA, potted, ideal linear, new, boxed, £15 incl p&p. Belling Lee rf interference filter, mains 250V 30A, cost £70 when new, £15 plus p&p. G3SEF, QTHR. Tel Cheslyn Hay (0922) 415369.

**Liner 2**, fitted preamp, cw mod, pip-tone, mobile mount, handbook, £110. S. Fox, DST 18 Student Squadron, RAF Locking, Weston-super-Mare, Avon BS24 7AA.

**Yaesu FR50B**, full 10m plus 160m, 100kHz calibrator, all mods by Lowe, immac cond, hardly used, £60. Carr at cost. A. C. Bryant, 21 Briarfield Road, Gosforth, Newcastle upon Tyne NE3 3UE.

**FT200/FP200** tx/rx, spare valves incl 6JS6C, 7360, £295; Shure 444 mic, £20; FRSDX400 all mode rx, 2m and 4m converters, £175; Liner 2, PA3, £110; all mint, orig packing. G2BUP, QTHR. Tel Faulkland (037 387) 432.

**HW8**, 80-15, QRP, cw, matching psu, little used, £110. Pye PTC3302 a.m. base stn tx only, no case, manual, £15. Buyer collects. G4FMC, QTHR. Tel Colleshill 64824.

**Pair of tx/rxs**, all-transistor Cadre 515 5W a.m. two-way radios, on 10m, five xtal channels, volume, squelch, dynamic mic, 240V ac 12V dc, pair of xtals in each set, £45 the pair. SAE enquiries; carr extra. G4DFE, QTHR.

**Pye RTC** controllers, wkg order, no mics, 240V, £10 ea. Pye vhf a.m. rxs, type PTC3004 and TCL 102, comp except xtals, 240V, £10 ea. Electrical parts for Creed Envoy (pcb). G8MXX, QTHR. Tel Reading (0734) 83596.

**B40C** rx, handbook, £25. KW Vanguard, 160-10m, £25. KW E-Zee watch, £25. KW101 swr meter, £10. Buyer collects. G4AEF, QTHR. Tel Wokingham (0734) 784954, after 6pm.

**Trio 2200GX**, fitted 9ch, R3-7, S20-23, nicads, charger, exc cond, £135. Buyer collects. G4HFT. Tel Glos (0452) 33698.

**Trio 7010**, preamp, mobile mount, etc, in immac cond, £145. G4DFX, NOT QTHR. Tel 01-560 7450.

**B2** cw tx/rx/pp, comp, £35. Pair 813 valves, £3. Bauer keyer paddle, £4. Advance E2 sig gen, £8. G3VW, QTHR. Tel 01-205 1443.

**Pye Cambridge U10B**, 6ch, control, spkr, toneburst, mic, xtalld on 433-2, RB14, £50. BC221 mains psu, charts, £18. Prefer buyers collect. *Wanted*: FRG7, no mods, and FL1. G3VWWJ, QTHR. Tel Cambridge (0223) 880101.

**7E/RP** teleprinter, 6S6 auto tx, ps/control unit, comp, £35. Telequipment amplifier, plug-in unit 43B, £10. Carr/collection by arrangement. G3TND, QTHR. Tel 027 587 2241, after 6pm.

**HW101 Deluxe**, matching psu, Heath spkr, as new, perfect, £200. Rotron Muffin fan, 230V, 4in square, £3. Johnson rotary coil, approx 30µH, new, £5. 813 fil transformer, 230/250, 10V CT 10A, 10V CT 8A, £4. Postage extra; cash preferred; see enquiries. G3JJM, QTHR.

**Burns TC101** wavemeter, £30; SWR50 swr/pwr meter, £5; PA7 2m preamp, £2; Bantex 5/8 2m fibreglass whip, £5; all buyer collects or plus postage. G8JWX, 11 Beamsley Grove, Leeds 6.

**X-band** radar rx, klystron, diodes (coaxial), t/r switches, waveguide block, min crt W916 I/P, £30 ono. Pye ssb 125T, 20m xtals, 80m vfo, ac psu, mic, handbook, spare filters, £65. TR123 spy set, 2-5-20MHz, 25W rf, ac psu, £20. *Wanted*: HQ1 Minibeam, AR40 rotator, comp. G3ZDG, QTHR. Tel 0386 792933.

**FT221**, xtals, £290. MM144/432 transverter, £100. FL2100B hf linear, £270. 400W 12 dc-250 ac inverter, £40. FL110 12V 200W hf linear, £100. 4m transverter for 101, £40. Vibratrol FL80 2m amplifier, £60. Sig gen, £10. *Wanted*: HT transformer, 2kV QRO bits, why? G4CXL, QTHR. Tel Weybridge 43267.

**KW2000B**, good cond, £175. G3TVO, QTHR. Tel Shoreham-by-Sea 4107.

**PF5**, wkg, £55. UHF Westminster, xtalld RB2, £85. SF1, 70cm, £45. QM70 70cm transverter, £70. Telequipment S54A 10MHz 'scope, £140. SP600 hf rx 5-54MHz, £110. Garrard SP25 deck, £20. 35mm auto camera, £35. G3PLX vdu, comp tx/rx, kbd, £140. G8HVO, QTHR. Tel Pagham 5220.

**TS515**, VFO5S, PS515, cw filter, manual, all leads, recently overhauled, vgc, £275. FT221RD, 3N204 preamp, six months old, immac, £325. Datong rf clipper, £27. CMOS keyer, incl squeeze paddle, £15. G4AAQ. Tel Knottingley (0977) 86213, after 6pm.

**HRO**, incl coils, £25. Codar CR70A gen cov rx, headphones, calculator, antenna, £25. MMC 2m converter, vgc, £15. Homebrew 2m converter, £8. R1392 vhf rx, psu, £6. Many ancillary units, offers. Tel Leamington Spa 313009.

**Trio TS510** tx/rx, 80-10m 160W i/p, cw/ssb, 500Hz cw filter, very nice cond, £185. Prefer buyer collects. Easdown, G4HIZ. Tel Medway (0634) 47786.

**Codar CR70A Mk2** gen cov rx, matching preselector, spkr, suit swl, as new cond, buyer collect please, £35. ST5 rty terminal unit, fsk/afsk oscillator, first class cond and order, £28. G3KZU, QTHR. Tel 0865 63000, evenings.

**TS700**, £290. Two TF1066 vhf sig gens, not wkg, offers. MMC144/432 converter, £15. TV camera cable, approx 200ft, offers. Datong RFC/M, £20. Xtals for KP202, R5-7, £3 per pair. Tel Chelmsford (0245) 66776.

**FT101B**, never used mobile, cw filter, £330; no exchanges. G4BJZ, QTHR. Tel 021-706 4000, evenings.

**Spy set** tx/rx Mk123, 2-5-20MHz, size 1½ by 3½ by 5½in, tx xtal controlled, 25W output, mains or 12V dc, cw only, manual, £45. G4HOH. Tel 0246 38249.

**Vinten MTR20** mobile radio telephone, QQVO3-20, 25W output, xtals channel R4, £80. CR100 rx, £20. Buyer to inspect and collect. G8EJR, QTHR.

**20m for £157** All components, except case, for direct-conversion rx, Jan '78 PW, all new and unused, reason for sale—purchase FR50B, £15 ono. G. Roberts, "Maesymellion", Llangadfan, Welshpool, Powys SY21 0NW.

**TS900**, PS900, £550 ono. Delivery to be arranged by purchaser. G4FDW, QTHR. Tel Eastbourne 31620.

**FM tx/rx**, Belcom FS1007P, 10W, scanning 16ch, 220V ac/12V dc, fitted digital clock, in exc cond, will deliver if necessary, £140. G8MEO, QTHR. Tel 0632 665568, evenings.

**Yaesu FT620b**, 50-54MHz, xtal marker, Modular Electronics 10W 70cm transverter, 432-50-10, both vgc, used as second rig, orig packing, carton, manual, £275. Tel 0305 834017.

**Sphinx** ssb/cw tx, 160/80/20m, 60W p.e.p., £30. Panda Cub a.m./cw tx, 160-10m, £25. Trio 9R59DS rx, £50. Buyer collects. G4EPO, QTHR. Tel St Albans (0727) 59789, evenings and weekends.

**FT101B**, 160-10m, fan, cw filter, £350. K. McDermott, 5 Rannoch Close, Stewarton, Kilmarnock KA3 3HS. Tel 05603 4182, evenings.

**Liner 2**, preamp, psu, etc, £110. FL1, £35 ono. G3LLL clipper for FT101 Mk1, £25 ono. Philips N4307 four-track tape recorder, £20. **Wanted:** FV101. G3XTT, QTHR. Tel 0604 37894.

**Racal RA17**, matching preselector; new TTC swr/pwr meter, separate meters; £220 comp. G3OJR, 190 Victoria Avenue, Hull HU5 3DY. Tel 0482 43353.

**Standard C146A**, 2W portable tx/rx, case, helical whip, telescopic whip, nicads, charger, 5ch, fitted S20, S22, good cond, £100. Pye Cambridge, dash-mount AM10D, converted for fm, 6ch, toneburst fitted, £50. G8NZC, QTHR. Tel 051-648 5502.

**HW32A** 20mt ssb tx/rx, mint cond, comp with ac psu, spkr, £70. SP101B spkr, £10. **Wanted:** KW2000. G8RFJ. Tel Tom, Rotherham 874100, evenings and weekends.

**Sinclair PDM35** digital multimeter, dc volts, dc current, ac volts, resistance, unmarked. £20. Xtals: 452-51kHz, B7G case; 4433-681kHz, wire ends; 459-000kHz, two-pin; £1 ea. Ex-WD 500µA 2½in meter, £1. All post free. G3RDC, QTHR. Tel 01-455 8831.

**Yaesu FRG7**, new October '77, comp with Partridge UFA System A antenna, exc cond, unmodified, handbook, can deliver to Manchester free, the lot £150. Owner graduated to FT101E. Tel Belfast 621148.

**FT75B**, FV50C, FP75B, DC75B, in very clean cond, new pa tubes, £200. **Wanted:** Joystick antenna, comp. GW3QN, QTHR.

**Trio 9R59DS** gen cov rx, amateur bands bandspeed, exc cond, partially re-valved incl int spkr, handbook, £55 ono. KW201 amateur rx, £90. Andrew Wilkes, "Dr Winterbottom Hall", Grosvenor Road, South Shields, Tyne & Wear. Tel Norwich 897530.

**FT221R**, used few hours only, comp with all accessories, in orig packing, £320. Portable antenna tester, by Seco Electronics USA, rf power 0-5-1,000W swr calibrated 3-5-180MHz, exc job, manual, £25. G5FH, QTHR. Tel 0425 25974, evenings.

**FT2F**, all accessories, fitted S0, S20, R6-7, 144-48, 144-6, first class cond, £85. Heathkit RA1 amateur bands rx, xtal calibrator, fm discriminator, matching i/s, first class cond, £35. G3VGY, QTHR. Tel 09845 62113.

**10Y/2m 10-el Yagi** Jaybeam, Stolle 2030 rotator, R2100 ballrace, 60ft coaxial and rotator drive cable, sectional steel mast with fittings for house-end mounting, can be seen wkg in situ at G5SG, can be dismantled in two hours, buyer must collect, £75 ono. G5SG, "Old Forge", Longparish, Hants. Tel Longparish 316, evenings.

**Quad 22**, two Quad 11 amplifiers, £100. Pair Quad electrostatics, £200. Gilding GL75, £30. **Wanted:** Steel cored copper wire for quad antenna; 18AVT vertical; Datong UC/1. G4EKO, QTHR. Tel Yelverton (Devon) (082 285) 3320.

**TR3200** 70cm portable tx/rx, fitted xtals for all UK repeaters, plus three simplex, nicads, charger, helical whip, 12 months old, £150 ono. G8OQT. Tel John 01-902 9143.

**Advance** oscilloscope, type OS2100, OS2002Y and OS2005X plug-ins, 0-25MHz, all solid-state; exch for colour video recorder, wkg or not; cash difference where applicable. G3ZDB, QTHR. Tel Epsom 24814.

**FRG7000**, mint cond, manual carton, Microwave Modules 432 and 144 converters with regulated psu, £265; or p/exch FT101E. CR100, manual, £25. Davies, 54 Sharpshoe Road, Barton, Beds. Tel Luton 881323.

**TS700**, in mint cond, £290 ono. Will deliver reasonable distance. G3NPJ, QTHR. Tel 051-648 6389.

**KW swr meter**, £5. E-Zee match, £15. AR40 rotator and control unit, unused, £40. G3TTJ. Tel Warminster (Wilts) 212779.

**KWM-2**, late "round emblem" series, manual, mint cond, hardly used, owner's standby, new, boxed, Yaesu FC901 atu, SP901 spkr, £110. Johnson Matchbox, £50. Heathkit SB610 monitor, £50. R4C mod kit; 1-5 filters; 10 and 160 xals. G3DAM, QTHR.

**Trio 2200G**, fitted 7ch, nicads, helical, £100. Yaesu FT2 auto, fitted 8ch, preamp, £130. 40ft steel tower, £40. 2m Parabeam, 14-el, £12. 70cm Parabeam, 18-el, £10. G3JTC, QTHR. Tel 01-894 7249.

**KW204**, ruggedized vox, 6146B pas, Decca serviced, fb cond, manual, £200, no offers. Collect. G3KX, QTHR. Tel East Dean 2212.

**KW2000**, ac psu needs transformer/rewire, spare 6146, £85 ono. G3JLZ, QTHR. Tel Weston-super-Mare (0934) 28633.

**Icom IC701**, as new, £755. Etek digital readout unit for R4C, T4XC, £75. G3AZT, QTHR. Tel 0865 390 598.

**KP202** hand-held 2m tx/rx, S20-22, S0, S24, R6, comp with 1/4 whip, helical and carrying case, £80. GW3WSU, QTHR.

**RA1** amateur band rx, xtal calibrator, matching ls, handbook, £40; MMC144/LO 2m converter, 28-30MHz out, £14; Pye Ranger, £3; Bush TV125U, dual standard, £3; 8MHz xtals, S0, S22, 8-99MHz, £1 ea; or the lot, £55. G8KYU. Tel Luton 29164.

**Heathkit HW8** low power tx/rx, beautifully wired to full professional standard, wkg perfectly, IRT mod included, only three months old, absolutely as new in all respects, £105. G3KLF, QTHR. Tel Ipswich (0473) 310442, weekends or evenings only.

**Sommerkamp FTD500**, good cond, manual, £230. KW2000A, ac supply, Shure 201 mic, manual, good cond, £150. Hammarlund HXL-One linear, pair 572Bs, good cond, very rugged version of SB200, £165. May haggle. G3XPM, QTHR. Tel Richard, Harrogate 871723.

**TS700G**, boxed, mint, £350; exch, similar FT101B. 2m linear (QQVO6-40), largely assembled, neat case, ac psu, £21.50. 2m 6-el Yagi, four 10ft sections mast, £13.50; ditto, two 12ft sections, light mast, £7.50. 4m 3-el, 14ft mast, £7.50. Please collect. Kokusai filters: MF-455-10K, £13.50; MF-455-30W, £4.50. Rotary coil, counter, £4. Neat nuvistor converters, 2m (4-6MHz), 4m (2-1-2-7MHz), 240V ac, £6 ea. New 6CW4 nuvistors, bases, £3. H/B swr bridge, £4.50. Xtals, 8007-69 (10X), 6010 (10XJ), 7010 (10XJ), 65p; others. Postage please. G2HCV, QTHR. Tel 01-954 2960.

**Hallcrafters 8236** valves, £15 ea. G3UUI, QTHR. Tel Southend-on-Sea (0702) 64485, after 7pm please.

**Yaesu FT101E** tx/rx, mint cond, almost new, ssb and cw filters, mic, manual, all leads, £520. Heathkit HW12A 80m ssb tx/rx, HP23 psu, mic, handbooks, £120. G3VY, QTHR. Tel Evesham 45497.

**Eddystone 940**, in vgc, £120 ono. M. A. Taylor, 5 Hawford Avenue, Comberton Estate, Kidderminster, Worcester DY10 3BH.

**WANTED**

**Telescope**, up to 4in refractor, and/or 8-10in reflector. Also good quality binoculars, magnification 7-12X. Object glass 50-70mm. Details. Holden, GM4MF, 3 Hodge Street, Falkirk. Tel Falkirk 24832.

**Transverter** 28/144 28/70. 2m HC6U xtals. FM Cambridge or Vanguard, multi-channel preferred. VHF tx/rx. Good gen cov or ham band rx. LF band tx/rx. Vertical multi-band antenna. Write: S. Baskfield, 46 Golborne Avenue, Meir Heath, Stoke-on-Trent, Staffs.

**Recording barograph**, must be in 100% wkg order, with readily available charts and pens, etc; alternatively name and address of makers and/or suppliers. G4CGS, QTHR. Tel Bradford (0274) 881605, weekends only.

**Noise blanker** for KWM2 (Collins 136B-2), or info to enable homebrew. Details please. G3FZG, QTHR. Tel Penketh 2403.

**Handbook** and servicing information for National NC183 rx, buy or borrow. A. Allen, 19 Sunny Grove, New Costessey, Norwich, Norfolk.

**R216** rx; also R209. John Pryor, c/o G5YC QTHR. Tel 01-368 5712.

**Linear amp**, SB220 or similar, state cond and price. Letters please. GM3AVA, QTHR.



**Seimens G12** marine rx. G4BLZ, 1 South Place, Lee-on-Solent. Tel 550721.

**SR9**, SMC HF12, or other vhf, fm, 2m rx, with xtals, vfo, squelch. Tel 021-445 2842.

**AR88D**, in good radio and mechanical wkg cond, with spares, details. McAdam, G13TPE, 1 The Vines, Erinvale, Belfast 10.

**QSL card display strips**. GM4GUA, QTHR. Tel John, 041-956 1366.

**Trio VFO30G**, in good cond. G3PIN, QTHR. Tel Penkridge 2472.

**"Wireless World and Radio Review"**, bound volumes prior to 1931, for reference library of technical historian, good price paid for volumes in good cond, all letters answered. G8AMJ, QTHR.

**FRG7**, must be mint cond, no mods. Tel David, Hornchurch 55733.

**KW2000A** 12V dc psu. G6WA, QTHR. Tel 0480 63088.

**One 5-LT-01** 24h clock display, and one 35pF per section split stator wide-spaced capacitor. G3ARU, QTHR. Tel 01-989 3196.

**Veteran swl** begs loan handbook and/or circuit diagram Eddystone 840C. J. Gay, 14 Springfield Avenue, Holbury, Southampton SO4 1LP. Tel 0703 891284.

**Postally used pre-1946 QSL cards**, by collector, any cond, particularly Australia, New Zealand, Malaysia, Singapore and former Dutch East Indies, postal charges refunded. Symonds, "Rosedene", Rush Green Road, Clacton-on-Sea, Essex CO16 7BL.

**SOE or Resistance** type suitcase sets (post-1940) for collection, anything similar considered, incl instruction manuals, incomplete or damaged sets, any items for spares. Taylor, G3UCT, 27 Glen Road, Fleet, Hants GU13 9QS. Tel Fleet (02514) 6998.

**TV camera**, modern transistor type preferred, must be comp with lens and in wkg order, up to £100 paid for suitable unit, state details and price. G8IHP, QTHR. Tel Sheffield (0742) 57189, evenings or weekends.

**RSGB "Handbook"**, first and second edns; *Admiralty W/T Handbook*, Vol 2 1938; any pre-1950 radio books, any cond. G3OQF, QTHR.

**Repairable KW Vespa** or 2000 or Atlanta, severe electrical faults no problem, but good mechanical cond please. GM3HAT, QTHR. Tel 0224 36004.

**Trio JR310**, or similar, any cond but in wkg order, manual; anything considered. Tel Ralph, 031-551 1706, evenings; 059 984 260 until 16 April.

**For collection**. Resistance, SOE, spy etc type tx/rxs, post 1940, as follows: A Mk3, B2, BP5 (or T5), AR2, No119, No122, No123, No128, any similar sets; separate and/or damaged items considered for spares. Taylor, G3UCT, 27 Glen Road, Fleet, Hants GU13 9QS. Tel Fleet (02514) 6998.

**HW100**, HW101, or similar rig, with psu, etc. Also cw filter for FT101E. Please write, all letters answered. G4CJB, QTHR.

**Bantams**, fm or a.m., hb or 2m. *For sale*: two Bantams fm/lb; two Storno CQP532s fm/lb; £20 ea; or £75 the lot. GU3HKV, QTHR. Tel 0481 47278, 6-7pm Monday-Friday.

**Tower and winch**, any height, part or comp, everything considered. Also MM transverter 432/144R and amateur bands rx, or similar. G3UGF, QTHR. Tel 0274 814218.

**Postally used QSL cards**, from early 'twenties to 1950, by collector, must be in clean, unburnt cond, fair price offered, especially for cards from exotic dx locations, what have you? G3BDQ, "Whitefriars", Friar's Hill, Guestling, Hastings, East Sussex.

**Two 6GE5** valves, for Heathkit HW32A tx/rx. GM4BGA, St Andrews University ARS, Physics Dept, North Haugh, St Andrews, Fife.

**KW204**, with vox if possible, in good wkg order. G4GVH, QTHR. Tel Winchester 882317.

**Young enthusiast** requires 2m converter, 6-8MHz i.f., 12V, in good cond. Tel Penkridge 2860.

**Eddystone EA12**; also FT101B or FT101E. *For sale*: KW600 linear. G4BIU, QTHR.

**Manual**, circuit diagram, Trio JR500S amateur bands rx; manual, circuit diagram, Magnavox TM840 reel-to-reel tape recorder; beg, borrow, buy. C. Antwis, 18 Park Lane, Frodsham, Warrington, Cheshire WA6 6RY.

**Trio JR59DS**; Yaesu FR50B; for father and 12yr-old son, just started listening, must be in good cond, reasonable prices. Tel Mansfield 35945, after 5pm.

**VFO-900**, VFO-900, VFO-900, by Trio, your price paid for unit in as new cond, comp with manual. G3JVC, QTHR. Tel 01-398 0939.

**DC (mobile) psu** for KW2000A/B; hf or 10m only mobile whip. G3YRU, 5 Quarwood Cottages, Stow-on-the-Wold, Glos. Tel 0993 830842, evenings.

**RX for 4m**, in wkg order, manual, circuit diagram, if possible. Locals only. Brown, Canterbury Road, Morden, Surrey. Tel Kim, 01-648 0028, after 7pm.

**O/P textbook**, *An introduction to counting techniques and transistor circuit logic*, author K. J. Dean, publisher Chapman and Hall, list price paid for mint copy. G3TCS, QTHR. Tel 0422 60321.

**Valves**, 6BV8 and 6AW8A, one of ea; also mains transformer for HQ180, input 220/240V. G3FVG, QTHR. Tel 01-699 1642.

**Good class rxs**, 1-30MHz, also 20-170MHz or similar cov, with comp manuals, psu, in good cond and wkg order, for swl. Due to ill health confined to house, will pay delivery. Also to buy/borrow or photocopy, comp manual for Trio JR60 rx. All cost refunded. Details, price. Trail, 49 St Andrews Gardens, Dalry, Ayrshire. Tel 3426.

**RXs**: RAX-1, BC969A, BC314, BC344, Collins R389. Loop antenna, type C or type B. Multimeter, type CT471C. Modern rx for 10-600kHz. Circuit for adaptor frequency range No 1. Passfield, 144 Gilmore Road, Lewisham, London SE13. Tel 01-318 5290.

**Circuit diagrams** for Pye Ranger, Cambridge and Bantam. Will refund postage. GW8LXO, c/o A. Tait, 3 Thornbury Park Avenue, Plymouth, Devon.

**Telequipment S51** or D52 'scope, need not be in wkg order. Manual for Avo sig gen CT378A, purchase or loan to copy. F. W. Mulford. Tel 01-764 6207.

**Drake twins T4XB, R4B**, or T4XC, R4C, AC4, MS4, must be good cond and appearance; also L4B and Datong FL1. *For sale*: Trio 520, cw filter, vgc/a; Yaesu FR101, all options. G3ASM, QTHR. Tel Stockton 583001.

**Heath SB303** rx; HP23 ac supply; exch or sell NEC P2200E, fitted S20-23, R3-7, plus accessories. GM3MQO, QTHR. Tel 0292 79245.

**Hy-Gain TH6DXX** antenna. QRP tx/rx, not hb. Ten-Tec or similar for cw and ssb. Spacemarc ETM3C keyer, will consider others. Coaxial cable, over 20yd lengths, for 400W. All replies acknowledged. G4DXC, QTHR. Tel Bingley 3289.

**E20** for that redundant RY-4 teletype board in your Drake SPR-4 rx, easy to remove and will not affect normal listening of cw, ssb or a.m. Cassidy, G3HSW, QTHR. Tel 06614 3676.

**KW** antenna tuning system 109. G2BJL, 3 Hillside View, Brierfield, Nelson, Lancs BB9 5DO. Tel Nelson 62239.

**TS700** or FT220; also VFO30G; state cond and price; will collect within reasonable distance; all letters answered. G8RGJ, 64 Harts Road, Ward End, Birmingham B8 3JZ.

**Pye F27** a.m. low band tx/rx manual, or any service information, will buy or hire and copy. Syms, 15 Bengairn Avenue, Brighton BN1 8RH. Tel 0273 506141.

**Heath vfo**, SB100, or faulty tx/rx. Collins PT osc. Xtals: 27-7-28-000, 35-400, 1,399-7. Cabinet for 19 by 10 1/2 panel, 14in deep. Glynrafon, Bontnewydd, Aberystrwyth. Tel 097 421 608.

**Icom IC201**, Yaesu FT220, or similar 2m multi-mode. G. R. Kelman, 61 The Fairway, Oadby, Leicester.

**For the Wireless Museum**: pre-war tx, rx, valves, spkrs, valve-tester, old wireless books, catalogues, magazines, QSL cards, Voight corner horn, HMV dog "Nipper", collection arranged, details please to hon curator. Douglas Byrne, G3KPO, QTHR. Tel Shanklin 2586.

**Creed model 75**, for rx only, suitable for rtty Murray code. Sadler, G4FAJ, QTHR (Staffs). Tel 054 33 2169.

**FLDX400** or similar hf tx, no mods please. *For sale*: Pentacon 500mm, f5-6, big telephoto, leather case, £60. G3MBN, QTHR. Tel Bath (0225) 810621.

**Help with R1471** rx (ref 10D/1465), any information, circuit diagrams, etc., up to £5 paid for purchase or loan. G8MEO, QTHR. Tel 0532 665568, evenings.

**Somewhere** there is a tx/rx in poor cond, it may well have severe electrical faults, or even lack its ssb filter and require rebuilding; what have you? G3SYC, QTHR.

**Three capacitors**, Pyranol 4µF 6kV dc wkg; two wirewound resistors, 50kΩ 85W. G3VWR, QTHR. Tel Bembridge (098 387) 3493.

**For Trio JR310**, 10AZ type mechanical filter and matching transformers. Also manual, circuits, any info for TW Communicator. All letters answered. Mrs M. Walker, 182 Norman Street, Cotmanhay, Ilkeston, Derbs DE7 8NR.

## Looking ahead

**22 April**—NRSA Radio & Electronics Exhibition, Belle Vue, Manchester.

**11-12 May**—RSGB Amateur Radio Exhibition, Alexandra Palace, London.

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

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

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

**30 September**—Sixth Welsh Amateur Radio Convention, Blackwood, Gwent.



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144.480	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	e	c	e	e	e	e	e	e	e	e	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.000/R0T	a	b	a	c	c	a	a	b	b	c	a	a	c	c	e	e	e	e
145.025/R1T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.050/R2T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.075/R3T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.100/R4T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.125/R5T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.150/R6T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.175/R7T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.200/R8T	a	b	a	e	e	a	e	b	e	e	e	e	e	e	e	e	e	e
145.300/S12	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.350/S14	e	e	e	c	e	c	c	c	c	c	c	c	c	c	c	c	c	c
145.400/S16	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.475/S19	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.500/S20	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
145.525/S21	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
145.550/S22	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
145.575/S23	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
145.600/R0R	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
145.625/R1R	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.650/R2R	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.675/R3R	e	e	e	c	c	e	b	e	e	a	a	e	c	e	e	e	e	e
145.700/R4R	e	e	e	c	c	e	b	e	e	a	a	e	c	e	e	e	e	e
145.725/R5R	e	e	e	c	c	e	b	e	e	a	a	e	c	e	e	e	e	e
145.750/R6R	e	e	e	c	c	e	b	e	e	a	a	e	c	e	e	e	e	e
145.775/R7R	a	b	a	c	c	a	b	b	e	a	a	e	c	e	e	e	e	e
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### CRYSTALS FOR THE BRITISH 70CM CHANNELS

Due to the much higher multiplication involved (3 times that on 2m) all our stock 70cm crystals are to much closer tolerances than our standard amateur range. We are stocking the following channels RB0 (434-60/433-00), RB2 (434-65/433-05), RB4 (434-70/433-10), RB6 (434-75/433-15), SUB (433-20), RB10 (434-85/433-25), RB14 (434-95/433-35), SU18 (433-45) and SU20 (433-50)—TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U105), Pocketfone (PF1) and STORNO CQL/COM 662 all at £2.32 (£2.61). For the U450L Base Station we have the TX crystals for all the above channels £2.32 (£2.61). The RX crystals for the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SU12-433-30-RTTY, SU16-433-40 and SU22-433-55) for all the above equipments are available at £3.92 (£4.41) to amateur spec or £4.64 (£5.22) to same spec as stock items. Delivery approx. 4/5 weeks.

### 4m CRYSTALS FOR 70-26MHz—HC6/U

TXH-7825MHz and RX6-7466MHz or 29-7800MHz £2.32 (£2.61).

10-245MHz "ALTERNATIVE" I.F. CRYSTALS—£2.32 (£2.61). For use in Pye and other equipment with 10-7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145-0MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U, HC13/U and HC25/U (Low loss) 16p each (18p). 10p P. & P. per order (P. & P. free if ordered with crystals).

### CONVERTER/TRANSVERTER CRYSTALS—HC18/U

All at £3.00 (£3.37), 39-6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz (144/2), 95MHz (342/52), 96MHz (1,296/432/144), 101MHz (432/28), 101-50MHz (434/28), 105-6666MHz (1,296/28) and 116MHz (144/28).

### CRYSTALS MANUFACTURED TO YOUR SPECIFIC REQUIREMENTS

Prices shown are for one off to our amateur specs; closer tolerances are available. Please send us details of your requirements.

### A Low frequency fundamentals in HC13/U or HC6/U

	Adj. tol. ±50ppm	Temp. tol. ±100ppm 0 to +70°C
6-0 to 19-999kHz	£28.12 (£31.63)	80 to 99-999kHz £7.30 (£8.21)
20 to 29-999kHz	£17.75 (£19.97)	100 to 149-999kHz £6.68 (£7.51)
30 to 59-999kHz	£15.51 (£17.45)	150 to 499-999kHz £6.20 (£6.97)
60 to 79-999kHz	£12.41 (£13.19)	500 to 799-999kHz £7.30 (£8.21)

### B Mid frequency fundamentals in HC6/U, HC18/U or HC25/U

	Adj. tol. ±20ppm	Temp. tol. ±30ppm -10 to +60°C
+800 to 999-9kHz	£9.50 (£10.64)	* 0-0 to 5-999MHz £4.24 (£4.77)
* 1-0 to 1-499MHz	£9.40 (£10.57)	* 6-0 to 20-99MHz £3.92 (£4.41)
* 1-5 to 2-599MHz	£4.24 (£4.77)	* 21 to 24-99MHz £6.48 (£7.29)
* 2-6 to 5-999MHz	£3.92 (£4.41)	25 to 27-99MHz £8.88 (£9.99)
* 6-0 to 3-999MHz	£4.96 (£5.58)	28 to 30MHz £9.68 (£10.89)

### C High frequency overtones in HC6/U, HC18/U or HC25/U

	Adj. tol. ±20ppm	Temp. tol. ±30ppm -10 to +60°C
* 15 to 20-99MHz (3 O/T)	£4.24 (£4.77)	
* 21 to 63MHz (3 O/T)	£3.92 (£4.41)	
* 60 to 62-99MHz (5 O/T)	£4.88 (£5.49)	
* 63 to 105MHz (5 O/T)	£4.48 (£5.04)	
* 105 to 125MHz (5 O/T)	£5.84 (£6.57)	
125 to 180MHz	£6.48 (£7.29)	
180 to 250MHz	£10.54 (£11.86)	

\* Delivery Normally 4/6 weeks (express available)—all other frequencies 6/8 weeks.

Holders—Low frequencies HC13/U or HC6/U dependent on frequency.  
Mid and High frequencies are available in HC6/U, HC18/U or HC25/U unless marked + only available in HC6/U or p only available in HC18/U and HC25/U.  
HC17/U (replacement for FT243) and HC33/U (wire end HC6/U) available as per HC6/U above at 25p (28p) extra on HC6/U price.

Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

### TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS

100kHz in HC13/U and 455kHz in HC6/U, £2.95 (£3.19).  
1MHz and 5MHz in HC6/U and 10MHz and 10-7MHz in HC6/U and HC25/U, £2.80 (£3.02).

### CRYSTALS FOR PROFESSIONAL USE

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30-7pm and ask for Mr. Norcliffe.

### CRYSTALS FOR LARGE QUANTITY COMMERCIAL USERS

We can supply crystals for commercial use, e.g. TV or computer crystals, etc. at very competitive prices. Please let us know your requirements.

### EXPRESS SERVICE

Many types of made-to-order crystals are available on our "EXPRESS SERVICE"—with delivery of three days on our class "A" service. Telephone or Telex for details.

TERMS: CASH WITH ORDER—MAIL ORDER ONLY—S.A.E. WITH ALL ENQUIRIES—PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED—OVERSEAS CHARGED AT COST.

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**MML432/100**

10 WATTS IN—100 WATTS MIN. OUTPUT

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### SPECIFICATION: MML144/100

Power Output	: 80 watts minimum RMS output 100 watts RMS typical
Power Input	: 10 watts nominal for 80 watts output
Frequency Bandwidth	: 144–148MHz @ –0.5dB
RF Input Connector	: 50 ohm BNC
RF Output Connector	: S0239
Power Requirements	: 12.5V nominal @ 12 amps for 80 watts output. 13.8V maximum.
Weight	: 4kg (8lb 13oz)
Overall Size	: 315 × 142 × 105mm (12½ × 5½ × 4½")
Price	: £124 + VAT (£139.50 inc. VAT)

### SPECIFICATION: MML432/100

Power Gain	: 10dB minimum
Power Output	: 100 watts RMS output @ 1dB compression
Power Input	: 10 watts nominal for 100 watts output
Frequency Bandwidth	: 435MHz ±15MHz @ –1dB
RF Input Connector	: 50 ohm BNC
RF Output Connector	: 50 ohm 'N' Type
Power Requirements	: 12.5V nominal @ 20amps for 100 watts output. 13.8V maximum
Weight	: 4kg (8lb 13oz)
Overall Size	: 315 × 142 × 105mm (12½ × 5½ × 4½")
Price	: £220 + VAT (£247.50 inc. VAT)

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

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QSL leads the field in supplying crystals world wide to major communications companies, broadcasting authorities and posts and telecommunications administrations. As a result we can supply the amateur with a high quality, competitively priced product over a frequency range from 10 kHz to 225 MHz. Get the power of the professionals in crystal supply behind you!

### 2 METRE STOCK CRYSTALS. Price £1.85 for one crystal. £1.75/crystal when two or more purchased.

	HC6/U 30pF TX	HC6/U 30pF TX	HC25/U 25pF and 30pF TX	HC25/U 25pF and 30pF TX	HC6 & 25/U SR RX	
R1	4.0277	8.0555	12.0833	14.9888	18.1250	44.9666
R2	4.0284	8.0569	12.0854	14.9916	18.1281	44.9750
R3	4.0291	8.0583	12.0875	14.9944	18.1312	44.9833
R4	4.0298	8.0597	12.0896	14.9972	18.1343	44.9916
R5	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R6	4.0312	8.0625	12.0937	15.0027	18.1406	45.0083
R7	4.0319	8.0639	12.0958	15.0055	18.1437	45.0166
S20	4.0326	8.0652	12.0979	15.0083	18.1468	45.0250
S21	4.0333	8.0666	12.1000	15.0111	18.1499	45.0333
S22	4.0340	8.0680	12.1021	15.0139	18.1530	45.0416
S23	4.0347	8.0694	12.1042	15.0167	18.1561	45.0500

**2 METRE MADE TO ORDER CRYSTALS at £2.50 (No discounts)**  
This service is designed specifically for those customers who require an odd S channel or Raenet crystal and covers most ex-commercial and Japanese equipments. TX4 to 4.06 MHz, 6 to 6.08 MHz, 8 to 8.12 MHz, 12 to 12.17 MHz and 18 to 18.25 MHz. RX 10.25 to 10.4 MHz, 11.1 to 11.28 MHz, 14.81 to 15.04 MHz, 44.43 to 45.1 MHz and 51.56 MHz to 52.24 MHz. Delivery 6 to 8 weeks. Holders HC6, HC18 or HC25/U. When ordering please give crystals load capacity and holder. Specify equipment in which crystals are to be used.

### 4 METRE CRYSTALS for 70.26 MHz in HC6/U at £2.25. TX 8.78250 MHz RX 6.7466 or 29.78 MHz in stock.

### 70cm CRYSTALS

Crystals held in stock for Pye Pocketfone PF1 for SU8 (433.2 MHz) and all UK repeater channels RB0, 2, 4, 6, 10 and 14 at £4.50 a pair or TX only £2.50, RX only £2.50. Also 8.0222 and 12.0333 in HC6/U for SU8 at £1.85. We can supply crystals in 6 to 8 weeks for any frequency within the 70cm amateur band for Pye, W15U, U10B, U450L and FDK Multi U11 at £2.50 per crystal.

**CONVERTER CRYSTALS** in HC18/U at £2.85. In stock.  
38.666, 42.000, 70.000, 96.000, 101.000, 105.666 and 116.000 MHz in stock.

**TONE BURST AND I.F. CRYSTALS** in HC18/U at £2.25. In stock.  
7.168 MHz for 1750 kHz and 10.245 MHz for 10.7 MHz IF's.

**FREQUENCY STANDARDS (8% VAT)** In stock.  
455 kHz, 1 MHz, 5 MHz, 10 MHz in HC6/U Price £2.75, 10.7 MHz in HC18/U Price £2.75, 100kHz in HC13/U Price £2.50 (special offer)

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### MADE TO ORDER CRYSTALS SINGLE UNIT PRICING

	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery A	Price and Delivery B
Fundamentals	1	200 (total)	10 to 19 999 kHz	—	£23.00
	2	200 (total)	20 to 29 999 kHz	—	£16.50
	3	200 (total)	30 to 99 999 kHz	—	£10.50
	4	200 (total)	100 to 999 999 kHz	—	£ 6.00
	5	50	1 000 to 1 499 MHz	£5.90	£ 5.50
	6	10	1 500 to 1 999 MHz	£3.90	£3.50
	7	10	2 000 to 2 999 MHz	£3.50	£3.10
	8	10	3 000 to 3 999 MHz	£3.40	£3.00
	9	10	4 000 to 20 999 MHz	£3.35	£2.95
	10	10	21 000 to 24 000 MHz	£3.70	£3.30
3rd OVT	11	10	21 000 to 59 999 MHz	£3.35	£2.95
5th OVT	12	10	60 000 to 104 999 MHz	£3.35	£2.95
	13	10	105 000 to 119 999 MHz	£5.00	£4.85
	14	20	120 000 to 149 999 MHz	—	£6.00
	15	20	150 000 to 225 000 MHz	—	£7.50

Unless otherwise requested fundamentals will be supplied with 30pF load capacity and overtones for series resonance operation.

**HOLDERS** — Please specify when ordering — 10 to 200 kHz HC13/U, 170 kHz to 170 MHz HC6 or HC33/U, 4 to 225 MHz, HC18 and HC25.

**DELIVERY** Column A 3 to 4 weeks, Column B 6 to 8 weeks.

**DISCOUNTS** 5% mixed frequency discount for 5 or more crystals at B delivery. Price on application for 10 or more crystals to same frequency and specification. Special rates for bulk purchase schemes including **FREE** supply of crystals used in UK repeaters.

**EMERGENCY SERVICE SURCHARGES** (to be added to A delivery prices). 4 working days £8, 6 working days £6, 8 working days £4, 13 working days £3 (maximum of 5 crystals on 4 day delivery).

**CRYSTAL SOCKETS** HC6/U and HC25/U 16p

**MINIMUM ORDER CHARGE** £1.50

**COMMERCIAL USERS.** Crystals can be supplied for MPU, industrial control etc in the range 4-21 MHz fundamental and 3rd OVT 18 to 60 MHz at £1.15 for 100 off. This is only a limited example of our capabilities. Please enquire about other quantities, frequency ranges, watch and sub-carrier crystals. We can supply crystals for marine and land mobile radio telephone use. Send for details.

**TERMS.** Cash with order, cheques and postal orders payable to QSL Ltd. All prices include postage to UK and Irish addresses.

### OVERSEAS DISTRIBUTORS.

West Germany, Austria and Benelux countries — SSB Electronic, Karl Arnold Str 23, 5860 Iserlohn, West Germany.

Denmark — Asbjorn Jorgensen, Aabrinken 1, Tapdrup, DK800, Denmark.

Portugal — Sorubal SARR, Rua General Pimenta de Castro, 15-81, Lisboa 5.

(Enquiries invited from companies in other countries).

DIODES/ZENERS				SOCKETS/BRIDGES				TRANSISTORS, LEDS, etc.			
1N914	100v	10mA	.05	8-pin	pcb	.20	ww	2N2222	NPN (2N2222 Plastic, 10)	.15	
1N4005	600v	1A	.08	14-pin	pcb	.20	ww	2N2907	PNP	.15	
1N4007	1000v	1A	.15	16-pin	pcb	.20	ww	2N3906	PNP (Plastic - Unmarked)	.10	
1N4148	75v	10mA	.05	18-pin	pcb	.25	ww	2N3904	NPN (Plastic - Unmarked)	.10	
1N4733	5.1v	1 W Zener	.25	22-pin	pcb	.35	ww	2N3054	NPN	.35	
1N753A	6.2v	500 mW Zener	.25	24-pin	pcb	.35	ww	2N3055	NPN 15A 60v	.50	
1N758A	10v	"	.25	28-pin	pcb	.45	ww	T1P125	PNP Darlington	.35	
1N759A	12v	"	.25	40-pin	pcb	.50	ww	LED Green, Red, Clear, Yellow		.15	
1N5243	13v	"	.25	Molex pins	.01	To-3 Sockets	.25	D.L. 747	7 seg 5/8" High com-anode	1.95	
1N5244B	14v	"	.25	2 Amp Bridge	100-prv	.95		MAN72	7 seg com-anode (Red)	1.25	
1N5245B	15v	"	.25	25 Amp Bridge	200-prv	1.95		MAN3610	7 seg com-anode (Orange)	1.25	
								MAN82A	7 seg com-anode (Yellow)	1.25	
								MAN74A	7 seg com-cathode (Red)	1.50	
								FND359	7 seg com-cathode (Red)	1.25	

C MOS				- T T L -							
4000	.15	7400	.10	7473	.25	74176	.85	74H72	.35	74S133	.40
4001	.15	7401	.15	7474	.30	74180	.55	74H101	.75	74S140	.55
4002	.20	7402	.15	7475	.35	74181	2.25	74H103	.55	74S151	.30
4004	3.95	7403	.15	7476	.40	74182	.75	74H106	.95	74S153	.35
4006	.95	7404	.10	7480	.55	74190	1.25			74S157	.75
4007	.20	7405	.25	7481	.75	74191	.95	74L00	.25	74S158	.30
4008	.75	7406	.25	7483	.75	74192	.75	74L02	.20	74S194	1.05
4009	.35	7407	.55	7485	.55	74193	.85	74L03	.25	74S257 (8123)	1.05
4010	.35	7408	.15	7486	.25	74194	.95	74L04	.30		
4011	.20	7409	.15	7489	1.05	74195	.95	74L10	.20	74LS00	.20
4012	.20	7410	.15	7490	.45	74196	.95	74L20	.35	74LS01	.20
4013	.40	7411	.25	7491	.70	74197	.95	74L30	.45	74LS02	.20
4014	.75	7412	.25	7492	.45	74198	1.45	74L47	1.95	74LS04	.20
4015	.75	7413	.25	7493	.35	74221	1.00	74L51	.45	74LS05	.25
4016	.35	7414	.75	7494	.75	74367	.75	74L55	.65	74LS08	.25
4017	.75	7416	.25	7495	.60			74L72	.45	74LS09	.25
4018	.75	7417	.40	7496	.80	75108A	.35	74L73	.40	74LS10	.25
4019	.35	7420	.15	74100	1.15	75491	.50	74L74	.45	74LS11	.25
4020	.85	7426	.25	74107	.25	75492	.50	74L75	.55	74LS20	.20
4021	.75	7427	.25	74121	.35			74L93	.55	74LS21	.25
4022	.75	7430	.15	74122	.55			74L123	.85	74LS22	.25
4023	.20	7432	.20	74123	.35	74H00	.15			74LS32	.25
4024	.75	7437	.20	74125	.45	74H01	.20	74S00	.35	74LS37	.25
4025	.20	7438	.20	74126	.35	74H04	.20	74S02	.35	74LS38	.35
4026	1.95	7440	.20	74132	.75	74H05	.20	74S03	.25	74LS40	.30
4027	.35	7441	1.15	74141	.90	74H08	.35	74S04	.25	74LS42	.65
4028	.75	7442	.45	74150	.85	74H10	.35	74S05	.35	74LS51	.35
4030	.35	7443	.45	74151	.65	74H11	.25	74S08	.35	74LS74	.35
4033	1.50	7444	.45	74153	.75	74H15	.45	74S10	.35	74LS86	.35
4034	2.45	7445	.65	74154	.95	74H20	.25	74S11	.35	74LS90	.55
4035	.75	7446	.70	74156	.70	74H21	.25	74S20	.25	74LS93	.55
4040	.75	7447	.70	74157	.65	74H22	.40	74S40	.20	74LS107	.40
4041	.69	7448	.50	74161	.55	74H30	.20	74S50	.20	74LS123	1.00
4042	.65	7450	.25	74163	.85	74H40	.25	74S51	.25	74LS151	.75
4043	.50	7451	.25	74164	.60	74H50	.25	74S64	.15	74LS153	.75
4044	.65	7453	.20	74165	1.10	74H51	.25	74S74	.35	74LS157	.75
4046	1.25	7454	.25	74166	1.25	74H52	.15	74S112	.60	74LS164	1.00
4049	.45	7460	.40	74175	.80	74H53J	.25	74S114	.65	74LS193	.95
4050	.45	7470	.45			74H55	.20			74LS367	.75
4066	.55	7472	.40							74LS368	.65

4069/74 C04	.25	MCT2	.95	LINEARS, REGULATORS, etc.				LM723	.40
4071	.25	8038	3.95	LM320T5	1.65	LM340K15	1.25	LM725N	2.50
4081	.30	LM201	.75	LM320T12	1.65	LM340K18	1.25	LM739	1.50
4082	.30	LM301	.45	LM320T15	1.65	LM340K24	1.25	LM741 (8-14)	.25
MC 14409	14.50	LM308 (Mini)	.95	LM324N	1.25	78L05	.75	LM747	1.10
MC 14419	4.85	LM309H	.65	LM339	.75	78L12	.75	LM1307	1.25
4511	.95	LM309K (340K-5)	.85	7805 (340T5)	.95	78L15	.75	LM1458	.65
74C151	1.90	LM310	.85	LM340T12	.95	78M05	.75	LM3900	.50
		LM311D (Mini)	.75	LM340T15	.95	LM373	2.95	LM75451	.65
		LM318 (Mini)	1.75	LM340T18	.95	LM380 (8-14 PIN)	.95	NE555	.35
		LM320K5 (7905)	.65	LM340T24	.95	LM709 (8, 14 PIN)	.25	NE556	.85
		LM320K12	1.65	LM340K12	1.25	LM711	.45	NE565	.95
								NE566	1.25
								NE567	.95

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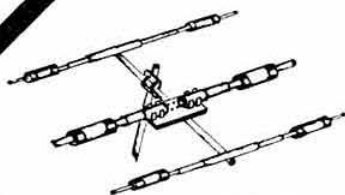
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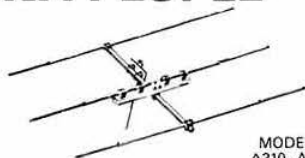
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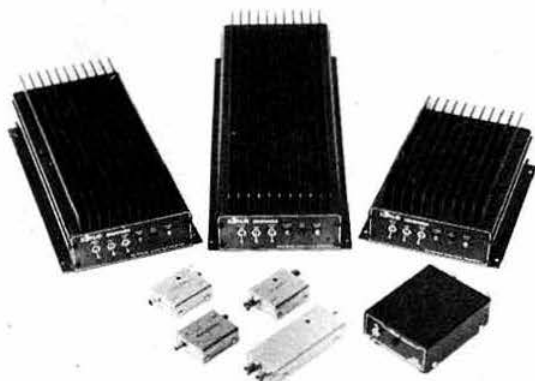


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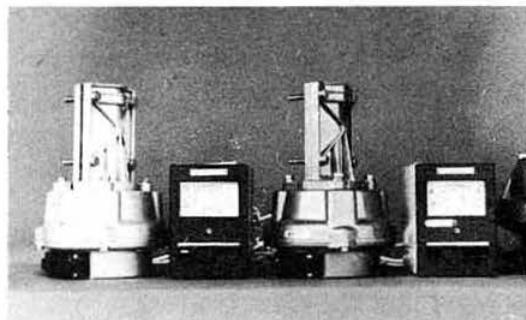
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CA3123E	AM tuner IC 1.40
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TCA740	DC tone control 3.50
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TDA1029	DC mode switch 3.50
Radio and Tuner modules	
We cannot really list all the details we would like to here - but with advent of the new mark 3 tuner system, the Dorchester and matching AF units, Ambit offers you the widest choice ever, plus hardware and styling that matches the very high standards we have set in this new range.	

TERMS etc: CWO please, VAT on Ambit items is generally 12%, except where marked (\*). Catalogue Part 1:45p, part 2:50p all inclusive. Please 25p per order, carriage on tuner kits £3. Phone Brentwood (0277) 216029/227060 9am-7pm. Callers welcome inc. Saturdays.

## At last, DIY Hi Fi which looks as if it isn't.

That's not to say it doesn't look like HiFi - just that it doesn't look like the usual sort of thing you have come to associate with DIY HiFi. The Mk3 outstrips and outperforms all British made HiFi tuners, and most imported ones too. Certainly at the price, there isn't one near it. But more than that, it looks superb. A small pic here would be an insult, so send an SAE for details on the kit that looks as if it isn't. It's something else.....

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- Hitachi VMOS power fets - characterized especially for HiFi applications
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## The PW Dorchester-LW,MW,SW,& FM stereo tuner

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The Dorchester has been described in PW Dec., Jan. and Feb. issues - but for those of you who may have missed it - it is an All Band broadcast tuner, covering LW/MW/SW and FM stereo in 6 switched ranges. Construction is very straightforward, with all the switching being PCB mounted - and the revolutionary TDA1090 IC used for AM/FM. The electronics for the radio section of the Dorchester remain unchanged at £33.00, with 12.5% VAT. The hardware package, of case, meter, PSU now costs £33.00 + 8% with the MA1023 available for an extra £5 only. For the fully digital version, with Ambit DFM1, the price is £56.50 + 8% VAT.

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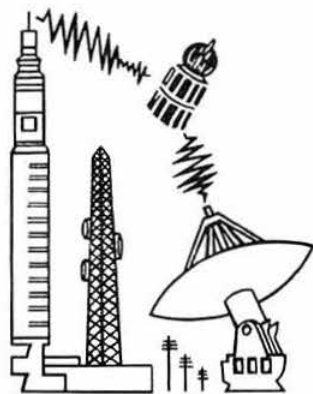
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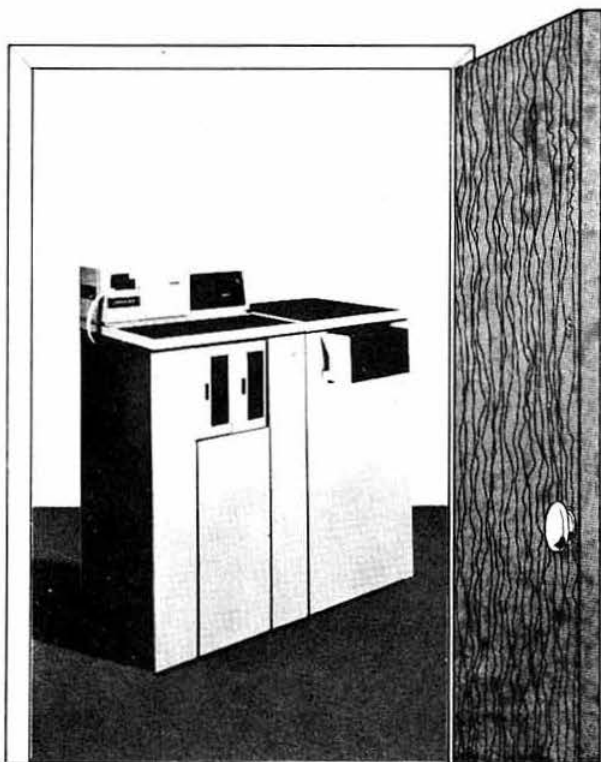
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